CARDIFF UNIVERSITY – SCHOOL OF HISTORY, ARCHAEOLOGY AND RELIGION

THE CORRELATION OF TECHNOLOGICAL AND STYLISTIC CHANGES, AND SOCIETY, IN THE PRODUCTION OF ATTIC GEOMETRIC AND ORIENTALISING FINEWARES

Ph.D. Thesis in Archaeology
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To Alexandra Coucouzeli, my first mentor in archaeology.

THESIS SUMMARY

This thesis investigates stylistic and technological changes in the production of Attic Geometric and Orientalising finewares (c. 900 – 620 BC), and their relationship with society. The transition from the abstract motifs of the Early and Middle Geometric styles to the figurative representations of the Late Geometric and Orientalising styles are examined in conjunction with the technological advances in the ceramic *chaîne opératoire*, and the social changes that characterise these periods.

According to previous studies, the social developments in the Athenian *polis* between the 9th and 7th centuries BC left traces in the archaeological record suggesting competition among different elite groups. This social competition was expressed through funerary rites, which were subject to continuous changes all across the Attic Early Iron Age. The consumption of decorated finewares in such rites and other important social occasions demarcated the social position of the consumers/users of fine decorated pottery, while ceramic styles adapted to accommodate the changing nature of social demands. An important manifestation of stylistic change was the dominance of the figurative style in pottery decoration during the beginning of the Late Geometric period (c.760 BC).

The original hypothesis of this research project is based on the fact that decoration was only part of the total production sequence of Attic Geometric and Orientalising pottery; therefore, it could be likely that the social changes noted during these periods triggered broader advances in ceramic technologies employed for the production of such finewares. This thesis moves away from traditional stylistic approaches and employs a technological approach based on the *chaîne opératoire* theory in order to explore the behaviour of Attic Early Iron Age potters and their response towards changing consumption demands during an era of significant social transformations.

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ABBREVIATIONS

Archaeological Schools and Institutions (in alphabetical order):

ASCSA = The American School of Classical Studies at Athens

BM = The British Museum

BSA = The British School at Athens

DAI = Deutsches Archäologisches Institut

Abbreviations related to macroscopic and microscopic ceramic analyses (in alphabetical order):

e.f. = Extremely Fine (fabric)

HS = Hand Specimen Examination

PPL = Plain Polarised Light

SEM/EDX = Scanning Electron Microscopy coupled with Energy Dispersive X-ray Spectroscopy

TCF = Textural Concentration Features

TSA = Thin Section Analysis

XPL = Cross Polarised Light

Dating and stylistic abbreviations (in chronological order):

SM = Submycenaean era or style

PG = Protogeometric era or style

- EPG = Early Protogeometric period or style
- MPG = Middle Protogeometric period or style
- LPG = Late Protogeometric period or style

G = Geometric era or style

- EG = Early Geometric period or style
- MG = Middle Geometric period or style
- LG = Late Geometric period or style
- SG = Subgeometric style

PA = Protoattic period or style

- EPA = Early Protoattic period or style
- MPA = Middle Protoattic period or style

LPA	=	Late Protoattic period or style
BF	=	Black-Figure style
RF	=	Red-Figure style

Abbreviations used in charts (in alphabetical order):

Amph.	=	Amphora/e
B-H	=	Belly-handled
BR.	=	Deriving from burial context
c.	=	Circa
Fr.	=	Fragment
Frs	=	Fragments
H/H	=	High-handled
H/L	=	High-lipped
L/H	=	Low-handled
Non-BR	=	Deriving from non-burial context
N-H	=	Neck-handled
N/A	=	Not Applicable
N/L	=	Neck-less
S-H	=	Shoulder-handled
SOS	=	Abbreviation for specific transport amphora class
STR/H	=	Stirrup-handled

CHAPTER 1: INTRODUCTION

This thesis examines the correlation between technological and stylistic changes, and society, in the production of Attic Geometric and Orientalising finewares. The present approach targets some core technological aspects of Attic Geometric and Orientalising ceramic *chaîne opératoires*, which are discussed in conjunction with the broader evolution of ceramic styles during the 9th, 8th and 7th centuries BC, and the social changes connected to this stylistic evolution.

So far, the passing from the abstract motifs of the Early and Middle Geometric periods to the figurative decoration of the Late Geometric and Orientalising periods has been examined in a series of publications related to styles and chronology (e.g. Cook 1960; Coldstream 1968); attribution and connoisseurship (e.g. Cook 1935; Davison 1961); art and its continuity with the Bronze Age (e.g. Böhlau 1887; Schweitzer 1969); art and its relationship with popular myths and/or epic poetry (e.g. Hurwit 1993; 2011); art and Early Iron Age contemporary reality (e.g. Boardman 1983); and finally, art and visual narration (Benson 1970; Ahlberg 1971). Few studies have investigated this stylistic transition in its broader archaeological context and in relation to social changes of the Attic Early Iron Age, such as demographic expansion (e.g. Snodgrass 1977; 1980), political reformation (e.g. Morris 1987; Osborne 1989) and gender (e.g. Whitley 1991; 2000; Langdon 2008). Previous research has argued that the production of Attic decorated finewares was subject to various social demands connected with the consumption of specific ceramic styles in funerary rites (Whitley 1991). Furthermore, changes in the decoration of such vessels and the passing from aniconic to figurative themes reflected transformations within the society[1] connected with the ideology of the rising *polis*[2].

Despite the large number of publications on ceramic styles, art and iconography, little effort has been put in understanding the importance of ceramic technologies and ceramic *chaîne opératoires*. In earlier studies, Desborough (1952) discussed part of the decorative technologies in the production of such vases, while

[1] For example Snodgrass 1971; 2000; 2006; Carter 1972; Coldstream 1977; Hurwit 1985; Osborne 1988; 1989; 1996; Boardman 1998; Langdon 2006; 2008.
[2] For example Snodgrass 1971; 1980; Coldstream 1977; Langdon 2006; 2008.

R.M Cook (1960; 1997) described the whole operational sequence for Attic decorated finewares based on literary sources, iconographic evidence and ethnographic parallels. In more recent times, John Papadopoulos (2003) has investigated Athenian Early Iron Age ceramic production in relation to its technical features and geographical distribution. Still, the relationship between social and technological changes, and fineware production during this time is unexplored. This thesis aims to address the above relationship.

1.1 RESEARCH QUESTIONS AND AIMS

The background of this research is formed by three major publications that discuss social transformations in Attic Early Iron Age society and the significance of stylistic change or adaptation as a response to consumption demands. The study by Ian Morris (1987) is not directly relevant to the consumption of ceramics; however, it demonstrates how social and political changes manifested in the fluctuations of the archaeological record in Early Iron Age Attica. Morris's (1987) study is followed by James Whitley (1991), who investigates social changes through the fluctuation of burial offerings in Attic Early Iron Age funerary rites. Whitley (1991, 11-12) is the first to suggest that the consumption of ceramic styles was not only related to the social occasions of the buriers, but also the entire production of such vessels was governed by a strong social logic, dictated by specific consumption demands across time. Finally, the study by Susan Langdon (2008) on Attic Late Geometric iconography, which suggests that the decoration of such vessels was not only subject to a social logic, but also the consumption of such pottery aimed in the enforcement of distinct gender ideologies. As it will be explained in Chapters 2 and 8, these three scholars neither agree on what consists of social change in Early Iron Age Attica, nor support the same ideas regarding when and how this happened; however, they all point towards the same direction: fine decorated pottery played important role in the social transitions of the Attic Early Iron Age, while ceramic production and consumption were parts of the same social process that led to the rise of the Athenian *Polis* (as put by Snodgrass 1977).

According to the above, if the social changes noted in the archaeological record were indeed responsible for stylistic changes in Attic fineware production during the Geometric and Orientalising periods, then there are two new questions that need to be addressed: Firstly, were the same social changes responsible for technological advances in the ceramic production sequence? And secondly, what was the potters' response to these social changes?

Answering both questions is not easy. As it will be explained in Chapter 3, the basis of any discussion on Attic Geometric and Orientalising pottery production has been defined on a purely stylistic basis, while workshop practice has only been examined through connoisseurship (e.g. Davison 1961; Coldstream 1968). Answering both questions requires a step away from traditional approaches that tend to equate ceramic decoration with ceramic production, or in other words, to equate the work of painters with that of potters[3]. Even though the present study examines the work of potters as separate and independent compared to that of painters, this does not necessarily mean that during the Attic Early Iron Age such artisans operated independently within the ceramic *chaîne opératoire*. In fact, during some specific periods and in some workshops, such artisans might have been the same people. Still, for the needs of the technological approach followed in the current research, the work of potters and painters is examined separately. It is not the aim of this approach to prove the division of labour between the two artisans, but to elucidate the behaviour of the artisan(s) during two separate yet subsequent stages of the *chaîne opératoire*.

1.2 CERAMIC MATERIAL, CHRONOLOGY AND SITES

This study focuses solely on Geometric and Orientalising finewares. The term describes elaborately decorated vessels, produced from fine-grained clays on a fast-spinning wheel, and fired at high temperatures with advanced kiln control methods. The material is divided across three broader ware groups according to vessel sizes. These are: large closed ceramic containers, medium sized pouring vessels and small drinking pots. The total material that is analysed macroscopically

[3] In a recent study, Patricia Crown (2007, 677) has commented: "Archaeologists often implicitly assume that individual ceramic objects were the work of a single individual artisan".

numbers 391 ceramic artefacts, including both sherds and complete vessels. A detailed typological breakdown of this material is presented in Chapter 3.2 and a full artefact catalogue follows in Appendix 1.

The studied material dates mainly in the Geometric period and few Orientalising samples have been used to examine ceramic technologies during the transition between the 8th and early 7th centuries BC. Such ceramics belong primarily to the Early Protoattic (EPA) and Sub-Geometric (SG) styles, while others that cannot be securely dated are recorded as broadly Protoattic (PA). This thesis follows the chronological divisions established by Nicolas Coldstream (1968, 330) (Figure 1).

CHRONOLOGICAL SYSTEM BY COLDSTREAM (1968)			
MAJOR PERIODS	**DIVISIONS**	**DATES Circa (BC)**	**ABBREVIATIONS**
Early Geometric		900-850	EG
	Early Geometric I	900-875	EGI
	Early Geometric II	875-850	EGII
Middle Geometric		850-760	MG
	Middle Geometric I	850-800	MGI
	Middle Geometric II	800-760	MGII
Late Geometric		760-700	LG
	Late Geometric Ia	760-750	LGIa
	Late Geometric Ib	750-735	LGIb
	Late Geometric IIa	735-720	LGIIa
	Late Geometric IIb	720-700	LGIIb
Protoattic		700-620	PA
	Early Protoattic	700-675	EPA + SG
	Middle Protoattic	675-640	MPA
	Late Protoattic	640-620	LPA

Figure 1: Chronological conventions by Coldstream (1968, 330).

According to the title of the thesis, focus of this study is Attic Geometric and Orientalising fineware production; still, it must be clarified that the majority of the material analysed in the thesis comes from Athens. The broader term 'Attic' was decided because a small portion of the studied material, which comes from museum collections, relates to unknown contexts that have been securely identified by previous scholars as broadly Attic, yet it is not entirely certain if they are Athenian. The ceramic artefacts discussed in this thesis originate from five sources:

1. The Geometric and Orientalising contexts from the Athenian *Agora*. This is the later Classical Athenian *Agora* (see Figure 2) and not the Old Archaic

Agora that used to be at the South East foot of the *Acropolis* in the modern area of Plaka (see Schnurr 1995, 131-8; Papadopoulos 2003, 285; Schmaltz 2006). The *Agora* assemblage is located in the study collections of the American School of Classical Studies at Athens (ASCSA), which also granted access to this material. A research permit was granted by the A′ *Ephoreia* of Prehistoric and Classical Antiquities at Athens (permit number: A′ ΕΚΠΑ/15415/29-12-2011).

2. The Geometric graves at the *Kerameikos* cemetery in central Athens. This assemblage is located at the *Kerameikos* archaeological site and access was granted jointly by the German Archaeological Institute at Athens (Deutsches Archäologisches Institut, Abteilung Athen) and the director of the *Kerameikos* Museum. A research permit for only a portion of this material was granted by the Γ′ *Ephoreia* of Prehistoric and Classical Antiquities at Athens (permit number: Γ′ ΕΚΠΑ/161567/69127/6506/24-6-2014).

3. The Geometric and Orientalising material from the *Kynosarges* burials in central-east Athens, part of which is now located at the study collections of the British School at Athens (BSA). According to Coldstream (2003b, 331), the exact location of this site is near today's intersection between *Odos Vouliagmenis* and *Odos Vourvachi* (see Figure 2). The material was excavated by the School's third director, Cecil Harcourt Smith, in spring 1896 and only portion of it survives. Some selected artefacts were first published by Droop (1905) and a full publication followed by Nicolas Coldstream (2003b). Despite that this material comes from burial deposits, its exact contexts are unknown.

4. The Attic Geometric finewares from the collections of the Museum of the British School at Athens (BSA). This material derives from private donations to the School and its exact context of recovery is unknown. All artefacts have been identified as broadly Attic, dated and published by Nicolas Coldstream (2003b) in the same volume as the *Kynosarges* pottery. A study permit and access to both assemblages were granted from the Director of the British School at Athens.

5. The Geometric collections of the British Museum in London. This material also derives from unknown contexts and it has been studied, dated and characterised as broadly Attic by Nicolas Coldstream (2010). Even though part of this assemblage was accessed for preliminary study in 2011 with the courtesy of

the Department of Greece and Rome of the British Museum, the majority of ceramic artefacts were studied through Colstream's (2010) publication.

Figure 2 illustrates the locations of the three archaeological sites that produced artefacts with known contexts and pottery of known Athenian provenance on a map of modern central Athens. The distribution of finds from all sites is discussed in detail in Section 3.2. A catalogue of all artefacts, including photographs, chronology, provenance, recovery contexts, condition and relevant publications, is presented in Appendix 1.

Figure 2: Map of modern Central Athens with sites studied in this thesis.

Despite the larger size and better preservation of pottery from *Kerameikos*, primary focus of this research project is the material from the Athenian *Agora*. This choice was decided for two reasons: firstly, pottery from the *Agora* derives primarily from well deposits and only small portion of this material comes from graves. By contrast to a strictly burial site such as *Kerameikos*, the ceramic assemblages from the *Agora* represent broader functions (domestic and ceremonial) and their production was most likely not restricted to funerary consumption (also see Shear 1993). Secondly, Papadopoulos (2003) suggests that during the Early Iron Age the *Agora* was a pottery production site. Many artefacts found in the *Agora* wells were discarded debris of ceramic workshops, which once operated in the broader region; therefore, pottery from the Athenian *Agora* is more suitable for technological analysis of Attic Geometric and Orientalising *chaîne opératoires* compared to any other site.

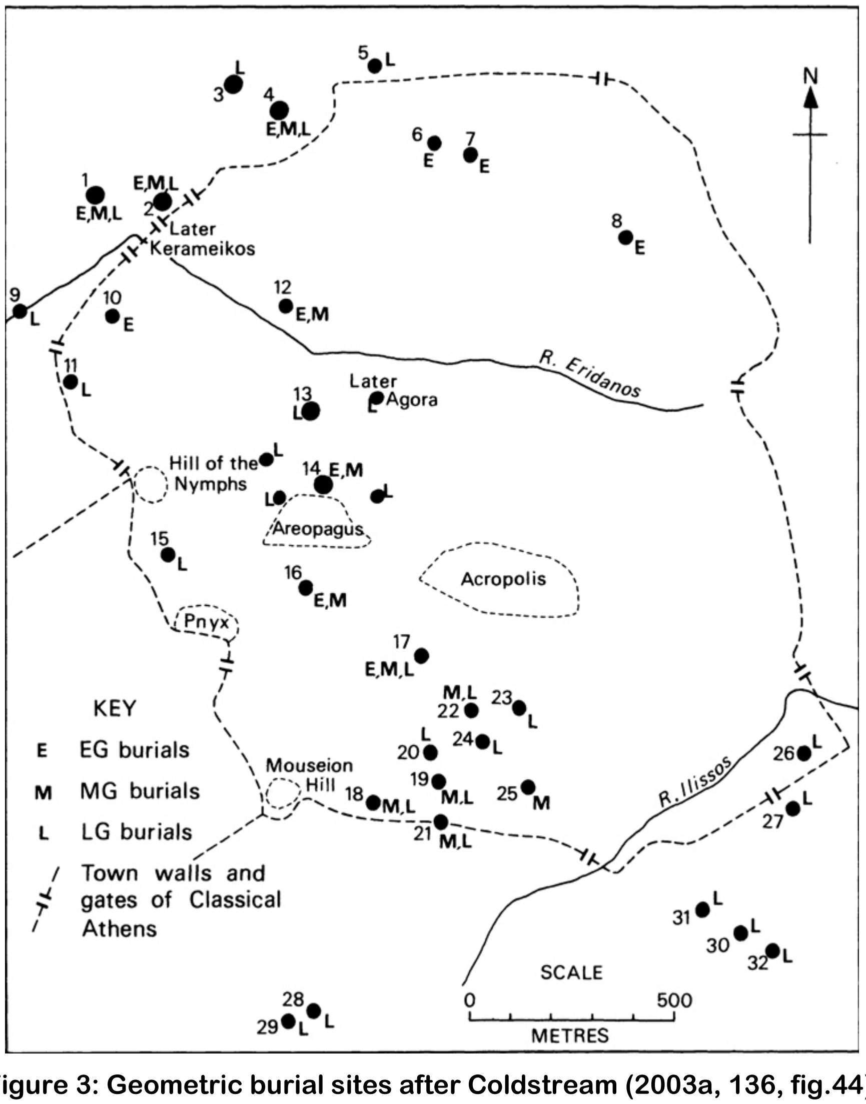

Figure 3: Geometric burial sites after Coldstream (2003a, 136, fig.44).

For better understanding of the geographical distribution of the sites investigated in this thesis, Figure 3 presents a plan of Classical Athens surrounded by its 5th century BC defence wall, originally published by Nicolas Coldstream (2003a, 136, fig.44). On this map, Coldstream numbers all Early, Middle and Late Geometric burials that have produced fine decorated pottery. The locations investigated in this thesis are: (1) and (2) from the *Kerameikos* cemetery, located outside the *Dipylon* gate and the later Classical walls; (13) from the later Classical Athenian *Agora,* the material of which relates to burial and well deposits; (14) from the *Areopagus* hill, the material of which is limited and related to burials; and (32) from the *Kynosarges* graves.

1.3 STRUCTURE OF CHAPTERS

After this brief introduction (Chapter 1), the remaining thesis is divided in seven chapters. Chapter 2 discusses the history of the study of Early Iron Age pottery, which begins in the middle of the 19th century. Given the vast bibliography written on this subject, Chapter 2 covers the most important arguments on Attic Early Iron Age fineware production, also in relation to the aims of this thesis. The literature review discusses previous approaches on ceramic typologies, decorative styles, chronology, iconography, art, connoisseurship, and archaeological approaches in the investigation of Attic Early Iron Age society. The chapter includes a separate section on archaeometric studies and the investigation of Attic Early Iron Age ceramic technologies, and a final section that discusses the problems of previous approaches.

Chapter 3 is divided in two major sections. Section 3.1 introduces the theoretical concept of the *chaîne opératoire*, and explains some core aspects of this theory that will be employed in following chapters. The most important of these aspects are: technological choice, conceptualisation and partonomy of ceramic vessels (*sensu* Sillar & Tite 2005, 5; Van der Leeuw 1994, 136-7); artefact variability (*sensu* Schiffer & Skibo 1997); and, Behavioural Chain Analysis (*sensu* Schiffer 1995, 57). Furthermore, this section discusses our current knowledge and understanding of Attic Early Iron Age *chaîne opératoires* based on the existing archaeological, ethnological and literary evidence. Section 3.2 discusses the methodological details of this study. Primarily, it explains the four areas of macroscopic analyses that will follow later on, focusing on metrical features, proportions, fabrics and decorative technologies. Secondarily, it discusses the ceramic material of this study according to ware groups, shapes, sites and recovery contexts.

Chapters 4, 5 and 6 are analytical chapters discussing ceramic finewares divided in three broader ware groups respectively: large closed ceramic containers (mainly amphorae and *hydriae*), medium sized pouring vessels (mainly trefoil *oinochoai* and pitchers) and small drinking vessels (*kantharoi* and *skyphoi*). Vessels belonging to these three broader fineware groups exhibit similarities in relation to their function, size, assembling features and sequence of manufacture; therefore, they consist of three different *chaîne opératoires* that are examined separately. Each of the three chapters follows the same structure based on the four areas of macroscopic analysis explained in Chapter 3. Aim of these chapters is to point out the presence or absence of technological traditions, together with the introduction of innovations in Attic Geometric and Orientalising fineware production.

Chapter 7 is an independent chapter based on a small archaeometric pilot study on Athenian finewares from the *Agora*, which supplements the study of fabrics and decorative technologies presented in Chapters 4, 5 and 6. This microscopic project discusses fabric groups, provenance, tempering practices and chemical compositions of pastes and paints by a combination of three techniques: Hand Specimen Examination, Thin Section Analysis (TSA) and Scanning Electron Microscopy coupled with Energy Dispersive X-ray Spectroscopy (SEM/EDX).

Chapter 8 presents the final discussion of this study and is divided in three sections. Section 8.1 answers the questions set in this introductory chapter and discusses the general conclusions of this research in relation to the social changes noted in previous studies by Morris (1987), Whitley (1991) and Langdon (2008). Section 8.2 discusses modes of production, labour division and the number of Attic Geometric and Orientalising workshops in relation to the studies by Davison (1961) and Coldstream (1968). Finally, Section 8.3 points out the general contribution of this research project; it discusses its limitations and proposes ideas for future research.

The thesis is supplemented by two appendices at the end of this volume. The first appendix presents a catalogue of all ceramic artefacts analysed macroscopically in Chapters 4, 5 and 6, divided by site, typology and chronology. The second appendix presents the analytical results for each sample analysed under Scanning Electron Microscopy in Chapter 7 and records the percentages of different oxide concentrations identified in these samples.

1.4 THE ARGUMENT

This thesis introduces some aspects of the *chaîne opératoire* theory in the practical analysis of archaeological ceramics in order to explore production and consumption patterns in the ancient world. The *chaîne opératoire* approach is popular in the study of lithic artefacts, while ceramic *chaîne opératoires* have been primarily studied through ethnographic research. Despite the problems of such approaches, this thesis demonstrates that archaeologists can unwind the operational chain backwards and understand the behaviour of potters, also in relation to the society that consumed their products.

Attic Early Iron Age finewares are a useful case study for a number of reasons. Firstly, such pottery dates in a period when literary sources and iconographic evidence do not refer to the actual sequence of production, which is -by contrast- the case during later periods (e.g. Black-Figure and Red-Figure styles). Secondly, archaeological evidence on Attic Geometric and Orientalising *chaîne opératoires* are scarce and not always clear. Thirdly, our current understanding on Attic Early Iron Age workshop practice has been based on iconographic analysis and connoisseurship, which targets the work of painters instead of potters. In that sense, a study of ceramic technologies based on the *chaîne opératoire* approach is more likely to function independently and elucidate pottery production patterns that have not been noted in previous studies. Furthermore, the results of such analysis can be combined with existing archaeological evidence in order to explore the relationship between fineware production and consumption during periods of noted social changes.

The practical analysis conducted in the following chapters targets three broader ware groups that are examined separately. These *chaîne opératoires* characterise the production of large ceramic containers, medium sized pouring vessels and small drinking vessels. The main focus of analysis is the shape of such pots, which is examined in relation to the metrical features of ceramic vessels (e.g. height, rim and base diameter) and the proportional relationships with each other. Secondarily, the analysis targets fabrics and decorative characteristics of the same pots.

This thesis argues that despite some adaptation of fineware production during two periods of significant social change (between EGII and MGI, and after LGII), the broader *chaîne opératoire* of Attic Geometric finewares was highly standardised, practised by specialised potters, and regulated by long-lasting technological traditions. The strongest of these traditions related to the presence of archetypal forms in the conceptualisation (*sensu* Van der Leeuw 1994, 136-7) of such vessels and the use of a single fabric across three centuries for the production of finewares with different functions and performance characteristics. Furthermore, standardisation and specialisation related to specific ceramic shapes: large closed ceramic containers and medium sized pouring vessels were the most standardised of all products. Their manufacture was practised by a small number of potters, most likely nucleated in a single production site in the later Classical Athenian *Agora*. The production of *skyphoi*, however, was a paradox: it was probably scattered in different locations and was regulated by individual workshops, the artisans of which enjoyed a higher degree of artistic freedom compared to their colleagues producing other fineware classes.

Finally, this thesis suggests that the broader *chaîne opératoire* of Attic Geometric finewares was either regulated by specialised labour division, or it was subject to a strict notion of hierarchy in the apprenticeship stages of potters and painters. It appears likely that such artisans moved gradually from the production of simple to the production of complex vessel shapes. The numbers of Attic Geometric workshops and potters suggested by previous studies based on iconography and connoisseurship are relatively high and must be revised in the future.

CHAPTER 2: THE HISTORY OF THE STUDY OF ATTIC EARLY IRON AGE FINEWARES

The material culture of the Greek (and more specifically Attic) Early Iron Age has been discussed in a large corpus of publications, ranging from excavation reports (e.g. Kraiker *et al*., 1939; Kübler 1943; 1954); analyses of ceramic typologies (e.g. Desborough 1952; Coldstream 1968); analyses of cemeteries and studies on demography (e.g. Snodgrass 1977; Morris 1987; Whitley 1991); studies of residential areas, buildings, cult and religious sites (e.g. Mazarakis Ainian 1997a; 2007; Whitley 1994a; 1995; Coucouzeli 2007); land surveys (e.g. Bintliff 2013); and finally, volumes on the entire Greek Dark Age (Snodgrass 1971; Desborough 1974; Coldstream 1977; Dickinson 2006). Given the vast bibliography on the subject, this chapter does not cover all previous work. It only provides a brief overview of the work directly related to Attic Early Iron Age decorated finewares, with particular interest in Athenian production and consumption.

This chapter is divided in three sections. The first section (2.1) discusses archaeological and iconographic studies on Attic Early Iron Age pottery and the broader arguments regarding Attic Early Iron Age society. It begins with the first studies of the 19th and early 20th century, and moves on to chronology, art, iconography and connoisseurship. Such discussions are not directly related to the scope of this thesis; however, they describe the course of the study of Attic Early Iron Age finewares and the broader scholarly interest until today. The second section (2.2) presents an overview of the scientific approaches on Geometric and Orientalising ceramic technologies. Technological studies form a separate scientific field, and fall under the broader umbrella of archaeometry. The final section of this chapter (2.3) discusses current problems and offers personal critique to previous archaeological and scientific approaches.

2.1 ARCHAEOLOGICAL AND ICONOGRAPHIC STUDIES ON ATTIC EARLY IRON AGE FINEWARES

This section presents some major arguments with regard to archaeological and iconographic studies on Attic Early Iron Age finewares. Due to the variety of such approaches, this section is divided in seven sub-sections discussing arguments according to different areas of interest: 1. the early scholarship of the 19th and early 20th century; 2. the use of ceramic styles and context synchronisms in dating the Attic Early Iron Age; 3. the use of scientific dating methods; 4. iconographic studies; 5. connoisseurship; 6. the 'Mycenaeans versus Dorians' debate; and 7. archaeological studies on Attic Early Iron Age society.

2.1.1 The scholars of the 19th and early 20th century

The discovery of pottery in the area of *Kerameikos* and the '*Dipylon'* cemetery in Athens during the late 19th century drew archaeological attention on Attic Early Iron Age finewares for the very first time (Knigge 1988, 1991). One of the most important ceramic finds from the early excavations was the monumental belly-handled amphora Athens NM804 (Brückner & Pernice 1893, 104), which still remains one of the most famous Geometric pieces. Before that time, Early Iron Age decorated vases such as those of the Elgin collection (see Coldstream 2010) were already known and exhibited in various European museums; however, such vessels were neither appreciated as sources of archaeological information, nor examined with focus on their archaeological context.

The first systematic analysis of the Geometric style was by Alexander Conze (1870; 1873), who identified it as independent and dated it towards the end of the second millennium BC. Under the influence of Semper (1860; 1863), Conze (1870) suggested that the Geometric style originated from primitive Northern European styles, which arrived in the southern Balkans by Indo-German invaders. Hirschfeld (1872) introduced the term *Dipylon* pottery for decorated burial amphorae and argued against Conze that the Geometric style was to be placed later than the end of the second millennium BC. Following Conze, Wolfgang Helbig (in Helbig & Conze 1875) supported the idea that the rough and incised Geometric pots had been developed after Indo-Germanic influence; however, the fine painted Geometric pottery was influenced by the Phoenicians and the East. By contrast, Furtwängler & Loeschcke (1876) supported the resemblance between Geometric and Mycenaean styles, and argued that the Geometric style appeared together with invading Dorians.

Böhlau (1887) diversified Geometric and Protoattic styles and set their chronological limit towards the end of the 8th century BC, a time when Athens was the most dominant production centre. By contrast to the Phoenician influence suggested by Helbig & Conze (1875), Böhlau (1887) suggested that the Protoattic style was not only local, but it also derived from the preceding Athenian Geometric style (also see Stais & Wolters 1891; Brückner & Pernice 1893). Furthermore, he saw that the Geometric style had survived from the Middle Helladic period throughout the Mycenaean era (Böhlau 1895). Sam Wide (1896; 1899) noted this relationship between some Attic Geometric and Mycenaean vases; however, he rejected the idea of direct continuity and linear evolution of Attic pottery, and saw relationships with other production areas. In 1903, Hans Dragendorff noted the importance of Euboea as a transmission centre (in Hiller von Gärtringer *et al*. 1903).

Frederik Poulsen (1905) supported the linear continuity between Attic Geometric and Mycenaean styles; however, the chronological gap between those two was still evident until Bernard Schweitzer (1917; 1918) introduced the first definition of the Protogeometric style (for chronology see Section 2.1.2). Schweitzer argued that the Protogeometric style stood between the Mycenaean and the Geometric style, and therefore, the latter was not the product of a Dorian invasion.

Along the years between Böhlau (1887) and Schweitzer (1917; 1918), a series of excavations in the Attic countryside conducted by Greek archaeologists (e.g. Philios 1885; Skias 1898; 1912; Kourniotis 1911; Stais 1917) offered evidence for the Athenian influence on other peripheral Attic Geometric styles. However, the most important and thoroughly recorded ceramic assemblages from Athens were produced in the 1920s and 1930s, during the new German excavations at *Kerameikos*. These were followed by the excavations of the American School of Classical Studies (ASCSA) at the Athenian *Agora*[4] in 1931, and by a series of other

[4] For general information on the history of the *Agora* excavations see Hamilakis (2013). The reports from the Athenian Agora used in this study are: Burr (1933); Shear (1933; 1935; 1936a; 1936b; 1939; 1940); Young & Angel (1939); Pierce-Blegen (1948); Thompson (1940; 1947; 1953; 1953); Blegen (1952); Young (1949; 1951); Brann (1960; 1961a; 1961b; 1962); Smithson (1968; 1974); Camp (1998; 1999; 2001-4). On Athenian Early Iron Age pottery and production sequence see Papadopoulos (1994; 1998; 2003; 2007).

excavations undertaken by the Greek archaeological services in central Athens, the port of Piraeus[5] and the Athenian suburbs[6].

In 1939, Wilhelm Kraiker published the first report from the excavated *necropolis* north of the river *Eridanos* and saw that the Protogeometric style was something new and originally developed under the influence of a preceding Submycenaean style. Kraiker (1939) provided a first summary of the most popular decorative motifs that were painted on each ware. He conducted the first correlation of forms, shapes and decorative elements, and examined the continuity of past traditions and the gradual evolution of Attic Early Iron Age styles (Kraiker *et.al*. 1939, 131-64). His work at *Kerameikos* was followed by Kübler (1943; 1954), Krause (1975) and Ruppenstein (2007).

2.1.2 Pottery styles and context synchronisms in dating the Attic Early Iron Age

Chronologies for the Greek Early Iron Age have been traditionally established with three methods: stratigraphy or sequencing, stylistic analysis or attribution, and context comparisons or synchronisms (Cook & Dupont 1998, 8-9; Whitley 2001, 63). For Athens, the best know sequences come from *Kerameikos*, as the excavations conducted by Karl Kübler and the German Archaeological Institute in 1926 were to "set new standards in the stratigraphical recording of finds and deposits" (Whitley 2001, 35; also see Knigge 1991, 166-7).

Before the excavations at *Kerameikos*, early scholars followed a rough chronological system suggested by Schweitzer (1917; 1918), in which the 11th and 10th centuries BC were characterised by the Protogeometric style, and the 9th and 8th centuries BC by the Geometric style. The Protoattic style diversified from the Geometric towards the end of the 8th century BC (Böhlau 1887). This rough dating system was primarily stylistic.

The chronologies for the Protoattic period became clear from the beginning of the 20th century and the Protoattic style never attracted different arguments in

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[5] Some examples or Greek excavations in Athens are: Theocharis (1951); Stavropoulos (1956; 1958; 1959; 1960; 1961; 1962; 1963); Donta (1961-2, 86, 90-1); Andreionemou (1966, 84-5); Philippaki (1966, 61-3, 71); Tsirivakos (1968, 112-3); Alexandri (1968, 36-8, 48-9, 55-6, 61, 7, 73-4, 82, 89, 89-92; 1969, 26-7; 39, 1973, 32; 1976, 26-7; 1977, 18-20, 27-8); Charitonidis (1973); Karagiorga-Stathakopoulou (1979, 16-17, 18, 27); Tsouklidou-Penna (1981, 19; 1983, 19); Spathari & Chatzioti (1983, 23); Zachariadou (1984, 11); Lykouri-Tolia (1985, 25, 32; 1990, 31-3).

[6] For other Greek excavations in Attica see: Kallipoliti (1963); Verdelis & Davaras (1966); Geroulanos (1973); Mylonas (1975); Theocharaki (1980, 84); Zoridis (1981, 33-4); Rozakis (1982, 60); Kasimi-Soutou (1984, 35); Kavogianni (1984, 43-4); Arapogianni (1985, 207-28).

relation to its duration. In 1935, J.M. Cook studied the evolution of the style and defined the chronological span among different groups of painters based on attribution techniques. His comparisons allowed the construction of a relative dating sequence for the Protoattic period, divided in three phases (Cook 1935, 205):

CHRONOLOGICAL SYSTEM BY J.M. COOK (1935)		
MAJOR PERIODS	**DATES Circa (BC)**	**ABBREVIATIONS**
Early Protoattic	700-675	EPA
Middle Protoattic	675-625	MPA
Late Protoattic	625-600	LPA

The dating of the Protogeometric was more challenging due to the presence of two pottery styles which seemed to overlap during the 11th century BC: the first one was Schweitzer's (1917; 1918) Attic Protogeometric and the second one was Skeat's (1934, 28) Submycenaean[7]. Kraiker *et al*. (1939) saw that the early phases of the necropolis at *Kerameikos* belonged to the Submycenaean period, followed by the Protogeometric. Both phases belonged the 11th and 10th centuries BC, even though their exact duration was unclear. Kraiker *et al*. (1939, 162-4) produced synchronisms with Palestine and estimated that the passing from the Protogeometric to the Geometric in Athens was sometime after the middle of the 10th century BC, and more specifically between c.950 and c.930 BC. His estimation was based on Athenian flat-based cups and a fragment of a *skyphos* recovered at Tell Abu Hawam in the levels immediately preceding the destruction of the settlement in 926 BC. The internal development of the Attic Geometric style was mapped a year later in a short stylistic study by Peter Kahane (1940), who did not consider any context comparisons for dating.

Based on stylistic observations and by considering the broader seriation from *Kerameikos*, Desborough (1952, 294-5) placed the beginning of the Attic Protogeometric around 1050 BC. He rejected the previous dates offered by German scholars and suggested that the passing from the Protogeometric to the Geometric needed to be placed half a century later, between 900 and 875 BC. He also argued that due to differences in styles between different regions, the Early Iron Age cannot

[7] The Submycenaean style was no other than the 'Salamis style', previously excavated by Kavvadias (1893) and studied by Wide (1910). For the dating of the Submycenaean period see Furumark (1941; 1972); Desborough (1964; 1972); Mountjoy (1986; 1988); Iakovidis (1979, 462) and Ruppenstein (2003; 2007). For arguments regarding the distinctiveness of the Submycenaean style see Whitley (1991, 83-4; 2001, 79); Snodgrass (1971; 2003, 34); Rutter (1977; 1978); and Osborne (1996a, 24).

be divided in the same way for the whole of Greece. Desborough's (1952, 295) dates for the Attic Protogeometric sequence were:

CHRONOLOGICAL SYSTEM BY DESBOROUGH (1952)		
MAJOR PERIODS	**DATES Circa (BC)**	**ABBREVIATIONS**
Rise & Experimental phase of Protogeometric	1025-980	EPG
Ripe Protogeometric	980-960	RPG
Late Protogeometric	960-900	LPG
Transitional phase to Geometric	900-875	LPG-EG

In 1954, Kübler suggested a *terminus post quem* for the Geometric era sometime in the first quarter of the 8th century BC based on a bronze bowl from Cyprus that was excavated in Grave 42 at *Kerameikos* (Kübler 1954, 202, fig.5; Schweitzer 1969, 16-19). However, his conclusions regarding the dating of the Geometric sequence were seriously questioned later by Hachmann (1963) not only for high dating, but also for their whole stylistic basis.

In 1957, Desborough produced new synchronisms between Attica, Cyprus and three contexts from the Levant: Megiddo, Tell Abu Hawam and Tell Qasile. Absolute chronologies for these sites had been previously established on known dates of Israelite kings in relation to the foundation of Samaria, and also according to the destruction layers after the invasion of Shishak I in c.918 BC (Desborough 1957, 216). Desborough noted that the Levantine contexts produced two different dating systems, a higher and a lower one. If both were applied in the Attic Early Iron Age, then the results were controversial: firstly, the high ('biblical') dates suggested that the Attic Geometric would have lasted about 300 years, while Late Helladic IIIC, Submycenaean and Protogeometric would have all been between c.1150 and c.1025 BC. Secondly, according to the lower dates, the Attic Protogeometric would have ended a little after c.900 BC and the Late Geometric a little before c.650 BC (Desborough 1957, 218). Even though the low dates from the Levantine contexts were lower than the conventional dates established by Kraiker *et al*. (1939) and Kübler (1954), they seemed to lie within the limits of probability for the Attic Protogeometric and Geometric (Desborough 1957, 218). In later years, Desborough (1964) produced synchronisms between Philistine and Mycenaean contexts correlated with changes that followed the invasion of the 'Sea Peoples', and verified that the Attic Protogeometric stood between c.1050 and c.900 BC.

Following Desborough (1952; 1957) and by revising the German chronological system developed by Kahane (1940) and Kübler (1954), R.M. Cook (1960; 1997) produced a new chronological chart, where the Attic Geometric style began at about 900 BC. The style appeared not much later in Argos, Corinth and Boeotia, while in Euboea, the Cyclades and the East Greek cities it appeared at about 850 BC; in Thessaly and Crete in the beginning of the 8^{th} century; and, in Laconia and Western Greece quite later. As for the end of the style, the 'Orientalising' became established in Corinth at about 720 BC, while in Athens, the Cyclades and Crete at about 700 BC. Cook's analysis was based on stylistic comparisons among different Greek regions and his synopsis of the Attic sequence suggested:

CHRONOLOGICAL SYSTEM BY R.M. COOK (1960)		
MAJOR PERIODS	**DATES Circa (BC)**	**ABBREVIATIONS**
Protogeometric	1050-900	PG
Early Geometric	900-850	EG
Middle Geometric	850-760	MG
Late Geometric	760-700	LG
Protoattic	700-600	PA

Following R.M. Cook (1960), Coldstream (1968, 302-31) examined the internal developments of the Attic Geometric style through attribution techniques (also in relation to Davison 1961), and expanded the internal subdivisions of the three Attic Geometric groups:

CHRONOLOGICAL SYSTEM BY COLDSTREAM (1968)			
MAJOR PERIODS	**DIVISIONS**	**DATES Circa (BC)**	**ABBREVIATIONS**
Early Geometric		900-850	EG
	Early Geometric I	900-875	EGI
	Early Geometric II	875-850	EGII
Middle Geometric		850-760	MG
	Middle Geometric I	850-800	MGI
	Middle Geometric II	800-760	MGII
Late Geometric		760-700	LG
	Late Geometric Ia	760-750	LGIa
	Late Geometric Ib	750-735	LGIb
	Late Geometric IIa	735-720	LGIIa
	Late Geometric IIb	720-700	LGIIb
Protoattic		700-620	PA
	Early Protoattic	700-675	EPA + SG
	Middle Protoattic	675-640	MPA
	Late Protoattic	640-620	LPA

Furthermore, Coldstream (1968, 302-10) re-examined Attic and Atticising imports at three sites in Palestine (Tell Abu Hawam, Megiddo and Samaria) and concluded that the end of the Attic MGII was to be placed no later than c.750 BC based the dating of Period V at Samaria. In relation to the imports at Megiddo, he placed the beginning of MGI towards the middle of the 9th century BC. The duration of both sub-phases of the Attic MG were cross-referenced with regard to Attic and Atticising pendent-semicircle skyphoi and kraters recovered at Hama and Al-Mina in Syria (Coldstream 1968, 310-6). During comparisons of Corinthian and Euboean imports found at destruction layers associated with the campaigns of Sargon II at Hama, a t*erminus ante quem* was established for the Corinthian Geometric period at 720 BC (Johansen 1957, 106-8; Coldstream 1968, 313), which verified the observations by Cook (1960); therefore; the end of the Geometric era for Attica and Euboea was placed shortly after that time (Coldstream 1968, 316), at 700 BC.

In relation to Egypt and the Western Greek colonies, Coldstream (1968, 316-7) noted that a child inhumation at Pithekoussai (in Grave 102) contained Corinthian *skyphoi* and globular *aryballoi* together with an Egyptian scarab from the time of Pharaoh Boccoris (718-712 BC) (de Salvia 1993, 777-80). The scarab provided a *terminus ante quem* for the earliest occupation phases of the colony, and also a date for Euboean and Corinthian Late Geometric, and Protocorinthian[8] pottery found at the site (Ridgway 1992; Buchner & Ridgway 1993, 378-82; Coldstream 1995, 251-67). Similar Protocorintian imports found in Late Geometric, Subgeometric and Protoattic wells at the Athenian *Agora* (Brann 1961a; 1961b) verify the Attic sequence based on its connections to the Corinthian.

Schweitzer (1969, 16-20) re-examined the dating of finds from *Kerameikos* by Kraiker and Kübler (Kraiker *et al*. 1939, Kübler 1943; 1954) and considered it in relation to the arguments by Desborough (1952; 1957) and Cook (1960). He refined the existing German chronological system for the Attic Geometric and divided it according to five ceramic styles:

[8] Additional fixed points for the end of the Corinthian Geometric and Early Protocorinthian were established on evidence from other Western Greek Colonies. Thucydides provided dates for the foundation of Naxos at 734 BC, Syracuse at 733 BC, Leontini at 729 BC, Megara Hyblaea at 728 BC and Gela at 688 BC (Coldstream 1968, 323; also see Dunbabin 1948, 435-71; Graham 1982, 89-91; Osborne 1996, 119-27; Morris 1996, 52). Such dates functioned as a *terminus post quem* for Corinthian Late Geometric and Protocorintian pottery recovered in the above sites (Coldstream 168, 322-7; also see Vallet & Villard 1952, 329-40).

GERMAN CHRONOLOGICAL SYSTEM SUMMARISED BY SCHWEITZER (1969)			
MAJOR PERIODS	**DURATION**	**DATES Circa (BC)**	**ORIGINAL NAME**
Early Geometric style	End of 10th to middle of 9th century BC	(1025-1000) to 850	Frühgeometrischer Stil
Strict Geometric style	End of 9th to first quarter of 8th century BC	(850-800) to 775	Strenggeometrischer Stil
Mature Geometric style	First quarter of 8th to middle of 8th century BC	(800-775) to 750	Reifgeometrischer Stil
High Geometric style	Partly overlapping with Mature Geometric style	770 to750	Hochgeometrischer Stil
Late Geometric style	c.750 to last quarter of 8th century BC	750 to (725-700)	

Schweitzer's chronologies bridged the gap between the traditional 'German' dates from *Kerameikos* and the 'British' dating system for the Greek Early Iron Age, even though his phases were slightly different compared to those suggested by Coldstream (1968). Again, both dating sequences were primarily established through stylistic observations.

Coldstreams's chronological system is widely accepted nowadays, despite the fair amount of criticism that has received from Francis & Vickers (1985). Its main problem is that despite the cross-referencing of his Attic MG and LG divisions with contexts of know dates from the Palestine and North Syria, the identification of his EG divisions and LG sub-divisions are solely stylistic. With regard to the Attic Early Geometric, he accepts the dates suggested by Desborough (1952; 1957) and Cook (1960) for the end of the Protogeometric era and continues his discussion on purely stylistic ground. Lemos (2002, 24-5) notes the same problem with regard to the dating of the Protogeometric in general: absolute dates cannot be cross-referenced with Eastern Mediterranean sites and PG dating depends highly on fixed dates assigned to Late Helladic IIIC. Evidence of trade and connections between Attica and Euboea[9] have helped further in verifying Coldstream's EG divisions. For example, Athenian Early Geometric II ceramic imports have been excavated at Subprotogeometric graves at Lefkandi (Popham *et al.* 1980, 350-4; Coldstream 1977, 63-5), pointing to a *terminus post quem* for both ceramic styles c.850 BC.

Coldstream's chronological system is followed in this thesis for two reasons: firstly, it provides sub-divisions for the Late Geometric period, which may be

[9] In a latest publication, Charalambidou (2011) also notes the connections in pottery production between Euboea and Oropos towards the beginning of the 7th century BC.

stylistic, but they have been used in the discussion regarding Geometric ceramic workshops through connoisseurship (see section 2.1.5). Secondly, his dates have been verified through latest radiocarbon studies, which will be explained in detail in the following section (2.1.3). Morris (1996, 58) concludes that according to the existing synchronisms, particularly in relation to the Western Greek colonies, the absolute chronologies for Greek pottery between the 8th and 7th centuries BC are fixed securely.

In the latest volume on Early Iron Age chronology, Whitley (2001, 61) suggests a slightly revised version of Coldstream's (1968) chronological system for Attica:

CHRONOLOGICAL SYSTEM BY WHITLEY (2001)		
MAJOR PERIODS	**DATES Circa (BC)**	**ABBREVIATIONS**
Protogeometric	1050-900	PG
Early Geometric	900-860	EG
Middle Geometric	860-770	MG
Late Geometric	770-700	LG

Furthermore, Lemos (2002, 3-26) offers a full discussion on relative chronology for the Protogeometric period across Greece based on the comparison of grave contexts. It must be clarified that according to Snodgrass (1971, 1-25), Coldstream (1977, 25-106) and Whitley (2001, 61) such pot styles are not necessarily chronological periods, as for example, the Geometric style was not universal in 'Geometric Greece' during the 9th century BC[10]; therefore, any discussion on chronology based solely on pottery must be treated with caution.

2.1.3 Scientific dating methods for the Greek Early Iron Age

Because of the convenience in using chronologies established with traditional methods, archaeologists have put little effort in producing absolute chronologies with scientific techniques such as radiocarbon dating (^{14}C). An example that describes this problem comes from the analysis of deposits at Protogeometric Asine (Wells 1983, 28). Even though the calibrated ^{14}C date of c.1050 BC (±90) for Asine's Phase 1 was in accordance with older absolute chronologies based on synchronisms (e.g. Desborough 1952; 1964), Berit Wells (1983, 124) argued that it did not say anything about the beginning or end of this phase. By contrast, Wells

[10] Similar problems in establishing comparative chronologies for the Geometric and Archaic periods through ceramic styles and typologies have also been discussed by Rückert & Kolb (1993) with regard to Asia Minor.

(1983, 124) saw context synchronisms with Cyprus to be more rewarding in establishing an absolute chronology for the beginning of Protogeometric Asine at about c.1075 BC.

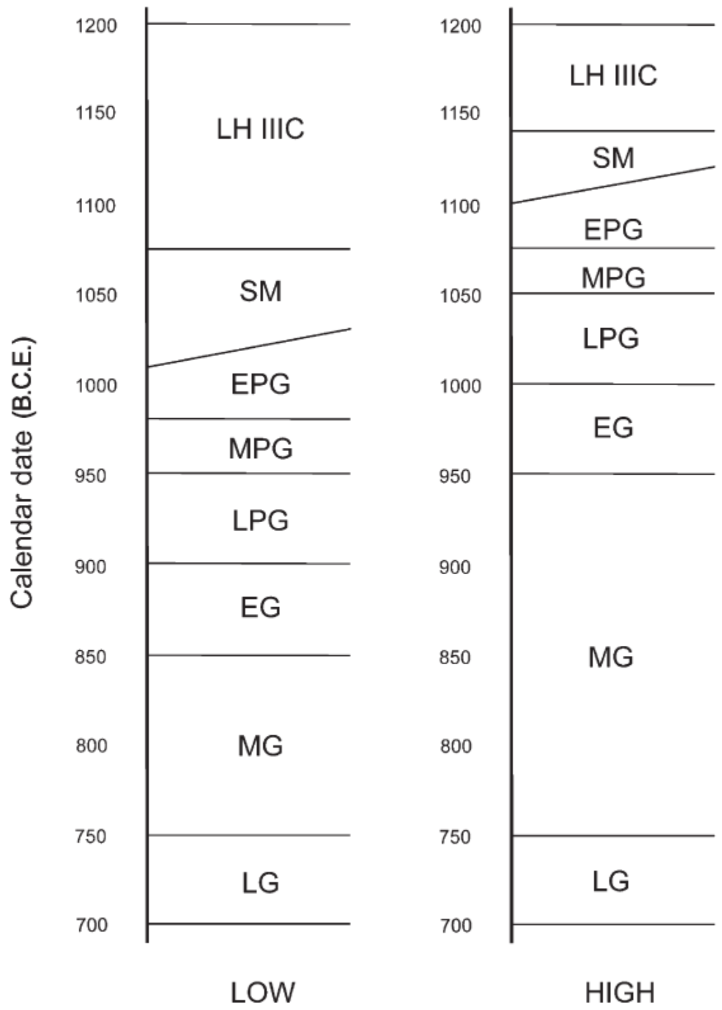

Figure 4: High and Low chronologies for the Aegean Late Bronze and Early Iron Age after Coldstream (2003c, 254).

The problems of context synchronisms between Attica, Cyprus and the Levant were revisited by Coldstream (2003c), who produced a chart explaining the differences between high ('biblical') and low (conventional) dating of the Aegean Late Bronze Age and Early Iron Age (Figure 4). Ever since, several studies with the use of Radiocarbon dating (^{14}C) and dendrochronology have contributed in this debate, despite the difficulties in the applications of both techniques.

A major problem in the use of radiocarbon (^{14}C) for dating is the fluctuation ('wiggling') of the Stuiver & Pearson (1986; 1993) curve for the period between 800 BC and 400 BC (e.g. Hajdas 2008, 9, fig.5, 16-18), or in other cases, between 750

BC and 400 BC (e.g. Capuzzo *et al*. 2014, 853). This problem, also referred to as the Hallstatt Plateau, makes it impossible to date anything that falls in between those dates; however it is possible to date artefacts that precede or exceed the above chronological limits.

The first attempts to produce dendrochronologies for the entire Aegean from Bronze Age to present were carried out by Kuniholm & Striker (1987) (revised in Kuniholm 1996). Newton *et al*. (2003; 2005) and Wardle *et al*. (2007) combined dendrochronological and radiocarbon dates from Assiros and suggested that the Protogeometric period needed to rise a century earlier than its conventional date at c.1050 BC. The 'biblical' date for the Protogeometric was again suggested in a radiocarbon study by Van der Plicht *et al*. (2009).

Coldstream & Mazar (2003) combined context synchronisms with radiocarbon dating in pottery from Tel Rehov in Jordan, followed by Gilboa & Sharon (2003) and their study from Tel Dor. Both approaches showed limitations either in relation to contexts that were not secure, or in relation to wares that were limited to specific Aegean regions. The conventional (low) dates for the Aegean Submycenaean and Protogeometric were recently verified in a study by Toffolo *et al*. (2013), which disproved Ruppenstein's (2007) suggestion that the Submycenaean expanded almost across the entire 11th century BC. The study also rejected Traschel's (2004; 2008) suggestion for a high-dating of the Protogeometric, placed in the 12th century BC.

Weninger and Jung (2006) used tree-ring ^{14}C-data obtained from Kastanas and concluded that there was near-perfect agreement between the traditional historical-archaeological dates for all Aegean phases between Late Helladic IIIB and Submycenaean, and their calibrated dates. Chronological fine-tuning of finds from Kastanas, Assiros, Tiryns, Tell Kazel and Ugarit, and their association with dendrochronologies from Switzerland and Italy, indicated that the end of the Submycenaean and the beginning of the Protogeometric was to be placed at c.1045 BC ±20 (Weninger & Jung 2009, 393-4, fig.1). However, Wardle *et al*. (2014) produced radiocarbon dates for timber, plant remains and animal bones from Assiros, and suggested that the earliest phases of the Protogeometric should be placed earlier than c.1120 BC.

The debate between the supporters of high or low radiocarbon chronologies still continues. In the most recent publication, Fantalkin *et al*. (2015) reject the high-dating by Wardle *et al*. (2014) by disproving the reliability of the Assiros contexts and the compatibility of the Threan high-chronology that has been followed in their study. Instead, they employ a comparative radiocarbon dating method targeting seven Levatine contexts (Megiddo, Beth Shean, Tell Tweini, Tel Miqne, Tel Hadar, Tel Dor, and Tel Rehov) in relation to Lefkandi and Kalapodi. Their study proves the existing conventional dates suggested by Coldstream (1968, 330), at least until the end of Attic MGI.

2.1.4 Iconographic studies

Even though iconographic approaches are irrelevant to the focus of this thesis on ceramic technologies, they comprise the vast majority of studies on Attic Geometric and Orientalising finewares. Many of such approaches have attempted to shed light on Early Iron Age society by noting the symbolic importance of ceramic decoration in pottery consumption. For this reason, it is considered important to present a brief overview of such studies, including their most relevant arguments on Attic Geometric society.

The study of Attic Early Iron Age iconography flourished immediately after World War II, during a period when previous studies on the development of styles had formulated the basis of a new archaeological discussion. Karl Kübler (1954, 19-23) was the first to suggest that the *prothesis* and *ekphora* representations on Late Geometric vessels related to scenes of contemporary life, an opinion that was also shared -on some occasions- by later scholars such as Schweitzer (1969) and Boardman (1983).

Despite Kübler's views on the relationship between iconography and contemporary reality, Late Geometric representations in the 1950s were treated as evidence of Homeric inspiration in early Greek pictorial art. Hampe (1952), Webster (1955), Notopoulos (1957, 65-93) and Whitman (1958, 87-102) saw such representations as directly related to the battle scenes and funerary practices described in Homer's *Iliad*. Their views supported the idea that Late Geometric iconography described events of mythical or heroic nature; however, Cook (1960; 1997, 21) argued that this was rather unlikely. Instead, he suggested that Late Geometric painters probably showed some intention to add a heroic flavour in their work. The sole focus of early iconographic approaches on the figurative representations of the Late Geometric period created a legacy that carries on until recent years. By exception, Himmelmann-Wildschütz (1962) was the only scholar who moved away from Late Geometric figurative scenes and attempted an aesthetic explanation of the *Maeander*, a motif that appeared for the first time during the Early Geometric.

Schweitzer (1969, 56-8) argued that the emergence of myth in Geometric Greek art was to construct a new ideology and a new mythological identity in the Greek society under the influence of the East. He agreed that images of battles on Late Geometric vases had literary parallels in Homer's *Iliad*; however, the figural representations of *hoplites* related to the ideological concept of death in battle and the reputation of men as warriors (Schweitzer 1969, 36). The military character of some Early Geometric burials was already known after the discovery of a group of warrior graves at the area of *Areopagus* (Blegen 1952), where iron swords and spearheads were placed inside the burial shafts together with the cremation urn and other ceramic finewares[11]. Schweitzer argued that the figurative scenes on Late Geometric vases represented the same ideological context that was described by Homer and saw similar connections between such representations and other mythological events. In his opinion, this proved the neighbouring of myth, epic poetry and figurative decoration (Schweitzer 1969, 43-6).

Snodgrass (1971, 431-2) supported the probability that during the Late Geometric era Homeric poems were in circulation to stimulate such an artistic interest, which would justify a mythological and/or heroic significance of a number of Late Geometric scenes. By contrast, Carter (1972, 27) saw that Geometric artistic motifs functioned as ideographs, meaning "stereotypes without individuality or context in time or place"; therefore, he suggested that Late Geometric iconography should be disengaged from specific heroic personae and mythological events. This view brought up a new perspective, in which Geometric iconography could have related to broader symbolisms that moved away from the construction of ideologies and mythical identities as these were put by scholars until that time. On this point, Boardman (1983, 20) suggested that motifs which were not combined with human figures in Argive Geometric iconography (e.g. water, fish, birds and horses) bore

[11] D'Onofrio (2011) argues that Athenian burials with weapons should be reconsidered. Instead of being viewed as warrior graves with distinct reference to gender, one needs to bear in mind the symbolic character of weapons in burials. This is archaeologically visible in the burial customs of different cultural groups, regardless of gender affiliations (D'Onofrio 2011).

symbolic importance in the society they were used in[12]. However, when it came to Attic Late Geometric representations, Boardman (1983, 25-7) accepted traditional approaches and suggested that by contrast to previous scholars who considered them heroic, these should be interpreted as mythical. Hurwit (1985, 120) argued against Boardman (1983) that the Geometric Greeks viewed themselves as the new Mycenaeans and this was clearly seen in their attempts to approach their past by creating a heroic age, and not just reviving it. According to Hurwit (1985, 120-4) Homer did not make Geometric Greeks reclaim and recover their past but he was part of the recovery, just as Geometric art; therefore, the context of both was heroic (Hurwit 1985, 120-4).

A major contribution by Hurwit (1985, 106-8) was his argument that the creation of the heroic past in Late Geometric iconography related to elites and was connected to aristocratic rituals. Snodgrass (1987, 150) added that Geometric art was commissioned and consumed during a period of social exclusiveness, by a small groups of people that were unrepresentative of Athenian contemporary society. Such people were buried in distinct plots and were probably relatives (Snodgrass 1987, 148-56). Furthermore, Whitley (1988) and Morris (1988) pointed out that the hero cult of the late 8th century BC was connected with aristocrats who aimed in asserting power through claiming connections with the Mycenaean past. All these studies carried the discussion on Geometric iconography to a new direction, pointing that its function could have related to the creation of a new social or political identity.

The same discussion expanded in the study of 7th century iconography. Osborne (1988; 1989) saw that the marked differences between Protoattic and Protocorinthian decoration were due to the different social and political structures of the two *poleis*[13]. In his opinion, the surface chaos of Protoattic art depended on a strong sense of order deriving from the artistic language of the Late Geometric period (Osborne 1989, 320). In marked difference with the artistic manners of Corinthian Early Orientalising pottery[14], Protoattic decoration reflected a form of

[12] By contrast, Pappi (2006, 229) argued that Argive Geometric images "were introduced under a powerful stimulus of myth and epic, as the experimentalising products of inspired and innovative artists and as an expression of new interest groups in the rising polis, and that they had an important social function in the changing world of the Iron Age".

[13] Before Osborne (1988; 1989), Coldstream (1977; 2003a, 187) stressed the political role of the Bacchiad tyranny towards the beginning of the 7th century BC in relation to the emergence of Corinthian trade and the popularity of Corinthian exports as opposed to Athenian.

[14] The discussion on Corinthian Orientalising pottery continued by Shanks (1999) and Osborne (2007), who examined social agency (*sensu* Gell 1998) in the production of Corinthian 7th century BC

conservatism justifying the existence of a plethora of social groups (Osborne 1989, 321).

In the 1990s the discussion on the social role of Attic Geometric iconography expanded further. Whitley (1991, 52-3) argued that the elaborate decoration on Athenian Late Geometric burial vessels could have related to the symbolisms of elites that were competing for the acquisition of social status[15]. Hurwit (1993, 63, 39) added that Geometric art was not only related to, but also socially enforced by the elites at the time of the rising *polis*. The connections between Geometric and Orientalising art, myth and social ideology were stressed further by Robin Osborne (1996; 1998), while Bohen (1997) discussed social status in relation to the iconography of large funerary *kraters* from elite burials at *Kerameikos*. By contrast to the above scholars, Boardman (1998, 25) argued that the demonstration of status by show in elite Athenian Geometric graves was more evident in the consumption of other materials instead of pottery, except when it came to large grave markers.

Despite the shift of interest of iconographic approaches during the 1990s towards elite ideology in Geometric pictorial art, the ideas of Hurwit (1985) on its Homeric and heroic associations had not been abandoned. More specifically, Hurwit (1985, 97) had noted that the *Dipylon* style and the Homeric style were parallel. In both, one could detect the formula as their basic compositional unit, either in a single brush stroke in pottery decoration, or in a single word in poetic composition. However, Hurwit (1985, 102) suggested that Homer might had never seen a *Dipylon* vase and the *Dipylon* Master might had never heard of Homer's *Iliad*. The gap between iconographic approaches on elite ideology and approaches on Homeric associations was bridged by Himmelmann-Wildschütz (1998, 30), who accepted that Geometric pictorial art expressed an aristocratic worldview and was also connected to myths and heroic events. However, his interpretation suggested something entirely new: Geometric pictorial art aimed to present every-day events as heroic (Himmelmann-Wildschütz 1998, 30). This point was significantly different compared to the heroic flavour in Late Geometric art, which was previously suggested by Cook (1960; 1997, 21). By contrast to Himmelmann-Wildschütz, Boardman (1998, 26-7) insisted in the traditional interpretations by Kübler (1954,

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aryballoi.

[15] In addition, Dougherty (1993, 61-76) saw symbolic connections between Geometric iconography and early Greek colonisation, although not in relation to Athens.

19-23), which saw the *prothesis* and *ekphora* scenes -at least- as contemporary; however, he offered different explanations for a series of other Late Geometric scenes that were treated as mythical according to his older (Boardman 1983, 25-7) views. At the end of the 1990s, Snodgrass (1998) argued that Geometric pictorial art should not be paralleled with the written form of the *Iliad* and the *Odyssey* as they appeared during the Archaic period; however, it was possible that Geometric representations were inspired by popular folktales, which circulated during the Geometric era.

Even though iconographic approaches of the 20th century discussed issues of pictorial symbolism and elite ideology in Attic Geometric art, the traditional debate between its mythical *versu*s heroic associations never stopped. In a later study, Langdon (2008, 19-20) used the example of an abduction scene drawn on a Late Geometric II *louterion* from the British Museum (1899.2-19.1), and pointed out that the same couple depicted on the vessel has already been identified as Ariadne and Theseus, Helen and Paris, Helen and Menelaus, Jason and Medea, and Hector and Andromache. This clearly showed that, by contrast to the views of Ahlberg (1971, 285-7), such scenes could not be identified as specific. Continuing from the above point, Langdon (2008, 19-25) rejected the heroic *versus* mythical debate and suggested a new approach, in which Late Geometric iconography should be interpreted through the ideological symbolisms it once projected on every-day events.

Furthermore, Langdon (2006; 2008, 3) argued against Whitley (1988; 1991, 13-23) and Snodgrass (1979; 1998, 1-11) that their approaches privileged textual sources over art and falsely projected the hierarchy of Homeric poetry in the Early Iron Age past. Langdon (2008, 4) pointed that Whitley's (1991, 48, 196) approach presupposed that Geometric iconography was misguiding; therefore, he treated Geometric motifs as purely decorative symbols by neglecting their rich iconographic readings. By contrast to most studies that saw Geometric art as the assimilating agent of elites to a glorious, heroic and imaginary past, Langdon (2008, 3) suggested a clear cut with such approaches and argued that "seeing Geometric art as the visual counterpart of epic poetry is no longer supportable".

Langdon (2008, 10) suggested that Late Geometric iconography implied a message and a social intent. It was connected to the creation of large urban formations, the *synoikismoi*, which depended on a new kind of political and religious authority, which emerged from the households of the local leaders into the public sphere. The role of Late Geometric visual representations was to construct gender hierarchy. Figural art was destined to play its own ceremonial role in maturation rituals, marriage, household foundation, and other important social occasions (Langdon 2008, 3-11). By contrast to Whitley's (1991, 182-3) argument that the main social distinction in Athens during LGII related to age instead of sex, Langdon (2008, 63) argued that LGII iconography suggests that young maidens in Athens were probably gaining new symbolic status towards the end of the 8^{th} century BC. This debate will be addressed further in Chapter 8, in relation to the conclusions of this thesis.

Following Langdon (2008), Philippa-Touchais (2011, 39) suggested that Geometric iconography expressed the "emerging ambiance of socio-political instability and ideological heterogeneity, where social relations and identities were under a new negotiation" (Philippa-Touchais 2011, 39). She (2011, 39) argued that figurative representations were probably linked with network construction strategies connected to complex political structures such as the *polis* (discussed by Blanton *et al*. 1996, 8). This contrasted with the absence of figurative art in simpler political structures such as group-oriented chiefdoms (discussed by Renfrew 1974, 79).

Despite Langdon's contribution, the debate on the mythical *versus* heroic aspirations of Late Geometric iconography continues until recent years. In a latest publication, Jeffery Hurwit (2011, 1) argues that even though many of the Late Geometric figurative scenes have been banished from the ranks of early mythological narratives, several others need to be restored to the ranks of possible mythological or heroic images. In his opinion, pottery commissioned by the elites probably transmitted the idea of an elite status. This was projected to the viewers by incorporating notions of heroic or mythological connections in a time of reaction to the rising *polis* (Hurwit 2011, 8-11). This argument contrasts with Snodgrass (1998), who raises doubts whether such scenes could have reflected the written form of myths and epic poetry, which dated two centuries later. Still, Hurwit (2011, 12-16) agrees with Snodgrass (1998) on the range of interpretations that can be given to Late Geometric scenes. He argues that during the Late Geometric period some scenes might have been more common than we usually think today, and perhaps Late Geometric artists had the intention to describe events of both heroic and real nature at the same time. This could also explain the complexity, variety and originality of the Late Geometric imagery (Hurwit 2011, 12-16).

Having summarised previous iconographic approaches on Attic Geometric and Orientalising finewares, special mention needs to be made is two different discussions that emerged in the 1960s regarding narration and the birth of Western European pictorial arts. John Beazley (1951, 2) was the first to trace the origin of Western arts in ancient Greece, but apart from a small mention to Late Geometric figurative vase painting as being ancestral to this phenomenon, he showed no particular interest in engaging in a deeper discussion regarding Early Iron Age vases. It was E.H Gombrich (1962, 99) who detected the emergence of Western 'illusionism' in Greece between the 9th and 5th centuries BC, in a time when artists advanced from the aniconic decorative styles of the Early Geometric period towards the figurative and representational styles of the Late Geometric, Archaic and Classical eras. This process was named the 'Greek revolution' (Gombrich 1962, 99). In later years, his point was strengthened by Carter (1972, 26-7), who saw that the grave amphora Athens NM804 from the *Dipylon* cemetery[16] signified the beginning of a new era in Western pictorial arts.

Gombrich (1962, 99-125) also began a thorough discussion on narration. Before him, Friis Johansen (1961) and Himmelmann-Wildschütz (1961) had noted that Geometric figurative scenes were not static and not taking place at one specific moment in time; instead, they were drawn to produce a feeling of continuous narration. Combrich noted that by contrast to the narratives of the Near East and Egypt[17], the Greeks connected their artistic representations to the Homeric and other epic narratives to produce a new form of art. In the same way that poets employed dramatic narrative techniques to describe their events, artists rejected previous *schemata* and introduced narration in pictorial arts, which served the purposes of early naturalism (Gombrich 1962, 99-125).

Gombrich's (1962) views were introduced and established in the analysis of Geometric art by Benson (1970), who saw Late Geometric iconography as a conflict between representations of contemporary life and scenes of mythical consciousness.

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[16] Coldstream 1968, pl.6; Schweitzer 1969, pl.30; Richter 1970, pl.29; Ahlberg 1971, fig.2; Beazley 1986, pl.1.

[17] For the relationship between 'abstract' Egyptian and Near Easter pictorial representations and 'specific' Late Geometric figurative scenes see Himmelmann- Wildschütz 1967; Schweitzer 1969; Benson 1970; Honor & Fleming 1984; Hiller 2006.

Following Himmelmann-Wildschütz (1961), Ahlberg (1971, 285-7) explained that the Geometric narrative was a depiction of complex scenes which involved a temporal succession of episodes occurring in a time sequence. These scenes formed a successive narrative that related to the same event. Furthermore, Ahlberg (1971, 285-7) suggested that particular figures on such representations showed features of individuality; therefore, they could be connected to specific heroic personae[18].

By contrast to Johansen's (1961) continuous narrative, Gombrich's (1962) dramatic narrative, and Ahlberg's (1971) successive narrative, Snodgrass (1982, 5; 2006, 395) redefined Early Iron Age figurative representations as a synoptic narrative. This view was later strengthened by Hurwit (1985, 102-3), who also suggested that the idea of *parataxis* was fundamental to both Homeric epic and Late Geometric representations.

Following the discussion on narration, Whitley (1991, 46-7) introduced Bryson's (1983) theoretical approach for the study of art, which proposed the distinction between denotation and connotation: connotative representations contained additional information and details that could be irrelevant to the recognition of the scene. By contrast, denotative representations were set with characteristic economy, which provided a clearer interpretation of the scene and created a persuasive illusion of the real event (Bryson 1983, 59-62). Following this distinction, Whitley (1991, 46-7) classified Late Geometric narrative as denotative.

By contrast to previous studies, Mark Stansbury-O'Donnell (2006, 1) saw narrative as a discourse, analysed through the circumstances of artistic production, viewer response, viewing context and visual language. In a comparative study of Athenian and Cretan iconography, he saw that both narratives operated as independent phenomena, which met local needs in distinct ways. In addition to this point, Langdon (2008, 19) stressed that the interpretations of Late Geometric narratives were in most cases ambivalent. As a final remark, it is perhaps important for future studies to consider the role of artistic agency in narration (*sensu* Gell 1998), and also in relation to context specific interpretations.

[18] The same point was briefly made two years earlier, by Schweitzer (1969).

2.1.5 Connoisseurship in the study of Attic Early Iron Age workshops

Connoisseurship is another area of iconographic studies related to Greek Early Iron Age decorated finewares. Here, it is discussed separately as it is the only approach taken for the identification of Attic Geometric and Orientalising workshops, and individual artists. Further discussion on the results of connoisseurship in relation to the questions of this thesis will follow in Chapter 8.

The first application of the principles of connoisseurship on Attic painted pottery was by John Beazley (1922). Donna Kurtz (1983; 1985) suggested that this methodology derived from the work of the Italian art historian Giovanni Morelli, whose work was known to Beazley, perhaps through the time he spent in Italian museums studying collections of pottery from Etruscan graves (Kurtz 1983; 1985; Robertson 1991; Whitley 1997). Beazley (1922) followed Morelli's ideas and focused on the manners in which specific artists depicted human anatomy on Greek painted pottery. These manners were definite, coherent and distinctive, and formed a personal "system of renderings" for each painter (Beazley 1922, 84). Beazley (1922; 1946; 1951; 1956; 1963) employed this logic to study the systems of renderings of various Attic painters, to categorise their work, to define affiliated groups of artisans, and to identify different schools and workshops in Archaic and Classical pottery production.

J.M. Cook (1935; 1947) was the first to employ the principles of connoisseurship in the study of Protoattic pottery. He identified workshops of the EPA 'Classical Tradition' attributed to the Analatos painter and the Mesogeia painter, and the LPA workshop of the Nessos painter (Cook 1935; 172). Similarly to J.M. Cook, Gerba Nottbohm (1943) was the first to assign a group of Geometric vases to a particular painter, and more specifically to the *Dipylon* Master, opening new paths in the investigation of Attic Geometric workshops.

The first application of the Beazleyan connoisseurship in a full identification of Attic Late Geometric and Early Orientalising workshops was published in 1961 by Jean M. Davison. Davison studied roughly 800 vessels (1961, 9); she summarised the work of all previous connoisseurs and identified 17 different groups of painters and broader workshops, including related schools and independent artists (hands). These comprised a total of at least 36 artisans: the *Dipylon* Master (painter of Athens NM804) and Workshop, including the Kunze Painter, the Sub-*Dipylon* Hand and Workshop, the *Dipylon Oinochoe* Group, and the Tapestry Hand; the Villard

Workshop; the Hirschfeld Painter and Workshop; the Lion Painter; the Workshop of Athens 894, comprised of the Painter of Athens NM894, the Stathatou Hand and the *Hydria* Hand; the Workshop of Athens 897, comprised of the Painter of Athens NM897, the Empedokles Hand, and the broader Workshop of Athens 897; the Philadelphia Painter; the Benaki Painter and Workshop; the Oxford Painter and Workshop; the Birdseed Workshop, comprised of the Birdseed painter, the Birdseed *Skyphoi* Group and the Painter of Munich *Oinochoe* 8696; the Lambros Painter and Workshop; the Knickerbocker Painter and Workshop; the Swan Wokshop; the Burly Painter and Workshop; the Early Analatos Painter; the Mesogeia Painter; and finally, the Vulture Painter and Workshop.

Davison's approach was critiqued by R.M. Cook (1962) and Evelyn Smithson (1962). Both scholars argued that Davison's investigation was limited to a small number of vessels, which represented about 1/5 of the existing material found until that time. Furthermore, R.M. Cook (1962) argued that some of the groups described by Davison did not exhibit distinct characteristics in order to be grouped individually. For example, the Knickerbocker painter and the *Oinochoe* groups were analysed and grouped mainly in terms of abstract ornaments and their arrangement (Cook 1962, 88). Smithson (1968, 423) also argued that some of Davison's major groupings[19] were just composites and not real individual groups.

Davison's groups were revised by J.N. Coldstream (1968, 29-82), who also adapted them to his chronological system (see Section 2.1.2). According to Coldstream, there used to be at least 21 different groups of ceramic workshops producing decorated finewares for the period between LGIa and LGIIb:

[19] The Kunze Painter, the Knickerbocker Hand and Workshop, the Tapestry Hand and the Burly Hand and Workshop.

ATTIC GEOMETRIC WORKSHOPS BY COLDSTREAM (1968, 29-82)	
Chronological Groups	**Name of Workshop**
LGIa	Dipylon Master and Associates
LGIIb	Hirschfeld Painter and Workshop
	Lambros Workshop
	Workshop of Athens 706
LGIb-LGIIa (transitional phase)	Swan Painter
	Concentric Circle Group
	Hunt Group
LGIIa	Birdseed Painter and Workshop
	Bird-and-Lozenge Painter
	Sub-Dipylon Group
	Soldier-Bird Workshop
	Workshop of Hooked Swastikas
LGIIa and early LGIIb	Rattle Group
	Anavyssos Painter
	Manheim Painter
	Philadelphia Painter
	Workshop of Athens 894
	Lion Painter
LGIIb	Workshop of Athens 897
	Benaki Painter
	Painter of Paris CA3283

Despite the arguments by R.M. Cook (1962) and Evelyn Smithson (1962), Davison's (1961) work and the revised conclusions by Coldstream (1968) are still accepted and widely used nowadays.

Sarah Morris (1984) was the first to employ connoisseurship in a study that moved away from defining production units, to investigating the social context of ceramic production. Morris (1984) compared Athenian and Aeginetan Orientalising finewares, and concluded that 'Attic' Black and White wares of the Middle Protoattic period were in reality Aeginetan exports. Toughing on the historical events, Morris (1984, 116) saw the possibility of a war between Athens and Aegina in the early 7th century BC, followed by Athenian recession and poverty because of an Aeginetan embargo. Both events justified the decline of Athenian Middle Protoattic ceramic workshops. Whitley (1994b, 66) argued against this point that ceramic production and consumption in Aegina and Athens were probably not related during the middle of the 7th century BC due to the different vessel shapes encountered in both contexts; therefore both productions should be treated independently.

Bohen (1988) examined the evolution of forms and decorative motifs on different types of Athenian *pyxidae* from the Sub-Mycenaean to the Late Geometric period. Her analysis included the identification of potential workshops by examining the decorative motifs on miniature clay-horses that were attached on the top part of the 'horse-*pyxis*' vessels, following the example of Davison (1961).

The methodology of Beazleyan connoisseurship and the discussion on Davison's (1961) Geometric workshops continues by Anne Coulié (2010; 2013; 2014) and her arguments regarding the *Dipylon* Workshop. In a recent re-evaluation of Davison's (1961) conclusions, Anne Coulié (2015) argues that the identification of individual artists in a traditional workshop can be more complicated than what has been demonstrated in previous years. In her own analysis of the *Dipylon* workshop, Coulié sees the style of at least five individual artists: the *Dipylon* Master painter, three of his most accomplished students and a secondary student that would only decorate the surface of handles (Coulié 2015). The complexity and the innovative character of the *Dipylon* workshop have also been discussed by Galanakis (2013) through a combined analysis of shape and decoration.

2.1.6 The 'Mycenaeans *versus* Dorians' debate

The 'Mycenaeans *versus* Dorians' debate in not relevant to this study; however, a brief mention is necessary as it shows how ceramic studies have been used to distinguish ethnic identities in Early Greece. As explained in Section 2.1.1, the debate whether Greek Early Iron Age styles related to indigenous or externally diffused inspirations began together with the first stylistic studies of the 19th century. From the early scholars, Helbig & Conze (1875) saw Indo-German and Phoenician influences; Furtwängler & Loeschcke (1876) saw Dorian invaders; and, Schweitzer (1917; 1918) saw connections with the Mycenaean past.

Kübler (1954) pioneered in an analysis of human remains which showed that the people buried at *Kerameikos* were no different than the previous inhabitants of Athens; therefore, no Dorian invasion could be proven based on skeletal evidence. However, Desborough (1964, 106-11) argued that by contrast to the homogeneity of pottery styles during Late Helladic IIIB, the emergence of diverse regional styles during Late Helladic IIIC (e.g. Submycenaean pottery) could be attributed to a new cultural group. Such peoples arrived in mainland Greece during the 11th century BC and were most likely the Dorians or invading *Herakleidai* of the Greek heroic past

(Desborough 1964, 106-11). By contrast to Desborough (1964), Schweitzer (1969) and Bouzek (1969) argued on the connection between Early Iron Age styles and Mycenaean ceramic traditions.

Snodgrass (1971; 2000, 48) explained that the Geometric style was not a new product that sprang after the decline of the Protogeometric, but it was its logical culmination (Snodgrass 1971; 2000, 48). By contrast to Desborough's (1964) theory of Dorian invasion, he (1971; 2000, 311-13) argued that there is no distinct differentiation between Mycenaean and Submycenaean cultures. Additionally, it is problematic to regard Submycenaean ceramic decoration different to Mycenaean, as both styles demonstrate continuity with Bronze Age traditions in the use of the potter's wheel. Such technological traditions continued in Protogeometric and Geometric times (Snodgrass 2000, 28-40). Still, a year later, Desborough (1972, 339) insisted in the clear break between Mycenaean and Submycenaean traditions during the first fifty years of the Dark Age and the arrival of new peoples in mainland Greece.

With regard to the invading Dorians, Hector Catling (1981) noted the popularity of a 'Barbarian ware' in the Peloponnese after the destruction of the Mycenaean palaces at the beginning of the 12^{th} century BC. This ware dated almost a century earlier than the Submycenaean style in Attica, yet Catling (1981) saw it as the product of new peoples. In later years, Hall (1997, 128-9) suggested that ethnic identity may not always be visible in the archaeological record. Morris (1999, 198-207) argued against Catling (1981) that instead of understanding changes in material culture as a result of migration of peoples with a different concept of identity, it is important to see such changes as a series of decisions connected to adaptation in new conditions. Indeed, Small (1990) had previously suggested that changes in pottery styles at the beginning of the Iron Age could have been due to the collapse of the centralised pottery production system of the Mycenaean palaces, also affected by changes in the broader economy. Even though the debate on the invading Dorians is now over, recent iconographic approaches on Early Iron Age finewares continue on stressing the connections between Geometric and Mycenaean art (Crouwel 2006; Dakoronia 2006; Güntner 2006; Hiller 2006; Iacovou 2006; Wedde 2006; Bouzek 2011).

2.1.7 Archaeological studies on Attic Early Iron Age society

This sub-section offers an overview of archaeological approaches on Attic Early Iron Age society. In must be clarified that not all approaches relate to the study of decorated pottery; however, they formulate the background of the discussion that will follow in Chapter 8, where the production and consumption of Athenian finewares will be correlated with the changing social demands of the Geometric and Orientalising periods.

The first attempt to produce a full archaeological volume on Early Iron Age decorated pottery was by Vincent Desborough (1952), who noted two important things: firstly, that the Protogeometric style was not homogeneous all across Greece but followed regional variations; secondly, that Athenian workshops exercised strong influence not only in Attica but also on many other Greek regions, with which they developed and maintained frequent contacts[20]. He was also the first to note the deliberate use of specific amphora shapes in relation to the gender of the deceased in Attic Protogeometric burial rites: neck-handled amphorae for males and belly-handled amphorae for females (Desborough 1952, 5-6). After him, Kübler (1954) noted the social significance of drinking vessels placed in separate trenches (*Opferrinnen*)[21] in Late Geometric adult inhumations at *Kerameikos*, and also the prevalence of miniature vessels in infant burials of the same period.

In the most extensive archaeological volume on *Greek Geometric Pottery*, Coldstream (1968) followed the discussion by Desborough (1952) on the local variations of Early Iron Age styles. Coldstream (1968, 332) argued that the existence of numerous -yet connected- Geometric styles across the Aegean showed that there must have been decentralisation after the collapse of the Mycenaean palatial system. Coldstream (1968, 332-3) saw a gradual move from the homogeneity of Mycenaean styles towards the variety and diversity of local Geometric styles, and rejected Desborough's (1964) views for a clear break of ceramic traditions during the 11th century BC. Despite regional diversity, however, he suggested that there must have been some sharing of ideas through the travelling of potters or through the export of pottery, which resulted to reproductions of foreign originals in local clays (Coldstream 1968, 332-4).

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[20] Protogeometric contacts and trade were investigated again by Murray (1975).

[21] A full discussion and summary of previous work on offering trenches has recently been published by Alexandra Alexandridou (2015).

Smithson (1968, 96) was the first to note the symbolic role of the shapes of Athenian decorated finewares and their possible connection to social class. She suggested that a long narrow ceramic chest with a lid surmounted by five model granaries in a row, placed in the Middle Geometric *Tomb of the Rich Athenian Lady* at *Areopagus*, was possibly the wealth badge of the *Pentakosiomedimnoi*. According Aristotle's *Athenaion Politeia (3, 1)*, this was the highest social class of early Athens (Smithson 1968, 96-7). Despite this interesting explanation, it is highly unlikely that the class system discussed by Aristotle existed in Athens during the 9th century BC.

The 1970s were a new period in Greek archaeology due to the contributions of Anthony Snodgrass (1971) and Colin Renfrew (1972). Archaeological interest gradually shifted from typologies and styles towards why and how complex social structures emerged from less complex tribal communities (Whitley 2001, 55). In his critique on previous studies on decorated pottery by Desborough (1952), Kübler (1954), Cook (1960) and Coldstream (1968), Snodgrass (1971) argued that they limited research in providing a relative chronological framework, in showing local differences in style and in describing some social and economic influences; however, once pots were used to shape the whole picture, this became dangerous (Snodgrass 1971; 2000, 27-8). Even though Snodgrass' (1971) contribution in ceramic studies was limited, he made a clear point that pottery could not be used as the sole mean of exploring the Greek past.

Similarly to Snodgrass (1971), Nicolas Coldstream (1977) produced a full publication on Greek Early Iron Age material culture. He (1977; 2003a, 107) examined the 'Greek Renaissance' of the Late Geometric era and suggested that there used to be a network of aristocratic patrons, who demanded gigantic vessels to stand on their graves. In his second edition of *The Dark Ages of Greece* Snodgrass (2000, 413-14) argued against Coldstream (1977; 2003a, 107) that the so called 'Renaissance' of Late Geometric figurative decoration was probably symbolic. The connections between material culture and aristocracy had also been discussed in a similar manner by Jeffery (1976, 101) for the Archaic period. Coldstream (1970; 2003a, 110) suggested that Late Geometric funerary vessels depicted scenes related to aristocratic social views and by the end of the Geometric period there was *"*a marked contrast in quality between large and small shapes, perhaps symptom of widening social distinctions" (Coldstream 2003a, 135). Coldstream (1977; 2003a, 295-302) also stressed the role of the Phoenicians and the Greek-Levantine contacts, which formed the ideological context to produce such artistic representations.

In his *Archaeology and the Rise of the Greek State*, Snodgrass (1977) introduced a new discussion regarding the rise of the Greek *polis* based on a study of settlements, cemeteries and demographic expansion. Snodgrass (1977, 19) argued that the regional uniformity of pottery decoration in large and thinly populated areas was the result of tribal organisation within the community. For example, the people of Early Iron Age Mycenae decorated their pottery in pretty much the same way as the people from Troezen (40 miles away), yet differently from the people of Kleonai (only 10 miles away). This pattern indicated communities based on tribes and kinship. By contrast, the uniformity of Attic styles of the 8th century BC, recovered in different cemeteries between *Anavyssos* and *Kerameikos,* was explained as the effect of the *polis*' urban core imposing its own popular styles on the people of its rural periphery (Snodgrass 1977, 19-20). In later years, Morgan & Whitelaw (1991) analysed the distribution of Argive pottery in the Argolid plain and concluded that the formation of the Argive *polis* and Argive hegemony were to be placed in the 8th century BC. Their conclusions contrasted with the views of Snodgrass (1977, 19), who saw diversity of ceramic styles in the Argolid plain during the same period.

Merle K. Langdon (1976) noted an increase of fine pottery during the late 8th/ early 7th century BC at the sanctuary of Zeus on Mt. Hymmetos near Athens, by contrast to pottery dedications of the previous three centuries. Snodgrass (1980, 104-5; 2006, 257-67) noted a similar increase in bronze dedications at others sanctuaries such as Delphi, Olympia and the Athenian *Acropolis* during the same era. He explained that during the rise of the Greek p*olis* ritual activity shifted gradually from burial sites to sanctuaries, which became the new focal point of local communities. In later years, De Polinac (1984, 84) argued that this did not necessarily imply an abandonment of competition amongst individual aristocrats, which was evident in burials of the Late Geometric. Instead, sanctuaries became an arena of externalised competition through which a more coherent social structure was about to emerge (De Polinac 1984, 84).

In 1987, Ian Morris published his book *Burial and Ancient Society*. He argued that the rise of visible burials during the Attic Late Geometric was not due to demographic expansion as previously suggested by Snodgrass (1977), but due to political struggles related to citizenship (more in Chapter 8). Major fluctuations in the archaeological record, particularly c.760 BC and 700 BC, were the result of competition amongst the nobles (*agathoi*) and the non-elites (*kakoi*), who did not always possess the same access to formal burial (Morris 1987, 94-6). In his opinion, the idea of the *polis* emerged during the 8th century BC as a result of social struggles in communities that were already highly stratified (Morris 1987, 1).

In his *Style and Society in Dark Age Greece*, Whitley (1991, 44) argued against Morris (1987) that his model of stratified society for Dark Age Athens presupposed the emergence of a slave-society in accordance to the Classical *polis* model as early as the 8th century BC. By contrast to the distinct political stratification suggested by Morris (1987, 1), Whitley (1991, 11) argued in favour of a rank social order similar to the Nuristan model described by Jones (1974). This model was the result of major social changes related to gender, wealth and status that began during the 9th century BC. Such changes gradually led to the rise of competing elites and finally to the collapse of elite ideologies during Late Geometric II (c.735 BC) (Whitley 1991, 182-3; more discussion in Chapter 8).

Furthermore, Whitley (1991, 182) suggested that male and female distinctions became visible in the Athenian archaeological record as early as the Protogeometric period, while they declined towards the end of the 8th century. In later years, osteological analysis of the material from the Tomb of the Rich Athenian Lady (c.850 BC) showed that the female occupant of the tomb was pregnant. In their analysis, Liston & Papadopoulos (2004) suggested that the tomb might not have associated with the female but with the neonate; therefore, they suggested that gender distinctions in Early Iron Age Athens might have been more complex than what we might think today. Finally, Langdon (2008, 63) argued against Whitley (1991, 182) that Late Geometric iconography implied a re-affirmation of gender distinctions around LGII, if not earlier.

With regard to Attic Geometric finewares, Whitley (1991, 11-12) saw that the shape and decorative elements of the pottery found in grave assemblages played important role in social demarcation. Certain types of vases and decoration were to be found only in Attic graves, and at the same time, not only the selection but the entire production of such vases must have been stimulated by the social requirements of the occasion and the interests of the buriers. The decorative forms of the pots were as much an outcome of social demand as they were of technical or artistic accomplishment. The course of development of style was therefore intimately connected with social changes and there was a social logic behind its development (Whitley 1991, 11-12). These points will be discussed in relation to the results of this study in Chapter 8.

With regard to 7th century BC finewares, Whitley (1994b) argued that the Orientalising style in Attica was rationed and used in high-status contexts and to liminal occasions (e.g. burial ceremonies). This use reflected a conservative and rather suspicious to the exotic society, but at the same time this society appeared attracted by and caught up in the Orientalising world (Whitley 1994b, 65). Prior to this study, Osborne (1988; 1989) had argued that the consumption of Orientalising finewares in Athens and Corinth differed due to the distinct social and political structures of the two *poleis*. Coldstream (1996) expanded this argument and noted further complexity in the patterns of fineware consumption through the study of Attic Geometric imports found in burials at Knossos and Lefkandi. All studies pointed out that fineware consumption during the Early Iron Age was subject to the different social notions that circulated among Greek regions.

Whitley (2000, 223) suggested a different perception of gender in the Athenian society during the 9th century BC. This distinct perception was expressed through the deposition of elaborate and highly symbolic artefacts in adult female graves, similar to those offered in adult male graves. In a re-evaluation of this phenomenon, Whitley (2015) added that this perception did not exist in any other places of the Greek Early Iron Age world, despite that characteristically Athenian artefacts used in such burials (e.g. belly-handed amphorae) were already exported in other regions such as Argos and Knossos. Attic rich female burials gradually disappeared during the late 8th century BC and by the beginning of the Archaic period, gender divisions complied with the general pattern noted in the rest of the Greek world: that between adult males and children (Whitley 2000, 229-30). Pappi & Triantaphyllou (2011, 721) noted similarities between Argive and Athenian Late Geometric burials, particularly related to the increase of subadults and neonates. They suggested an increase of social status and interest in the social identity of children, connected to the decrease of female burials in both regions (Pappi & Triantaphyllou 2011, 722).

Whitley (2000, 230) also argued that the disappearance of rich Athenian female burials in the late 8th century BC was not due to the rise of a collective male *hoplite* identity related to the first formation of the *polis*. As previously demonstrated by Osborne (1989) and Whitley (1994b), Athens was by no means a normal or progressive city during the 7th century BC. Instead, he suggested that this disappearance must be treated as a paradox (Whitley 2000, 230-1). By contrast, Langdon (2008, 242-4) argued that Late Geometric iconography implied the masculinisation and manhood ideology of the Athenian society during the middle of the 8th century BC in relation of the rise of the *polis*. This resulted to the establishment of male-defined social roles for females, projected through pictorial arts.

In relation to political structures and social power, Lemos (2006, 516) argued that Late Helladic IIIC and Submycenaean burials demonstrate that Early Iron Age Athens did not have an urban centre. Instead, it was divided in small villages, made up by members of the same lineage, each with a small amount of equal-in-status leaders. This fragmentation of the political landscape did not encourage funerary display to the same extent that this occurred in Lefkandi. The dependency on local resources in Athens led to a formalisation of funerary rites, by contrast to Lefkandi, where local competition and internal conflict occurred between power groups who tried to gain control of the entire region (Lemos 2006, 526-7).

At this point special mention needs to be made to the Greek Archaeological Services, which intensified their work during rescue excavations conducted from 1992 onwards, either for the construction of Athens' Metro and Tram network, or in relation to the preparations of the 2004 Olympic Games. Such excavations produced new assemblages of Attic Early Iron Age pottery, coming from graves and other deposits at central Athens[22], the Athenian suburbs and the broader region of Attica[23]. The material produced from such excavations offered evidence that challenged previous views on Attic Geometric society (Alexandridou, forthcoming), and

[22] Relevant publications include: Chatzipouliou (1992, 30); Orphanou (1993, 37; 1998, 68); Baziotopoulou & Drakotou (1994, 34); Eleutheratou (1997, 35); Zachariadou & Kavvadias (1998, 55); Kaza-Papageorgiou (2000, 105); Lykouri-Tolia (2001-4, 254-5); Iliopoulos (2001-4, 214-6); Tsirigoti-Drakotou (2001-4, 259); Pologiorgi (2003-9).

[23] Relevant publications include: Papangeli (1992, 36-8; 1997, 60; 1999, 87; 2004); Kyriakou-Zapheiropoulou (1993, 42; 1994, 48); Kaza-Papageorgiou (1993, 70; 2001-4, 473); Platonos-Giota (1994, 72; 1997, 90; 1999, 111; 2001-4, 404-5); Agallopoulou (1994, 76); Kakavogianni (1999, 115; 2001-4, 336, 344-5); Kakavogianni & Ntouni (2001-4, 340-1); Oikonomakou (2001-4, 375-6). Other studies on Early Iron Age Attica include the work of Muskalla (2002); Xagorari-Gleissner (2005) on the Geometric necropolis of Merenda; Vlachou (2010) and Charalambidou (2011) on wheel made finewares from Oropos; and Demetriadou (2012) on Athenian topography, cemeteries and habitation areas between the Submycenaean era and the end of the Archaic period.

particularly in relation to the *isonomia* that supposed to have existed in Attica towards the end of LGII, as this was originally supported by Morris (1987, 205).

More specifically, Laughy (2010, 49-53) argued that the increase and variability of LGII burials suggested that lower social classes were able to practise funerary rites that were previously restricted to the upper social classes, meaning the aristocrats. However, the existence of a class system according to the Marxist sense in Early Iron Age Athens is highly unlikely. In an older publication, Duplouy (2006) preferred the term social groups and questioned the existence of hereditary prestige among Athenian aristocratic elites. Furthermore, Laughy (2010, 49-53) argued that the LGII was characterised by an increase of social status among non-aristocratic groups, which probably gained power and wealth through various economic activities. This was more evident in the Attic countryside. In addition to this point, the analysis of ceramic evidence from the Geometric cemetery of Kiphisia by Schilardi (2011) raised considerations whether there was a form of LGII *isonomia* that could prove Morris (1985, 205). Based on the burial patterns, Schilardi (2011) argued that the elites of the periphery of LGII Athens probably maintained their status and power compared to those buried in central areas such as *Kerameikos*.

Coldstream (2011) offered a new perspective in the function of Geometric pottery in Attic burials. He argued that the enlargement of ceramic funerary vessels in Athens during the Late Geometric period was combined with the idea that the pot was meant to be the final resting place of the person associated with the grave; therefore, the pot should have been produced at a full human size. This idea continued during the Archaic period, only then, ceramic vessels were replaced by equally large marble *stelae*. Furthermore, during LGII there appeared an increase of large grave markers outside Athens. By contrast to the increasing economic power of peripheral elites suggested by Laughy (2010, 49-53), Coldstream (2011, 804) attributed this phenomenon to the colonisation of the Attic countryside by noble Athenians. A different 'colonisation' of the Attic countryside was suggested in an iconographic analysis by Vlachou (2011b), who detected a regional originality of Attic Geometric vases from Marathon. Vlachou (2011b, 822) argued that sometime between LGIb and LGIIa there was a movement of Athenian craftsmen towards the countryside, which coincided with the rise of rural elites suggested by Laughy (2010) and Schilardi (2011).

A major problem in the study of Attic Geometric finewares until nowadays is that scholars tend to connect them with burials. This produces the wrong impression that ceramic studies are useful in understanding society only in relation to its funerary practices. In fact, there is little interest in seeing whether such vessels could have related to other -more practical- commercial or social functions outside burials, which would have also added to our existing knowledge on fineware production. In a recent study, Simantoni-Bournia (2011) questioned functionality and pottery consumption in Geometric Athens, and demonstrated that potters shifted from established consumer demands to personal experimentations. This was noted with regard to the production of playful vessels such as multi-storeyed *skyphoi,* the function of which is still unknown. Aim of this thesis is to offer another perspective by examining Geometric and Orientalising finewares as technological products. Still, before doing so, it is important to present a general overview on the study of Attic Early Iron Age ceramic technologies.

2.2 TECHNOLOGICAL STUDIES ON ATTIC EARLY IRON AGE CERAMICS: A GENERAL OVERVIEW

Early studies on Greek ceramic technologies, in general, were based on simple macroscopic techniques and focused mainly in clay properties and decoration equipment. Desborough (1952, 119-21) was the first to describe Submycenaean clays as moderately well prepared and baked. Protogeometric clays were identified as light brown, well prepared with few impurities, and baked hard (Desborough 1952, 119). In a similar way, Submycenaean paints were characterised as dull and Protogeometric paints were described as brown-black, spread on a surface previously smoothed with a wash. Protogeometric vessels were fired at high temperatures until their paint acquired a “metallic sheen” (Desborough 1952, 119). Finally, Desborough (1952, 120; 1972, 145) argued that the greatest advancement of the Protogeometric era was the “swiftly turning wheel”, which produced harmonious, light and balanced shapes.

Perhaps as a result of the general stylistic approach in ceramic studies of the 1950s, Desborough’s main concern was the identification of decorative technologies through the analysis of Protogeometric motifs. He was the first to identify that the concentric circles on Protogeometric vessels were drawn with the use of compass multiple brushes (Desborough 1952, 79). A full analysis of this technique was later discussed by John Boardman (1960) and was also included in the study of the Protogeometric style by R.M. Cook (1960; 1997, 8). Schweitzer (1969, 22-8) suggested that the decorative elements of Mycenaean traditions passed on Protogeometric and Geometric art together with pottery manufacturing techniques such as the fast wheel and the pivoting brush, which survived the Dark Ages.

By contrast to Desborough (1952), Harrison Eiteljorg (1980) questioned the use of compass multiple brushes in the Protogeometric period and demonstrated their problems when used on curved surfaces through experimental methods. Eiteljorg (1980) argued that if they existed, such tools were probably not used for drawing circular motifs. Papadopoulos *et al*. (1998) conducted a similar study by comparing groups of concentric circles from Mycenaean and Protogeometric vessels, and by producing their own experimental work. They argued against Eiteljorg (1980) that the compass multiple brush not only existed for painting concentric circles but also Desborough's (1952, 79) observations were right. The use of new technologies in pottery production in Athens, Knossos and Lefkandi during the 11th and 10th centuries BC were later summarised by Lemos (2002, 101-3).

Despite the broader preference in simple macroscopic techniques in the study of Early Iron Age ceramic technologies, the birth of archaeometric analysis in Greek ceramic studies was also in the 1960s. Before Leroi-Gourhan and Lechtman established the idea of the *chaîne opératoire* in archaeology (see Chapter 3), Josef Noble (1960; 1966) and R.M. Cook (1960; 1997, 231-7) were the first to describe the full operational sequence of ancient Greek ceramic production. Their discussions were mainly based on textual sources and iconographic evidence from the Archaic and Classical era, depicting potters and painters at work (see Stissi 2002; Chatzidimitriou 2005). R.M Cook (1960; 1997, 231-7) identified the steps of the standard process followed by ancient Greek ceramic workshops and used the term 'technique' as opposed to technology to discuss clay selection and levigation, forming and decorating practices, and finally the three-step firing cycle (oxidisation-reduction-reoxidisation). The three-step cycle was later analysed with scientific microscopic techniques by Tite *et al*. (1982). Finally, Noble (1960; 1966) examined the ceramic operational sequence through experimental methods and ethnographic analogies. He discussed the effect of different chemical element concentrations in paints in relation to the three-step firing cycle, and was also the first to investigate Attic ceramic vessels with the use of X-ray radiography (Noble 1966).

Archaeometric studies on Attic Early Iron Age pottery expanded after the 1970s. Compared to other archaeological and iconographic approaches of the same period, they were relatively few and restricted to the investigation of provenance, most of which summarised by Jones *et al*. (1986). Apart from provenance studies, few approaches focused in the investigation of firing temperatures (e.g. Maniatis & Tite 1981; Tite *et al*. 1982; Schilling 2003).

For Athens, chemical analyses proved the existence of at least four different clay sources in the local area: firstly, the red fine-textured *Amaroussi* clays, identified with the use of Wet Clay Analysis and Optical Emission Spectroscopy by Farnsworth (1964; 1970) and Noble (1966), later revised by Fillieres *et al*. (1983). Secondly, the *Cape Kolias* pale red clays that were quarried near the coasts of Agios Kosmas, examined by Gautier (1975) with Thin Section Microscopy and X-Ray Diffraction. Finally, the *Iera Odos* and the *Koukouvaounes* clays studied by Farnsworth (1970) through X-Ray Diffraction. These four clay sources and their combinations characterised Attic pottery production from its early stages, including Protogeometric, Geometric and Orientalising times. Additional research on Attic provenance of 6th century BC vessels was produced by Boardman & Schweizer (1973) with the use of Optical Emission Spectroscopy (more in Chapter 7).

In the case of exported pottery, archaeometric approaches were used to examine the distribution of large Attic vessels, revealing social contacts and trade. Jones (1979) mapped the typical composition of Attic Late Geometric and Orientalising finewares with the use of Optical Emission Spectroscopy. This composition was compared to suspected Athenian imports at Megara Hyblaea proving the commercial contacts between the two cities. Attic trade has also been investigated through SOS transport amphorae, which were in use between LGI and the first half of the 6th century BC. Their large distribution in the Mediterranean (e.g. Italy, Sicily, Spain, Morocco, Al Mina and Istria) was ideal to investigate the scale of Attic trade and its possible trade roots. However, back in the 1970s Chalkis was thought to have produced similar vessels and it was not clear whether Chalkis was involved in the same trade network. Confirmation tests with the use of Optical Emission Spectroscopy (Johnston & Jones 1978; Tréziny 1979; Jones 1979), X-Ray

Fluorescence (Stern & Descoeudres 1977), and Wet Clay Analysis (Bouchard 1971) demonstrated that the 'Chalkidian' amphorae belonged to Attic clusters. Few samples that were considered 'Attic' were found to be of non-Attic and non-Chalkidian origin (Jones *et al*. 1986, 706-12).

With regard to Late Geometric decorated finewares, Gautier (1975, 43-4) conducted Thin Section Analysis and argued that the *Dipylon* fabric was a deliberate mixture of a red plastic clay and a marly clay. By contrast, the clay for the majority of Archaic finewares from Athens was phyllitic; therefore, their fabrication recipe was different compared to the one from the Geometric period (Gautier 1975, 37-8).

Liddy (1996) argued that distinct fabrication practices existed in Athens even earlier than the Late Geometric period. His study on large Attic amphora imports at Knossos with the use of Atomic Absorption Spectroscopy verified the presence of two distinct composition clusters, in which the samples belonged to specific chronological groups: cluster 3/4 contained predominantly Protogeometric to Middle Geometric samples (10^{th} and 9^{th} centuries BC), while cluster 3/5 contained Middle Geometric to Late Geometric samples (8^{th} century BC). Liddy (1996, 488) argued that the instances of Knossian and Attic materials resolving into multiple composition groups could be due to three factors: a) the exploitation of similar clay beds in both regions; b) the wide natural variation in clay compositions within the same region; and c) the effect of different potters' practices in preparing the clay (Liddy 1996, 488-9). Furthermore, recipe differentiations in Attic Geometric fabrics could indicate two possibilities: firstly, a single production centre exploiting different clays over time, and secondly, a spatial variation in which the earlier groups represented Athens and the later groups represented one or more different workshops (Liddy 1996, 489).

Eleni Hasaki (2002, 220-5) discussed shape, size and capacity of Early Iron Age kilns from Torone, Lefkandi and the Athenian *Agora*. She argued that monumental funerary vessels of the *Dipylon* tradition would have barely fitted in an average Geometric kiln; therefore, their production was seasonal (possibly once a year) and practised individually for a limited number of vases (Hasaki 2002, 224). Stissi (2002) discussed the organisation of fineware production in Attica during Late Archaic and Classical times, and argued in favour of a market system connected to the consumption of decorated pottery (more in Chapter 3).

With regard to spatial distribution, Papadopoulos (2003, 5) argued that the large presence of production debris in Geometric wells (e.g. test pieces for kiln control) suggested that the area of the later Classical Athenian *Agora* was filled with pottery workshops and kilns during the Early Iron Age. Furthermore, he suggested that the *Acropolis* was probably the only settlement during that time (Papadopoulos 2003, 297-316)[24].

Sara Strack (2007, 215-22) discussed migration though the consumption patterns and *chaîne opératoires* of Late Bronze Age and Early Iron Age hand-made coarse wares, including Attic Late Geometric cooking pots. Strack (2007, 244-6) argued that the production and consumption patterns during the transition between the Late Bronze and Early Iron Age cannot be attributed to a population movement; therefore, ceramic evidence does not support any theory connected to migration.

Other archaeometric studies on Early Iron Age ceramics include a comparison of slips with the use of portable X-Ray Fluorescence between East Attic Late Geometric pottery (from Merenda, Anavyssos, Koropi, Pallene and Oropos) and pottery from Eretria, Thera, and Naxos (Aloupi & Kourou 2007). The recovery of large quantities of Attic Early Iron Age ceramics over the last decade has triggered an interest in new approaches and experimentations for the application of quantitative methods in the study of archaeological contexts (Verdan *et al*. 2011). With particular reference to Attica, Gros (2007) and Vlachou (2011a) produced quantitative studies for fine wheel-made pottery coming from workshop and household deposits at Oropos.

McLoughlin (2011) conducted technological analysis and revealed the assembling processes and techniques used in the production of large Geometric *pithoi* at Zagora in Andros. She described the *chaîne opératoire* of complex ceramic forms[25], the regional diversity of large storage vessels, their production techniques and their functional characteristics (McLoughlin 2011).

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[24] By contrast to Papadopoulos (2003), other scholars have suggested that: a) Early Iron Age Athens was made by an agglomeration of houses and burials instead of workshops (Snodgrass 1980, 28-31; Morris 1987, 62-5, Lemos 2002, 188; 2006, 524; Mazarakis Ainian 2007-8, 386-8; D'Onofrio 2007-8); b) the Athenian *Agora* was uninhabited before the 6th century BC (Camp 1992, 24, 33; Townsend 1995, 12); and c) the *Acropolis* was uninhabited between the Protogeometric and Middle Geometric period (Gauss & Ruppenstein 1998, 27-30, 43-5).

[25] The term complex ceramic form is used to describe pottery produced in more than one constituent vessel parts. It also relates to partonomy (*sensu* Van der Leeuw 1994, 136-7), which is explained in Chapter 3.

In the most recent provenance study, Mazarakis Ainian & Vlachou (2014) examined Attic 10th and 9th century BC drinking vessels from Oropos with the use Neutron Activation Analysis. They argued that even though a small group of pottery belonged to Athenian imports, the majority of the material found at Oropos originated from Euboea (Mazarakis Ainian & Vlachou 2014).

Finally, Rik Vaessen (2014) argued that archaeologists need to rethink the production of Attic Submycenaean and Protogeometric vessels by considering the broader impact of technological change and innovation during the 11th century BC. Future research needs to move away from traditional stylistic approaches and archaeologists need to consider the practical parameters of pottery-making. These relate to the gradual learning processes for developing skills, cross-craft specialisation (e.g. skeuomorphism) and technological innovation in the introduction of new tools (e.g. the multiple pivoting brush) (Vaessen 2014).

2.3 PROBLEMS AND CRITIQUE OF PREVIOUS APPROCHES ON DECORATED FINEWARES, AND CURRENT UNDERSTANDING OF ATTIC EARLY IRON AGE SOCIETY

The initial interest of Attic Early Iron Age archaeology in ceramic typologies and styles, which began in the late 19th century by scholars of the 'German Tradition' (*sensu* Whitley 2001, 32-6), is perhaps responsible for the broader interest in art and iconography, which flourished after World War II and continues until nowadays. The vast majority of such iconographic studies aimed in the analysis of Late Geometric and Orientalising figurative representations, which generated a gap in the archaeological understanding of periods without figural art, such as the Protogeometric, Early and Middle Geometric. Furthermore, this prevailing focus on iconography has generated confusion, as the Late Geometric period monopolises scholarly interest in the broader discussion on Geometric society. A manifestation of this problem is seen in the recent debate between Langdon (2006; 2008) and Whitley (1991; 2000): although Whitley examines social changes in relation to gender through archaeological evidence from the Protogeometric until the Orientalising period, Langdon's critique and basic arguments are only backed up in relation to the iconography of the Late Geometric.

Iconographic studies focused on Homer (e.g. Hampe 1952; Webster 1955; Notopoulos 1957; Whitman 1958; Schweitzer 1967) created a legacy that manifests in the long lasting debate regarding 'heroic *versus* mythical' aspirations of figurative decoration. This debate is evident in the work of John Boardman (e.g. 1983; 1998) and Jeffery Hurwit (e.g. 1985; 2011), and still carries on. Again, the debate is limited in the figurative representations of the Late Geometric period and makes someone wonder how useful may that be in the broader understanding of Early Iron Age society. And how different may heroic or mythical representations be, especially if these were simultaneously used for the creation of an elite/aristocratic ideology?

The studies on the birth of Western 'illusionism' (e.g. Gombrich 1962; Benson 1970; Carter 1972; Hurwit 1985) and the broader view of the Late Geometric as the 'Greek Renaissance' (by Coldstream 1968; 1977; 2000) have generated some interesting points in relation to the broader evolution of pictorial arts in Europe. Seeing, though, that the entire discussion began right after World War II, it makes one wonder what the political parameters behind such debate. Of course, it is not the intention of this thesis to engage in such discussion, as the concept of art will not be examined in relation to ceramic technologies.

A useful and practical application of iconographic analysis in the study of Attic Early Iron Age finewares is connoisseurship. Its methodology has been applied in discussing chronology (e.g. Cook 1935) and ceramic production through the identification of Geometric and Orientalising workshops (Cook 1947; Davison 1961; Coldstream 1968; Morris 1984; Coulié 2013; 2014; 2015). No matter how useful this methodology is, there are four issues that require further attention. Firstly, that the entire discussion on workshops has been limited in the Late Geometric period while the contribution of connoisseurship in the identification of 7th century BC workshops is limited. Secondly, that the chronological sub-divisions of the Late Geometric cannot be cross-referenced with scientific methods and the dates followed by connoisseurs are stylistic. Thirdly, that the methodology of connoisseurship focuses in the identification of systems of rendering, which are supposed to relate to the identity of a specific painter. What happens, though, if after several years of apprenticeship, a painter decides to adopt the rendering systems of another painter, or consciously modify his/her own? Fourthly, that connoisseurship identifies painters and not potter; so, could workshops be defined solely on the work of painters? This question will be discussed further in Chapters 3 and 8.

The contribution of stylistic studies in establishing a chronological framework for the Geometric and Orientalising periods must not be neglected (e.g. Cook 1935; Kraiker *et al*. 1939; Kübler 1954). An equal amount of credit must be acknowledged to the first scholars who produced synchronisms with various contexts across the Eastern Mediterranean (e.g. Desborough 1952; 1957; Coldstream 1968); however, one must not forget that their broader chronological discussion was again stylistic. It is not always certain if ceramic styles relate to actual chronological periods; therefore, Early Iron Age chronology may worth revisiting in the future. A general problem in verifying chronologies for the Greek Early Iron Age is that scientific methods such as dendrochronology and radiocarbon (^{14}C) are biased for two reasons: firstly, due to the problem of the Hallstatt Plateau, and secondly, due to the simultaneous existence of a high ('biblical') and a low (conventional) chronological system (Coldstream 2003c). For Attica in particular, the most recent study with the use of radiocarbon dating (Fantalkin 2015) verifies the conventional dates produced by Coldstream (1968, 330), but only until MGI.

Another problem is that the Orientalising period is underexplored. Stylistic and typological studies have shown that Orientalising finewares reflect the influence of Near Eastern traditions in Greek Early Archaic ceramic production, which blended together with preceding Geometric traditions (e.g. Coldstream 1977; Snodgrass 1980). Furthermore, our understanding of 7th century BC Attic society is limited in the works of Morris (1987), Whitley (1991; 1994b; 2000) and Osborne (1988; 1989). Primary focus of such scholars is the Early Protoattic period, either in relation to the transformations that occurred after the end of the Late Geometric (e.g. gender or political restructure), or in relation to the social and political ideologies that existed between Athens and other *poleis* (e.g. Corinth, Knossos, Argos). Morris (1984) expands this discussion in the Middle and Late Protoattic period; however, Whitley (1994b) suggests that her study is unlikely to relate to actual Athenian ceramic vessels.

In relation to the studies on elite ideology of the Geometric period (e.g. Coldstream 1977; Snodgrass 1987; Morris 1987; Whitley 1991), a major problem is that they connect the consumption of Geometric finewares with burials. Even though this is true when discussing burial contexts, it produces the wrong impression that ceramic studies can only interpret Attic Early Iron Age society in relation to its funerary practices. It remains an interesting question what the ideological concept of such vessels in relation to other -commercial or social- functions outside burials. And again, was the consumption of Attic decorated finewares restricted to the rituals of aristocratic elites? This may not have always been the case, as archaeologists cannot be entirely sure if decorated ceramic vessels were also purchased and consumed by non-elite groups. With regard to this point, Langdon (2008) makes an important contribution, suggesting that the iconography on such vessels exploited every-day themes in order to transmit social messages for the construction of gender ideologies; therefore, the social function of such vessels might not have been restricted to elite burials.

Our current understanding of Attic Early Iron Age society is constantly adapting in the light of new evidence. Snodgrass (1977, 19-20) saw that the regional uniformity of Geometric pottery in Attica could be connected with the increasing power of the Athenian *polis*, imposing its distinct ceramic style on its rural periphery; however, Morgan & Whitelaw (1991) proved that similar uniformity can also be noted in other regions of the Greek world. Morris (1987, 205) saw a form of *isonomia* expressed through Attic LGII funerary rites; however, under the light of recent funerary evidence, Laughy (2010), Schilardi (2011) and Alexandridou (forthcoming) have raised doubts that this *isonomia* existed, pointing to the arguments by Whitley (1991, 182-3) regarding the collapse of elite ideologies in Attica during that time. The gender debate between Whitley (1991; 2000) and Langdon (2008) suggests that either current archaeological and iconographic approaches are not compatible and cannot produce the same conclusions, or a different approach is required due to the complexity of gender distinctions in Early Iron Age Attica (e.g. in Liston & Papadopoulos 2004).

This thesis is perhaps tuned in the technological approaches discussed in section 2.2. However, such approaches are equally problematic as others. The broader problem in technological studies on Attic decorated finewares is that they have been carried out independently and they have never engaged in the archaeological debate on Early Iron Age society[26]. With particular reference to Athens, even though archaeological studies have pointed out social changes in

[26] The study by Strack (2007) on migration during the transition from Bronze to Iron Age is an exception.

relation to burial customs and pottery consumption between the 9th and 7th centuries BC, the social response of the ceramic *chaîne opératoire* remains unknown. By contrast, pottery production and its social role has been approached though stylistic and iconographic studies, which have undermined the role of the potters as opposed to the role of the painters. Even though the distinction between the two artisans is not always possible, the prevailing focus in the ideological and symbolic role of Late Geometric figurative decoration has created two broader gaps in our current knowledge: firstly, pottery production modes during periods without figurative decoration are unclear; secondly, the behaviour and social attitude of potters is still unknown. This thesis aims to cover these gaps through an application of the *chaîne opératoire* approach in pottery analysis.

CHAPTER 3: CHAÎNE OPÉRATOIRE THEORY AND CURRENT METHODOLOGY

Theoretical approaches in social sciences have stressed the importance of material culture in constructing social relationships, identities and ideologies (Bourdieu 1977; Appadurai 1986; Miller 1987; Dobres 2000). Archaeology itself engages in the study of the past by using material culture as a mean, through which it attempts to explain the behaviours of people in past societies (Hodder 1986). The analysis of the *chaîne opératoire* (or operational sequence) is a theoretical tool connected to the cycle of production and consumption of any form of material culture, which aims to elucidate social aspects of human technical behaviour. With particular reference to ceramics, the *chaîne opératoire* is a complex process. It not only includes a number of technical steps (see Rice 1981; 1987, 1991; Rye, 1981) potentially tied to various social notions, but also the entire consumption cycle (e.g. commissioning, purchase, use, disposal and often reuse), which is tied to a number of equally important social parameters. This chapter discusses some aspects of the *chaîne opératoire* theory, which are then incorporated in the methodology of the present research project.

This chapter is divided in two sections. In the first section (3.1) there is a general introduction to the *chaîne opératoire* theory, also discussing problems related to its practical application in the study of archaeological ceramics. This section argues that the concept of technological choice in pottery production is directly observable on the final archaeological product; therefore, it can be isolated and studied in order to understand the potter's behaviour and the social and cultural aspects involved in pottery production. The first section also includes a thorough discussion about the information we actually know about Attic Early Iron Age ceramic *chaîne opératoires*. This discussion not only shows our lack of evidence and current misconceptions, but also argues that the ideas of artefact variability and standardisation can be borrowed from the *chaîne opératoire* theory in order to elucidate some areas of Attic fineware production that still remain unclear. The second section of this chapter (3.2) presents the methodology and the archaeological material used in this study. The terminology explained in Section 3.1 is incorporated in the methodology of the present research, which is laid out in detail in relation to four broader areas of analysis. These are: metrical features, proportions, fabrics and decorative technologies. Lists summarising the archaeological material of this project are given at the end of Section 3.2, while a detailed artefact catalogue is laid out in Appendix 1.

3.1 THE CHAÎNE OPÉRATOIRE THEORY

3.1.1 A brief introduction to the *chaîne opératoire* theory

The term *chaîne opératoire* derives from the ideas of the French ethnologist Marcel Mauss (1935), who was the first to explore how *savoir-faire* was passed from one generation to another through a system of kinship and apprenticeship. He argued on the importance of understanding technical acts as they unfold, and the process of becoming of an artefact inside the social milieu, through which it receives specific social meaning (Dobres 1999, 127). These ideas along with the whole concept of the *chaîne opératoire* were introduced in archaeology during the 1960s by André Leroi-Gourhan (1964; 1965; 1993), followed by Heather Lectman (1977; 1979; 1984). The original interest of archaeologist who first focused on the *chaîne opératoire* approach was the study of Palaeolithic flint industries. In later years, Leroi-Gourhan's views on the *chaîne opératoire* shifted the interest of researchers from the study of morphology, typology and function of artefacts towards their dynamic "life-histories" (Dobres 1999, 127).

Nowadays, the term *chaîne opératoire* is understood in a double sense: firstly, it refers to a range of practically applied processes in which naturally occurring raw materials are selected, shaped and transformed into usable cultural products (Cresswell 1983; 1990, 46; Delaporte 1991**;** Sellet 1993; Dobres 2000; Schlanger 2005, 25). Secondly, it is used to describe a production sequence in which every technical act is also a social act (Lemonnier 1980; Leroi-Gourhan 1964, 1965, 1993; Cresswell 1972). Additionally, it has become clear along the years that the *chaîne opératoire* theory cannot be confined to the study of prehistoric lithic artefacts, but it can be used more widely in other archaeological fields and material studies.

As is has been argued by Mauss (1935; 1973) and Leroi-Gourhan (1993), in the operational sequence of production the participation of the human body is the major component of the transformation process of raw materials. Together with that, the production of any material culture requires a level of technological knowledge within the society, connected to a range of technologically defined choices (Sillar & Tite 2000, 2-3). Normally technologies are perceived as functional; however, anthropologists and sociologists have emphasised that technologies play an important social, ideological, cultural and economic role at the same time[27]. Nowadays, it is generally accepted that the complexity of technological choices cannot be understood without reference to their social significance[28].

In pottery production, contemporary *chaîne opératoires* have been examined through systematic ethnographic research (e.g. Rye, 1981). Such research has proven that the availability of natural resources and the environmental factors involved in ceramic production are in constant interaction with technological decisions that are based on cultural choice (e.g. Gosselain 1992; 1994; 1995). Technical variants are not always an issue of exploiting the best available options, for example minimising the cost by maximising the efficiency, but more often they appear to be an issue of pure social choice (Mahias 1993). Technological styles are in continuous relationship with aspects of social identity (Gosselain 2000). Pottery making has a strong symbolic prominence and pottery production can be connected to a series of other activities, which can often serve as metaphors, explaining aspects of human experience or ritual behaviour (e.g. Barley 1983; 1994). Finally, potters' behaviours can be influenced by the broader symbolic context of the society inside which they interact and the steps of the *chaîne opératoire* can become the locus of a symbolic discourse (Gosselain 1999).

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[27] See Lemmonier (1986; 1992; 1993); Bijker *et al.* (1987); Ingold (1988; 1990); Pfaffenberger (1988; 1992); Latour (1991; 1996); Law (1991).

[28] See Leroi-Gourhan (1964, 1965); Lectman (1977; 1979; 1984); Schiffer & Skibo (1987; 1997); Schlanger & Sinclaire (1990); Sinopoli (1991); Schiffer (1992); Dobres & Hoffman (1994; 1999); Van der Leeuw (1991; 1993); Schlanger (1994); Gosselain (1992; 1994; 1995; 1999; 2000); Stark (1998); Dobres (1999; 2000).

3.1.2 Practical problems regarding the application of the *chaîne opératoire* theory in the study of archaeological ceramics

Practically, the successful application of the *chaîne opératoire* theory in the study of archaeological artefacts is challenged by various obstacles. A major problem in the field of ceramic studies is that most approaches on the *chaîne opératoire* depend highly on ethnographic research[29] on contemporary pottery production (e.g. Peacock, 1982). Orton *et al*. (1993, 17) also argue that the large amounts of contemporary written evidence for pottery production of historical periods have contributed greatly on our knowledge on organisation and modes of production, although these approaches are not usually regarded as ethnographic evidence.

Ethnographic research is not necessarily problematic and until today it has played important role in understanding the combinations of economic, technological, ideological and social parameters involved in the ceramic production sequence. Ethnographers and ethnoarchaeologists are privileged to record technological choices, knowledge and skill inside the production context "as the process unfolds" (David & Kramer 2001, 141). Simultaneously, they observe the social notions and messages that are transmitted through artefacts in a chronologically contemporary consumption context (e.g. Barley 1994). Problems begin when pottery is discovered inside the archaeological context, where the potter and the broader society are unfortunately not there.

The first issue to consider in the study of contemporary ceramic *chaîne opératoires* is that production is viewed either as industrial (mass production) or 'traditional' (e.g. Peacock 1982; Rye 1981). Ethnographic studies prefer to focus on modes of production that still use materials and techniques that have not been completely altered by modern technological development. It remains questionable how well these ethnographic approaches on contemporary modes of production fit the operational sequence models of past societies. And if this is the case, then in which contexts? According to Van der Leeuw (1991, 13), if archaeologists are to realise their avowed aim of reconstructing the process of how people made decisions in the past, they will have to stop looking back from their present position in time,

[29] For ethnographic work on Greek ceramic workshops see: Casson (1938; 1951); Rieth (1960); Hampe (1962); Hampe & Winter (1962; 1965); Voyatzoglou (1984); Cuomo di Caprio (1982; 1985; 1991; 1995); Blitzer (1984; 1990); Jones (1986, 849-880); London (1989); London *et al*. (1989); Schneiber (1999).

trying to recognise which patterns of the past are still used in the present. By contrast, they will have to travel back in time and look forward with those people who they study at the moment (Van der Leeuw 1991, 13).

A second issue to consider is that in a contemporary society it is rather obvious that the context of production is the same as the context of consumption. However, this correlation is not necessarily valid for the case of past societies. Archaeologists are aware that artefacts have several connected afterlives; they tend to travel through time, while they are likely to be used differently each time in each afterlife (Gosden & Marshall 1999). In ethnographic research the idea of a pot's afterlife is completely absent. Artefact reuse or discard are expected to happen in the future; therefore, they will be explored by somebody else. For the archaeologists, however, reuse and discard are two important sources of information that must be taken into account.

A third issue to consider is how one can find a secure way to exchange data between a modern and an ancient ceramic *chaîne opératoire*. What may be happening similarly or differently between those two contexts? The popularity of the *chaîne opératoire* theory in the study of prehistoric lithic artefacts can be cross-referenced in a variety of studies produced along the years by Japanese, French and American theoretical schools (Bleed 2001). Unfortunately, the same variety of approaches does not seem to exist in the study ceramic artefacts, especially to those from historical times. Additionally, the practical study of pottery production from historical periods requires the creation of typologies through classification and categorisation of the ceramic material. The term is generally described as taxonomy and according to David & Kramer (2001, 157- 62), it can either be etic or emic. In the first case, researchers employ devised typologies to resolve specific problems related to artefacts, such as temporal relationships, cultural affiliation, community styles, trade and technology (Hayden 1984, 82). In the second case, researchers accept folk classifications that are widely encountered in ethnography, which are used by common people, they are subject to changes through time and they are orally and informally transmitted from one generation to another (Kempton 1981, 3). A main problem in investigating *chaîne opératoire* models in ancient pottery production is that even though ethnology follows folk classifications of the emic approach, classical archaeology follows devised typologies that stand between emic and etic. For example, John Beazley (1927-8) notes that the shape that is nowadays described as an *aryballos*, in antiquity it might have also been called *lekythion*. In that sense, it is not entirely sure if the pseudo-emic typologies followed by Classical archaeologists are the exact emic typologies of the past.

Any approach on ancient ceramic *chaîne opératoires* could incorporate information from ethnographic research, even though an amount of caution is required. Furthermore, researchers need to bear in mind that pseudo-emic typologies are the only available since the 19th century, especially in Greek Early Iron Age studies; therefore, approaches need to incorporate these instead of ethnographic folk classifications. The final products of ceramic workshops need to be viewed as the result of successive technological choices subject to a series of social choices, also controlled by the potter's behaviour.

3.1.3 Technological choices in pottery production: what, who and how?

In pottery production, each technological choice is co-depended on a series of other technological choices, which form together a particular *chaîne opératoire* that produces a ceramic vessel with specific properties and performance characteristics. (Sillar & Tite 2000, 5). According to Sillar & Tite (2000, 4), in pottery production there are five areas of choice within every technology, which relate to raw materials, tools, energy sources, techniques and finally sequence. Techniques are used to orchestrate raw materials, tools and energy sources under the participation of the human body. The sequence is the actual *chaîne opératoire* that links these acts together, transforming raw material into consumable products. Sequence includes "the order of the techniques, the frequency with which they are repeated, and the locations at which they take place" (Sillar & Tite 2000, 4). The location where ceramic production takes place is based on the proximity to natural resources (e.g. clay, fuel, tempers, water, etc.) and the mode of production (e.g. household, workshop, manufactory, etc.), in conjunction with the amount of specialisation required for each step within each production mode (Rise 1981, 1991; Peacock 1982; Arnold 1985; Costin 1991, Sillar & Tite 2000).

Tim Ingold (1990, 7) distinguishes technology and technique according to their different properties: technique is embedded in the shaping of particular things, while technology consists of a knowledge of objective principles of mechanical functioning, which do not relate to the identity of their human carriers and their context of application (Ingold 1990, 7).

In this sense, technological choices in pottery production are linked together in the *chaîne opératoire* through the sequential application of different techniques that are connected to the professional experience and skill of the potter.

Ingold (1990, 8) rejects the commonly supposed view that "where there are techniques there must be technology, for it skill lies in the effective application of knowledge, there must be knowledge to apply". According to him, it is the direct and practical contact with materials (mediated or not by some tools) that is entailed in the process of creative work, where technical knowledge is gained as well as applied. Thus, skill is both a form of knowledge and a form of practice or in his own words "a practical knowledge or a knowledgeable practice" (Ingold 1990, 8). Moreover, as a form of knowledge, skill is different from technology. Skill is a tacit, subjective, context-dependent, practical 'knowledge how', acquired through observation and imitation rather than verbal instruction. Technological knowledge, by contrast, is explicit, objective, context-independent, discursive 'knowledge that', encoded in words or artificial symbols that can be transmitted by teaching (Ingold 1990, 8).

Having clarified what consists of technological choice in relation to the *chaîne opératoire* and what is technological knowledge by contrast to technique and practical skill, it is time to define *who* makes technological choices in pottery production. According to Sillar & Tite (2000, 9-11), the word 'choice' suggests some kind of agency. In the process of choosing, potential alternative techniques are rejected in order to favour the technique that will be finally used. This agency may be lying in the hands of an individual person; however, this person is most unlikely to be traced in the archaeological record. Instead, archaeologists are looking at a whole group of manufacturers or a whole society and the way they adopt a certain technique by contrast to other available options. What is observed is an interaction between individual choices and cultural choices (Sillar & Tite 2000, 9-11). Under this frame Sillar & Tite (2000, 10) introduce the term technological tradition, which is described as an "active interplay between the conservative force of 'cultural choice' and the innovative nature of 'individual choice'".

A similar mechanism of choice appears in selecting techniques. According to Van der Leeuw (1993) different techniques can be used in different ways for producing the same result. For example, the base of a pot can be formed by using coiling, moulding, throwing or beating with a paddle on anvil. Potters, however, are not always aware of all their available choices. They usually employ a limited number of techniques, the majority of which are used inside a traditional frame and are being taught from one generation of potters to another (Van der Leeuw 1993). On the other hand, when innovations of individual artisans take place within this traditionally shaped environment, techniques, materials and tools for one type of technical activity are adopted and adapted to be used for another purpose (Sillar 1996).

According to Van der Leeuw *et al.* (1991), these traditionally used techniques are unquestioned and comprise the technological style within which the potters are living, working and learning. Lechtman (1977) suggests that this technological style is strongly affected by social and ideological factors, while Lemonnier (1980; 1986; 1992; 1993) argues that no technique can be understood outside its context of local perceptions.

After discussing *who* makes choices in pottery production, it is time to see *how* such choices are made. According to Van der Leeuw (1994, 135) human beings employ perception and cognition to reduce the information overload within their environment into manageable proportions. Reduction is achieved through the identification of apparent symmetries (similarities) which are used to control information chaos. Cognition allows them to 'fix' certain symmetries in real, virtual or conceptual space in their memory, which then disappear. Repetition of the process permits them to retain temporal symmetries for further reference (Van der Leeuw 1994, 135).

In a cross-cultural analysis of *chaîne opératoires*, Van der Leeuw (1993) argues that regardless the variety of ceramic vessels and *chaîne opératoire* steps, there are similarities between different pottery producing traditions in the way in which they produce specific forms. Van der Leeuw (1994, 136) argues against the assumption that potters, wittingly or unwittingly, have different ideas in making pottery. Even though it is assumed that different technological, functional, social, behavioural, economic and other ideas affect potters in their work, he suggests that it is our modern and highly fragmented perception that distinguishes these areas anyway. According to Van der Leeuw (1994, 136), the process of pottery making operates as a cognitive function of the human mind, which has a universal, trans-cultural rather than culture-specific application. Roux (1990, 142) also recognises the cognitive (physical) and non-cognitive (psychological) factors involved in pottery production, and she introduces the term "cognitive and perceptual-motor competences” that are developed by potters along the process of know-how (*savoir-faire*).

Renfrew & Scarre (1998), and Malafouris & Renfrew (2010), stress that a study of ancient material culture cannot take place outside study of the human mind; however, Malafouris (2004) suggests that ethnology has manipulated the boundaries of human cognition. In relation to wheel-throwing, Malafouris (2008) argues that considering the human mind responsible for executing universally applicable cognitive functions in pottery making is no longer viable; instead, one needs to understand the process as an interaction between the potter’s brain and the technical features of wheel-throwing, which are constantly changing during the wheel throwing process while the potter constantly adapts. In that sense, all material products should be regarded as different to each other and the idea of technological tradition requires to be abandoned. Even though this idea is interesting in its own sense, this thesis suggests that an archaeological study on a large ceramic assemblage is unlikely to progress if each vessel is treated individually and outside its typological categorisation.

3.1.4 How do technological choices manifest on archaeological ceramics?

Having examined what technological choice is, who makes it and how, it is time to move to the actual areas where technological choices manifest on the final products. In pottery production, technological choice defines the interaction between what is perceived as an ideal ceramic form and the material aspects of the forming process, expressed in the areas of conceptualisation, executive functions and tools, and raw materials (Van den Leeuw 1993, 256-61; 1994, 136-7, also see De la Fuente, 2011).

The conceptualisation of a vessel is divided in three fundamental parameters:

1. Topology, which relates to the shaping of a pot. For example, a shape can be seen as ‘horizontal’ or ‘vertical’, deriving from an already know geometrical shape such as a sphere or a cylinder, undergoing transformations attributed to stretching or compressing.
2. Partonomy, which relates to the different parts of the vessel that are conceptually divided by the potter.
3. Sequence in which the vessel is made. For example, the sequence of producing a pot can be bottom to top, top to bottom, shoulder to bottom, etc.

It must be clarified that according to Van der Leeuw (1994) the term sequence describes a property of the ceramic vessel. By contrast, Sillar & Tite (2000, 4) use the same term broadly, in order to describe the entire *chaîne opératoire*. On the importance of conceptualisation, Sillar and Tite (2005, 5) add that a potter must have some conception of the practical and social function of the pot s/he intends to shape, or there must be some conception of at least a potential market for the vessel to be sold, as this defines the raw materials and techniques to be used in production.

The executive functions and tools refer to the different solutions that have to be found in order to overcome basic problems[30] related to the manufacture of a vessel. Regardless of how practical these manipulations are, David & Kramer (2001, 149) stress that these can be channelled by cultural traditions.

Raw materials are the last area where technological choice is expressed. As it is understood, different materials have different properties and constrains, which need to be dealt accordingly in conjunction with the expected result. From a *chaîne opératoire* perspective, controlling raw materials is a practical aspect, making its confrontation most directly 'objectifiable'. On the other hand, the conceptualisation and the execution are the steps that are more likely affected by social parameters (Van der Leeuw 1994, 138).

In the case of decorated pottery, style is another aspect related to vessel conceptualisation. By contrast to what is perceived as 'style' in the study of Greek Early Iron Age ceramics, in *chaîne opératoire* studies style describes vessel function instead of external decoration. Definitions and explanations vary. Heather Lechtman (1977, 4) defines style as a formal, extrinsic manifestation of an intrinsic pattern, which is usually "neither cognitively known nor even knowable by members of a cultural community except by scientists". Ian Hodder (1990, 45) describes style as "the referral of an individual event to a general way of doing" and James Sackett (1977, 370) as "a highly specific and characteristic manner of doing something". By

[30] Basic problems during the process of making a pot are: 1) the pull of gravity on the object under construction, often leading to sagging or collapsing; 2) the potters physical access to different parts of the vessel while this is under construction (e.g. while spinning on the wheel); 3) the composition of raw materials found at the potter's disposal (e.g. the quality of the clay or fuel); 4) the speed that the vessel requires to be made; 5) the control over the shape of the pot; and 6) the width of the range of shapes which the technique allows the potter to produce. Certain executive functions employed to deal with the above problems can be summarised as follows: a) squeezing; b) supporting; c) controlling the shape; d) turning the vessel; e) cutting (with a knife or string); f) scraping (with a rib, gourd scraper, etc.); and g) smoothing the surface (with a piece of leather, pebble, bone, wood, etc.) (Van der Leeuw 1994, 137).

contrast, David and Kramer (2001, 172) define style as a "potential for interpretation residing in those formal characteristics of an artefact that are acquired in the course of manufacture as the consequence of the exercise of cultural choice". According to their definition, style resides in conscious or unconscious cultural choices, which are expressed in the actions of artisans, users and modifiers of artefacts (David & Kramer 2001, 172).

Although artefacts could function in three cultural domains (utilitarian, social and ideological), when archaeologists speak about function they usually mean attributes that relate to the ability of the artefact to perform its intended utilitarian and technomic roles (David & Kramer 2001, 139-40). As explained in Chapter 2, the utilitarian function of decorated finewares from the Attic Early Iron Age has been noted in relation to their shapes and forms, while socio-ideological functions have been examined mainly through stylistic and iconographic studies. Sackett (1977), however, argues that decorative style and function are not necessarily excluding each other. In fact, artefacts can be both stylistic and functional. Furthermore, the process of producing functional artefacts involves decisions that are "embedded in and conditioned by social relations and cultural practice" (Dieter & Herblich 1998, 235). Therefore, any approach towards decorative styles should regard these as part of the broader functionality of ceramic vessels, even if this functionality operates at a purely symbolic (social or ideological) level.

In ethnographic research, the above areas of technological choice (raw materials, conceptualisation - including style- , executive functions and tools) are usually recorded in relation to one specific ware group, produced in one distinct production centre (e.g. Gosselain 1994; 1995; 1999). By contrast, the study of large ceramic assemblages of various typologies coming from archaeological excavations requires a comparative approach and an analysis based on statistics (e.g. Orton *et al.* 1993). Comparisons need to target vessels that belong to the same typological or stylistic group, aiming in the analysis of artefact variability.

On this issue, Schiffer & Skibo (1997) suggest a model of artefact variability based on a range of factors that influence the design of products. These include the performance and capability of the artisan (who is the main source of energy) and situational factors such as access to raw materials, manufacture process, distribution, use, maintenance and repair, reuse and disposal.

Schiffer (1995, 57) argues that the interaction between energy sources and cultural factors occur as a succession of small steps forming a behavioural chain. This behavioural chain is represented by sequential activities in a systemic context through the simultaneous participation of various cultural element. Behavioural chain analysis consists in hypothesising and using the components of each individual activity, which are the segments of the broader behavioural chain. An individual activity is defined as "the patterned interaction between at least one energy source (human or nonhuman) and at least one other cultural element" (Schiffer 1995, 57). This behavioural chain can be reversed, starting from the artefact and reaching to the artisan or the society that produced it, while this reverse process could reveal cultural patterns in the archaeological record (Schiffer 1995, 61).

By contrast to Schiffer & Skibo (1997) and Schiffer (1995), David & Kramer (2001, 141) argue that this model sets an unrealistic and ethnocentric image of the artisan, who are projected as engineer-handymen. Artisans seem to adjust the design of their artefacts in relation to specific performance characteristics that approximate a culturally determined ideal. In their critique, David & Kramer (2001, 141) note that the archetypal artisan are in fact a projection of Schiffer and Skibo engaged in their Laboratory of Traditional Technology through Reverse Design Engineering, neglecting artefact variations in relation to causes such as gender competition and asymmetries in social power. Despite the critique by David & Kramer (2001, 141), this thesis supports that the Laboratory of Traditional Technology and the Reverse Design Engineering approach can be useful in the study of Early Iron Age pottery production.

3.1.5 Attic Early Iron Age *chaîne opératoires*: What do we actually know?

To begin the discussion on Early Iron Age *chaîne opératoires* it is necessary to define an appropriate mode of production for the Protogeometric, Geometric and Orientalising periods. Unfortunately, this is difficult due to lack of textual sources and other information related to Early Iron Age potters. Stissi (2002) discusses various problems related to Late Archaic and Classical fineware production and suggests that Peacock's (1982) ethnoarchaeological model for Roman ceramic workshops[31] could describe some Greek ceramic production modes between the 6th and 4th centuries BC. Still, the situation during the Early Iron Age remains unknown.

A major problem in understanding the scale and mode of ancient Greek pottery production relates to the different views of scholars on ancient economic models. Some, who support the Primitivist Approach, see ancient craft production as a secondary activity. It functioned inside agricultural economies and targeted specific elite consumer groups who demanded craft products either to express social status or to maintain diplomatic contacts through gift exchange (e.g. Finley 1973; Austin & Vidal-Naquet 1977; Garnsey *et al.* 1983; Von Reden 1995; Möller 2000). Others, who support the Market Approach, see ancient craft production similar to modern. It was a primary source of income for artisans and operated in a market regulated by laws of demand and supply (e.g. Burke 1992; Cohen 1992; Sherratt & Sherratt 1993; Sherratt 1995, 152; Osborne 1996b; Loomis 1998). Finally, there is a group of scholars who have refined the Primitivist Approach by noting the complexity behind ancient economies and craft production (e.g. Morris 1994, 351, 354; Davies 1998, 230; Parkins 1998, 1-2).

Two studies that investigate fineware production models that are chronologically close to the Greek Early Iron Age are those by Arafat & Morgan (1989) and Osborne (1996b). By comparing the organisation patterns between Athenian and Corinthian fineware production during the Late Archaic and Classical periods, Arafat & Morgan (1989) see marked differences in their spatial organisation: Athenian production was centralised by contrast to Corinthian, which was more disperse. In both cases, however, Arafat & Morgan (1989) accept that Late Archaic pottery production functioned as a secondary economic activity in societies that were mainly agricultural. By contrast, Osborne (1996b) argues that potting was by no means a supplementary activity that aimed to meet the shortfalls of agricultural production. Instead, large trade networks across the Mediterranean indicate the existence of markets in which ceramic products were sold as a main source of profit.

Even though networks are considered highly complex (see Knappett 2005; 2011; 2013), Van der Leeuw (2013) simply sees them as lines that are drawn to

[31] Peacock (1982, 8-11) identifies eight major modes of production that probably existed during Roman times: 1) household production; 2) household industry; 3) individual workshops; 4) nucleated workshops; 5) manufactories; 6) factories; 7) estate production; and 8) military (or other official) production.

connect different points on a map. The length of such lines varies: Greek trade networks could have either related to organised exports towards long-distanced markets or small scale transactions between local producers and consumers. Osborne (1996b, 43) argues that the rise of trade networks of independent markets "should be assigned a place with the other transformations that mark the revolution of the 8^{th} century BC". Pottery markets from the 8^{th} century BC onwards have recently been investigated by Tsingarida & Viviers (2013); however, the majority of these markets relate to large-scale long-distance trade.

If we accept that a small-scale market existed in 8^{th} century BC Athens, then the internal relationship between Early Iron Age ceramic workshops and fineware consumers is rather unclear. Even though there is epigraphic evidence of commissioned potters producing vases for wealthy patrons during Classical times (Webster 1972), the same assumption is adopted for the Geometric period based on archaeological evidence of social competition expressed through burial rites, connected to the consumption of fine pottery (Coldstream 1977; Morris 1987; Whitley 1991; Duplouy 2006). Regardless these assumptions for commissioned pots, the possibility of an open market cannot to be excluded. Even though the production of funerary finewares might have been based on commissioning, the production of domestic finewares might not have been. In fact, domestic pottery was produced with similar shapes and decorative characteristics as funerary pottery. For this reason, it is important to understand the level of specialisation in ceramic production.

Regarding specialisation, Rice (1987, 189) suggests that a definition based on the intensiveness of production as full-time or part-time is already problematic even in the ethnological record. For example, Arnold (1985, 18) sees that specialisation is connected to full-time production modes, in which potters produce pots all over the year and their economic gain is based fully on potting. However, Rice (1987, 189) argues that specialised pottery production can be sometimes seasonal because of particular weather conditions, while in some other cases, workshops could hire part-time specialists for a certain period of time. By contrast to both, Roux (1990, 142) diversifies between technical specialisation and techno-economic specialisation. According to her definitions, technical specialisation relates to the production of an object that is meant to be consumed at a village or regional level. Such production is not the source of economic gain. However, techno-economic specialisation relates to the production of an object that is exchanged at a village or regional level for economic profit. This specialisation has two forms: "'simple' when the distribution of specialisation is on the basis of the raw material employed (ceramic or lithic), and 'complex' when production is also distributed in function of the type of object produced (i.e. ceramic containers of differing dimensions)" (Roux, 1990, 142-3).

With regard to Attic Early Iron Age fineware production, it is highly likely that Athens followed a model of techno-economic specialisation in order to meet the needs of a local market, related either to commissioned or non-commissioned products. Still, the form of this techno-economic specialisation in the production of specific shapes varied across time: Protogeometric neck-handled and belly-handled amphorae that have been recovered in Athenian burials (see Kraiker *et al*. 1939; Lemos 2002) were normally produced at standard sizes that could also relate to functional purposes; therefore, their production reflected simple techno-economic specialisation. However, when such vessels began to be produced in monumental sizes after LGIa (see Coldstream 1968; Whitley 1991), production probably shifted to a model of complex techno-economic specialisation.

In relation to spatial distribution, the largest quantities of ceramic test pieces, kiln waters and production debris have been excavated in the Athenian *Agora* (Papadopoulos 2003). The area that this material comes from extends between the *Kolonos Agoraios*, the south bank of river *Eridanos*, and the *Areiopagos* North-Slope cemeteries. Furthermore, this area, which was later built over by the Middle *Stoa* and the *Odeion*, was almost free of tombs during the Early Iron Age (Papadopoulos 2003, 275). Excavated pits and wells revealed large concentrations of potters' debris and "it is likely that these wells, including those largely filled with domestic debris, served pottery establishments rather than private dwellings" (Papadopoulos 2003, 274).

Monaco (2000, 17) also notes that the quantities of perforated sherds used for kiln control, recovered under the *Odeion* and inside the wells extending 130m to its South-East, suggest that ceramic workshops at the Athenian *Agora* operated as early as the Protogeometric period. Furthermore, she notes the absence of production waste at the area of *Kerameikos*, which was exclusively used for funerary purposes from the Protogeometric period until the 6th century BC (Monaco 2000, 70). By contrast to Papadopoulos (2003, 274), Monaco (2000, 17, 20, 22) argues that the presence of Early Iron Age production debris and domestic pottery in the *Agora* wells suggest the simultaneous co-existence of pottery production units and houses.

Although this possibility is likely, her characterisation of the well material as production waste or domestic pottery is problematic. In fact, the *Agora* wells contain ceramics that must be defined as either production debris or ready-made products. Furthermore, it is unclear if the latter were used in domestic contexts in the same area. If a pottery market existed next to the production site of the Athenian *Agora*, such ready-made products would have related to the workshops that sold them and not to the houses that purchased them; therefore, it is also likely that such ceramics relate to fragmented or unsold commercial waste that was dumped in the wells without having been sold or used at all.

Even though very few Athenian Geometric and Orientalising structures survive because of later building activity, there are remains of a 7th century BC kiln recovered at the foot of the hill south-west to the later *Tholos*. This kiln comprised of a round combustion chamber circa 1.33m in diameter, a column at its centre to support the upper floor, and a firing room of irregular shape. Even though no pottery debris was discovered, the clay floor of the chamber, the collapsed potsherds from the roof, the rich remains of charcoal and ash, and the presence of remains of a clay-lined basin in close distance, all undoubtedly suggested the presence of a ceramic workshop (Thompson 1940, 3-7).

In relation to Attic kilns, the one from the Athenian *Agora* resembles two potter's kilns with circular combustion chambers of 1m in diameter from Skala Oropou, dating in the late 7th century BC (Mazarakis Ainian 1996, 21-124, pl.15b-16d; 1997; 1998). The *Agora* kiln is also no different to a smaller 8th century BC kiln from Torone, the shaft of which is 0.80m in diameter (Papadopoulos 1989; 2005, fig.38b; 2013, 39-42; Whitbread *et al*. 1997) and to an Early Orientalising round kiln from Knossos, which is 0.65m in diameter (Pariente 1994, 819-21; Tomlinson & Kilikoglou 1998, Coldstream *et al.* 1997). By contrast, the *Agora* kiln is significantly smaller and different to an Argive Protogeometric kiln of the 10th century BC, the combustion chamber of which exceeds 2.20m in diameter (Courbin 1963, 59-102), and also to a pear-shaped Geometric (or perhaps Archaic) kiln from Eretria, the length of which is 2m (Krause 1981, 86; Ducrey *et al*. 1993, 21-2, figs.13-14).

Rich iconographic evidence of kilns (Nobble 1960, 198-200, fig.230-8) and images of potters and painters at work (originally in Beazley 1946; summarised by Stissi 2002, pl.28-48; also see Chatzidimitriou 2005) have been traditionally used to define Athenian pottery production of later periods. Still, it is questionable whether such evidence can be used as sources of information to investigate pottery workshops of the Early Iron Age. It is certain that fineware production in Athens continued all along the Archaic and Classical era (Cook 1961; Oakley 1992; Monaco, 1999), while the distribution of ceramic production sites expanded towards the areas north-west of the *Kerameikos*, in the modern region of *Academia Platonos* (Baziotopoulou-Valavani 1994, 45). Despite the large number of excavations in Athens, no pottery production has been identified to have taken place within the Classical city-walls, apart from the area near the *Dipylon* Gate that was known in Classical antiquity as *Kerameikos* (Papadopoulos 2003, 276). The discoveries from the *Agora* excavations point to the direction that long before the construction of the Classical walls, potters' activity and cemetery grounds expanded between the north-west of the Acropolis and east of the *Kolonos Agoraios*, leaving essentially no room for concentrated habitation (Papadopoulos 2003, 276).

Four Protogeometric ceramic kilns have been recently excavated by the 26th Ephorate of Prehistoric and Classical Antiquities at *Palaia Kokkinia*, Piraeus (Mazarakos *et al*. 2008). The kilns were made from clay mud, and although their dome did not survive, it is highly likely that it was made from the same fabric. The kilns comprised of a rounded combustion chamber separated from the furnace's floor, which stood at ground level. Furthermore, all kilns were found in close distance from each other (Mazarakos *et al*. 2008, 155, pl.15), suggesting a clustered production. The broader archaeological site at *Palaia Kokkinia* included building remains, a road, and what might have been part of a larger cemetery, comprised of 17 burials divided in three broader burial groups. The site was in use during the Protogeometric and Geometric periods, although the actual burial groups dated in Middle and Late Geometric times (Mazarakos *et al*. 2008, 253-4). *Palaia Kokkinia* is relatively similar to Geometric *Agora*, as both sites combine burials and ceramic production establishments.

By ethnographic analogy, Papadopoulos' (2003, 274-5) cluster of workshops at the Athenian *Agora* and the *Palaia Kokkinia* site (Mazarakos *et al*. 2008), could match Peacock's (1982, 8-10) models of individual workshops, nucleated workshops or manufactories. The absence of separate kilns in favour of limited communal kilns and the spatial nucleation of the manufacturing debris at the *Agora* perhaps exclude the possibility of individual workshops. Furthermore, Peacock (1989, 9) notes that manufactories match the *ergasteria* of Classical Greek and Late Roman times, which produced highly specialised and standardised products at a large scale. Such production is highly unlikely to have existed in Early Iron Age Athens. This perhaps leads us to the possibility of nucleated workshops, but whatever the case, archaeological information is limited and no distinct mode of production can be postulated with certainty.

For defining the number of Attic Early Iron Age fineware production units, one can only refer to the information on Attic Geometric workshops by Davison (1961) and Coldstream (1968) based on connoisseurship. As discussed in the previous chapter and according to Coldstream's (1968, 29-82) groupings, during the period between c.760 BC (LGIa) and c.700 BC Athens had at least 9 large fineware workshops. These were supplemented by 8 individual painters and 4 groups of affiliated painters that could have been working independently. This total of 21 Late Geometric 'workshops' may not necessarily reflect 21 separate production units; however, both Coldstream (1968) and Davison (1961) agree that the nine larger ones[32] must be regarded as such due to the relatively large amounts of vases attributed to them. For the 7th century BC, workshop numbers are unclear. The Analatos painter, the Mesogeia painter, the Vulture painter (Cook 1935; Davison 1961) and the Nessos painter (Jeffery 1961; Robertson 1978) are the only few artists that have been identified on the principles of connoisseurship. Still, these artists may not necessarily represent workshops, as by that time the scale of pottery production had increased.

Webster (1972, 2) provides estimated numbers of painters and potters for Attic Black-Figure and Red-Figure style workshops between c.600 and c.400 BC. His work is based on painted signatures and previous attribution by Beazley (1951; 1956; 1963). For the 6th century Webster (1972, 2) suggests:

Date circa BC	Number of painters	Number of painter groups	Number of potters	Number of pottery classes
600-575	8	5	?	?
575-550	29	14	4	?
550-525	59	65	43	18
525-500	91	47	23	39

According to the numbers for each quarter of the 6th century BC, Attic pottery production showed a gradual increase in painters and painter groups practising their

[32] *Dipylon* Master, Hirschfeld painter, Lambros painter, Athens 706, Birdseed painter, Soldier-bird workshop, workshop of the Hooked-Swastikas, Athens 894 and Athens 897.

work across time. Even though evidence for potters is unclear at the beginning of the century, until c.525 BC there is an increase in the number of potters and pottery classes that can be attributed to a single artisan (43 potters for 18 pottery classes); however, after c.525 BC potter numbers decline (23) despite the increase in pottery classes (39).

Webster's (1972) estimates suggest that during the first quarter of the 6th century BC there were a total of at least 13 painters and painter groups in Attic pottery production. If we accept that Attic Late Geometric 'workshops' (c.760-700 BC) were at least 21 according to Coldstream (1968, 29-82), then it seems that there was a sharp decline in the numbers of painters after c.700 BC. Numbers started to recover only after c.575 BC. Again, it could be likely that the number of Late Geometric 'workshops' suggested by Coldstream (1968) is unrealistic and that production probably depended on a smaller number of artisans.

A general problem with approaches that employ connoisseurship as a mean of defining workshop practice is that they presuppose painters and potters are the same people; therefore, a workshop is defined based on its painters. Unfortunately, evidence for the presence or absence of such labour divisions is not enough with regard to Greek Early Iron Age production. Even for Athenian production of later times, there has been a large debate whether the ΕΓΡΑΦΣΕΝ and ΕΠΟΙΕΣΕΝ signatures on decorated finewares show clear distinctions among such artisans within pottery workshops (e.g. Robertson 1972; for a full discussion see Stissi 2002, 104-21). In general, any approach based on stylistic or epigraphic evidence needs to be treated with an amount of caution.

The average output of Attic Early Iron Age ceramic production units is another area with no information. Postulations can only be made with regard to workshops of later times, and more specifically those of the early Black Figure style of the 6th century BC. The earliest recorded workshop, that of Sophilos, has been attributed at least 45 vessels in a span of 25 years of work (Bakir 1981, 78-80). However, Beazley (1956, 216-37) suggests that the largest Black-Figure workshop was that of Nikosthenes. Based on maker signatures, Nikosthenes' name is found on at least 186 vessels, produced in a span of 35 years and decorated by a number of painters including himself (Tosto 1999, 173-82); therefore, Nikosthenic vessels need to be treated as a brand that was produced by a significantly large production unit. Sophilos and Nikosthenes provide an output limit for any Geometric and Early

Orientalising workshop, as it is highly unlikely that their production could have been larger than workshops of the Back-Figure style.

Another issue connected to the internal organisation of ceramic workshops is that of gender distinctions. Pacey (1993, 104) notes that in craft production, technology is a term that is conventionally used to define the activities of men. Women's work also falls under the definition of technology; however, it is excluded from recognition not only based on the simplicity of the equipment they use, but also because it implies a different concept of what technology is about (Pacey 1993, 104). Dobres (1999, 130-2) argues that in communal modes of production the social organisation involves material, political and economic division of labour, in which every gender participates (Dobres 1999, 132). A good example is the case of hunting in primitive societies: hunting does not stop in killing the animal and distributing the meat by the men, but it also includes cooking by women, who are also part of the total hunting *chaîne opératoire* (Dobres 1999, 133-4).

Based on our current evidence, it is impossible to identify gender distinctions in Attic Early Iron Age ceramic workshops. It is likely that in the total *chaîne opératoire* labour was divided in primary and secondary tasks, which could have involved different genders. Judging from the signatures of potters and painter in Athenian vessels of later times, the dominance of male names is profane. Beazley (1956) records long lists of names of Attic potters of the Black-Figure style, who are all males. Additionally, the first name of an Attic potter signed on a vase is again male, that of *Sophilos* (c.610- 550 BC) (Cook 1960, 70-2). Following the thoughts of Dobres (1999), females must be treated as part of the ceramic *chaîne opératoire* in Early Iron Age Attica: the consumption of ceramic finewares in funerary rites was definitely guided by notions related gender (Whitley 1991; 2000); however, any gender notions behind pottery production are still unclear.

It can be generally postulated that from circa 615 BC onwards, the time of production of the *Nessos* amphora (Cook 1960, 69), Attic pottery workshops were monopolised by men, despite which gender was destined to consume the ceramic products. Langdon (2015) argues that some miniature drinking cups recovered in children's graves from Late Geometric *Kerameikos* were decorated in a 'clumsy' way, which implies that children were perhaps involved in Athenian Geometric ceramic production. At the moment, it is still unclear if children were drastically involved in workshops as full-time workers or apprentices, or if the decoration of a specific class of vessels was depended on children due to symbolic reasons.

Gender or age divisions in Attic Early Iron Age workshops may need to be examined under broader terms, such as skill variation and apprenticeship duration. Both terms are interconnected. According to Roux (1990, 143), the duration of apprenticeship of a technique is linked to three aspect: firstly, the nature of know-how involved, which depends on the technique and the method of production used; secondly, on the physical properties of the worked materials; and thirdly on the perceptual-motor capacities put in action by the potter.

Ethnographic work by Roux & Corbetta (1989) has shown that wheel throwing is a complex technique that takes long time to learn. The duration of apprenticeship necessary for mastering wheel throwing depends on four aspects: 1) the process of apprenticeship that is locally followed by young potters; 2) the fashioning phases of producing a pot and the organisation of two-handed gestures that are required in each apprenticeship stage, and for each type of pot; 3) the motor abilities developed by potters; and 4) the potters' performances according to their stage of apprenticeship (Roux & Corbetta 1989)[33]. In general, new potters need to integrate these factors in a progressive way. The acquisition and successive mastery of motor abilities depends on strategies employed at each stage of apprenticeship (Roux 1990, 144)[34]. Given that Attic Geometric and Orientalising decorated finewares are all wheel-made, apprenticeship duration should be regarded as a long-lasting process too. In that sense, it is highly likely that the work of children in pottery production could have related to a learning process that started at an early stage of their lives.

Finally, there is no information in relation to whether an individual potter produced indiscriminately every and any ceramic object, or if there was further specialisation and focus on specific shapes attributed to specific potters. Roux (1990, 147-8) provides three criteria to facilitate this distinction: 1) the diversification of forms and dimensions of vessels; 2) the quantities of pots of each type; and 3) the standardisation of the products. In pottery production of the Harappan culture in the

[33] For more on wheel fashioning techniques and their identification on the final products see Roux & Courty (1998). Roux (2003) also suggests the Dynamic System Framework approach in understanding technological change in wheel throwing practices.

[34] Such procedures involving the gradual acquisition of motor abilities across time have already been dicussed for the production of hand-made pottery in prehistoric societies by Kamp (2001) and Loney (2007).

valley of Indus (Roux 1990, 148) the throwing of small vessels does not require the competences noticed for the production of larger vessels. Furthermore, a substantial demand for larger vessels would produce a division of tasks among potters according to their dimensions (Roux 1990). Based to the above, a key concept in understanding specialisation in pottery production is the analysis of standardisation of the final products.

Previous stylistic approaches on Attic Early Iron Age decorated finewares by Desborough (1952), R.M. Cook (1960) and Coldstream (1968; 1977) have described the evolution of typologies and decorative styles as a linear process, in which specific shapes, painted motifs and figurative themes belonged to specific chronological periods. This approach was convenient in order to establish relative chronologies based on style; however, it also produced the notion that Attic Early Iron Age fineware production was standardised across specific periods of time. Even though changes occurred gradually, it was thought that these were adopted and followed by almost every workshop simultaneously. This understanding of general and linear evolution of ceramic typologies and styles is to a great extent responsible for the notion that Athenian Early Iron Age workshops functioned as a cluster, where diversification among workshops was highly unlikely to have occurred. It remains a question if this was actually true. This thesis approaches standardisation from another angle, that of the *chaîne opératoire* theory, and offers some different answers to this problem.

3.2 METHODOLOGY

3.2.1 Which aspects of the *chaîne opératoire* theory are examined and how?

According to the discussion on the *chaîne opératoire* theory in the previous section, a main concern in the analysis of archaeological ceramics is the aspect of technological choice. Although technological choice manifests in different domains of ceramic production and is subject to a range of social parameters, this thesis focuses on three of its most practical aspects. These are the conceptualisation of ceramic forms, including topology, partonomy and sequence (*sensu* Van der Leeuw 1994, 136-7), raw materials, and finally decorative technology. The above aspects relate to the four basic attributes (fabrics, shapes, dimensions and decoration), which according to Kotsonas (2014, 1) define standardisation or variation of ceramic materials.

Through the analysis of the above aspects, this project investigates artefact variability (*sensu* Schiffer & Skibo 1997) across three broader groups of Attic Early Iron Age finewares: large ceramic containers, medium sized pouring vessels and small drinking vessels. The analysis of artefact variability is likely to suggest two possibilities: Firstly, if a specific ware shows no variability across time, then its production was probably regulated by strong technological traditions (*sensu* Sillar & Tite 2000), leading to standardised forms. Standardisation in the production of a specific shape may indicate specialisation within the production sequence. Secondly, if a specific ware exhibits some degree of variability across time, then its production could indicate absence of distinct technological traditions in favour of experimentations, innovations, or freedom of technological choice among potters, leading to non-standardised ceramic forms.

As explained above, artefact variability is related to cognitive and perceptual motor competences (*sensu* Roux 1990, 142) related to the potter's behaviour. According to the Behavioural Chain Analysis Theory (*sensu* Schiffer 1995, 57) a potter's behaviour can be examined by reversing the sequence of production of the ceramic artefact; therefore, the final focus of this study is the potter's behaviour and not the artefact itself. The rationale of this study is summarised in Figure 5 below:

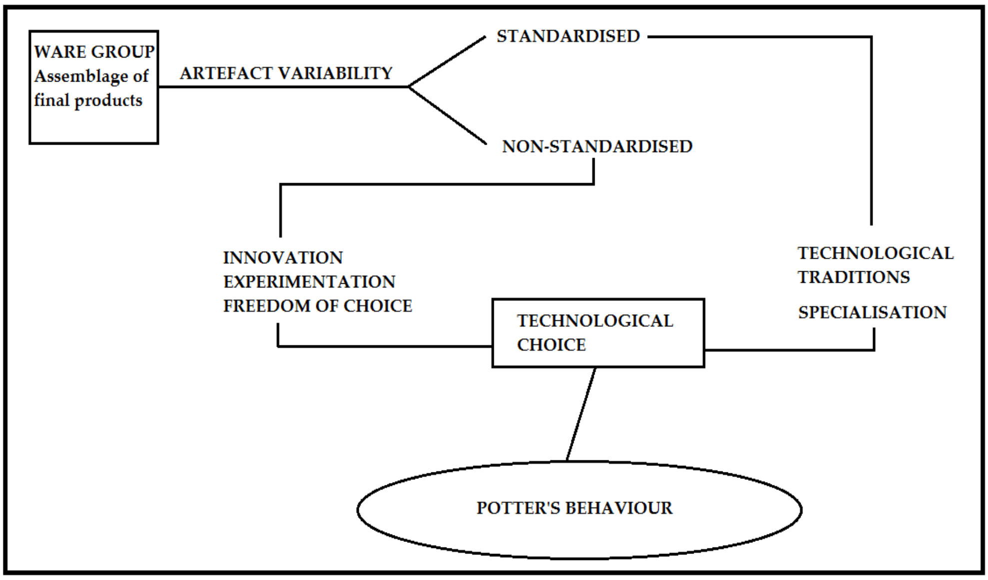

Figure 5: Rationale of current approach.

Conceptualisation (*sensu* Van der Leeuw 1994, 136-7) is studied through the analysis of metrical features of ceramic vessels and the mathematical proportions between them. Particular interest is placed on vessel height. The process of recording metrical features of ceramic vessels is straight forward: measure tapes, rulers, callipers and diameter charts are used to obtain characteristic measurements of a vessel's shape. In relation to partonomy and sequence (*sensu* Van der Leeuw 1994, 136-7), complex forms such as Early Iron Age amphorae have been assembled from a number of different constituent vessel parts. Unfortunately, the identification of such constituent parts is not a straight forward process. Intact wheel-made finewares do not reveal their constituent parts easily because joints between them do not survive. If the assembling procedure has been executed on the fast wheel some surface marks may exist; however, one cannot be fully sure. X-ray analysis often reveals such joints and points out the existence and exact number of assembled parts. For example, Josef Noble (1966, 24, 155, fig.150) used X-Ray radiography to show that Athenian Classical *lekythoi* where produced from a single piece of concrete clay, which was then drilled to formulate the inner cavity of the vessel.

In this project, the selection of pottery that would allow visual identification of constituent parts needed to be planed carefully because of various restrictions. Firstly, intact vessels appropriate for such analysis are difficult to find. Areas with long term occupation such as the Athenian *Agora* have primarily produced fragmented pottery. Sites such as the *Kerameikos* cemetery have produced a large number of intact vessels; however, the most important ones are now in museum display. A primary concern during this project was that vessels located in museum collections could not be easily removed from display. Secondly, X-ray analysis requires a time consuming process of acquiring scientific analysis permits from the local authorities. Vessels require to be transported to research facilities outside the museums; therefore, special arrangements are necessary for their safe transportation. Due to lack of resources to facilitate such procedures, the present study of constituent vessel parts was carried out through visual examination of fragmented vessels, which revealed visible joints on their surfaces. Access to such material was also quicker and safer for the artefacts. Macroscopic analysis showed that the only two constituent parts safely identifiable were necks and handles; therefore, the study needed to be restricted in the metrical features and proportions related to those two vessel parts only.

Despite this strategy, a second problem arose: smaller vessels such as *oinochoai* and *skyphoi* survive in better condition in the archaeological record compared to larger ceramic containers; therefore, sample numbers tend to favour an analysis that focuses on medium to small-sized pottery. To overcome the problem and to improve statistical accuracy, the material studied in this thesis needed to expand. It was decided to include two additional types of pots: firstly, vessels restored up to a good degree preserving key metrical features; secondly, mended or partly mended vessels preserving complete profile. Study of complete vessels that are currently in display was conducted though published photographs.

Despite the major focus in investigating artefact variability in relation to potters' technological choices, the discussion could not be limited to the work of one group of artisans. Equal attention needed to be placed on the work of painters, particularly because the majority of studies on Attic Early Iron Age workshops have been based on iconography and connoisseurship. Here, pottery decoration is analysed as a technological rather than stylistic choice: decorative variability can be inferred from the repetition of trends in the use of specific external treatments, instead of the repetition of specific decorative motifs. More specifically, macroscopic analysis of painted colours, slips and coatings is used to define patterns of continuity or interruption in decorative practices across time. Paints, slips and coatings are not just decorative features, but also technological features: their external appearance varies according to their chemical composition and the effects of firing.

The final concept in the investigation of technological choice is natural resources. In ceramic production natural resources are connected to core manufacturing processes such as clay selection, clay manipulation, tempering and firing (Rise 1987; Sinopoli 1991). Scholars of the *chaîne opératoire* approach usually discuss natural resources through ethnographic research (e.g. David & Krammer 2001); however, in the study of archaeological ceramics, macroscopic (hand specimen) and microscopic (archaeometric) techniques are the most popular in the investigation of fabrics.

The most convenient fabric analysis technique is commonly known as hand specimen examination. It is widely used by field archaeologists who require a fast and pragmatic fabric description to supplement their work. Hand specimen examination is performed by visual analysis on a sherd's fracture with the use of a low magnification (X10) hand lens. This examination offers colour descriptions based on the Munsell Soil Chart, identifications of voids and tempered inclusions in relation to their frequency, size, sorting and rounding, and finally information regarding texture, feel and hardness of a sherd's fracture (Orton *et al*. 1993, 231-41). According to Greek antiquities legislation, fresh fractures cannot be produced on ceramic artefacts without applying for a destructive analysis permit; therefore, the present study of fabrics needed to be limited in artefacts that were already fragmented and allowed instant hand specimen examination.

This thesis also includes an archaeometric pilot study on Athenian Geometric and Orientalising sherds. The study was planned to analyse fabrics with the use of archaeometric techniques such as Thin Section Analysis (TSA) and Scanning Electron Microscopy (SEM) (Chapter 7). The pilot project was carried out independently and parallel to the macroscopic analysis of larger assemblages discussed in this thesis. This small assemblage of 17 unpublished Athenian finewares comes from the same contexts as the rest of the published material analysed macroscopically in Chapters 4, 5 and 6; however, the samples that are analysed microscopically in Chapter 7 do not come from the same vessels. Due to restrictions in Greek antiquities' legislation, sampling of published artefacts was avoided.

A similar approach with the use of combined hand specimen examination, ceramic petrography and Scanning Electron Microscopy has been carried out by Hilditch (2014, 32, fig.3) for the analysis of the ceramic *chaîne opératoire* in the production of Minoan conical cups. Despite some problems of clarity in relation to her sample sizes and the general concept of ferrous clays, Hilditch (2014) demonstrates that microscopic techniques are highly useful in mapping ceramic *chaîne opératoires*.

3.2.2 Details and explanations regarding metrics and proportions

In the following chapters, the analysis of metrics and proportions takes place simultaneously. Initially, metrical features and proportions are recorded in charts that allow quick comparisons between numbers. These charts are presented at the end of the thesis, divided by chapter. The first column on each chart records the thesis number of each artefact. Thesis numbers correspond to the numerical order of the artefact catalogue presented in Appendix 1. The second column of each chart mentions the inventory number of each artefact, under which it was originally recorded and published. As all ceramic pieces are discussed in relation to their inventory numbers, there are two concordance tables at the end of this volume that correlate them to the thesis numbers and vice versa.

In the present analysis, the relationships between different metrical features and their proportional trends are plotted in scatter-graphs formed by two variables following Shennan (1997, 129). The same approach has recently been followed by Lambán *et al*. (2014, 108, fig.12), who plot the correlation between maximum diameter and height of necked vases from the Early Iron Age settlements of Cabezo de la Cruz and Cabezo Morrudo is Zaragoza, Spain. Furthermore, in another analysis of standardisation, Volioti (2014, 157, fig.5) plots the correlation of height and diameter measurements of *Haimonian Lekythoi* (500-450 BC), and produces regression lines similar to the ones used in this thesis. The present approach differs in relation to Lambán *et al*. (2014) and Volioti (2014) as it examines the correlation of a broader range of metrical features, which are also discussed in relation to their proportions in the form of percentages. In general, such bivariate analysis requires vessels in good condition, preserving complete profile; therefore, it applies for four types of vessels: a) intact, b) complete but mended, c) almost complete (a small but insignificant portion of the vessel is missing), d) almost complete or complete after restoration with plaster, which did not change the vessel's profile. Secondary charts with metrics (only) are presented for another two types of ceramic artefacts: a) vessels missing most of their surfaces but preserving some metrical features, and b) fragments of diagnostic vessel parts. Pottery that cannot be analysed with regard to metrics and proportions includes: a) vessels having received excessive restoration with plaster and are likely to be inaccurately restored, and b) sherds of non-diagnostic parts (joining and non-joining). Again, such material is used for fabric identifications and examination of decorative technologies.

All measurements and proportions for the material coming from the *Agora*, the *Kynosarges* burials and the collections of the British School's Museum at Athens were obtained after thorough macroscopic examination. The material from the *Kerameikos* cemetery and the British Museum in London was studied through published photographs due to access limitations. During this study, it was considered that calculating metrical features through illustrations is likely to produce a certain amount of bias in the final results. In order to limit this bias as much as possible it was ensured that the photographs selected for measurement were of high quality and taken from a straight angle between camera and object. Furthermore, mathematical tests were introduced to ensure that the bias was limited to small percentages. Such tests are explained separately in each chapter.

Charts of metrics are designed to include features of the two-dimensional axes of vessels. More specifically, vessels exhibit features along their vertical axis (commonly known as Y axis), such as net height, total height, length of neck, and handle attachment height. Similarly, they exhibit features along their horizontal axis (commonly known as X axis), such as base diameter and rim diameter. Metrical features are determined by vessel shapes, and therefore, different typologies include different metrical features (see Traunecker 1981). In general, the more complex the ceramic form, the more the metrics. In the present study metrical features are deliberately kept to a minimum because of the nature of the ceramic material. The pottery studied in the following chapters derives from a variety of typologies, ranging from complex forms such as amphorae to simple forms such as *skyphoi*. Metrical features are limited to those common among most vessel classes. These are the following:

1. Net Height (Figure 6): This is the height of the vessel, measured from the base to the uppermost point of the rim. If the rim is deformed or if the base does not stand in a balanced position affecting the vertical axis of the pot (Y axis), then mean net height is estimated accordingly. It must be clarified that the net height is not the same as the total height of a vessel.

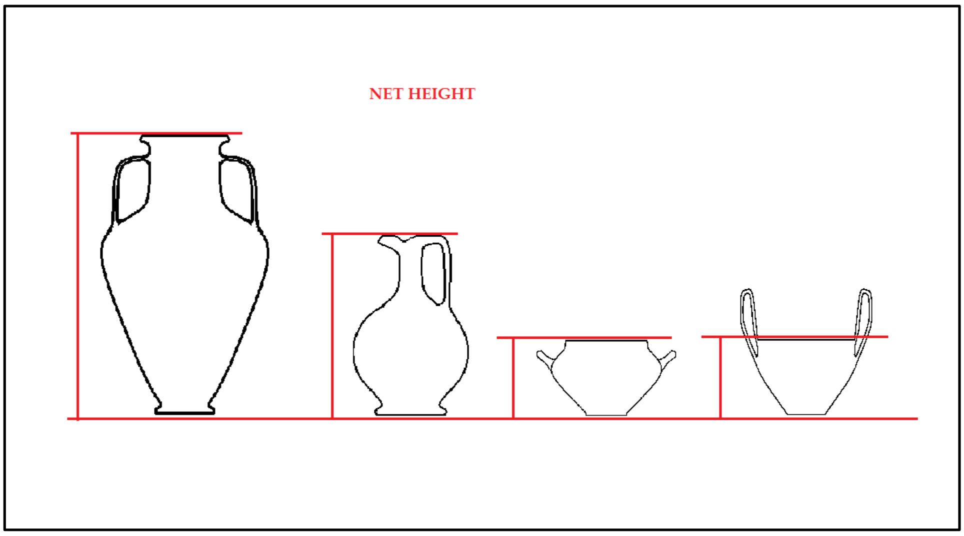

Figure 6: Illustration of net height.

2. Rim Diameter (Figure 7): This is the diameter of the rim coil, measured between two diametrical points of maximum distance along the external rim[35]. If the rim is deformed and deformation does not exceed 1 cm, then mean rim diameter is estimated accordingly. If deformation exceeds the limit of 1cm, then minimum and maximum rim diameters are recorded simultaneously (e.g. 13.3 to 16.1). In the case of rims with large diameters where only small portion of the rim survives, an estimated measurement is obtained through the use of a rim-diameter chart. In such cases, the abbreviation c. (=circa) precedes the measurement. This abbreviation may appear for other metrical features too. Trefoil *oinochoai* are excluded due to their irregular rim shape, which does not allow any diameter measurement.

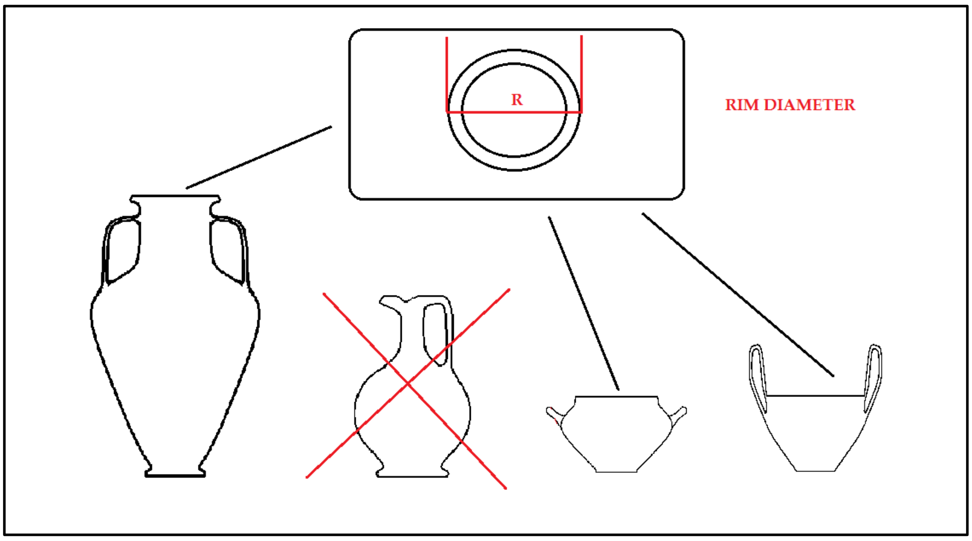

Figure 7: Illustration of rim diameter.

3. Base Diameter (Figure 8): This is the diameter of a vessel's base, measured between two diametrical points of maximum distance along the external side[36].

[35] It requires to be specified that the rim diameter is not the maximum diameter of the rim coil. On the contrary, the two diametrical points between which the external distance is measured can actually touch a flat surface if the pot is inverted and let standing on its rim.
[36] The base diameter is not the maximum diameter of the vessel's foot. On the contrary, the two diametrical points between which the external distance is measured can actually touch a flat surface if the pot is standing.

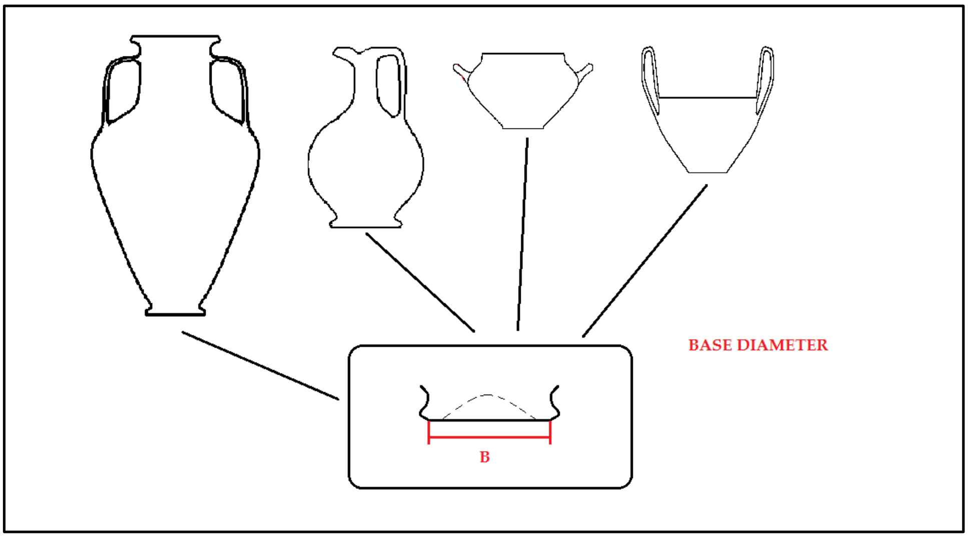

Figure 8: Illustration of base diameter.

4. Length of Neck (Figure 9): Thorough macroscopic analysis shows that necks of complex forms such as amphorae and *oinochoai* were shaped out of a different piece of clay, which was then attached on the shoulders of the rest of the vessel, most likely after it had dried. Examination of fragmented vessels shows that the fracture of neck pieces is significantly thicker compared to the fracture of the upper shoulders (Figure 10).

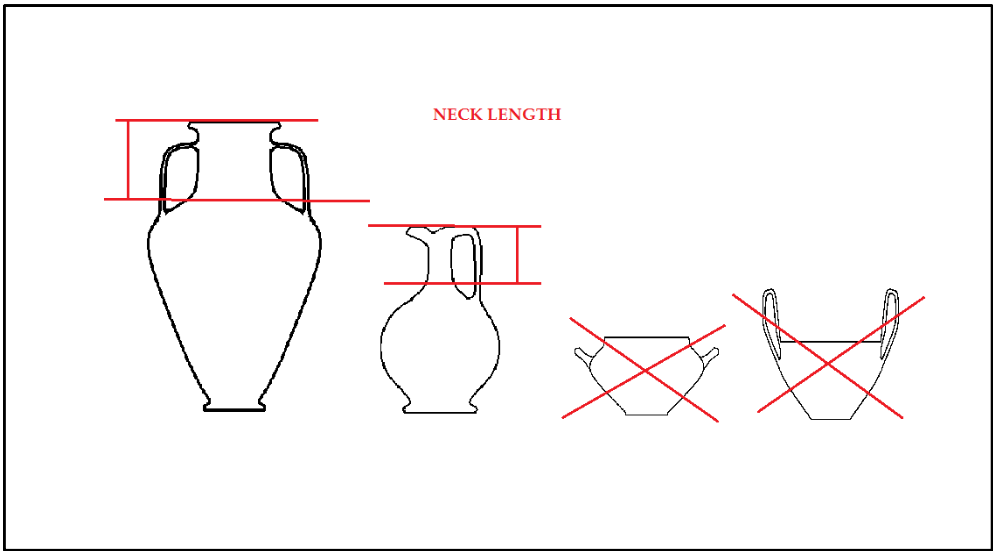

Figure 9: Illustration of neck length.

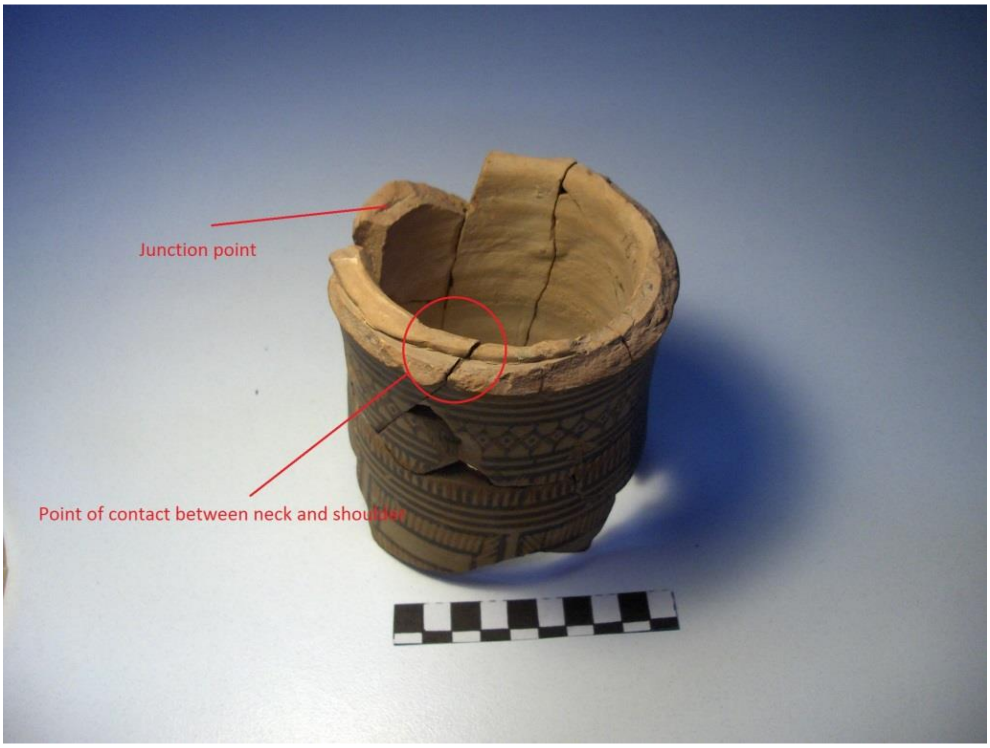

Figure 10: Inverted neck fragment P8382 from an amphora with visible joints and clay support between neck and shoulder.

This explains that not only necks were manufactured separately, but they were also stuck on the rest of the vessels after they had dried enough to support the weight of a thicker piece. In this study, neck length is measured between its junction point with the vessel's shoulders and the uppermost part of the rim. If a vessel has a short neck which was not produced from a separate clay-part, then such vessel is regarded as neck-less (abbreviated as N/L).

5. Handle attachment height (Figure 11): This is the height where handles are attached on the walls of a vessel. For vertical handles (noted on neck-handled amphorae, shoulder-handled amphorae, *hydriae*, *oinochoai*, pitchers and *kantharoi*), handle attachment height is measured between the base of the pot and the middle of the handle's lower joint on the walls. For horizontal handles (noted on *skyphoi*), handle attachment height is measured between the base of the pot and the middle of the handle's horizontal axis. The presence of a single handle attachment height requires that both vessel handles are attached on the same height level along the walls. If handles are unequally attached and their heights of attachment do not differ more than 1 cm, then mean handle attachment height is estimated accordingly. If height

difference exceeds 1 cm, then both handle attachment heights are recorded together (e.g. 10 cm + 12 cm).

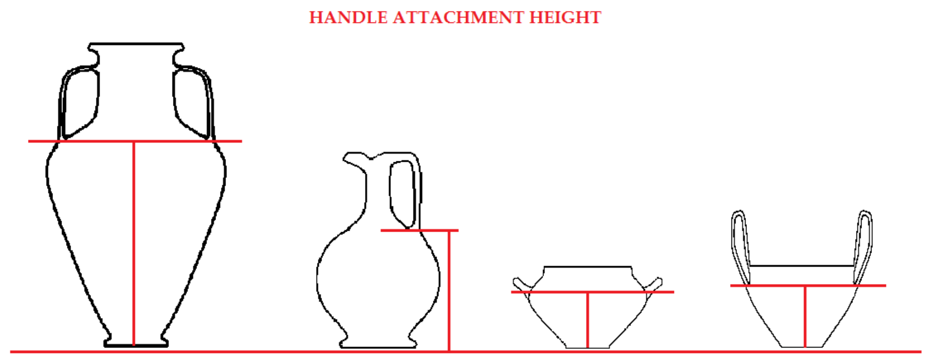

Figure 11: Illustration of handle attachment height.

Proportions aim to describe patterns of relationship between two of the above metrical features of ceramic vessels. The proportional relationship is recorded in the form of percentages based on the mathematical equations presented below. The use of such mathematical equations has already been demonstrated by Claude Traunecker (1981) in the study of Egyptian pottery. More specifically, Traunecker (1981, 52-3) produces vessel indices that correlate rim, base and maximum vessel diameters to net height, which are then used in the study of typologies and volumetrics. Another approach in the use of proportions for the investigation of skill in the reduction of mechanical stress is demonstrated by Gandon *et al*. (2011, 1084-6). In the present methodology, proportions are similar to the vessel indices explained by Traunecker (1981), although simplified to accommodate the different needs of this project:

1. Proportion of Handle Attachment Height to Net Height (Figure 12): This proportion reflects the height where vertical or horizontal handles were attached on the walls of a vessel in relation to the net height of the vessel. The mathematical equation that explains this proportion is:

$$\text{Proportion of Handle Attachment Height to Net Height (\%)} = \frac{\text{Handle Attachment Height}}{\text{Net Vessel Height}} \times 100$$

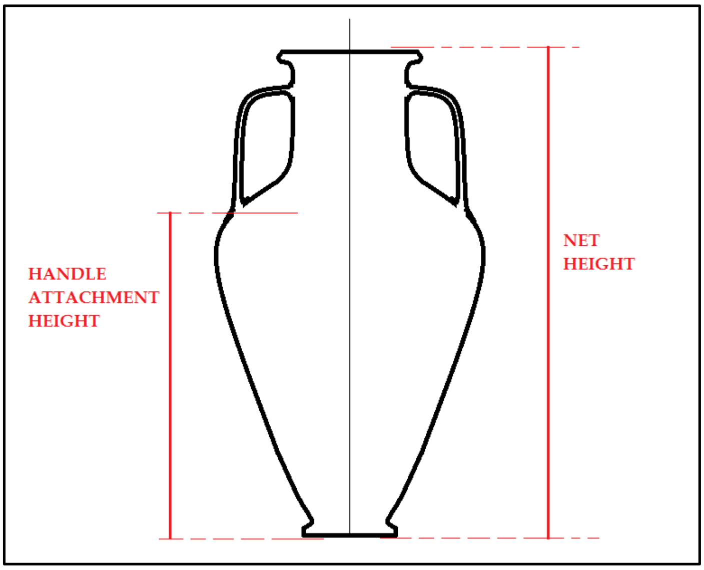

Figure 12: Illustration of proportional relationship between handle attachment height and net vessel height.

2. Proportion of Neck Length to Net Vessel Height (Figure 13): This proportion explains what fraction of a vessel's net height represents the length of its neck. The mathematical equation that explains this proportion is:

$$\text{Proportion of Neck Length to Net Vessel Height (\%)} = \frac{\text{Neck Length}}{\text{Net Vessel Height}} \times 100$$

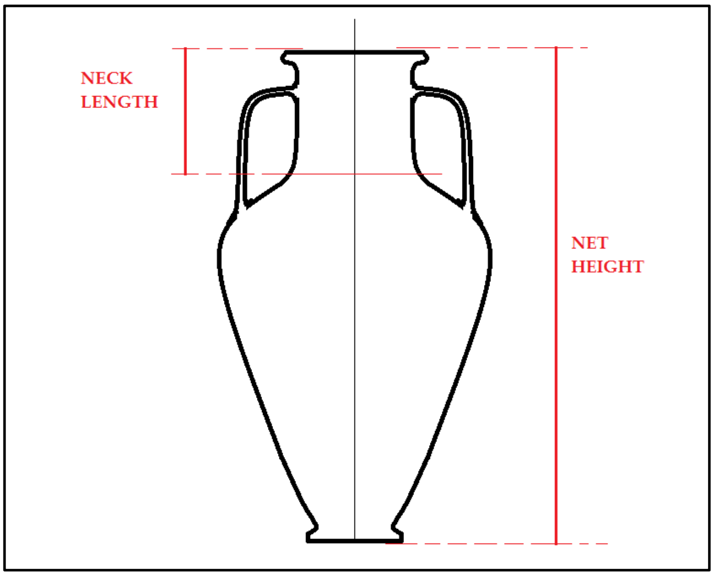

Figure 13: Illustration of proportional relationship between neck length and net vessel height.

If the rim is deformed or the neck stands slightly diagonally on the vessel's shoulders affecting the length of its vertical axis, mean length is estimated accordingly.

3. Proportion of Base Diameter to Rim diameter (Figure 14): A common phenomenon in the majority of ceramic vessels is that base diameters are smaller than rim diameters. This proportion explains how smaller is the base diameter in relation to the rim diameter of the same vessel. The mathematical equation that explains this proportion is:

$$\textit{Proportion of Base Diameter to Rim Diameter (\%)} = \frac{\textit{Base Diameter}}{\textit{Rim Diameter}} \times 100$$

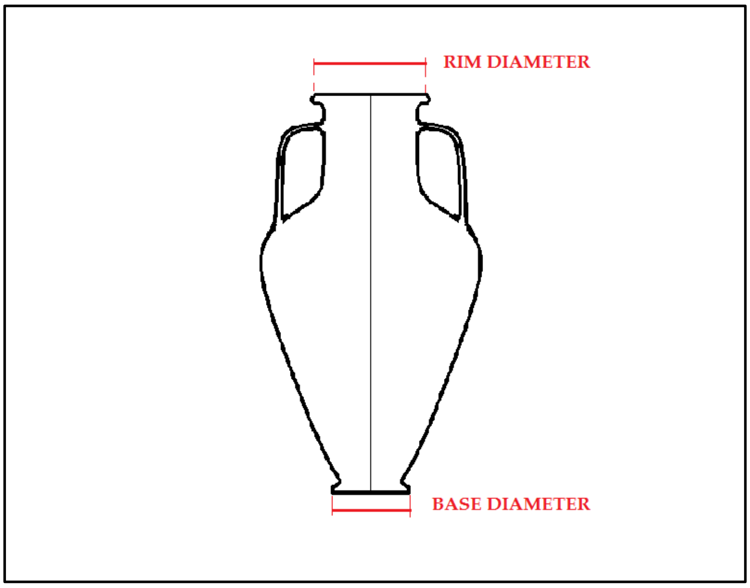

Figure 14: Illustration of proportional relationship between base and rim diameter.

4. Proportion of Rim diameter to Net Height (Figure 15): This proportion describes the correlation between rim diameter and net height. It shows what fraction of net height is the rim diameter of a vessel. The mathematical equation that explains this proportion is:

$$\textit{Proportion of Rim Diameter to Net Vessel Height (\%)} = \frac{\textit{Rim Diameter}}{\textit{Net Vessel Height}} \times 100$$

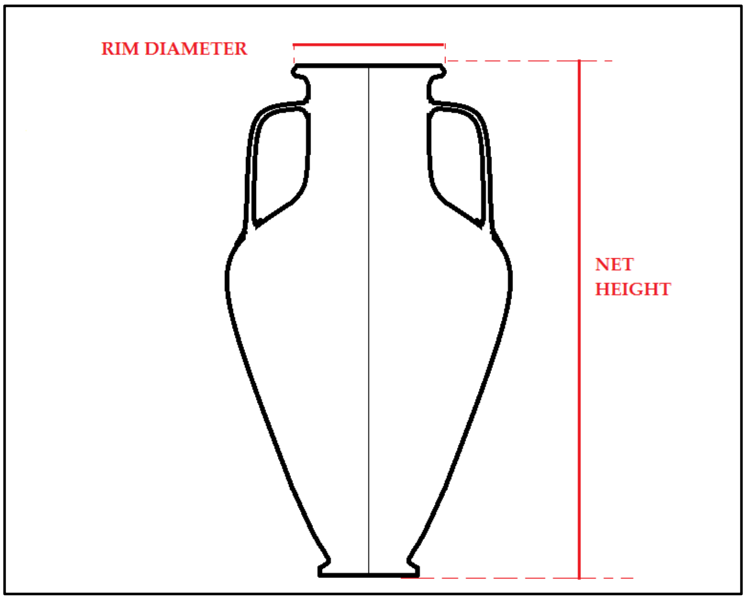

Figure 15: Illustration of proportional relationship between rim diameter and net vessel height.

5. Proportion of Base diameter to Net Height (Figure 16): This measurement presents the correlation between base diameter and net height. It explains what fraction of net height is the base diameter of a vessel. The mathematical equation that explains this proportion is:

$$\textit{Proportion of Base Diameter to Net Vessel Height (\%)} = \frac{\textit{Base Diameter}}{\textit{Net Vessel Height}} \; X \; 100$$

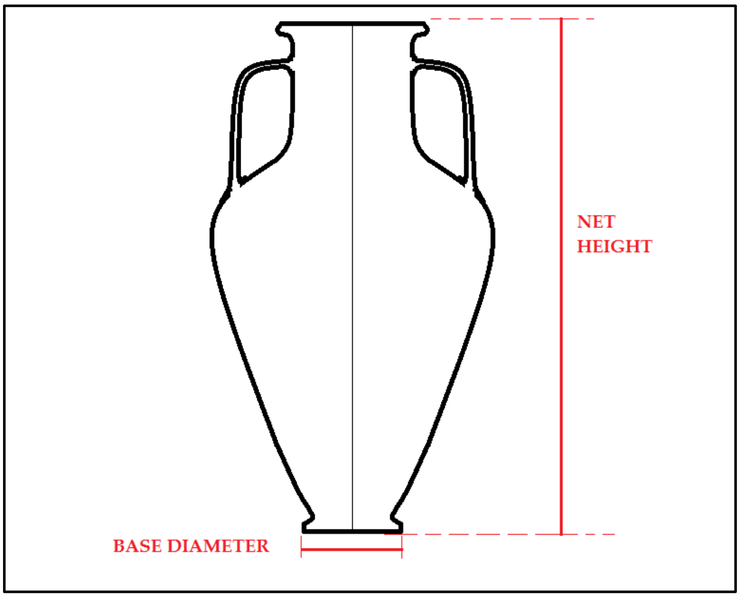

Figure 16: Illustration of proportional relationship between base diameter and net vessel height.

3.2.3 Details and explanations regarding fabrics and decorative technology

Each of the following three chapters (4, 5 and 6) contains a chart of fabric descriptions for each broader ware category. As discussed earlier, such fabric descriptions were obtained from a limited amount of fragmented vessels or sherds that allowed hand specimen examination. Fabric identifications derive from 86 out of of 391 artefacts, all coming from the Athenian *Agora* study collections. The material from the *Kynosarges* burials and the collections of the British School at Athens was unsuitable for such analysis. Identifications were conducted on existing fractures, cracks or areas along chipped surfaces, with the use of a normal 10X hand lens under artificial light.

Proper fabric examination conducted in the field (Orton *et al*. 1993) often includes reaction tests with 10% dilute hydrochloric acid, which help in the characterisation of calcareous inclusions. Such test could not be performed on the present assemblage due to the destructiveness of this technique. Here, fabric characterisations provide the following information: a) fabric colours based on the Munsell soil chart (1975), b) description of inclusions, c) density and distribution of inclusions and voids, and finally, d) hardness and feel of fracture. Fabric information is recorded according to the conventions by Orton *et al*. (1993).

The same hand specimen examination was carried out on the unpublished material of Chapter 7, which was originally selected for destructive analysis and was granted sampling permit from the local authorities (1st *Ephoreia* of Prehistoric and Classical Antiquities, permit reference ΥΠΑΙΘΠΑ/ΣΥΝΤ/Φ44/64642/2881). This material was used to compare and test the validity of hand specimen characterisations across all assemblages studied in this thesis.

	CHART OF COLOUR GROUPS AND DESCRIPTIONS	
COLOUR GROUPS	**COLOUR DESCRIPTION**	**MUNSEL COLOURS (1975)**
	Black, including reddish black	10YR 2.5/1; 7.5YR 2/0
GROUP 1	Brown/black, including very dusky red	2.5YR 2.5/2; 5YR 2.5/1; 10YR 2/1
Black and		
Brownish Black	Brown, including dusky red	10YR 3/2 to3/4; 2.5YR 3/2; 2.5YR3/4;
	and dark redish brown	2.5YR 2.5/4; 5YR 3/2 to3/4; 5YR 2.5/2;
		7.5YR 5/2 to 5/4; 7.5YR 4/2 to 4/4;
		7.5YR 3/2 to 3/4
		10YR 4/6; 10YR 5/4; 2.5YR 5/6 to 5/8;
	Brown/red	2.5YR 5/4; 2.5YR 4/4;
GROUP 2		5YR 5/3 to 5/4; 5YR 4/3 to 4/4
Brownish Red		10YR 5/6 to 5/8; 10YR 4/6 to 4/8;
and Red	Red	10YR 3/6; 2.5YR 3.6; 2.5YR 4/6 to 4/8;
		2.5YR 5/6 to 5/8
	Orange, including light red	2.5YR 6/6 to 6/8
GROUP 3		
Orange and		5YR 7/6 to 7/8; 5YR 6/6 to 6/8;
Reddish Yellow	Orange/red, including reddish yellow	5YR 5/6 to 5/8 7.5YR 7/6 to 7/8;
		7.5YR 6/6 to 6/8
	Faded colours after deposition in the soil	
?	with a degree of uncertainty	

Figure 17: Colour groups (with colour sample) and Munsell (1975) descriptions for the analysis of decorative technology.

With regard to the study of decorative technologies, this research project records information related to the nature of external treatments of Athenian Geometric finewares. Information relates to simple colour descriptions of decorative elements and coated areas according to the Munsell (1975) soil colour chart, and the identification of coating and slip quality. A similar approach has been followed by Ilieva (2014) in the study of regional standardisation of North Aegean G 2-3 wares; however, her approach is not entirely technological as it does not include microscopic analysis of decorated colours and slips, and does not discuss all the parameters related to colour variation. The present thesis presents some microscopic tests and a relevant discussion in Chapter 7.

For simplicity and effective analysis, colour descriptions are divided in three broader colour groups that are explained in Figure 17. The most common colours observed on Attic Early Iron Age pottery belong to Group 1; however, there appear to be spots on some vessels with black or brown black decoration that have faded towards red or brownish red colours (Group 2). Similarly, some vessels that were most likely intended to look brownish red or red, exhibit areas along their surfaces that have faded towards orange and reddish yellow colours (Group 3). As it has been observed in the archaeological record, Athenian Early Iron Age potters were capable of controlling firing cycles with the use of ceramic test pieces (Papadopoulos 2003); however, unevenly coloured surfaces would still occur. Such alterations of the final colours are complicated to explain and can relate to a combination of reasons.

Firstly, according to Tite *et al*. (1982) and Maniatis & Tite (1981) colours of ancient pottery resulted due to different concentrations of iron and manganese elements in paints that were produced from the suspension of clay in water. The unevenly coloured surfaces of some ceramics studied in this thesis may be due to the simultaneous use of more than one types of paint per vessel; however, this possibility is highly unlikely. Instead, decorated finewares show the intention of painters to use a single colour on as many vessels as possible.

Secondly, it is likely that unevenly coloured surfaces resulted due to differences in the density of the paints as they were being delivered by the brush strokes along the vessels' walls. More specifically, brush strokes tend to leave thicker and darker layers of paint during their initial contact on a blank surface, while colours tend to fade towards the end of a brush stroke. This can result to natural fading in the intensity of the original colour, but the colour would still be the same.

Thirdly, unstable kiln conditions and uneven distribution of heat within kilns could have also been responsible for the unevenly coloured surfaces of some ceramic products. In such cases, paints would have resulted in different colours due to fluctuation of firing conditions (oxidised or reduced), also related to the sequence and duration of each firing cycle.

Fourthly, one needs to bear in mind that in archaeological ceramics colours fade due to post-depositional conditions. Soil humidity and contamination could affect the external appearance of pots over time and this can create confusion in the identification of colours on excavated pottery. The effects of deposition on decorative colours have not been studied thoroughly, and therefore, this parameter is unexplored with regard to the present study. It could be likely that all colour groups are variations of one colour, most likely black, naturally faded in different shades because of long term deposition. Such possibility requires further investigation; however, the scope of this project is not to conduct any relevant corrosion tests.

Based on these observations, it needs to be clarified that all colours explained in Figure 17 are visually similar. The chemical composition of paints that were used for the decoration of all vessels was most likely the same (see Chapter 7) and variation among colour groups was due to firing. Here, all colours are grouped together based on their intensity and visual appearance by following a sequence from darker to lighter colours: the darker colours comprise Group 1, the intermediate colours Group 2, and the lighter colours Group 3. The colour recorded on each vessel is regarded as the intentional colour that the manufacturer wished to produce. This is the darkest colour on the vessel’s surface and not any other colours observed on faded spots.

	CHART OF SLIP AND COATING QUALITY		
THICKNESS	EXTERNAL APPEARANCE	REFERENCE	EXPLANATION
Thick	Lustrous	Coating	Vessel containing significant areas covered in thick layers of paint with lustrous external appearance.
Thick	Matte	Coating	Vessel containing significant areas covered in thick layers of paint with matte external appearance.
Thin	Lustrous	Slip	Vessel covered partially or completely with a thin yellow genuine slip with lustrous external appearance.
Thin	Matte	Wash or 'Slip'	Vessel covered completely with a thin wash in the colour of the original clay. Typical 'blank' surface.

Figure 18: Summary of slip and coating quality definitions.

Apart from decorative element and coating colours, this project also records quality of coatings and slips of decorated finewares. More specifically, coatings are regarded as thick layers of paint that cover a significant portion of the vessel's surface. Their external appearance can either be lustrous or matte. By contrast, slips can relate to two different things. Firstly, genuine slips: these are thin layers of non-iron rich suspension, coming from the original clay used to produce the vessel. Slips are yellow and their external appearance is in most cases lustrous. Secondly, plain washes: for simplicity, these are recorded as thin and matte 'slips' and they are typical 'blank' surfaces in the colour of the original clay. In general, all finewares have been produced with some sort of external treatment. The least elaborate is the thin matte wash, while the most elaborate is the thick lustrous coating. The definitions used in the study of slip and coating quality are summarised in Figure 18.

Closed ceramic containers such as amphorae and *oinochoai* are coated or slipped only on their external surfaces; however, open vessels such as *kantharo*i and *skyphoi* are coated or slipped both externally and internally. For simplicity, all coatings and slips recorded and analysed in this thesis relate to the vessels' external surfaces.

3.2.4 Ware groups and shapes

Each of the following three chapters discusses a broader ware group and presents the results of macroscopic analysis conducted according to the *chaîne opératoire* principles explained above. Finewares are grouped together in three broader categories based on vessel size, function, sequence of manufacture and assembling characteristics. These are: large-sized closed ceramic containers, medium-sized pouring vessels and small-sized drinking vessels. Figure 19 presents a summary of the total studied material, divided in these three broader ware groups and their subgroups. Detailed breakdown of each ware group is presented in Figures 26, 32 and 40 below.

SUMMARY OF TOTAL MATERIAL DIVIDED BY BROADER WARE GROUPS				
Ware Groups by Size	**Typological Groups**	**Complete Profile**	**Incomplete/Fragments**	**Totals**
Containers (Large)	Decorated Amphorae	56	33	89
Containers (Large)	Banded Amphorae	17	7	24
Containers (Large)	Hydriae	4	6	10
Pouring Vessels (Medium)	Oinochoai	62	19	81
Pouring Vessels (Medium)	Pitcers	22		22
Drinking Vessels (Small)	Kantharoi	40	4	44
Drinking Vessels (Small)	Skyphoi	114	7	121
	TOTALS	**315**	**76**	**391**

Figure 19: Total material divided in three broader ware groups.

Chapter 4 discusses three types of large-sized closed ceramic containers:

1. Elaborately decorated amphorae of three subtypes:
    a) Neck-handled amphorae (abbreviated as N-H) (Figures 20 and 21). Such shapes with typical elongated bodies and long necks appeared in Athens for the first time in 11^{th} century BC graves at Kerameikos. The most characteristic examples are vessel 3701 from Grave 76 and a similar shape without recorded inventory number from grave 92 (Ruppenstein 2007, pl.43). Such vessels became popular at *Kerameikos* during MPG times (e.g. Lemos 2002, pl.21/n.7-8) and continued to be used in burials from the LPG period onwards (e.g. Lemos 2002, pl.33.1, pl.34/n.3). A variation of this class, which appeared in Attica during the LG and was used as a transport vessel, is the SOS N-H amphora (Johnston & Jones 1978).

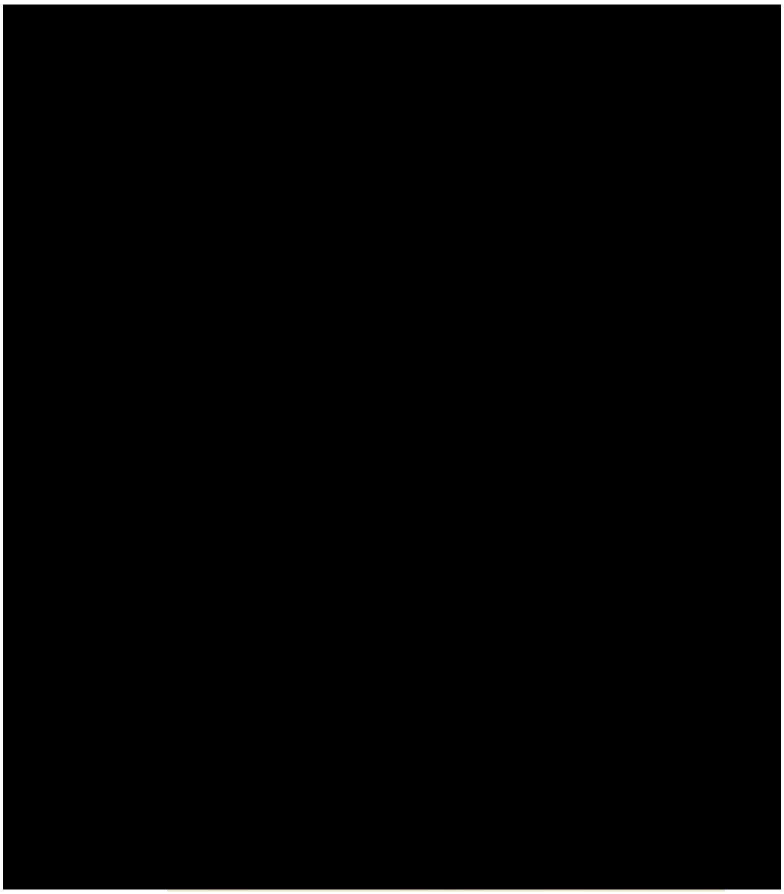

Figure 20: Example of elaborately decorated neck-handled amphora illustrated by Piet De Jong (*Agora* P3747, after Papadopoulos 2007, 106, fig.105).

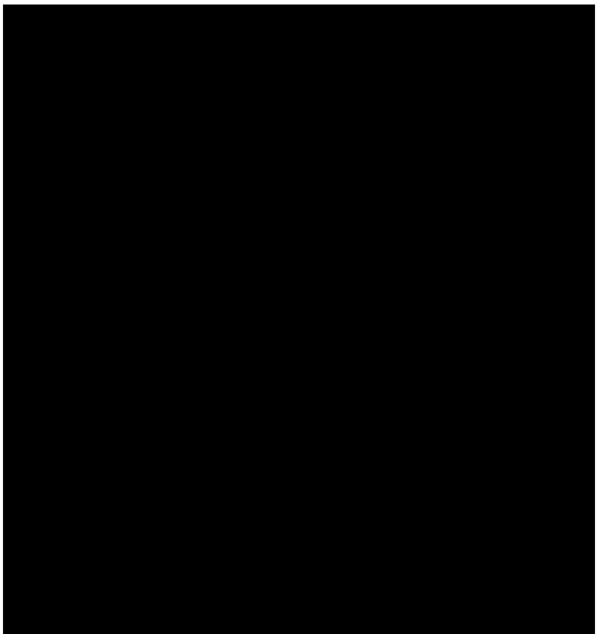

Figure 21: Example of SOS transport neck-handled amphora (*Kerameikos* 1298, after Kübler 1954, 354, pl.38).

b) Shoulder-handled amphorae (abbreviated as S-H) (Figure 22). Such shapes derived from earlier Protogeometric vessels (e.g. Lemos 2002, pl.86/n.1), which often carried a decorated lid.

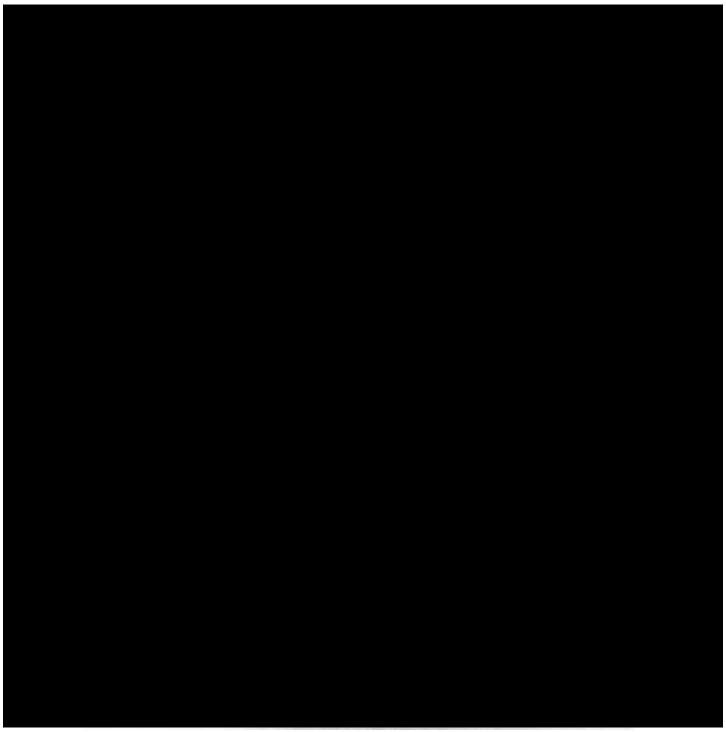

Figure 22: Example of elaborately decorated shoulder-handled amphora (*Agora* P19228, after Young 1949, 289, pl.68).

c) Belly-handled amphorae (abbreviated as B-H) (Figure 23). The shapes of Attic belly-handled amphorae and *hydriae* (see below) from the Geometric period show great similarity with popular vessels from Athenian burials of the EPG period. Globular belly-handled amphorae with broad necks such as those from EPG graves 22 (Lemos 2002, pl.3/n.1) and 13 (Lemos 2002, pl.4/n.1) at *Kerameikos* were rare in Geometric Athens; however; shapes with oval bodies and narrower necks such as those from the EPG Heidelberger grave B (Lemos 2002, pl.5/n.7), which also appeared in *Kerameikos* during MPG (Lemos 2002, pl.22/n.1) and LPG times (Lemos 2002, pl.32/n.1) match the typical Geometric form that dominates after EGII-MGI (e.g. Kübler 1954, pl.41). Some belly-handled amphorae resembling the ovoid body of typical Geometric shoulder-handled amphorae go back to the Submycenaean era (e.g. 2733 from Grave 101 at *Kerameikos*)

(Ruppenstein 2007, pl.43).

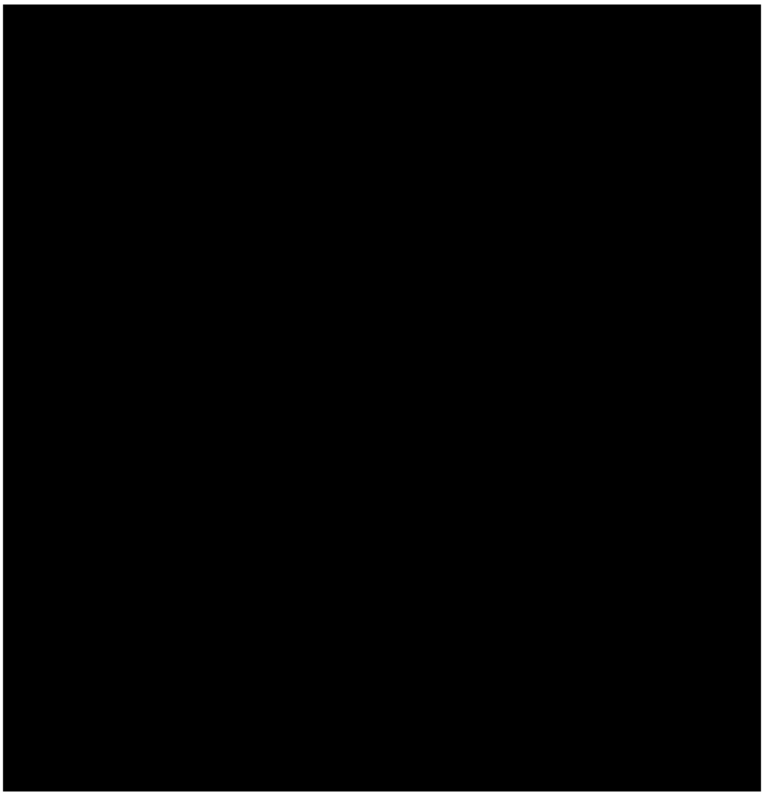

Figure 23: Example of elaborately decorated belly-handled amphora (*Kerameikos* 2146, after Kübler 1954, 235, pl.46).

2. Banded neck-handled amphorae of two types:
    a) Banded N-H amphorae with long necks (Figure 24, left). Their shape is no different to elaborately decorated N-H amphorae; the only difference is that they carry simple banded decoration instead.
    b) Banded N-H amphorae with short or almost no necks (abbreviated as N/L= neck-less) (Figure 24, right). Such vessels carry handles that extend from the vessel's shoulders to the upper rim and have typical banded decoration. This class has been recovered mainly in Late Geometric wells from the *Agora*. Some elaborately decorated versions of this shape go back to the EPG (e.g. Lemos 2002, pl.6/n.2) and LPG periods (e.g. Lemos 2002, pl.34/n.1), and have been recovered in burials at *Kerameikos*.

[redacted]

Figure 24: Examples of banded neck-handled amphorae (Left: *Agora* P26242, after Papadopoulos & Smithson 2002, 172, fig.17e. Right: *Kerameikos* 289, after Kübler 1954, 299, pl.41).

3. *Hydriae* (Figure 25). This shape is no different to B-H amphorae, except that *hydriae* carry an extra vertical strap handle that extends from the top of the rim to the vessel's shoulder. Their decoration is primarily banded with either straight or wavy lines, while necks can occasionally be coated. The earliest *hydriae* (783 and 784) come from MGII-LGIa *Kerameikos* (Kübler 1954, pl.50). Although this shape does not seem to have parallels in PG and EG Athens, it resembles PG belly-handled amphorae from *Kerameikos* and some smaller-sized *hydriae* from MPG Lefkandi (Lemos 2002, pl.24/n.12); therefore, this shape probably originates in the 11th and 10th centuries BC.

[redacted]

Figure 25: Example of *hydria* (*Agora* P4980, after Brann 1962, 35, pl.3/n.37).

In Chapter 4, greatest attention is placed in the study of neck-handled amphorae for two reasons. Firstly, during the Geometric period these vessels were produced for both domestic and funerary consumption. Elaborately decorated neck-handled amphorae of normal sizes (shorter than 1m) were used in burials together with larger decorated amphorae of monumental sizes, such as those of the *Dipylon* tradition. At the same time, shorter neck-handled amphorae with banned decoration were produced for domestic consumption and often found their way in graves. Secondly, neck-handled amphorae survive in larger quantities in the archaeological record, by contrast to shoulder-handled and belly-handled vessels.

With regard to amphorae, this research project could not include several important artefacts due to access limitations. For example, the belly-handled amphora P27629 from the *Grave of the Rich Athenian Lady* (Smithson 1968, 84, pl.20/n.1), the monumental *Dipylon*-style amphora Athens NM804 from *Kerameikos* (Coldstream 1968, pl.6) and the neck-handled amphora P20177 from the *Boot Grave* (Blegen 1952, 290-291, pl.74/n.15; Coldstream 1968, 10, pl.1:I) are currently in display and access would have required special and time-consuming arrangements. The only monumental *Dipylon*-style vessel included in this thesis is the neck fragment P22435 (Thompson 1953, 39, pl.18a). This is analysed in order to bring up the differences in the production of monumental grave vessels, as opposed to the production of other normal-size closed ceramic containers. The total Athenian and broadly Attic material studied in this chapter is summarised in Figure 26.

SUMMARY OF STUDIED MATERIAL: CLOSED CERAMIC CONTAINERS				
Ware Types	Context	Complete Profile	Incomplete/Fragments	Totals
Amphorae N-H	*Agora* (Athenian)	8	15	23
Amphorae N-H Banded	*Agora* (Athenian)	6	7	13
Amphorae N-H Banded N/L	*Agora* (Athenian)	6		6
Amphorae S-H	*Agora* (Athenian)	1		1
Amphorae B-H	*Agora* (Athenian)		1	1
Monumental N-H Amphorae	*Agora* (Athenian)		1	1
Amphorae ?	*Agora* (Athenian)		8	8
Hydriae	*Agora* (Athenian)	2	6	8
Amphorae N-H	*Kynosarges* (Athenian)		1	1
Amphorae ?	*Kynosarges* (Athenian)		4	4
Amphorae N-H	BSA Museum (Attic)		1	1
Amphorae ?	BSA Museum (Attic)		2	2
Amphorae N-H	*Kerameikos* (Athenian)	27		27
Amphorae N-H Banded	*Kerameikos* (Athenian)	1		1
Amphorae N-H Banded N/L	*Kerameikos* (Athenian)	4		4
Amphorae N-H SOS	*Kerameikos* (Athenian)	1		1
Amphorae S-H	*Kerameikos* (Athenian)	5		5
Amphorae B-H	*Kerameikos* (Athenian)	1		1
Hydriae	*Kerameikos* (Athenian)	2		2
Amphorae N-H	British Museum (Attic)	12		12
Amphorae B-H	British Museum (Attic)	1		1
	TOTALS	**77**	**46**	**123**

Figure 26: Athenian/Attic closed ceramic containers studied in Chapter 4.

Chapter 5 discusses two types of medium-sized pouring vessels:

1) Elaborately decorated trefoil *oinochoai* belonging to six subclasses:
    a) Standard trefoil *oinochoai* with oval bodies and long necks (Figure 27). Their handle extends from the vessel's shoulder and levels with the uppermost part of its trefoil mouth. Such shapes appeared for the first time in SM (Grave 105) and EPG *Kerameikos* (Grave 4), and had short ring bases (Lemos 2002, pl.7.6; Ruppenstein 2007, pl.45). They continued during MPG (e.g. Lemos 2002, pl.22/n.3) and LPG times (Lemos 2002, pl.35/n.1-4), and became popular during the Geometric era. A different class of trefoil *oinochoai* with small conical feet, which appeared for the first time in MPG *Kerameikos* (e.g. Lemos 2002, 21/n.3), were probably an evolution of SM and EPG Athenian *lekythoi* (Lemos 2002, pl.6/n.4-5; Ruppenstein 2007, pl.43, 45). This class did not continue during the Geometric era.

Figure 27: Example of standard trefoil *oinochoe* (*Kerameikos* 862, after Kübler 154, 216, pl.73).

b) Giant trefoil *oinochoai* with oval bodies and long necks. Such vessels are no different to the previous class. They appeared for the first time during LGIa and according to Galanakis (2013) they were first invented by the *Dipylon* Master. As there are no distinct guidelines for the classification of such vessels, in this project all LG trefoil *oinochoai* exceeding 35 cm in net height are regarded as giant.

c) Neck-less trefoil *oinochoai* (abbreviated as N/L) (Figure 28). These vessels have oval bodies similar to typical trefoil *oinochoai*; however, they have no necks and their trefoil mouths extend directly above the vessel's shoulders. Furthermore, neck-less trefoil *oinochoai* have handles that form a long curve, which exceeds the net height of the vessel. Such shapes probably derived from MPG (e.g. Lemos 2002, pl.24/n.4) and LPG (Lemos 2002, pl.33/n.9) hand-made wares; however, the shapes encountered in this project are all wheel-made and come from the Late Geometric period.

[redacted]

Figure 28: Example of neck-less trefoil *oinochoe* (*Agora* P12120, after Brann 1961a, 119, pl.15/L12).

d) Broad trefoil *oinochoai*. Such vessels have oval or globular bodies and short wide necks, ending at a trefoil mouth. Occasionally, their trefoil mouth seals with a lid. Even though they are no different compared to the previous two *oinochoai* subclasses, such vessels need to be categorised separately because they are open instead of closed shapes. More specifically, a person's hand can easily fit through the trefoil mouth and touch the internal surfaces of the pot, which is not possible in the previous two *oinochoai* subclasses. Such shapes are strictly Late Geometric and the earliest go back to the LGIa.

[redacted]

Figure 29: Example of broad neck-less trefoil *oinochoe* (*Kerameikos* 874, after Kübler 1954, pl.82).

e) Broad neck-less trefoil *oinochoai* (abbreviated as Broad N/L) (Figure 29). Such vessels are no different to N/L trefoil *oinochoai*: they have a broad trefoil mouth but almost no neck. They are a hybrid class of the previous two *oinochoai* subclasses and they also come from the Late Geometric period (e.g. 874 from Kerameikos Grave 9, Kübler 1954, pl.82).

f) Trefoil *oinochoai lekythoi* (Figure 30). Such shapes are rare and do not seem to descend from the Protogeometric period. The earliest vessel in this thesis (1141) comes from the MGI Grave 13 at *Kerameikos* (Kübler 1954, pl.83). Such vessels have broad semi-oval bodies and thin long necks, closer to those of *lekythoi*. Unlike typical LPG *lekythoi* from *Kerameikos* (e.g. Lemos 2002, pl.34/n.6), such vessels have trefoil instead of flat-rounded mouths, broad bases instead of conical feet, and their handles extend from shoulder to rim instead of shoulder to neck. For the above reasons, their production must be regarded closer to that of standard *oinochoai*.

Figure 30: Example of trefoil *oinochoe-lekythos* (*Kerameikos* 1141, after Kübler 1954, 219, pl.83).

2) Elaborately decorated pitchers (Figure 31). Such vessels used to be popular during the Late Geometric era and are not encountered in the archaeological

record during earlier times (Vlachou Forthcoming). They are comprised of a globular body, a wide and tall neck that resembles amphorae, and a handle that curves above the vessel's net height. Chapter 5 does not include any pitchers from the Athenian *Agora* due to their scarcity. Vessels such as P5053 (Shear 1936a, 31, fig.30) are found in display and cannot be easily accessed.

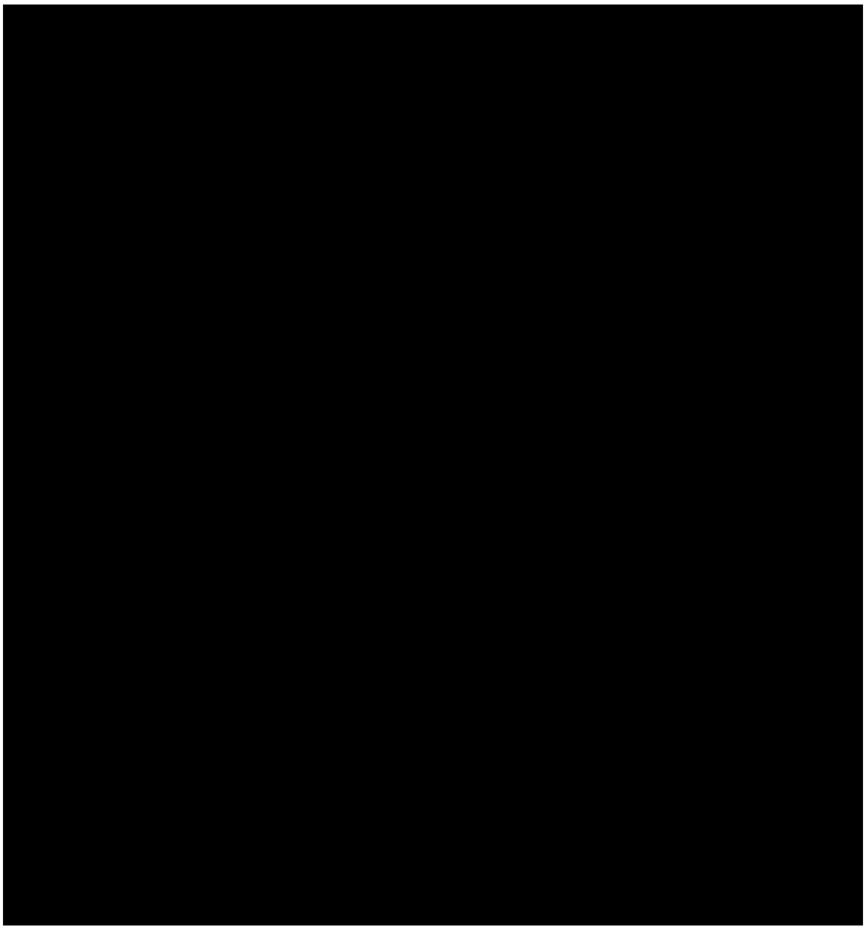

Figure 31: Example of elaborately decorated pitcher (British Museum Collections, GR1912,0522.1, after Coldstream 2010, 23, pl.28).

Despite their typological variations, the common characteristic encountered in all *oinochoai* subgroups is their trefoil mouth. This is also the characteristic that defines their function as pouring vessels. Neck-less trefoil *oinochoai* and their broader equivalents have been produced with short or almost no necks in a single episode on the potter's wheel. By contrast, standard trefoil *oinochoai* and *oinochoai lekythoi* contain long necks that have been attached on the vessel's body during a separate episode on the potter's wheel. The same can be said with regard to pitchers. The total Athenian and broadly Attic material studied in this chapter is summarised in Figure 32.

SUMMARY OF STUDIED MATERIAL: POURING VESSELS				
Ware Types	**Context**	**Complete Profile**	**Incomplete/Fragments**	**Totals**
Trefoil Oinochoai (standard)	*Agora* (Athenian)	20	12	32
Giant Trefoil Oinochoai	*Agora* (Athenian)		3	3
N/L Trefoil Oinochoai	*Agora* (Athenian)	8	2	10
Broad N/L Trefoil Oinochoai	*Agora* (Athenian)	1	1	2
Trefoil Oinochoai (standard)	*Kynosarges* (Athenian)		1	1
Pitchers	*Kynosarges* (Athenian)	1		1
Trefoil Oinochoai (standard)	BSA Museum (Attic)	1		1
Broad Trefoil Oinochoai	BSA Museum (Attic)	1		1
Pitchers	BSA Museum (Attic)	5		5
Trefoil Oinochoai (standard)	*Kerameikos* (Athenian)	18		18
Broad N/L Trefoil Oinochoai	*Kerameikos* (Athenian)	1		1
Trefoil Oinochoai Lekythoi	*Kerameikos* (Athenian)	1		1
Pitchers	*Kerameikos* (Athenian)	4		4
Trefoil Oinochoai (standard)	British Museum (Attic)	8		8
Giant Trefoil Oinochoai	British Museum (Attic)	2		2
Trefoil Oinochoai Lekythoi	British Museum (Attic)	1		1
Pitchers	British Museum (Attic)	9		9
Pitchers (with short neck)	British Museum (Attic)	3		3
	TOTALS	**84**	**19**	**103**

Figure 32: Athenian/Attic pouring vessels studied in Chapter 5.

Chapter 6 discusses two types of drinking vessels: *skyphoi* and *kantharoi*. Such pots are found in a variety of Attic Early Iron Age contexts and comprise the largest portion of ceramic artefacts examined in this thesis. By contrast to large ceramic containers and medium sized pouring vessels, which show greater degree of fragmentation, drinking pots are significantly smaller and survive in better condition in the archaeological record.

In terms of typological variation, *kantharoi* and *skyphoi* are subject to typological subdivisions that are not always clear and can generate confusion. A good example relates to the similarity between *kantharoi* with low handles and two-handled cups. Adjectives used to describe typological variations such as broad, wide, deep, shallow, etc. (according to Coldstream 1968; 1977; 2003b; 2010) are encountered across different publications without specific references to numbers. More specifically, there is no distinct height limit (in cm) to define the difference between a deep and a shallow *skyphos*, as there are no specific rim diameter and height limits (in cm) to classify vessels with similar shapes as wide *skyphoi* or bowls. In fact, in older German publications (e.g. Kraiker *et al*. 1939) such wares were referred to as *Näpfe*.

All drinking vessels examined in Chapter 6 are divided in two broader groups based on a simple and widely accepted principle: *skyphoi* are vessels with horizontal handles while *kantharoi* are vessels with vertical handles. Furthermore, any open shapes with horizontal or vertical handles that exceed 15 cm in net height and 20 cm in rim diameter are not included in this chapter, as these probably functioned as bowls instead of drinking cups. Finally, all shape details of *kantharoi* and *skyphoi* are recorded in relation to the typological definitions given by Nicolas Coldstream (1968; 1977; 2003b; 2010).

According to their shape differences, *Kantharoi* comprise four typological subgroups:

a) Typical *kantharoi* with high vertical handles exceeding the height of the vessel's rim (abbreviated as H/H= high-handled) (Figure 33). All these vessels usually have short lips; however, if such vessels carry high lips, then the abbreviation H/L (=high-lipped) is added next to their description. This shape appears for the first time during MGII and resembles contemporary *skyphoi* (Coldstream 1968, 23); however, the majority of *kantharoi* come from LG and EPA times.

Figure 33: Example of a typical *kantharos* with high vertical handles (*Agora* P4775, after Brann 1962, 52, pl.10/n.171).

b) Small-sized typical *kantharoi* with high handles (here noted as Small H/H). Such vessels do not show any chronological or typological differences compared to the first subgroup. However, in the current study a height limit of 4 cm is set to diversify miniature from functional drinking vessels; therefore, small *kantharoi* are recorded separately as their net heights range between 4 cm and 8 cm.

c) *Kantharoi* with low vertical handles reaching up to the height of the vessel's rim (abbreviated as L/H= low-handled) (Figure 34). Such vessels derived from LPG black-coated low-handled *kantharoi* (Coldstream 1968, 11, pl.1b; Lemos 2002, pl.31.4), which were produced without conical feet during the Geometric era. This shape survived until EGII (Coldstream 1968, 14).

[redacted]

Figure 34: Example of *kantharos* with low vertical handles (*Kerameikos* 929, after Kübler 1954, 211, pl.84).

d) Footed *kantharoi* with low vertical handles (abbreviated as Footed L/H) (Figure 35). Such vessels derived from black-coated LPG footed *kantharoi* (e.g. Lemos 2002, pl.31/n.4), which continued to be produced between EG and MGI times (Coldstream 1968, 14) while they declined shortly after (Coldstream 1968, 19). For simplicity, in this thesis there is no distinction between *kantharoi* with high or low feet.

[redacted]

Figure 35: Two examples of footed *kantharoi* with low handles (Left: *Kerameikos* 930, after Kübler 1954, 211, pl.84. Right: *Agora* P19247, after Young 1949, 296, pl.67/n.20).

In Chapter 6, *skyphoi* are divided in five subgroups based on their shape differences:

a) Typical *skyphoi* with short horizontal handles (Figure 36). These shapes derived from deeper footed *skyphoi* of the SM and EPG periods such as the ones from *Kerameikos* Grave 5 (Lemos 2002, pl.8/n.4) and Grave 76 (Ruppenstein 2007, pl.43). Such shapes continued to be produced during MPG (e.g. Lemos 2002, pl.21/n.2 and 22/n.2) and LPG times (e.g. Lemos 2002, pl.36/n.4-5). During the Early Geometric period these vessels lost their conical feet and were produced in shallower versions, which differed completely to their Protogeometric predecessors (Coldstream 1968, 14, pl.2b). Coldstream (1968, 14) names such drinking vessels *shallow skyphoi* (by contrast to the Protogeometric *deep skyphoi*), which also appeared in versions with high lips such as K2 from *Kynosarges* (Coldstream 2003b, 334, pl.40) and A343 from the collections of the British School at Athens (Coldstream 2003b, 345, pl.52). In this study the general name *skyphos* is used to describe Coldstream's *shallow skyphos*. Additionally, if such vessels have high lips, they are abbreviated as H/L (=high-lipped).

[redacted]

Figure 36: Example of typical *skyphos* with horizontal handles and high lips (British Museum Collections, 1842,0728.831, after Coldstream 2010, 32, pl.46).

b) Wide *Skyphoi* (Figure 37). According to Coldstream's (1968) typology, such vessels are typical *shallow skyphoi* with horizontal handles; however, in this project they are recorded as a separate class due to their wide rim diameter: it always exceeds 15cm and is likely to explain functions other than drinking.

[redacted]

Figure 37: Example of wide skyphos (*Kerameikos* 840, after Kübler 1954, 264, pl.90).

c) Wide *skyphoi* with stirrup handles (abbreviated as STR/H = stirrup-handled) (Figure 38). This class is a short-lived variant of the *shallow skyphos* produced after EGII (Coldstream 1968, 18). It is recorded as a separate class of wide *skyphos* by following the example of Coldstream (1968).

[redacted]

Figure 38: Example of wide *skyphos* with stirrup handles (*Kerameikos* 889, after Kübler 1954, 219, pl.93).

d) Gadrooned *skyphoi* (Figure 39). In previous pottery publications, gadrooned *skyphoi* such as A342 (Coldstream 2003b, 345, pl.52), *Kerameikos* 324 and 325 (Kübler 1954, 242, pl.99) were treated as ordinary *shallow skyphoi*; however, such vessels are generally considered to have derived from metallic prototypes (Coldstream 2003b, 345)[37]. In this thesis they are examined separately in order to test if their conceptualisation (*sensu* Van der Leeuw 1994, 136-7) is similar with that of other 'non-metallic' *skyphoi*.

[redacted]

Figure 39: Example of gadrooned skyphos (*Kerameikos* 1324, after Kübler 1954, 242, pl.99).

[37] The connections between metal and ceramic vessels in relation to their broader production has already been discussed by Borell (1978, 93-4) and Markoe (1985, 117-27).

In Chapter 6, *skyphoi* and *kantharoi* were selected among a broad typological range of Attic Early Iron Age drinking vessels because of their relatively higher degree of technological complexity compared to simpler forms such as drinking cups with one or two handles, miniature cups, *phialae* and *kotylae*. The total Athenian and broadly Attic material studied in this chapter is summarised in Figure 40.

SUMMARY OF STUDIED MATERIAL: DRINKING VESSELS				
Ware Types	**Context**	**Complete Profile**	**Incomplete/Fragments**	**Totals**
Kantharoi with H/H (typical)	*Agora* (Athenian)	4	1	5
Kantharoi with L/H	*Agora* (Athenian)	1	1	2
Kantharoi Small with H/H	*Agora* (Athenian)	4		4
Kantharoi Footed with L/H	*Agora* (Athenian)	1	1	2
Kantharoi ?	*Agora* (Athenian)		2	2
Skyphoi (typical shallow)	*Agora* (Athenian)	20	3	23
Skyphoi Corinthianising	*Agora* (Athenian)		1	1
Skyphoi Wide	*Agora* (Athenian)	5	3	8
Kantharoi with H/H (typical)	*Kynosarges* (Athenian)	1		1
Skyphoi (typical shallow)	*Kynosarges* (Athenian)	4		4
Skyphoi Wide	*Kynosarges* (Athenian)	2		2
Kantharoi with H/H (typical)	BSA Museum (Attic)	1		1
Kantharoi Small with H/H	BSA Museum (Attic)	1		1
Skyphoi (typical shallow)	BSA Museum (Attic)	1		1
Skyphoi Gadrooned	BSA Museum (Attic)	1		1
Kantharoi with H/H (typical)	*Kerameikos* (Athenian)	10		10
Kantharoi with L/H	*Kerameikos* (Athenian)	3		3
Kantharoi Small with H/H	*Kerameikos* (Athenian)	8		8
Kantharoi Footed with L/H	*Kerameikos* (Athenian)	5		5
Skyphoi (typical shallow)	*Kerameikos* (Athenian)	50		50
Skyphoi Wide	*Kerameikos* (Athenian)	12		12
Skyphoi Wide STR/H	*Kerameikos* (Athenian)	4		4
Skyphoi Gadrooned	*Kerameikos* (Athenian)	3		3
Skyphoi (typical shallow)	British Museum (Attic)	10		10
Skyphoi Wide	British Museum (Attic)	1		1
Skyphoi Gadrooned	British Museum (Attic)	1		1
	TOTALS	**153**	**12**	**165**

Figure 40: Athenian/Attic drinking vessels studied in Chapter 6.

3.2.5 Breakdown of wares groups by sites and contexts

As explained in Chapter 1, the ceramic material studied in this thesis derives from five locations: three archaeological sites in Athens (the Classical Athenian *Agora,* the *Kynosarges* burials and the *Kerameikos* cemetery) and two museum collections (the British School at Athens and the British Museum in London). A full summary of the studied material divided by sites or locations is presented in Figure 41.

SUMMARY OF TOTAL MATERIAL DIVIDED BY SITES/LOCATIONS			
Sites and Locations	**Vessels with Complete Profiles**	**Incomplete or Fragmented Pottery**	**Totals**
Agora	87	68	155
Kynosarges	8	6	14
Kerameikos	160		160
BSA Museum	11	3	14
British Museum	48		48
TOTALS	**314**	**77**	**391**

Figure 41: Summary of total studied material divided by sites or locations it derives from.

Even though detailed context numbers are recorded separately for each artefact in Appendix 1, this study compares different types of artefacts in relation to their function, divided in three broader contexts:

1) Burial contexts (=BR): such artefacts have been recovered in graves and their final function was ceremonial. All the material from *Kynosarges* (K-artefacts) and *Kerameikos* (plain number-artefacts) derives from such contexts; however, the exact grave numbers from *Kynosarges* are unknown (see Droop 1905). The material from the *Agora* (P-artefacts) includes only few finds recovered in graves, mainly coming from the *Areopagus* region.
2) Non-burial contexts (= non-BR): these are mainly wells and pits from the Athenian *Agora* and relate to the majority of the material coming from there (P-artefacts). The function of this pottery may have varied. According to Papadopoulos (2003) many of these sherds used to be test pieces or production debris from Athenian Early Iron Age workshops. Shear (1993) argues that some intact vessels recovered from the lower levels of Athenian Geometric wells were used in domestic contexts and they were dropped accidentally inside during the effort to extract water. Shear (1993) suggests that mixed Geometric pottery coming from the upper levels of such wells is most likely non-domestic; it probably comes from Geometric graves near by the *Agora*, which were purposely destroyed and their artefacts were dumped

in the wells by the Persians during the destruction of Athens in 480 BC.

3) Unknown contexts: such artefacts used to belong to private collectors of the 19th and 20th centuries, and were neither properly excavated nor recorded in the past. At some point they ended up in museum collections and their publication took place after their context information was lost. In the present study all artefacts from the Museum of the British School at Athens (A-artefacts) and the British Museum in London (GR-artefacts) belong to this specific category.

The breakdown of the total studied material according to contexts is presented in Figure 42.

SUMMARY OF TOTAL MATERIAL DIVIDED BY SITES/LOCATIONS AND CONTEXTS					
Ware Groups by Size	**Sites**	**Burial Context**	**Non-Burial Context**	**Unknown**	**Totals**
Containers (Large)	Agora	7	54		61
Containers (Large)	Kynosarges	5			5
Containers (Large)	Kerameikos	41			41
Containers (Large)	BSA Museum			3	3
Containers (Large)	British Museum			13	13
Pouring Vessels (Medium)	Agora	3	44		47
Pouring Vessels (Medium)	Kynosarges	2			2
Pouring Vessels (Medium)	Kerameikos	24			24
Pouring Vessels (Medium)	BSA Museum			7	7
Pouring Vessels (Medium)	British Museum			23	23
Drinking Vessels (Small)	Agora	8	39		47
Drinking Vessels (Small)	Kynosarges	7			7
Drinking Vessels (Small)	Kerameikos	95			95
Drinking Vessels (Small)	BSA Museum			4	4
Drinking Vessels (Small)	British Museum			12	12
	TOTALS	**192**	**137**	**62**	**391**

Figure 42: Total studied material divided by contexts.

3.2.6 Chronological breakdown of ware groups

As explained in Chapter 1, this project investigates ceramic technologies mainly related to one chronological period of the Attic Early Iron Age, the Geometric era (c.900-700 BC). Few ceramic artefacts from the Orientalising period are included to test any continuity of Geometric ceramic technologies during the 7th century BC. With regard to the Orientalising samples, these primarily belong to the Early Protoattic and Subgeometric styles; however, few samples that cannot be securely dated are recorded as broadly Protoattic (PA), including those that are tested microscopically in Chapter 7. Few Protogeometric samples (mainly LPG) have been used to supplement the assemblages from some sites that do not include adequate Early Geometric material (e.g. the collections of the British Museum). Such Protogeometric shapes survive in the Early Geometric period and mark the continuity in pottery production between the late 10th and early 9th centuries BC.

The ceramic material that is examined in the next three chapters is divided in chronological groups according to the system developed by Nicolas Coldstream (1968, 330), described earlier in Chapters 1 and 2. Artefacts from the *Kynosarges* burials, the Geometric and Orientalising collections of the British School at Athens (Coldstream 2003b), and Protogeometric and Geometric pottery from the British Museum (Coldstream 2010) have already been dated according to this system by Coldstream himself. However, the material from *Kerameikos* has been dated according to the German chronological system, based in five divisions for the Geometric period (according to Kraiker *et al*. 1939; Kübler 1954), or even ten divisions for the entire Attic Early Iron Age (according to Krause 1975). Furthermore, many artefacts from the Athenian *Agora* have already been published according to Coldstream's (1968) chronological system (e.g. Papadopoulos 2003; 2007); however, others (e.g. Brann 1962) have been dated in more conventional ways, by quarters or halves of a century.

In order to generate a mutual chronological framework for the following analyses, the material from the *Agora* and *Kerameikos* was selected and cross-referenced according to known contexts that have already been dated by Coldstream himself in his *Greek Geometric Pottery* (1968). Still, few finds from the Athenian *Agora* dated in conventional ways, stood somewhere between two or even more of Coldstream's chronological divisions. For example, a sherd dating in the last quarter of the 8th century BC (c.725-700 BC) could have belonged somewhere between the last years of LGIIa and the whole LGIIb. Despite the existence of transitional phases in Coldstream's (1968) *Greek Geometric Pottery*, the chronological span of artefacts dated in conventional ways became an issue.

To resolve the problem, it was decided that conventions for transitional phases discussed by Coldstream (1968) (e.g. MGII-LGIa) would be used to describe two different chronological groups of artefacts: firstly, the ones that are indeed transitional and can be cross-referenced by transitional contexts mentioned in Coldstream's *Greek Geometric Pottery*; secondly, artefacts of ambiguous date that could relate to larger chronological spans. For example, the above mentioned sherd dating c.725-700 BC needed to be recorded as LGIIa-LGIIb, even though this might not have necessarily been transitional.

It is obvious that such conversions can generate problems if the study needs to be period-specific. However, this project targets five broader chronological groups (Middle/Late Protogeometric, Early Geometric, Middle Geometric, Late Geometric, and 7th century); therefore, transitional or supposedly transitional finds fall under larger chronological divisions and do not affect the results of statistical analyses. In this study, transitional phases are grouped with regard to the beginning of the transition: for example, MGII-LGIa groups are included in MG clusters, or LGIIb-EPA groups are included in LG clusters. The breakdown of the total ceramic material divided by date groups is summarised in Figure 43.

SUMMARY OF TOTAL MATERIAL DIVIDED BY DATE GROUPS									
Ware Groups by Size	**Broader Typological Groups**	**MPG & LPG (c.980 - c.900 BC)**	**EG (c.900 - c.850 BC)**	**MG (c.850 - c.760 BC)**	**LG (c.760 - c.700 BC)**	**EPA (c.700 - c.675 BC)**	**SG (c.700 - c.675 BC)**	**PA (c.700 - c.620 BC)**	**Totals**
Containers (Large)	Decorated Amphorae	4	12	28	37	1	4	4	90
Containers (Large)	Banded Amphorae		1	9	13				23
Containers (Large)	Hydriae			4	5		1		10
Pouring Vessels (Medium)	Oinochoai	1	12	28	40				81
Pouring Vessels (Medium)	Pitcers				22				22
Drinking Vessels (Small)	Kantharoi		10	10	20	1	3		44
Drinking Vessels (Small)	Skyphoi		7	64	48		2		121
	TOTALS	**5**	**42**	**143**	**185**	**2**	**10**	**4**	**391**

Figure 43: Total studied material divided by date groups.

CHAPTER 4: ANALYSIS OF LARGE CLOSED CERAMIC CONTAINERS

This chapter investigates artefact variability of Attic Geometric large closed ceramic containers. Macroscopic analysis is conducted on 123 ceramic artefacts. These are 77 vessels with complete profiles and 46 incomplete vessels or sherds. The majority of this material (87%) comes from Athens (107 artefacts), while the remaining 16 pieces (or 13%) have been identified as broadly Attic by Coldstream (2003b; 2010).

The chapter argues that according to metrical features, proportions and fabrics, the production of large sized containers was highly standardised from the beginning of the Geometric period. Innovations related to the production of complex forms such as monumental vessels of the *Dipylon* tradition, the *chaîne opératoire* of which does not match with the production of regular sized containers. Banded amphorae were the most standardised of all vessels and this probably related to their function as domestic wares. Elaborately decorated containers were equally standardised; however, after LGII few of these vessels associated with funerary contexts were produced with different conceptualisations compared to the main norm. The external treatment of elaborately decorated containers moved towards gradual abandonment of thick lustrous coatings after MGII-LGIa, which coincided with the generalised use of figurative decoration. Despite this technological change in external treatments, all containers demonstrate similarities pointing to a *chaîne opératoire* that was controlled by few and highly specialised potters or workshops. Such production units followed strict technological traditions and probably clustered together in a single production site.

4.1 ANALYSIS OF METRICAL FEATURES AND PROPORTIONS

4.1.1 The Athenian *Agora*

The analysis of metrical features (metrics) and proportions of large sized containers from the Athenian *Agora* is conducted on 23 vessels with complete profiles, which were selected and analysed with the methods described in Chapter 3. The assemblage comprises of 8 decorated neck-handled amphorae, 12 banded neck-handled amphorae (6 of which are neck-less), 2 *hydriae* and 1 decorated shoulder-handled amphora. The material is recorded in Charts 4.1 and 4.3. Only 7 vessels with complete profiles come from burial contexts (abbreviated as BR), while 16 come from mixed non-burial deposits (abbreviated as non-BR). Additionally, Chart 4.2 presents 23 pieces coming from incomplete or fragmented pottery from the Athenian *Agora*, including 2 amphora sherds from *Kynosarges* and a single sherd from the collections of the British School at Athens. These fragments are not used in the current analysis of metrical features and proportions; however, they supplement the analyses of fabrics and decorative technology further below.

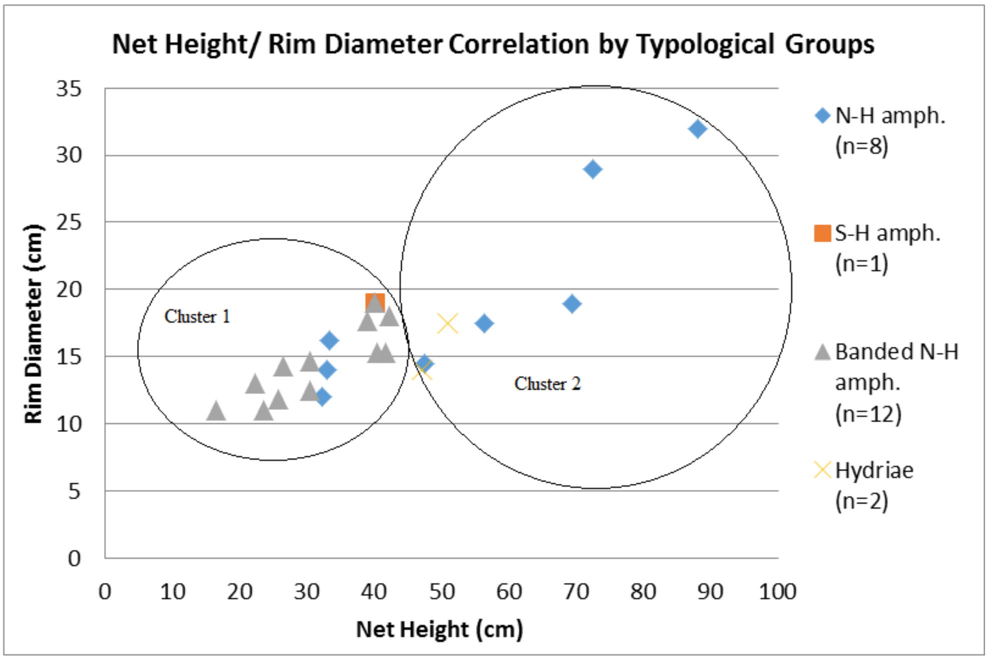

Figure 44: Scatter-graph of correlation between net height and rim diameter. Athenian closed ceramic containers from the *Agora* with complete profiles.

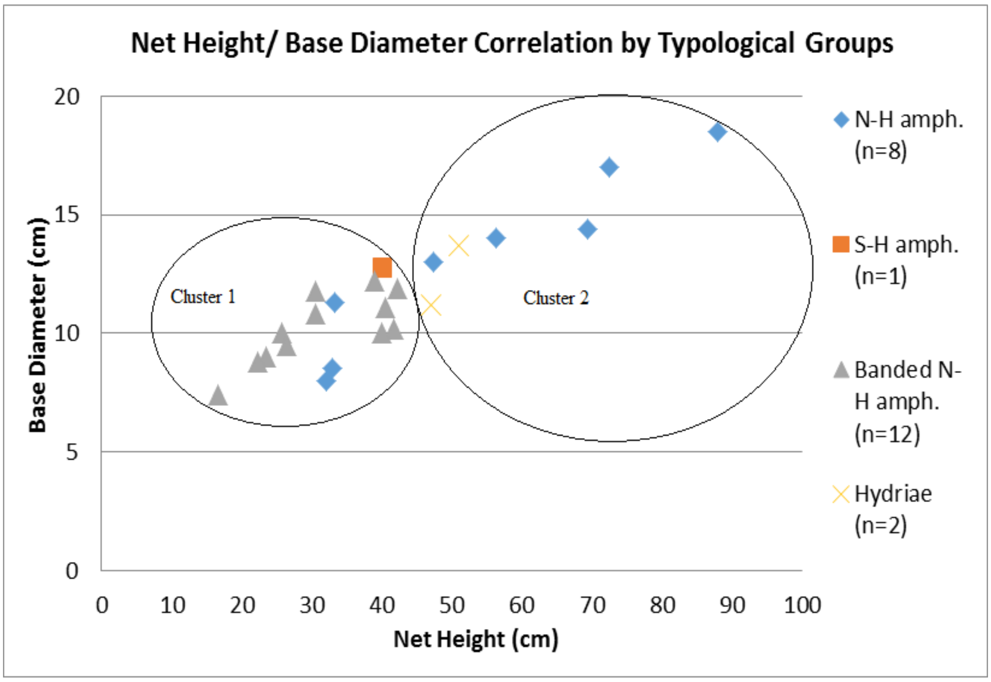

Figure 45: Scatter-graph of correlation between net height and base diameter. Athenian closed ceramic containers from the *Agora* with complete profiles.

Figures 44 and 45 plot the correlations between rim diameter and net height, and base diameter and net height for the above assemblage based on the measurements presented in Chart 4.1. According to both scatter-graphs, the assemblage forms two clusters which diversify according to vessel height and vessel shape. These are recognised by eye and the densest cluster belonging to a specific typology (e.g. banded neck-handled amphorae) is used as an index for identifying all other clusters. Cluster 1 contains vessels shorter than 45 cm, while cluster 2 contains vessels taller than 45 cm. More specifically, cluster 1 comprises of 16 vessels, dating between EGI and LGIIb-EPA, coming from both burial and non-burial deposits:

Cluster 1	Typology	Chronology	Context
P19228	S-H Amph.	EGI	BR
P3747	N-H Amph.	MGI	non-BR
P6410	Banded N-H amph.	MG	non-BR
P6423	Banded N-H amph.	MG	non-BR
P27937	N/L Banded N-H amph.	MGII	non-BR
P21578	Banded N-H amph.	LGIa	non-BR
P5422	N-H Amph.	LGIa	BR
P12105	N-H Amph.	LGIb-LGIIa	non-BR
P17198	N/L Banded N-H amph.	LGIIa	non-BR
P17197	N/L Banded N-H amph.	LGIIa	non-BR
P4613	Banded N-H amph.	LGIIb	BR
P23669	N/L Banded N-H amph.	LGIIb-EPA	non-BR
P23656	N/L Banded N-H amph.	LGIIb-EPA	non-BR
P23660	Banded N-H amph.	LGIIb-EPA	non-BR
P23658	N/L Banded N-H amph.	LGIIb-EPA	non-BR
P26242	Banded N-H amph.	LGIIb-EPA	non-BR

Even though this cluster includes 4 elaborately decorated amphorae (3 N-H and 1 S-H), the vast majority is banded vessels. According to Figures 44 and 45, all banded neck-handled amphorae (including neck-less) have been produced in small and standardised proportions. Such proportions are not related to any specific chronological period. Instead, they appear to be typologically specific and connected to vessel function. According to Shear (1993), banded neck-handled amphorae coming from the lowest contexts of well deposits (see Appendix 1) relate to domestic use: they were originally used to extract water from wells but they were accidentally dropped in and abandoned.

Cluster 2 comprises of 7 vessels, dating primarily in the Late Geometric period, coming from both burial and non-burial deposits:

Cluster 2	Typology	Chronology	Context
P6400	N-H Amph.	MGI?	non-BR
P7141	N-H Amph.	MGII-LGIa	non-BR
P26727	Hydria	LG	non-BR
P4980	Hydria	LGIIa	BR
P16990	N-H Amph.	LGIIa	BR
P32887	N-H Amph.	LGIIa	BR
P4768	N-H Amph.	SG-EPA	BR

All vessels are either decorated neck-handled amphorae (5) or *hydriae* (2). According to Figures 44 and 45, cluster 2 is characterised by larger and broader vessels, which show a larger degree of variability compared to those of cluster 1. Furthermore, according to Chart 4.1, the largest four vessels in this group come from

Geometric burial deposits dating after LGII (P4980, P16990, P32887 and P4768). Based on this observation, it appears likely that some vessels dating after c.735 BC were built according to distinct conceptualisations, most likely due to their funerary function. These were vessels of larger proportions, by contrast to pottery primarily found in non-burial deposits, such as banded neck-handled amphorae.

Despite the division of this assemblage in two clusters, the percentages for the proportions of rim or base diameter to net height (and base to rim diameter) in Chart 4.3 show a large span of variability that is unlikely to suggest any distinct patterns. According to mean proportions calculated based on the data in Chart 4.3 for the entire assemblage, the standard deviations of each proportion show relatively high degree of variability. Still, the assemblage shows two tendencies, in which standard deviations are the lowest: firstly, in the proportion of neck length to net height, and secondly in the proportion of handle attachment height to net height:

	Proportion of Handle Attachment Height to Net Height (%)	**Proportion of Neck Length to Net Height (%)**	**Proportion of Rim Diameter to Net Height**	**Proportion of Base Diameter to Net Height**	**Proportion of Base Diameter to Rim Diameter**
Count	23	17	23	23	23
Mean	65.1	28.0	42.4	30.1	71.6
Max.	73.7	34.8	66.3	44.6	89.7
Min.	51.3	16.5	27.2	20.7	52.6
St.Dev.	4.97	4.52	9.44	6.76	9.79

Both patterns require further investigation as they are likely to respond to technological traditions in the assembling features of such ceramic containers.

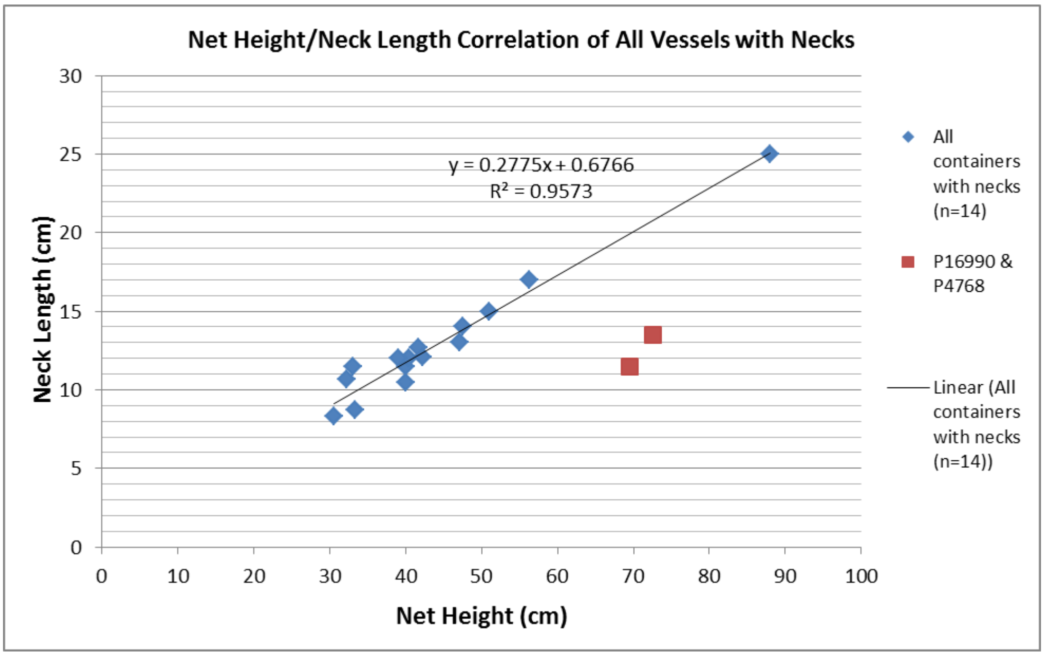

Figure 46: Scatter-graph of correlation between net height and neck length with regression line. Athenian closed ceramic containers from the *Agora* with complete profiles.

Figure 46 plots the correlation between neck length and net height for 14 large sized containers with necks. The assemblage forms a distinct cluster comprised of different typological and chronological groups. Two decorated neck-handled amphorae (P4768 and P16990) stand out. The regression line shows that the proportional increase between neck length and net height follows the equation y = 0.2775x + 0.6766 (where y = neck length and x = net height). In other words, neck lengths are roughly equal to 27.75% of a vessel's net height with a difference of 0.6766 cm, which is too small to be considered. The coefficient of determination of the regression line (R^2=0.9573) shows strong statistical correlation. The coefficient of determination (R^2) can be converted to percentage if multiplied by 100; therefore, in the above regression line variables show 95.73% statistical correlation.

This pattern explains a conscious choice by potters to form the necks of such containers at a specific proportion in relation to a vessel's height, serving specific conceptualisations of how such containers should have looked like. The presence of two loners shows that such conceptualisations in pottery production had few exceptions. According to Chart 4.3, the proportion of neck length to net height for P16990 is 18.6%, and for P4768 is 16.5%. Such vessels were produced with shorter necks and could perhaps be products of experimentation. Both come from burial contexts and date after LGIIa.

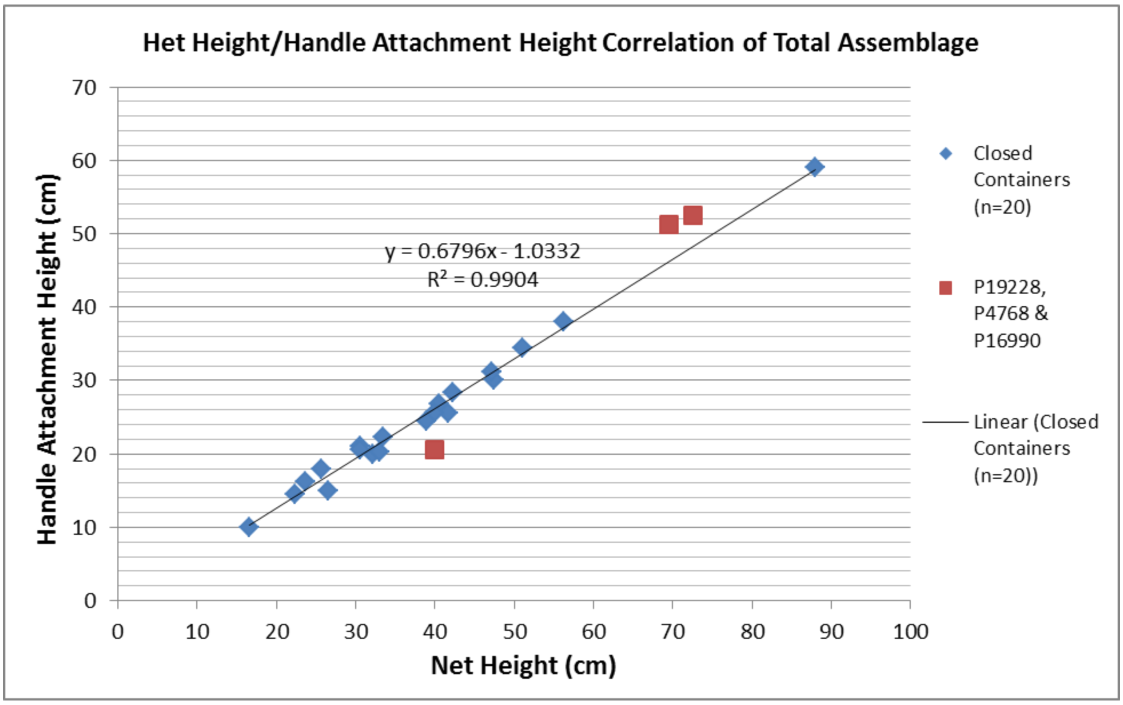

Figure 47: Scatter-graph of correlation between net height and handle attachment height with regression line. Athenian closed ceramic containers from the *Agora* with complete profiles.

Figure 47 plots another proportional pattern related to the handle attachment height of large containers. According to the scatter-graph, the proportional increase between handle attachment height and net height for 20 vessels coming from different chronological and typological groups follows the equation y = 0.6796x - 1.0332 (where y = handle attachment height and x = net height). In other words, the handle attachment height of amphorae and *hydriae* from the *Agora* is roughly equal to 67.96% of a vessel's net height, with a small difference of 1.0332 cm, which is relatively small to be considered. Furthermore, the coefficient of determination of the regression line (R^2=0.9904) shows perfect statistical correlation at 99.04%.

The above regression line for the *Agora* assemblage is followed by the majority of artefacts, although there are also three loners. This pattern relates to a technological choice formed by a strong technological tradition: potters deliberately attached vessel handles at a height of roughly 68%, or in other words close to 2/3 (=66.67%) of a vessel's net height. Similarly to Figure 46, neck-handled amphorae P4768 and P16990 are loners, together with P19228, which is a shoulder-handled amphora. Even though both neck-handled amphorae could be products of experimentation that stand out, the diversification of the shoulder-handled amphora

P19228 is most likely due to its different typological properties: according to Chart 4.3, the proportion of handle attachment height to net height for this pot is 51.3%, meaning that its handles have been attached roughly at the middle of its height. By contrast to neck-handled amphorae, shoulder-handled vessels have their handles attached at a different height. The possibility that this was regulated by another technological tradition will be examined below with regard to the *Kerameikos* assemblage.

4.1.2 The *Kerameikos* cemetery

The analysis of metrical features (metrics) and proportions of large sized containers from *Kerameikos* is conducted on 41 vessels with complete profiles. The assemblage comprises of 28 decorated neck-handled amphorae (one of which is an SOS type), 5 banded neck-handled amphorae (4 of which are neck-less), 2 *hydriae*, 1 decorated belly-handled and 5 shoulder-handled amphorae. The total material is recorded in Charts 4.4 and 4.5. All vessels have been recovered in burials and their grave contexts are noted on each chart.

In his publication on the material from the *Kerameikos* cemetery, Karl Kübler (1954) recorded one metrical feature per ware, and not always the same across different ware categories. In the case of amphorae presented in Chart 4.4, the only metrical feature that was originally recorded was net height. The other metrical features on the chart were measured in smaller scale through published photographs and then calculated in real scale based on the original real net height measurements recorded by Kübler (1954). In order to limit bias and ensure that the calculated measurements were close to the real ones, an accuracy test was conducted on 6 large sized containers of different types, summarised in Chart 4.6. During this accuracy test, vessels were accessed and examined macroscopically with the methods explained in Chapter 3: firstly, it was verified that the height measurements recorded by Kübler (1954) were correct; secondly, real rim diameters (and other key features) were recorded with the same equipment that was used in the macroscopic analysis of the *Agora* assemblage. After this examination, real rim diameters and real proportions or rim diameter to net height were produced and compared to the ones that were calculated though published photographs for the same artefacts. According to Chart 4.6, differences between real and calculated rim diameters range between 0 cm and 0.5 cm. Differences between real and calculated proportions of rim diameter to net height range between -0.9% and +0.1%. The test shows that differences between real and calculated metrical features exist; however, they are too small to affect the results of analyses.

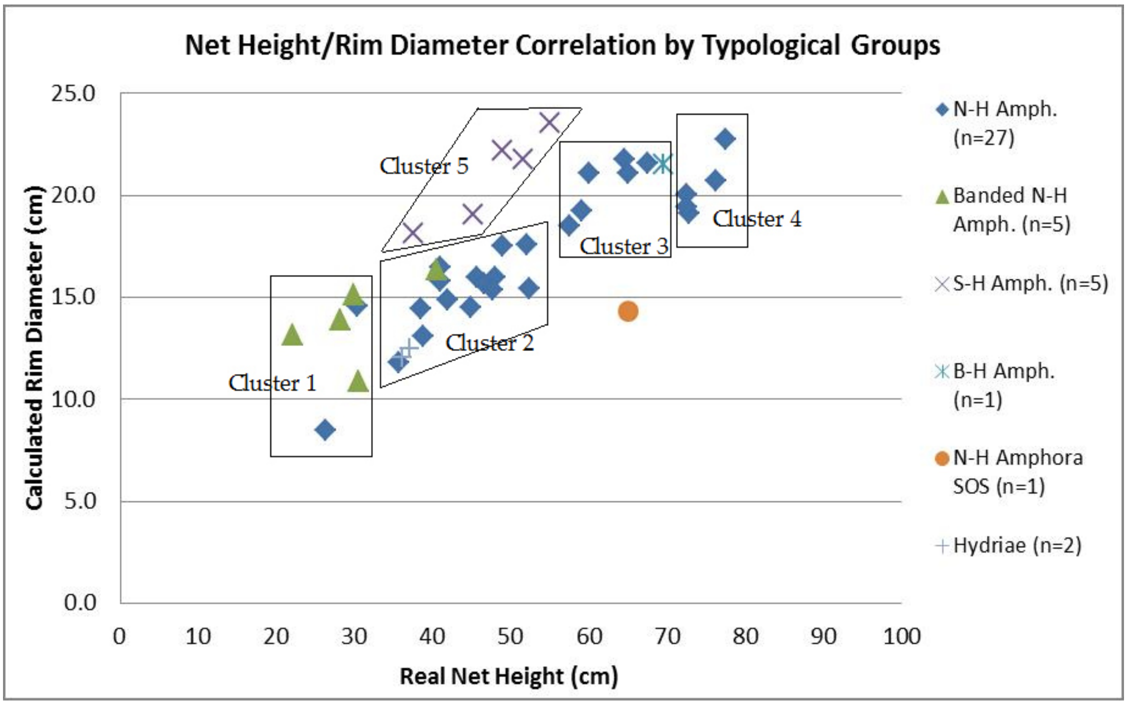

Figure 48: Scatter-graph of correlation between net height and rim diameter. Athenian closed ceramic containers from the *Kerameikos* cemetery with complete profiles.

Figure 48 presents the correlations of rim diameter to net height for the *Kerameikos* assemblage. The material is divided in five clusters according to typological groups. Similarly to the material from the *Agora*, all banded neck-handled amphorae do not exceed the height of 45cm and the neck-less ones are clustered together in one group (cluster 1). All neck-less banded vessels belong to the early phases of the Geometric era (between EGII and MGII):

Cluster 1	Ware Type	Date	Context
1250	N/L Banded N-H Amph.	EGII-MGI	Grave 43
894	N/L Banded N-H Amph.	MGI-MGII	Grave 12
296	N/L Banded N-H Amph.	MGII	Grave 22
289	N/L Banded N-H Amph.	MGII	Grave 29
242	N-H Amph.	MGII	Grave 22
1306	N-H Amph.	LGIa-LGIb	Grave 50

Decorated neck-handled amphorae are scattered across four clusters (clusters 1, 2, 3 and 4), three of which also contain vessels from other typologies such as banded neck-handled amphorae, *hydriae* and a belly-handled amphora (clusters 1, 2 and 3):

Cluster 2	Ware Type	Date	Context
926	N-H Amph.	EGII	Grave 2
253	N-H Amph.	EGII	Grave 74
277	N-H Amph.	MGII	Grave 30
255	N-H Amph.	MGII	Grave 69
783	Hydria	MGII-LGIa	Grave 89
784	Hydria	MGII-LGIa	Grave 89
346	N-H Amph.	LGIb	Grave 71
385	N-H Amph.	LGIb-LGIIa	Grave 72
267	N-H Amph.	LGIb-LGIIa	Grave 28
337	N-H Amph.	LGIIa-LGIIb	Grave 59
1315	Banded N-H Amph.	LGIIb-EPA	Grave 51
Cluster 3	**Ware Type**	**Date**	**Context**
2132	N-H Amph.	EGI	Grave 1
2146	B-H Amp.	EGII-MGI	Grave 41
884	N-H Amph.	MGI	Grave 13
2155	N-H Amph.	MGI	Grave 36
866	N-H Amph.	MGI	Grave 37
859	N-H Amph.	MGI-MGII	Grave 11
291	N-H Amph.	MGII	Grave 22
236	N-H Amph.	MGII	Grave 22
272	N-H Amph.	MGII-LGIa	Grave 31
377	N-H Amph.	LGIb	Grave 24
656	N-H Amph.	LGIIa-LGIIb	Grave 97
n.n.	N-H Amph.	LGIIb	Grave 52
850	N-H Amph.	LGIIb	Grave 85

Clusters 4 and 5 are distinct compared to the rest of the *Kerameikos* assemblage. Cluster 4 comprises of the tallest neck-handled amphorae in the entire assemblage, which all date between EGII and EGII-MGI:

Cluster 4	Ware Type	Date	Context
925	N-H Amph.	EGII	Grave 2
254	N-H Amph.	EGII	Grave 74
2136	N-H Amph.	EGII	Grave 38
2140	N-H Amph.	EGII-MGI	Grave 42
1249	N-H Amph.	EGII-MGI	Grave 43

This specific group of vessels stands out with regard to its chronology and size, and is likely to represent products of the same workshop. By contrast to decorated neck-handled amphorae from the *Agora*, where the tallest vessels derive from burials after LGII, the tallest equivalents from *Kerameikos* date in the Early Geometric period (for comparisons see Charts 4.1 and 4.4).

Cluster 5 comprises of all decorated shoulder-handled amphorae:

Cluster 5	Ware Type	Date	Context
412	S-H Amph.	EGII	Grave 14
234	S-H Amph.	MGI	Grave 76
890	S-H Amph.	MGI-MGII	Grave 12
284	S-H Amph.	MGII	Grave 29
825	S-H Amph.	MGII	Grave 86

These vessels probably belong to a different tradition: even though their net height is average and similar to that of neck-handled amphorae (between 30 cm and 60 cm), their rim diameters are broader compared to other decorated vessels (between 17 cm and 25 cm). Finally, the only SOS neck-handled amphora in the assemblage (1298) stands out. It is likely that by contrast to other decorated vessels, SOS amphorae were distinct products with little similarity to other containers.

The correlation of base diameter to net height for the *Kerameikos* assemblage in Figure 49 verifies the properties of clusters 1 and 4 discussed earlier and also that the SOS neck-handled amphora 1298 is a loner. However, according to the graph, all shoulder-handled amphorae of cluster 5, which appeared to be distinct in Figure 48, now merge together with the vessels of clusters 2 and 3, which are by majority neck-handled amphorae. A possible explanation is the following: even though shoulder-handled amphorae were produced with broader rims compared to average neck-handled amphorae, their base diameters were formed in a standard way that was common across other typological classes. As the sequence (*sensu* Van der Leeuw 1994, 136-7) of forming such vessels on the wheel was from base to rim, the conceptualisation of bases was the same for both types. In that sense, it is more than likely that the production of both types of amphorae was interconnected and potters probably shared similar conceptualisations.

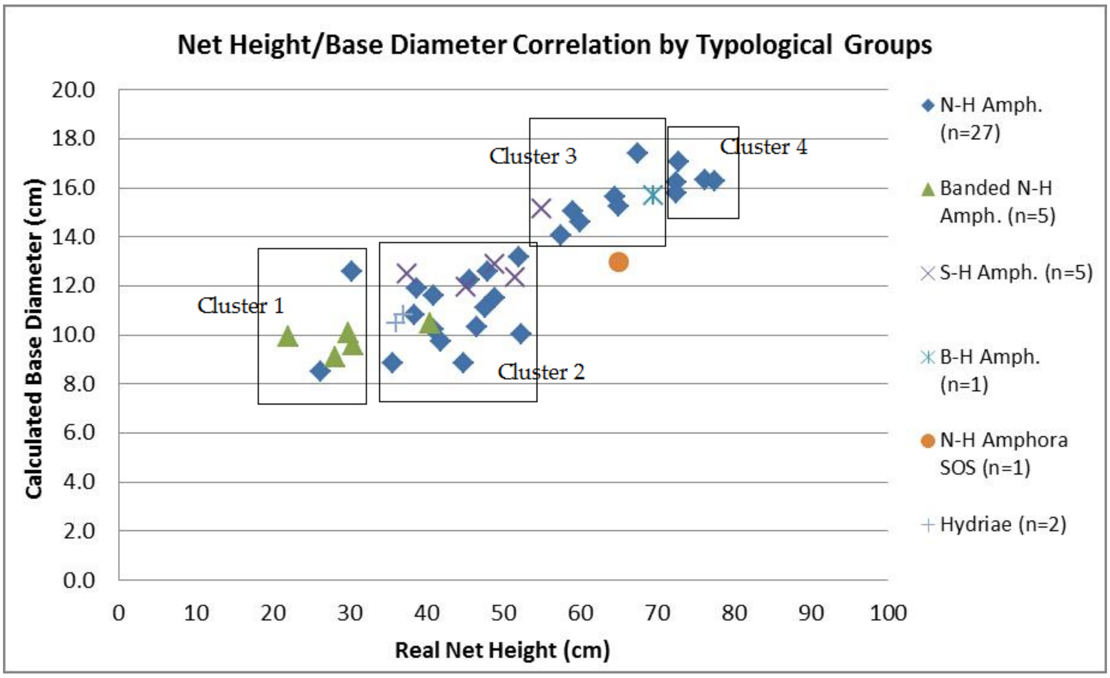

Figure 49: Scatter-graph of correlation between net height and base diameter. Athenian closed ceramic containers from the *Kerameikos* cemetery with complete profiles.

The percentages for the proportions of rim or base diameter to net height (and base diameter to rim diameter) for the *Kerameikos* assemblage in Chart 4.5 show large fluctuation which is unlikely to suggest any distinct patterns. The standard deviations of mean proportions calculated for the entire assemblage according to the data in Chart 4.5 show relatively high degree of variability. Only exception is the proportion of neck length to net height:

	Calculated Proportion of Handle Attachment Height to Net Height (%)	Calculated Proportion of Neck Length to Net Height (%)	Calculated Proportion of Rim Diameter to Net Height (%)	Calculated Proportion of Base Diameter to Net Height (%)	Calculated Proportion of Base Diameter to Rim Diameter (%)
Count	40	37	41	41	41
Mean	62.5	32.0	36.0	26.4	74.4
Max.	74.0	38.7	59.7	45.2	100.0
Min.	49.3	19.0	22.0	19.2	56.7
St.Dev.	5.62	4.06	7.57	5.36	9.94

According to Figure 50, the regression line for the proportion of neck length to net height is y = 0.2945x + 1.3824 (where y = neck length and x = net height). In other words, neck lengths of closed ceramic containers from *Kerameikos* are roughly equal to 29.45% of a vessel's net height with a difference of 1.3824 cm. For this specific assemblage the coefficient of determination of the regression line

(R^2=0.8722) shows 87.22% statistical correlation, which is relatively satisfactory. The SOS amphora 1298 is again a loner. Similarly to the material from the *Agora*, the necks of closed ceramic containers from *Kerameikos* have been conceptualised and produced at a proportion below 3/10 of a vessel's net height. The relatively smaller degree of statistical correlation of the regression line in Figure 50 is due to the wider scattering of the *Kerameikos* material compared to that from the *Agora*; however, the general tendency is clear.

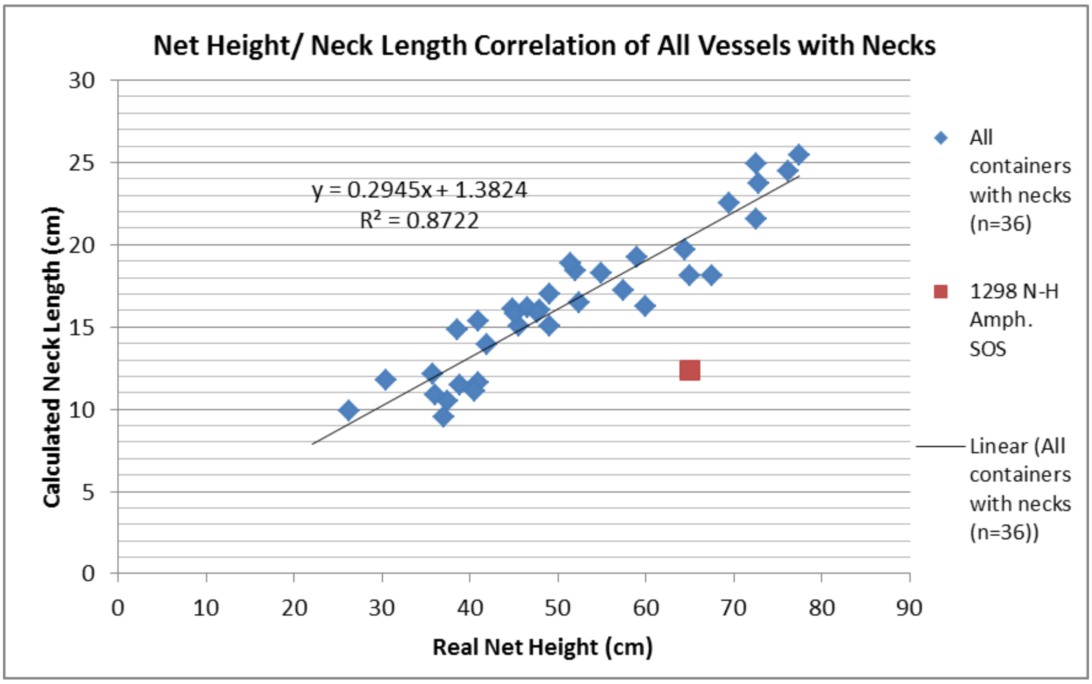

Figure 50: Scatter-graph of correlation between net height and neck length with regression line. Athenian closed ceramic containers from the *Kerameikos* cemetery with complete profiles.

In the previous section, the correlation of handle attachment height to net height for closed ceramic containers from the Athenian *Agora* showed that the handles of shoulder-handled amphorae were attached at a different area on a vessel's body, by contrast to neck-handled amphorae and *hydriae*. Furthermore, the height of handle attachment for neck-handled amphorae and *hydriae* was roughly 2/3 of a vessel's net height, starting from the base. The same conclusions are verified with regard to closed ceramic containers from *Kerameikos*.

Figure 51 presents the correlation of handle attachment height to net height for a total of 40 containers. The belly-handled amphora 2146 was left out as handle attachments of such vessels are not discussed in this thesis (see Chapter 3.2).

According to the scatter-graph all neck-handled amphorae (decorated and banded) and *hydriae* from *Kerameikos* form a regression line that follows the equation y = 0.6667x – 1.4131 (where y = handle attachment height and x = net height). In other words handle attachment heights are equal to 2/3 of a vessel's net height (66.67%) reduced by a small difference of 1.41 cm. The coefficient of determination of the regression line (R^2=0.9736) shows strong statistical correlation (97.36%). In the same graph, the regression line for shoulder-handled amphorae follows the equation y = 0.537x – 0.1826. This means that the handles of such vessels were attached at a height slightly above the centre of the pot, roughly at 53.7% in relation to a vessel's net height. The coefficient of determination (R^2=0.8141) shows ambivalent degree of statistical correlation. Similarly to all previous statistics, SOS neck-handled amphora 1298 is a loner.

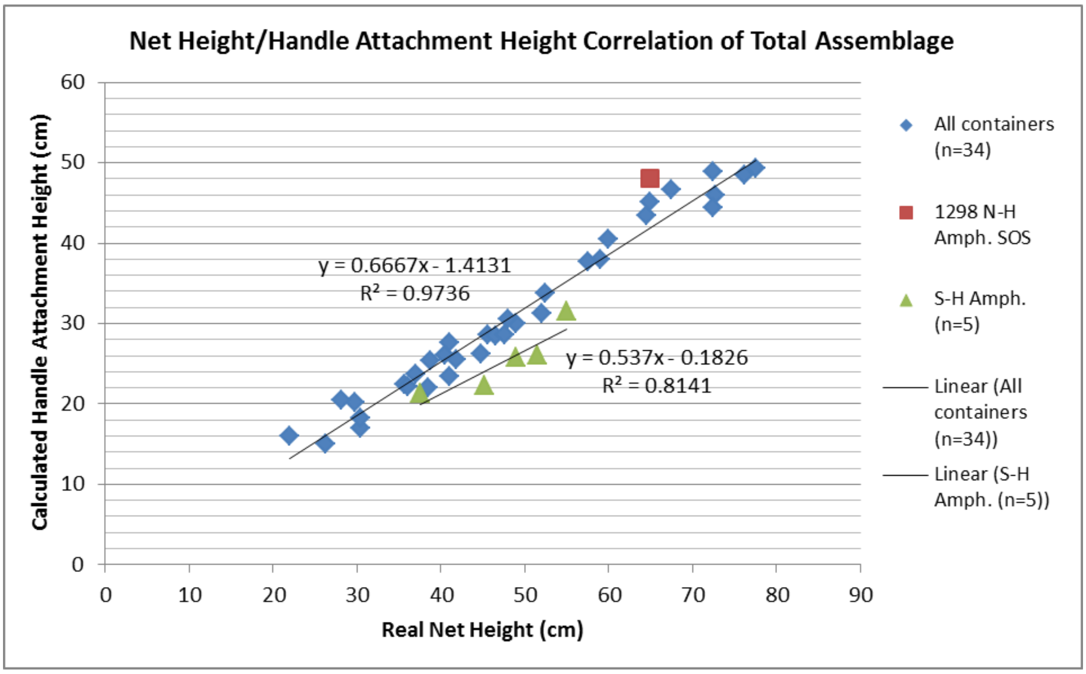

Figure 51: Scatter-graph of correlation between net height and handle attachment height with regression lines. Athenian closed ceramic containers from the *Kerameikos* cemetery with complete profiles.

4.1.3 The British Museums Collections

The analysis of metrical features (metrics) and proportions of large sized containers from the collections of the British Museum is conducted on 13 vessels with complete profiles. The assemblage comprises of 12 decorated neck-handled and

1 belly-handled amphorae, recorded in Charts 4.7 and 4.8. All vessels derive from unknown contexts and are characterised as broadly Attic by Coldstream (2010), apart from those of suspected Athenian origin. Three vessels come from the Protogeometric period but relate to known EG shapes. They have been added in the assemblage as an alternative due to lack of Early Geometric pieces. Such Protogeometric vessels also function as an index of continuity or discontinuity compared to the Geometric period.

The material from the British Museum was published by Coldstream (2010), who originally recorded two metrical features per vessel: height and rim diameter. Even though this assemblage was not examined macroscopically, the presence of two recorded metrical features allowed the calculation of others through published photographs. These were then tested with an accuracy test similar to the one described for the *Kerameikos* assemblage. During this test, real net height measurements were used to calculate rim diameters through photographs. Then, calculated rim diameters were compared with real rim diameter recorded by Coldstream (2010). According to the test presented in Chart 4.9, differences between real and calculated rim diameters for the British Museum amphorae range between -0.8 cm and +0.7 cm. Differences between real and calculated proportions of rim diameter to net height range between -1.8% and +1.3%. According to the test, calculated measurements do not differ greatly compared to the real ones; therefore, statistical bias is limited.

According to the net height measurements recorded in Chart 4.7, decorated amphorae from the British Museum show a distinct chronological pattern: the three Protogeometric amphorae (two N-H and one B-H) are the shortest in the entire assemblage.

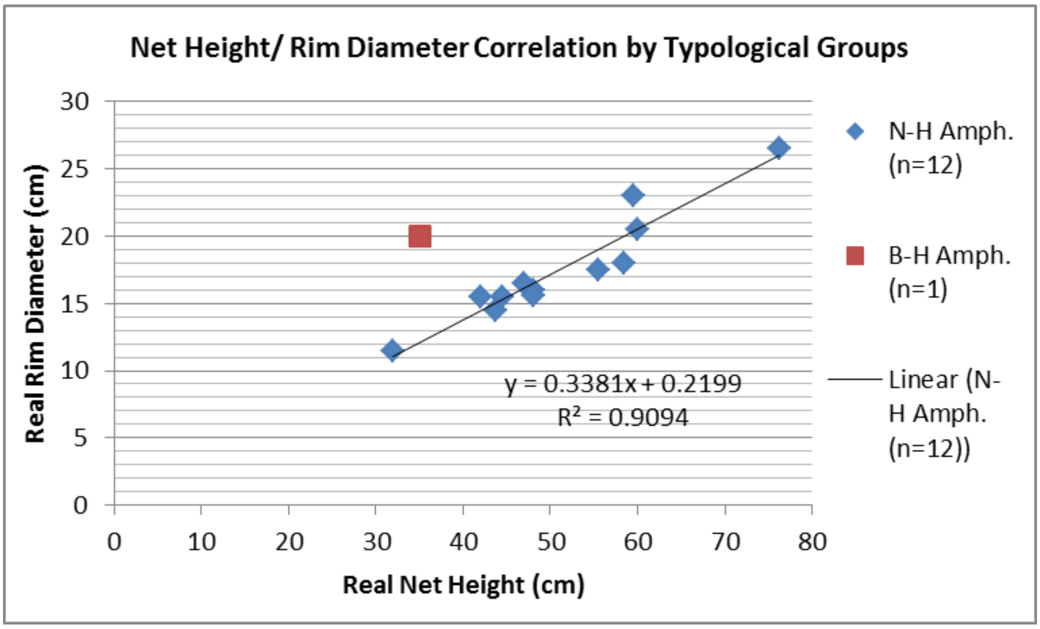

Figure 52: Scatter-graph of correlation between net height and rim diameter with regression line. Decorated Attic closed ceramic containers from the British Museum with complete profiles.

The proportional increase of rim diameter to net height for all neck-handled amphorae plotted in Figure 52 follows the equation: $y = 0.3381x + 0.2199$ (where y=rim diameter and x=net height). This means that rim diameters of neck-handled amphorae are roughly equal to 33.81% of their net height, while the difference of 0.2199 cm is too small to be considered. The coefficient of determination of this regression line (R^2=0.9094) shows relatively strong statistical correlation (90.94%). The only belly-handled amphora in the entire assemblage is a loner. The percentage of 33.81% is unlikely to suggest a technological trend followed by Attic Geometric (and possibly Protogeometric) potters. Some similar percentages ranging between 30% and 35% have been recorded in Chart 4.5 for the proportions of rim diameter to net height of the *Kerameikos* material; however, similar proportional ranges for the *Agora* material in Chart 4.3 are rare. Based on this comparison, the regression line of Figure 52 is most likely due to the nature of this specific assemblage and is unlikely to suggest a distinct technological tradition.

Mean proportions produced for the entire assemblage according to the data recorded in Chart 4.8 show relatively high standard deviations. Only exceptions relate to the proportions of neck length to net height and handle attachment height to net height, similarly to all previous assemblages:

	Calculated Proportion of Handle Attachment Height to Net Height (%)	Calculated Proportion of Neck Length to Net Height (%)	Real Proportion of Rim Diameter to Net Height (%)	Calculated Proportion of Base Diameter to Net Height (%)	Calculated Proportion of Base Diameter to Rim Diameter (%)
Count	12	13	13	13	13
Mean	61.9	32.3	36.1	25.1	34.7
Max.	67.3	39.0	57.1	33.7	57.5
Min.	54.4	26.7	30.8	17.5	20.6
St.Dev.	3.77	3.63	6.69	5.76	10.31

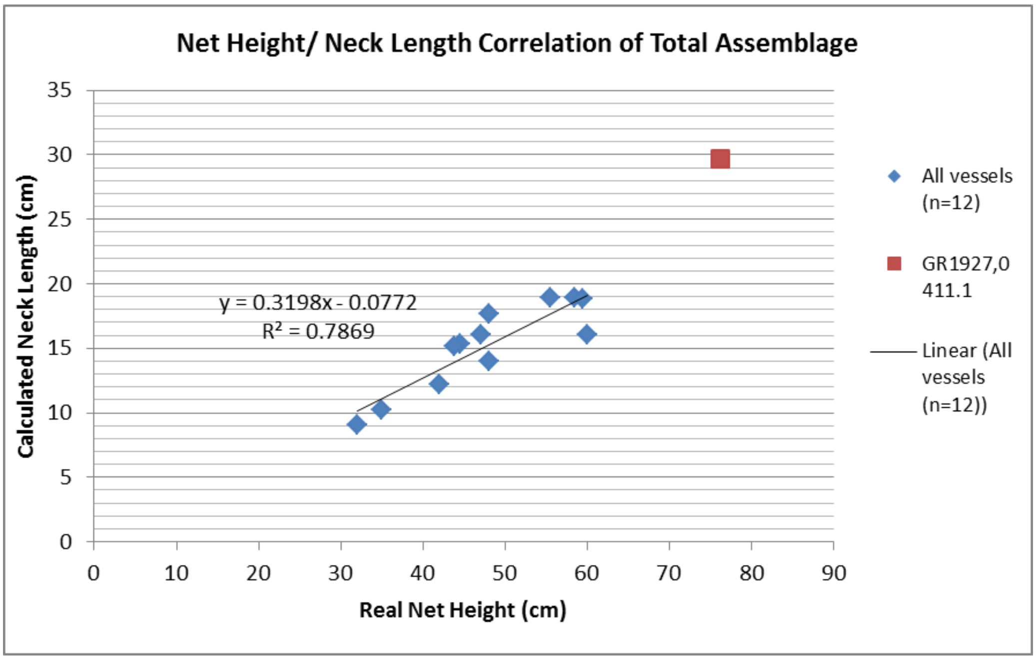

Figure 53: Scatter-graph of correlation between net height and neck length with regression line. Attic closed ceramic containers from the British Museum with complete profiles.

According to Figure 53, the regression line for the proportion of neck length to net height for the British Museum assemblage is y = 0.3198x – 0.0772 (where y = neck length and x = net height). This shows that neck lengths of closed ceramic containers are roughly equal to 32% of a vessel's net height, while the difference of 0.072 cm is too small to be considered. For this specific assemblage the coefficient of determination of the regression line (R^2=0.7869) shows weak statistical correlation (78.69%). Despite the weaker degree of statistical correlation for this assemblage, large containers from the British Museum seem to comply with the broader pattern noted in previous assemblages: neck lengths are roughly around 3/10 of a vessel's net height. Additionally, neck-handled amphora GR1927,0411.1 is a loner. This vessel dates in LGIIb and similarly to the loners discussed for the *Agora* neck-handled amphorae, it is the tallest vessel in the entire assemblage.

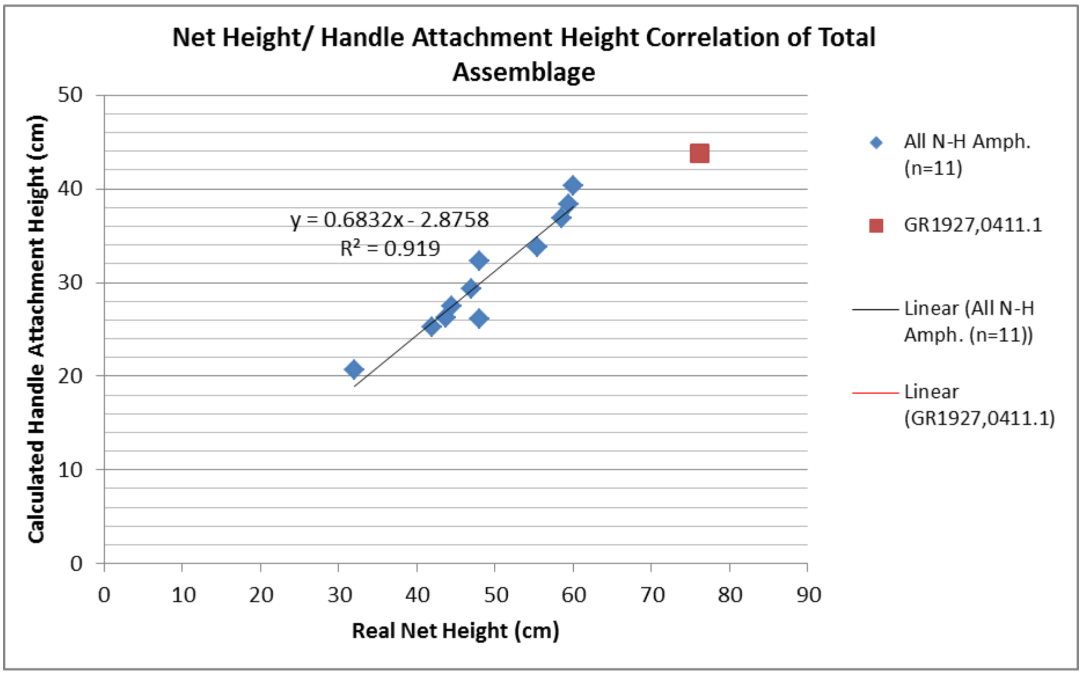

Figure 54: Scatter-graph of correlation between handle attachment height and net height with regression line. Attic closed ceramic containers from the British Museum with complete profiles.

Figure 54 presents the correlation between handle attachment height and net height for the same assemblage. The scatter-graph does not include belly-handled amphora GR1978,0701.7 because the attachment heights of belly-handles are not discussed in this project. According to Figure 54, the proportion of handle attachment height to net height for neck-handled amphorae follows the equation $y = 0.6832x - 2.8758$. The coefficient of determination of the regression line shows 91.9% of statistical correlation (or R^2=0.919), which is relatively strong. Similarly to neck-handled amphorae and *hydriae* from the *Agora* and *Kerameikos*, the above regression line shows that vessels from the British Museum have their handles attached at roughly 2/3 of a vessel's net height. More specifically, the handle attachment height is at 68.32%; however, this is reduced by an average of 2.88 cm. Furthermore, Figure 54 verifies that GR1927,0411.1 stands out and must be treated as a loner.

4.1.4 The special case of the monumental *Dipylon*-style neck fragment P22435

A neck fragment with part of the shoulder and one handle, P22435 (Figure 55), is the only monumental *Dipylon*-style artefact discussed in this study. It appears to be the product of a different production sequence and must be examined separately. This artefact reveals the complexity of the *chaîne opératoire* of large grave markers connected to burials and status display, and is completely different compared to all other vessels examined in this project.

By contrast to the necks of other amphorae, which were produced out of a single piece of clay during a single episode on the wheel's head (Figure 56), P22435 was produced out of five (if not six) different parts that were assembled by a combination of techniques (Figure 57). This neck fragment has an external rim diameter of 50.4 cm and its height reaches 46 cm. It is a heavy piece and its original weight probably exceeded 14 kg. Its current weight (16.25 kg) is after excessive restoration and attachment of three thick iron bars at the bottom part in order to allow the fragment to stand.

Figure 55: Neck fragment P22435 from a *Dipylon*-style monumental neck-handled amphora (after Brann 1961a, 125-6, n.M1, pl.14).

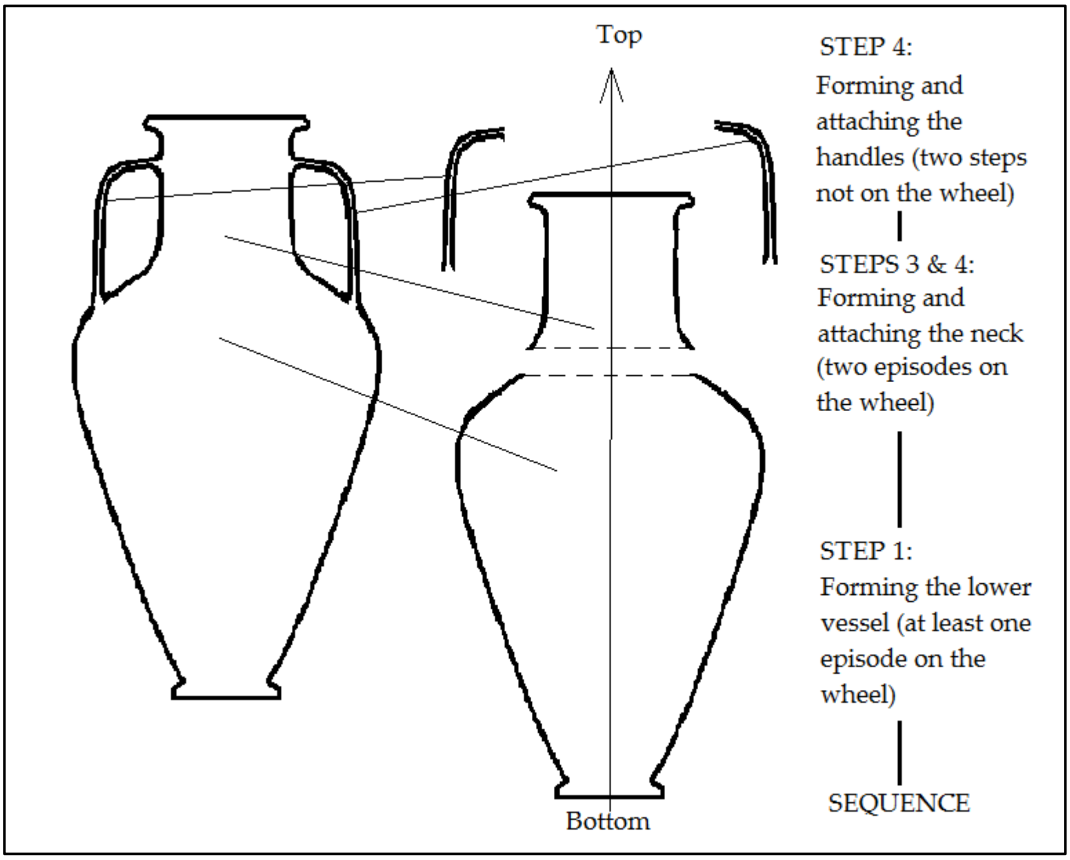

Figure 56: Forming and assembling process of a normal size neck-handled amphora.

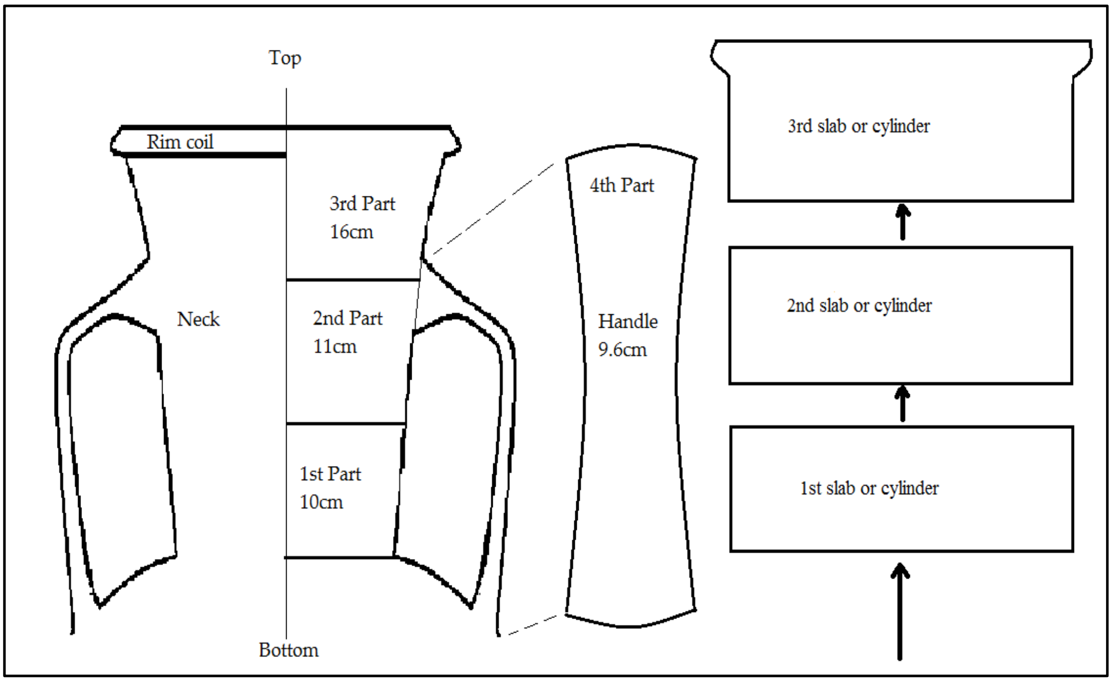

Figure 57: Features of forming and assembling of necks of monumental *Dipylon*-style vessels.

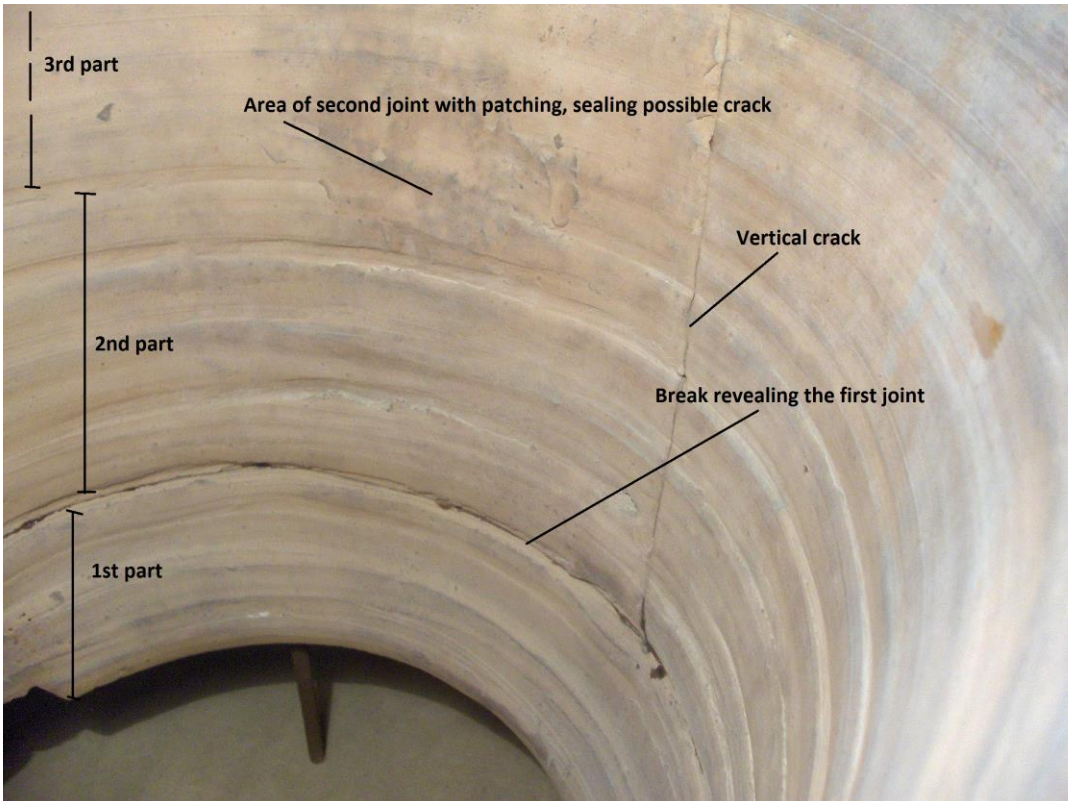

Figure 58: The inside of neck fragment P22435 from a *Dipylon*-style amphora.

Macroscopic analysis shows that the neck was produced out of at least three clay cylinders, connected together by placing one on top of the other. The final product was assembled and finished on a wheel or turntable, where the potter stabilised the cylinders together, shaped the neck and formed the rim coil by pulling the clay outwards (Figure 57). As shown in Figure 58, the inside surface of the neck bears a vertical crack which is likely to suggest that the clay cylinders were not formed on a spinning wheel. Instead, it is likely that these were originally produced from rectangular slabs, which were curved into a cylindrical shape before attached to form the neck. Furthermore, there are indications that such rectangular slabs were produced inside a mould and their manufacture could indicate similarities with tile-production (for discussion see Chapter 8).

Thorough macroscopic analysis of the fragment's inner surface reveals two clear joints, which allow the estimation of width of the three clay-slabs or cylinders that comprise the neck: the lower one (10 cm), the middle one (11 cm) and the upper one (or perhaps upper two – roughly 16 cm). The lower slab or cylinder has broken completely off the rest of the vessel revealing the joint between parts 1 and 2 (Figure 58). The joint between parts 2 and 3 is not clear; however, fluctuations in wall thickness around this specific height and patches of clay on the inside surface suggest that this is indeed a joint between two separate vessel parts. Additionally, the metrical features of the surviving handle are c.41 cm length, 9.6 cm width and 2.3 cm thickness. According to the above, two constituent pieces of the neck and the handle piece of P22435 are of similar width (10 cm, 11 cm and 9.6 cm respectively); therefore, it is likely that ancient potters who produced such complex vessels had specific guidelines or perhaps used large moulds that resulted to standardised constituents parts with similar metrical features. In that sense, P22435 is the product of a complex *chaîne opératoire*, combining moulding and wheel-finishing characteristics.

According to the study by Roux & Courty (1998) on wheel fashioning methods, and in relation to the analysis of apprenticeship duration in mastering wheel throwing techniques by Roux & Corbetta (1989), it appears likely that the production of monumental *Dipylon*-style vessels was in the hands of experienced potters, who employed combinations of techniques in order to achieve the expected results. Furthermore, the complexity of the production of such vessels probably required the collaboration of a number of artisans; therefore, monumental vessels were most likely produced by large and highly specialised workshops.

4.2 ANALYSIS OF FABRICS

Fabric analysis is conducted on 41 Athenian closed ceramic containers from the *Agora*, summarised in Chart 4.10. According to hand specimen examination, all closed ceramic containers are made out of one fabric, which comes in two variants:

Fabric Variant 1: This is a hard (occasionally medium-hard), very fine and very well sorted fabric, exhibiting fine distribution and orientation of voids of different sizes. It appears in colour variations of the higher 5YR sequence of the Munsell (1975) soil chart, and most commonly in 5YR 7/3 or 7/4. It contains well sorted small holes and elongated voids between 5% and 10%, although even in its coarser versions the fracture appears fairly dense. Larger inclusions are mainly clay pellets up to 5% and iron nodules in concentrations between 5% and 7%. Because of the firing temperatures and the dense nature of the clay matrix, it is difficult to distinguish between clay pellets and iron ores. The fracture contains some scattered white grits of perhaps calcareous nature at a concentration no more than 3%. These appear mixed with tiny white particles of fine quartz and silver mica, and again, they are difficult to distinguish because of the dense nature of the matrix. The fabric often contains very well distribute black bits of unknown matter up to 2%. The fabric's colour is generally homogeneous; however, sometimes it may occur that specific areas along the fracture have degraded to a yellowish colour.

Fabric Variant 2: This fabric is a slightly coarser version of variant 1. The colour of the fracture ranges between the higher and middle 5YR sequence of the Munsell (1975) soil chart. It is medium to hard, with well sorted, small elongated voids up to 15%. The orientation and distribution of inclusions is very fine. The only visible particles distinguished with certainty are fine quartz grains, white or grey, ranging between 10% and 15%, and silver mica flecks up to 5% maximum. In some cases variant 2 is abundant of well sorted and evenly distributed small and fine white particles, which appear in the form of calcareous dust. These particles mix evenly with the finest of quartz and mica particles, and as mentioned earlier, they are difficult to distinguish. Concentration of total white matter can vary between 15% and even 30%. Sometimes there occur moderately sorted clay pellets of medium to large sizes, yet no more than 3%. Similarly to variant 1, in certain spots along the fracture there appear clay concentrations of greyish or yellowish colour by contrast to the typical homogeneous reddish or brownish fracture.

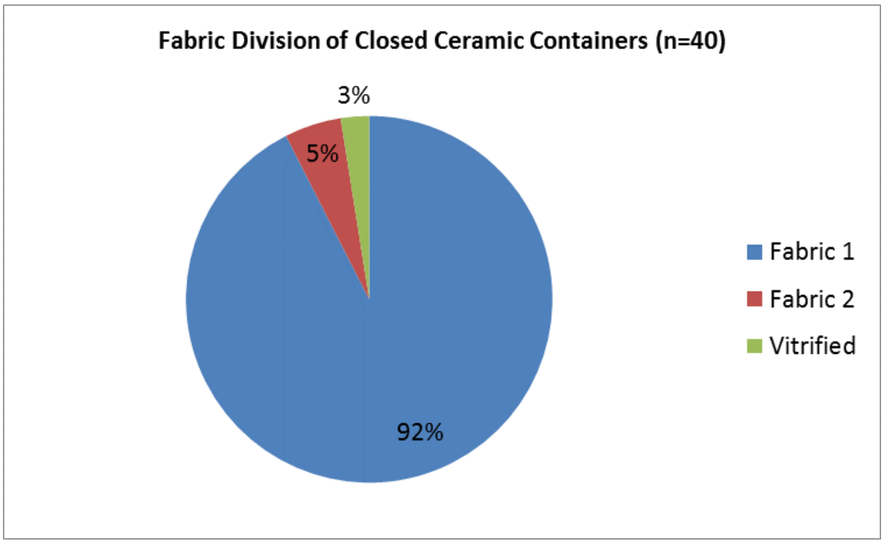

Figure 59: Fabric division of 40 closed ceramic containers from the Athenian *Agora.*

According to Chart 4.10, the majority of Athenian closed containers were produced from variant 1 and their Munsell colours belong to the 5YR series. Figure 59 shows that variant 1 comprises 92% of the examined fabrics. The same variant was used for the production of different typological classes such as banded and decorated neck-handled amphorae, belly-handled amphorae and *hydriae*.

The presence of one fabric (although in two variants) in the production of large containers indicates a strong technological tradition in clay selection, manipulation and tempering practices. The variants of this fabric diversify in relation to inclusion sizes and concentration of calcareous matter; however, it is important to stress that both variants do not contain any coarse non-plastic temper (e.g. grog or large rock fragments), which might have been expected for large vessels. This tradition was followed in the production of different ceramic containers, regardless of their typology and period of production. Furthermore, according to Chart 4.10 all samples come from different contexts and the same fabric was simultaneously used in the production of pottery that was used in burial and non-burial practices. Only 2 out of 40 containers have been produced from variant 2.

Figure 60: Vitrified sherd conglomerate P6413.

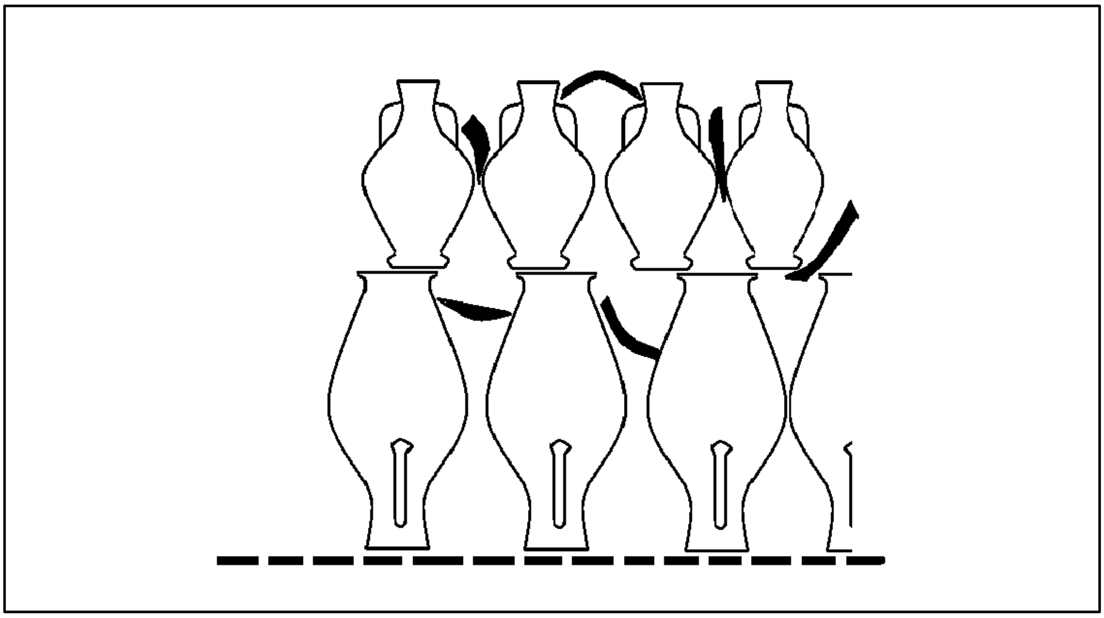

Figure 61: Possible kiln stacking strategy in Geometric kilns.

One MG sample in Chart 4.10, P6413 (Papadopoulos 2003, 103-4) is completely vitrified and shows that Athenian kilns could exceed temperatures above 850 °C, which are necessary to produce such vitrification (see Chapter 7). P6413 (Figure 60) is a conglomerate of at least three different sherds, two of which are bases. Both bases are stuck to each other in a way that implies kiln stacking strategies employed by Athenian Geometric potters (Figure 61).

During the initial stacking, it appears likely that the larger vessels were placed inside the kiln upside down; smaller vessels followed by being stacked in upright position, on top of the bases of the larger vessels. Older or broken sherds were probably used to separate stacked pottery in order to prevent vessels from touching together inside the kiln. When this specific firing accident occurred, both bases and part of another vessel's wall melted together forming the characteristic mass of P6413 (Figure 61).

4.3 ANALYSIS OF DECORATIVE TECHNOLOGY

The analysis of decorative technology is conducted on 68 closed ceramic containers (both complete vessels and sherds) from three sites. The assemblage from the Athenian *Agora* comprises of 34 mixed decorated amphora pieces (Chart 4.11), 18 banded neck-handled amphora pieces (Chart 4.12) and 8 *hydriae* pieces (Chart 4.13). The assemblage from the *Kynosarges* burials contains 5 mixed decorated amphora sherds, supplemented by 3 amphora sherds from the collections of the British School at Athens (Chart 4.14).

4.3.1 The Athenian *Agora*

The entire assemblage of banded neck-handled amphorae from the Athenian *Agora* has been treated with the least elaborate decoration (Charts 4.12). These vessels are uncoated and decorated with plain bands running across the vessels' walls. The same decoration applies for P6997, which dates to the Late Protogeometric period (LPG). All *hydriae* from the Athenian Agora (Chart 4.13) have similar decoration, comprised of linear bands and simple curved lines running along the vessels' walls. Three *hydriae* (P4980, P26727 and P8215) have black coated necks. Even though the *hydriae* assemblage is small to produce certain conclusion, the chronological distribution of semi-coated vessels complies with the pattern observed for decorated amphorae explained below.

With regard to Athenian decorate amphorae, Chart 4.11 shows that the material can be divided in two chronological groups, in which decoration follows distinct patterns: the first group dates between EGI and MGII-LGIa, and the second group in the period between LGIa (c.760 BC) and the early 7th century BC.

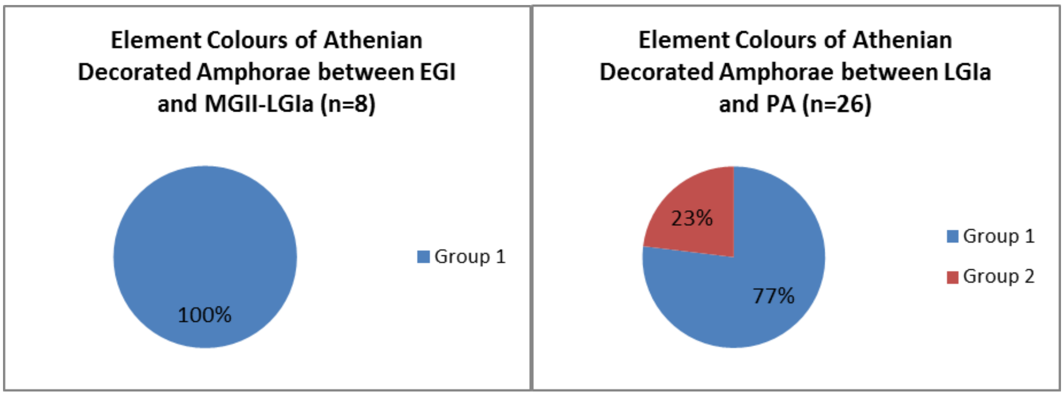

Figure 62: Comparison of decorative element colours of Athenian decorated amphorae from the *Agora.*

According to the Figure 62, all decorative elements of the first chronological group are painted with colours of Group 1 (black or brownish black). In the later period (after LGIa), the main decorative colours remain black and brownish black

(77%); however, red and brownish red colours of Group 2 appear alongside (23%). Furthermore, according to Figure 63, coated vessels before LGIa comprise 87% of the assemblage, while uncoated pottery is 13%. By contrast, during the period after LGIa uncoated pottery rises to 63% of the assemblage, while coated pottery drops down to 37% (25% in colours of Group 1 and 12% in colours of group 2).

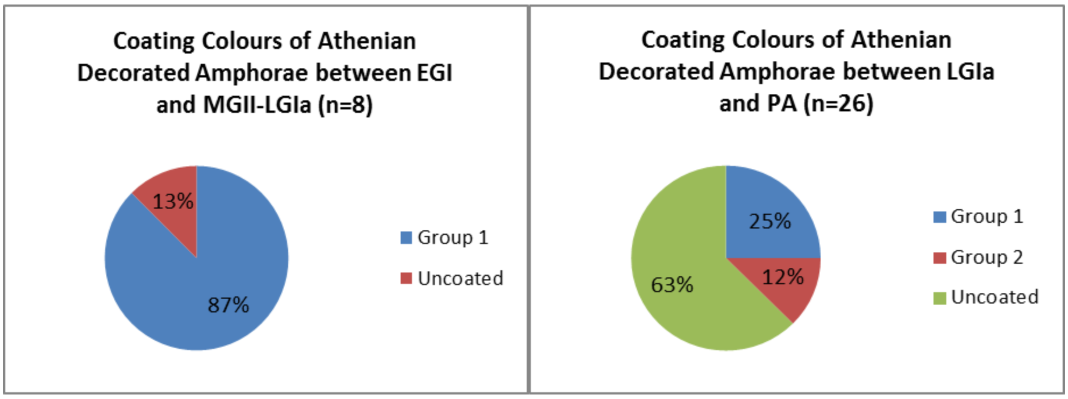

Figure 63: Comparison of coating colours of Athenian decorated amphorae from the *Agora*.

Based on the above, it appears likely that the generalised use of the figurative style after LGIa established new colours in the decoration of Athenian amphorae, at least to those from the *Agora* contexts. At the same period, the practice of coating vessels with thick layers of paint began to decline, although it was not completely abandoned. The decline of thick-coating practices on Athenian vessels was most likely due to the expansion of elaborate figurative decoration: it probably required additional 'blank' surface on the vessels' walls for the painters to work on. The same coating pattern is noted on *hydriae*, although such vessels did not usually carry figurative themes.

The appearance of new colours in the decoration of Athenian finewares after LGIa can also be verified with regard to banded neck-handled amphorae. According to Figure 64, all banded vessels between LPG and MGII-LGIa are painted in black or brown black colours (colour Group 1). However, after LGIa and until the early 7th century BC, 36% of the vessels are decorated in colours of Group 2 (red and brown red). Finally, in the *Agora* assemblage there is one vessel, *hydria* P12124, which is decorated in colours of Group 3 (orange or yellowish red). This vessel dates during LGIb-LGIIa.

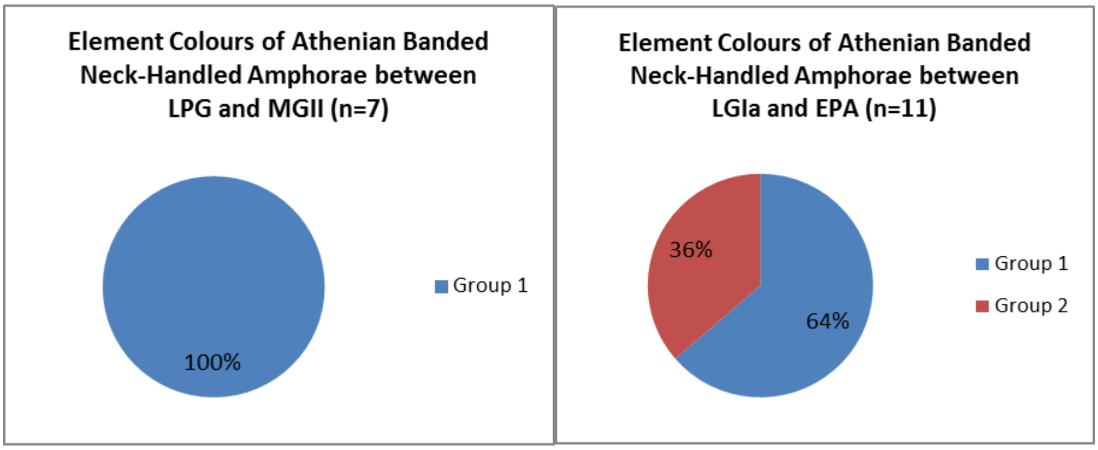

Figure 64: Comparison of decorative element colours of Athenian banded neck-handled amphorae from the *Agora.*

4.3.2 The *Kynosarges* burials and the collections of the British School at Athens

The amphora material from the *Kynosarges* burials and the collections of the British School at Athens is examined together due to its small size (7 pieces). According to Chart 4.14, the use of thick coatings on these sherds coincides with the chronological pattern observed for decorated amphorae and *hydriae* from the *Agora*: it relates to periods closer to the Middle Geometric, while uncoated sherds come from the Late Geometric.

Despite this similarity, the *Kynosarges* material appears different with regard to its decorative colours. Even though the majority of all amphorae from the *Agora* are decorated in Group 1 colours, the majority of vessels from *Kynosarges* are decorated in Group 2 colours (Chart 4.14). This observation may show two things: firstly, that some of the painters who decorated the *Kynosarges* material used paints of different chemical composition compared to those who decorated the material from the *Agora*. Secondly, that the paints used on the *Kynosarges* pots were the same as the ones used on the *Agora* ceramics; however, most of the *Kynosarges* vessels resulted in lighter colours due to the different firing techniques employed by the potters who fired them.

The *Kynosarges* samples are few to produce certain conclusions; however, it could be likely that the *Kynosarges* material was the product of at least one different group of artisans compared to that from the *Agora*.

4.4 SUMMARY AND DISCUSSION OF ANALYSIS OF LARGE CLOSED CERAMIC CONTAINERS

The analysis of artefact variability of various types of closed ceramic containers shows that there are technological similarities in the production of such vessel, and they must be regarded as products of the same *chaîne opératoire*. These vessels have been assembled from at least three different constituent parts (main bodies, necks and handles), the larger of which formed during different episodes on the fast wheel. Monumental *Dipylon*-style vessels such as P22435 were the products of a different *chaîne opératoire*, which not only required more complex assembling processes in relation to other containers, but also the use of combined techniques such a moulding and wheel-finishing. Such monumental vessels were an LGIa innovation. Their production coincided with the expansion of figurative style decoration (Coldstream 1968; Galanakis 2013) and they were probably commissioned for status display in elite burial rites (see Whitley 1991).

The analysis of metrical features and proportions in this chapter demonstrates that banded neck-handled amphorae were the most standardised of all closed ceramic containers, produced in small sizes that never exceeded 45 cm in net height. Their decoration was equally standardised, comprised of plain bands on uncoated surfaces. Although several elaborately decorated neck-handled amphorae from the *Agora* and *Kerameikos* cluster together with banded vessels, the majority of decorated amphorae (N-H, B-H and S-H) and *hydriae* form different groups according to their rim diameter, base diameter and net height measurements.

In the *Agora* and the British Museum assemblages decorated neck-handled amphorae become significantly taller and wider during Late Geometric times. Especially in the *Agora* assemblage, the largest neck-handled amphorae date after LGII (e.g. P16990, P4768) and derive from burial contexts. By contrast to the *Agora* assemblage, the tallest and widest decorated neck-handled amphorae from *Kerameikos* come from the period between EGII and MGI. This group of pottery is likely to relate to a specific workshop from this period, possibly connected to a specific burial group.

Decorated shoulder-handled amphorae from *Kerameikos* form a distinct cluster with regard to their net height and rim diameter correlation. It appears likely that such vessels were produced under different conceptualisations compared to other large containers: they were of average height with broader rim diameters. However, according to the overall correlation of base diameters and net heights from *Kerameikos*, the shoulder-handled amphorae cluster merges with the clusters of neck-handled and belly-handled amphorae, and *hydriae*. This could mean that during the initial episodes of the forming process on the potter's wheel, different amphorae types were non-distinguishable. Their external characteristics became clear in the second step of their assembling process, after their necks were attached on their main bodies. The ones with broader rim diameters received shoulder handles, and the rest received belly and neck handles. Finally, the only SOS neck-handled amphora from *Kerameikos* tested in this project is a loner and shows no connections with other vessels.

The analysis of proportions of different vessel parts in relation to vessel height reveals two strong technological traditions. These remained in constant circulation for more than two centuries across Athenian and possibly other Attic Geometric workshops. All are equally visible on the *Agora*, *Kerameikos* and British Museum assemblages, despite the presence of exceptions and the different degrees of statistical correlation of the regression lines characterising these patterns. Furthermore, the similarity of these proportions for the *Agora* and *Kerameikos* material verifies the existence of a single production site connected to both archaeological contexts.

In the first technological tradition, the neck length of almost every ceramic container in the three assemblages is roughly 30% of a vessel's net height (or 3/10):

Agora :	$y = 0.2775x + 0.6766$	$R^2=0.9573$
Kerameikos :	$y = 0.2945x + 1.3824$	$R^2=0.8722$
British Museum:	$y = 0.3198x – 0.0772$	$R^2=0.7869$

Neck handled amphorae P4768 and P16990 from the Agora, and GR1927,0411.1 from the British Museum, are loners and must to be regarded as products of experimentation or different technological choice. According to this broader pattern, is appears likely that the necks of large containers were consciously visualised in relation to the overall size of the pot. Potters probably had in mind some pre-existing conceptions regarding how amphorae should have looked like, which functioned as archetypes that operated within the broader potting tradition.

A similar phenomenon is noted with regard to the proportion of handle attachment height to net height, where a second technological tradition is noted. In the majority of neck-handled amphorae (banded or elaborately decorated) and *hydriae*, neck handles are attached at a proportion of roughly 2/3 of a vessel's net height (roughly between 67% and 69%):

Agora N-H Amph.:	y = 0.6796x - 1.0332	R^2=0.9904
Kerameikos N-H Amph.:	y = 0.6667x – 1.4131	R^2=0.9736
Kerameikos S-H Amph.:	y = 0.537x – 0.1826	R^2=0.8141
British Museum N-H Amph.:	y = 0.6832x – 2.8758	R^2=0.919

It is likely that such proportion related to functional purposes: neck handles were placed at a height that would allow the user to control the vessel by grasping one of the handles with one hand and by holding the vessel's base with the other hand. The material from all sites shows that there were few exceptions to this tradition: firstly, P4768 and P16990 from the *Agora* have their handles attached at proportions that exceed 70% of a vessel's net height; however, this could be due to the larger height of these loners in relation to the rest of the assemblage. Secondly, P19228 from the *Agora* and all other shoulder-handled amphorae from *Kerameikos* have their handles attached slightly above the middle of a vessel's net height (between 51% and 54%), suggesting another possible tradition for this typological group. Finally, GR1927,0411.1 from the British Museum has its handles placed at 57.5% of a vessel's net height, which is exceptional.

According to the above, it is more likely that the attachment of handles on large closed ceramic containers was dictated by technological traditions that characterised different typological groups. Such traditions might have originated from conceptions related to the functionality of such vessels, even though their use could have been domestic and ceremonial simultaneously. Regardless of their intended function, their archetypal shape was probably standardised: neck-handled amphorae and *hydriae* were produced with (upper) handles placed at roughly 2/3 of a vessel's net height, while shoulder-handled amphorae were produced with handles slightly above the centre of the pot.

In relation to the chronological distribution of the assemblages, shoulder-handled amphorae do not survive during the Late Geometric period. By contrast, all neck-handled amphora loners that stand out of these two traditions (including the SOS vessel 1298 from *Kerameikos*) have been produced after LGII. In that sense, the

Late Geometric must be viewed as a period during which certain technological traditions were abandoned (e.g. for shoulder-handled amphorae), while small-scale experimentation took place in relation to technological traditions that survived (e.g. for neck-handled amphorae).

The strongest technological tradition of all, which remained unchanged across two centuries, related to the use of a single fabric in the production of all types of ceramic containers. Hand specimen examination shows that this fabric comes in two variants: variant 1 is the finest and densest fabric, while variant 2 is a slightly coarser and more calcareous version of the first. Despite the presence of a finer and 'coarser' version of the same fabric, both variants contain no real coarse and large-sized tempers (e.g. grog or large rock fragments). The hardness of these clays, suitable for the production of thick-walled vessels, was most likely due to high firing temperatures instead of fabrication practices.

The dominant colours used for decorative elements and coatings of closed ceramic containers during the Geometric era were black and brown black (Colour Group 1). However, after LGIa other colours such as red, reddish brown, orange and reddish yellow (Colour Groups 2 and 3) began to be used simultaneously. Such colour variability could be attributed to the generalised use of the figurative style in pottery decoration. The majority of samples from *Kynosarges* have been decorated with red colours. This could mean that the *Kynosarges* group was produced by a distinct workshop that stood outside the *Agora* norm; however, the sample is very small to produce any certain conclusions.

The period between EGI and MGII-LGIa was characterised by a generalised use of thick lustrous or matte coatings on the external surfaces of elaborately decorated amphorae. Banded vessels and the majority of *hydriae* were produced without external coatings. Coating practices began to decline after LGIa and were gradually replaced by a preference in thin matte slips or plain washes in the colour of the original clay. This simpler and relatively quicker external treatment probably allowed more 'blank' space on vessels in order for the painters to apply complex figurative (or non-figurative) decoration. Therefore, the decline of thick coating practices should to be viewed in relation to the generalised spread of the figurative style after LGIa, but only in relation to elaborately decorated amphorae.

With regard to the broader fineware production, this chapter demonstrates that two periods of the Geometric era must be regarded as distinct. Firstly, between

EGII and MGI there appear elaborately decorated neck-handled amphorae at the *Kerameikos* cemetery, which are distinctively large in comparison to vessels from all other periods. The production of such vessels could relate to a specific workshop; however, the possibility of a distinct consumption demand during this period appears also likely and requires further investigation (see Chapter 8). Secondly, the Late Geometric period is indicative of three patterns of technological change in the broader production sequence. Firstly, during LGIa external treatments of large decorated amphorae change in relation to the spread of the figurative style. Secondly, during the same period and under the impact of the *Dipylon* workshop (Coldstream 1968, 29-30), monumental-size ceramic containers appear for the first time as the result of a different and more complex *chaîne opératoire*. Such vessels stand out with regard to the potters' technological choices, knowledge and skills. Other traditional shapes such as shoulder-handled amphorae decline. Thirdly, after LGII and until the early 7th century BC there appear patterns of experimentation in the production of neck-handled amphorae. Some vessels are produced larger and their proportional characteristics diverge from existing technological traditions. New shapes such as SOS neck-handed amphorae appear as independent products towards the end of the Late Geometric, most likely manufactured at distinct workshops that stood away from the existing technological traditions of that time.

CHAPTER 5: ANALYSIS OF MEDIUM SIZED POURING VESSELS

This chapter investigates artefact variability of Attic Geometric pouring vessels. Macroscopic analysis is conducted on 103 ceramic artefacts in total. These are 84 vessels with complete profiles and 19 incomplete vessels or sherds. The majority of this material (73 artefacts or 70.9%) comes from Athens, while 30 pieces (or 29.1%) have been identified as broadly Attic by Coldstream (2003b; 2010).

This chapter argues that according to metrical features and proportions, the production of pouring vessels became highly standardised only after the beginning of the Late Geometric period. During that time, new shapes such as neck-less trefoil *oinochoai* and pitchers appeared for the first time next to standard trefoil *oinochoai* with necks. Still, all types of pouring vessels were the products of the same *chaîne opératoire* and followed similar conceptualisations. Late Geometric standardisation is likely to suggest a reduction in the numbers of ceramic workshops producing pouring vessels, or a conscious shift towards specialisation in the production of such shapes as a result of increasing consumption demands. The most standardised feature of all pouring vessels is their fabric: all pots have been produced from the same clay, resulting in the same two variants noted in the case of large closed ceramic containers. The use of a single fabric remained unchanged for at least two centuries. The external treatment of elaborately decorated containers moved towards gradual abandonment of thick lustrous coating after MGII-LGIa, which coincided with the generalised use of figurative decoration. Despite this technological change in external treatments, all pouring vessels demonstrate similarities, pointing to a *chaîne opératoire* that was controlled by few and highly specialised potters or workshops. Such production units followed strict technological traditions and they probably clustered together in a single production site, particularly after LGIa.

5.1 ANALYSIS OF METRICAL FEATURES AND PROPORTIONS

5.1.1 The Athenian *Agora* (supplemented by the *Kynosarges* burials and the collections of the British School at Athens)

For the analysis of metrical features (metrics) and proportions of pouring vessels, 37 artefacts with complete profiles were selected and analysed with the methods described in Chapter 3. In this assemblage, 29 vessels come from the Athenian *Agora*, 1 from the *Kynosarges* burials and 7 from the collections of the British School at Athens. Pottery from *Kynosarges* and the British School's collections is examined together with the *Agora* artefacts due to their broader decorative and stylistic similarities. With regard to its typological variation, the assemblage comprises of 23 decorated trefoil *oinochoai* (9 of which are neck-less) and 6 decorated pitchers, all recorded in Charts 5.1 and 5.3. Only 4 vessels with complete profiles come from burial contexts; 27 come from mixed non-burial deposits, while the archaeological context of 7 vessels is unknown. In addition to this study, Chart 5.2 presents another 17 pieces coming from incomplete or fragmented pottery from the Athenian *Agora*, including 1 sherd from *Kynosarges*. These fragments are not used in the analysis of metrical features and proportions; however, they supplement the analyses of fabrics and decorative technology further below.

In the above ceramic assemblage, the typical comparison between rim diameters and net heights that took place for large containers in Chapter 4 is not applicable. This is because rim diameters cannot be recorded on trefoil *oinochoai* due to the recessed shape of their lips (or trefoil mouths); still, rim diameters are recorded for pitchers (Chart 5.1). The only direct comparison between the two typological groups relates to base diameters and net heights, as these features are recorded on both shapes.

Figure 65 presents the correlation between base diameter and net height for the above assemblage. The scatter-graph shows that trefoil *oinochoai* exhibit greater variability compared to pitchers, which appear standardised and distinct. All vessels form five clusters with specific typological and chronological properties, and the borderline between *oinochoai* and pitchers is at 33 cm net height.

Cluster 1 comprises of 5 pots with different shapes: standard, broad and neck-less broad trefoil *oinochoai*. It is the only cluster containing broad *oinochoai*, which were produced in small heights with narrow bases. No distinct chronological pattern is noted in this group:

Cluster 1	Ware Type	Context	Chronology
P6203	Oinochoe	non-BR	MGI
P18365	Oinochoe	non-BR	MGII
P21579	N/L Oinochoe Broad	non-BR	LGIa
A341	Oinochoe Broad	Unknown	LGIa
P12431	Oinochoe	non-BR	LGIb-LGIIa

Cluster 2 is the densest of all clusters and shows two distinct properties: Firstly, the majority of vessels (12 out of 15) date in the Late Geometric period; secondly, it is the only cluster containing neck-less trefoil *oinochoai*:

Cluster 2	Ware Type	Context	Chronology
P3874	Oinochoe	non-BR	MGI
P27948	Oinochoe	non-BR	MGII
A298	Oinochoe	Unknown	MGII-LGIa
P4772	Oinochoe	BR	LGIb-LGIIa
P12120	N/L Oinochoe	non-BR	LGIb-LGIIa
P17194	Oinochoe	non-BR	LGIb-LGIIa
P12115	N/L Oinochoe	non-BR	LGIb-LGIIa
P12108	N/L Oinochoe	non-BR	LGIb-LGIIa
P12433	Oinochoe	non-BR	LGIb-LGIIa
P22427	N/L Oinochoe	non-BR	LGIIb
P23649	Oinochoe	non-BR	LGIIb-EPA
P23657	N/L Oinochoe	non-BR	LGIIb-EPA
P23655	N/L Oinochoe	non-BR	LGIIb-EPA
P23654	N/L Oinochoe	non-BR	LGIIb-EPA
P20729	N/L Oinochoe	non-BR	LGIIb-SG

Cluster 3 comprises on 6 pots coming from the period between EGII and MGI. This group of standard trefoil *oinochoai* contains the tallest and widest vessels in the entire assemblage. Vessels properties resemble those of the cluster with the largest decorated neck-handled amphorae from *Kerameikos* (see Chapter 4.1.2) and both clusters date in the same period:

Cluster 3	Ware Type	Context	Chronology
P18618	Oinochoe	non-BR	EGII
P18622	Oinochoe	non-BR	EGII
P6205	Oinochoe	non-BR	MGI
P6164	Oinochoe	non-BR	MGI
P552	Oinochoe	BR	MGI
P6409	Oinochoe	non-BR	MGI

Cluster 4 comprises of 4 vessels that have narrow bases yet they are relatively tall. According to the shapes and chronological distribution of this group, no distinct patter can be noted:

Cluster 4	Ware Type	Context	Chronology
P18616	Oinochoe	non-BR	EGII
P553	Oinochoe	BR	MGI
P12104	Oinochoe	non-BR	LGIb-LGIIa
P23673	Oinochoe	non-BR	LGIIb-EPA

Cluster 5 contains every pitcher in the entire assemblage. Such vessels have standard base diameters and their heights exceed 33 cm. They all date in LGII:

Cluster 5	Ware Type	Context	Chronology
K83	Pitcher BR	BR	LGIIa
A306	Pitcher	Unknown	LGIIa
A305	Pitcher	Unknown	LGIIa
A303	Pitcher	Unknown	LGIIa
A304	Pitcher	Unknown	LGIIa
A361	Pitcher	Unknown	LGIIb

Finally, *Oinochoe* P6401 from the Athenian *Agora* stands out and must be treated as a loner. This vessel is of average net height; however, it has the narrowest base diameter in the entire assemblage.

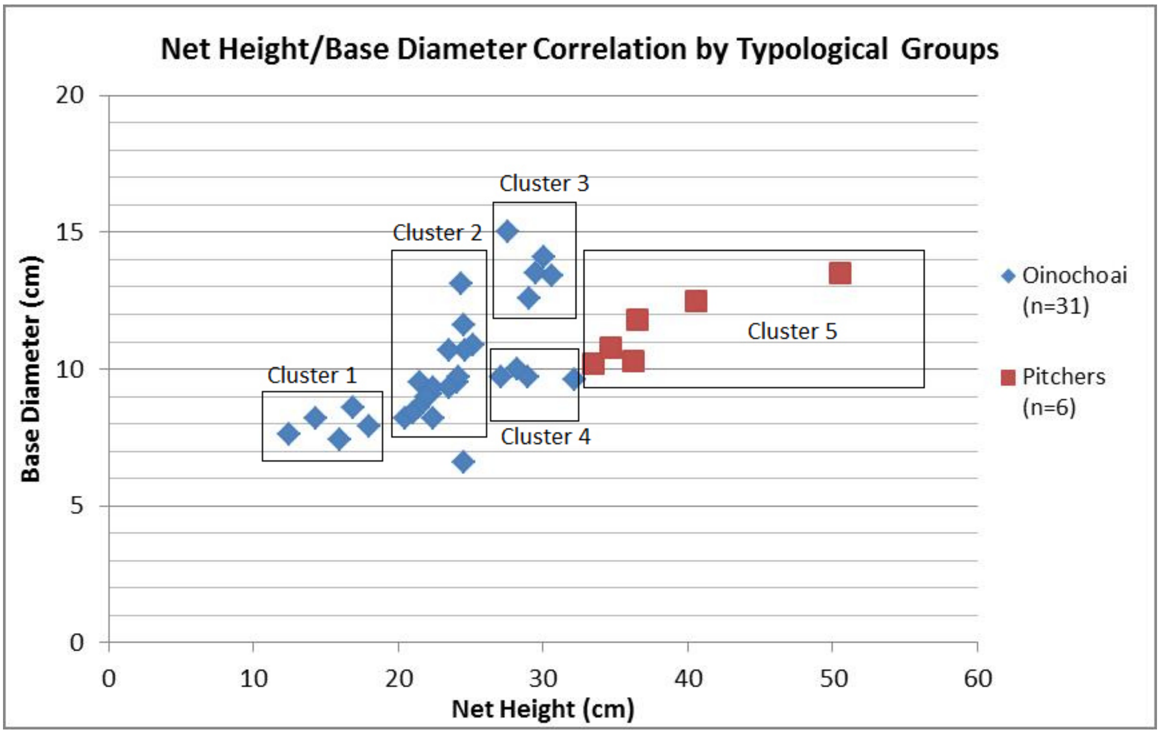

Figure 65: Scatter-graph of correlation between net height and base diameter. Athenian/Attic pouring vessels from the *Agora, Kynosarges,* and the British School's at Athens collections with complete profiles.

The presence of distinct groups of pouring vessels, which not only cluster according to their typology but also according to broader chronological periods, shows that any further analysis should accommodate two requirements: firstly, Late Geometric vessels must be examined separately; secondly, neck-less *oinochoai* must be treated as a distinct typological class. The analysis of mean proportions across two broader chronological groups based on the data of Chart 5.3 shows fluctuations in standard deviations. More specifically, the proportions of neck length to net height and base diameter to net height for *oinochoai* produced after LGIa are smaller compared to those for *oinochoai* produced before LGIa. The opposite pattern is noted with regards to the proportion of handle attachment height to net height; however, it must be noted that the Late Geometric mean includes different typological sub-classes. As it is explained further below, once these typological subgroups are separated, Late Geometric pots show homogeneity with regard to all their proportional features:

	Proportion of Handle Attachment Height to Net Height (%)	Proportion of Neck Length to Net Height (%)	Proportion of Rim Diameter to Net Height (%)	Proportion of Base Diameter to Net Height (%)	Proportion of Base Diameter to Rim Diameter (%)
		Oinochoai between EGII amd MGII-LGIa			
Count	14	14	N/A	14	N/A
Mean	56.3	37.3	N/A	44.3	N/A
Max.	69.4	48.8	N/A	60.8	N/A
Min.	45.0	26.5	N/A	26.9	N/A
St.Dev.	6.28	5.34	N/A	9.39	N/A
		Oinochoai after LGIa			
Count	16	8	N/A	17	N/A
Mean	59.9	34.7	N/A	41.8	N/A
Max.	70.5	38.7	N/A	57.3	N/A
Min.	44.7	26.9	N/A	35.5	N/A
St.Dev.	6.69	4.13	N/A	5.23	N/A

Furthermore, most mean proportions of Late Geometric pitchers show lower standard deviations compared to those of trefoil *oinochoai* from the same period:

	Proportion of Handle Attachment Height to Net Height (%)	Proportion of Neck Length to Net Height (%)	Proportion of Rim Diameter to Net Height (%)	Proportion of Base Diameter to Net Height (%)	Proportion of Base Diameter to Rim Diameter (%)
			All Pitchers (all from LGII)		
Count	6	6	6	6	6
Mean	54.3	38.9	44.9	30.0	67.1
Max.	59.9	45.9	48.3	32.3	78.1
Min.	48.3	33.5	39.4	26.7	58.9
St.Dev.	3.95	4.38	3.47	2.03	6.71

According to the comparison of standard deviations, trefoil *oinochoai* between EGII and MGII-LGIa exhibit greater artefact variability compared to those produced after LGIa. Furthermore, the clustering of LG *oinochoai* in Figure 65 suggests larger degree of standardisation in their production compared to their earlier equivalents. Finally, the most standardised of all pouring vessels are pitchers.

The possibility of standardisation in the production of Late Geometric pouring vessels is also noted with regard to base shapes. In a total assemblage of 39 *oinochoai* with recorded base diameters from three sites (31 presented in Chart 5.1 and 8 in Chart 5.2), 17 have been produced with ring bases. An example of ring base (or ring foot) is presented in Figure 66.

Figure 66: Example of ring base on Early Geometric I *oinochoe* P3687 (Papadopoulos 2003, 100).

During the *chaîne opératoire* steps for the production of *oinochoai* (Figure 67), the ring base was formed during a separate episode on the potter's wheel, which required the vessel to be inverted; therefore, forming such shapes without ring bases reduced the time of production by cutting down one of the *chaîne opératoire* steps. In the present assemblage, the majority of *oinochoai* with ring bases come from the period between EGI and MGII (14 out of 17):

Trefoil oinochoai with Ring Bases	
P3687	EGI
P18618	EGII
P18622	EGII
P552	MGI
P6164	MGI
P553	MGI
P6203	MGI
P6205	MGI
P3874	MGI
P27952	MGII
P6401	MGII
P18365	MGII
P18616	MGII
P27948	MGII
P26827	LGIIa-LGIIb
P24844	LGIIb-EPA
P23675	LGIIb-EPA

This suggests that during the Late Geometric period production moved towards greater simplification of the *chaîne opératoire* and ring bases declined.

A similar move towards simplification during Late Geometric times is noted with regard to the increase of neck-less shapes. Chart 5.1 shows that more than half of the Late Geometric trefoil *oinochoai* with complete profiles (9 out of 17) are neck-less. According to Figure 67, the manufacture and attachment of necks on *oinochoai* took place during two separate episodes on the wheel's head; therefore, the production on neck-less vessels reduced the total *chaîne opératoire* by another two steps.

According to the comparison of the four *oinochoai* shapes examined in this thesis (Figure 68), vessels with necks and ring bases are the tallest and most complex of all. By contrast, broad or neck-less vessels with flat bases are shorter and simpler in their conceptualisation and execution (*sensu* Van der Leeuw 1994, 136-7); therefore, their production probably required less time and effort. As neck-less flat-based pouring vessels increased after LGIa, it is likely that the preference in simpler shapes and the reduction of the *chaîne opératoire* steps were dictated by increasing consumption demands. The same demands were probably responsible for greater standardisation in the production of pouring vessels.

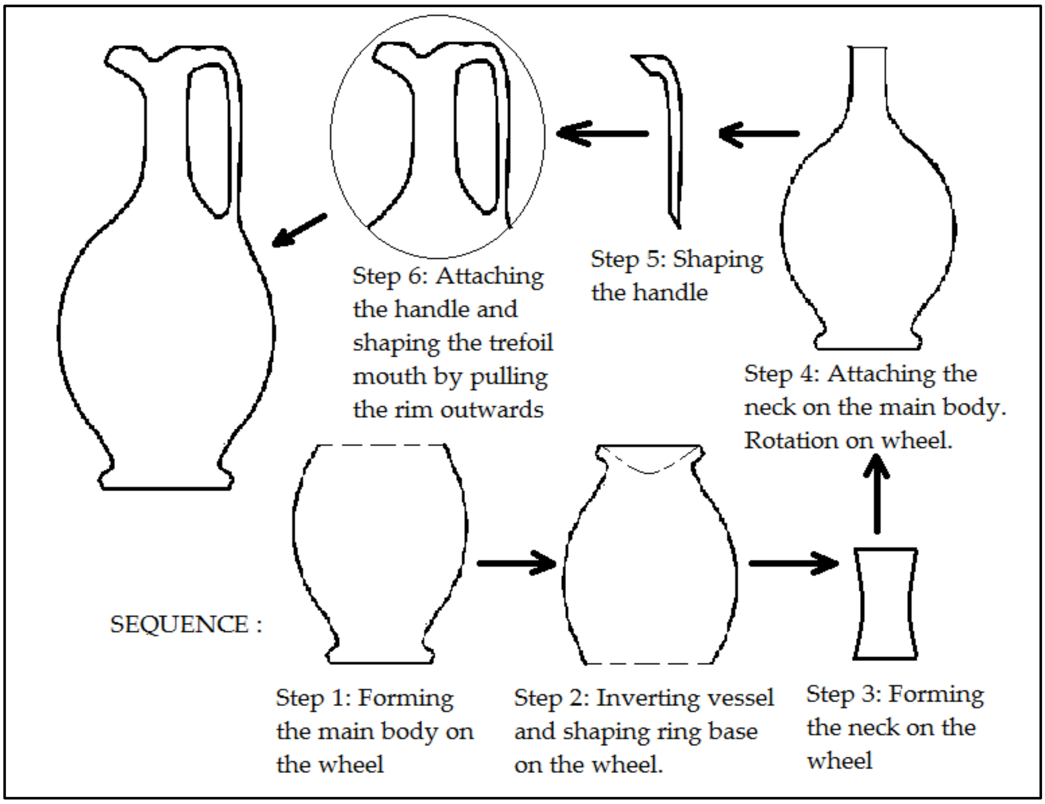

Figure 67: The assembling process of Geometric trefoil *oinochoai*.

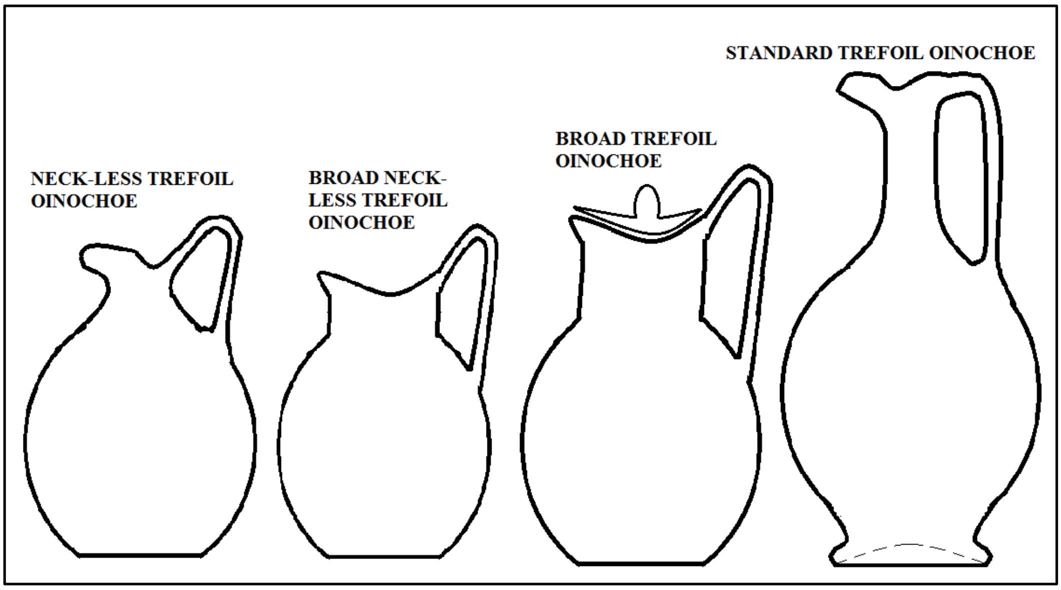

Figure 68: four types of *oinochoai* examined in this thesis.

The low standard deviations for the proportions of handle attachment height to net height (6.69) and neck length to net height (4.13) for *oinochoai* after LGIa are likely to suggest technological traditions followed in the production of such finewares. The same hypothesis is also likely for pitchers, where standard deviations for most mean proportions range at small percentages, with exception of base diameter to rim diameter. Both cases require further investigation.

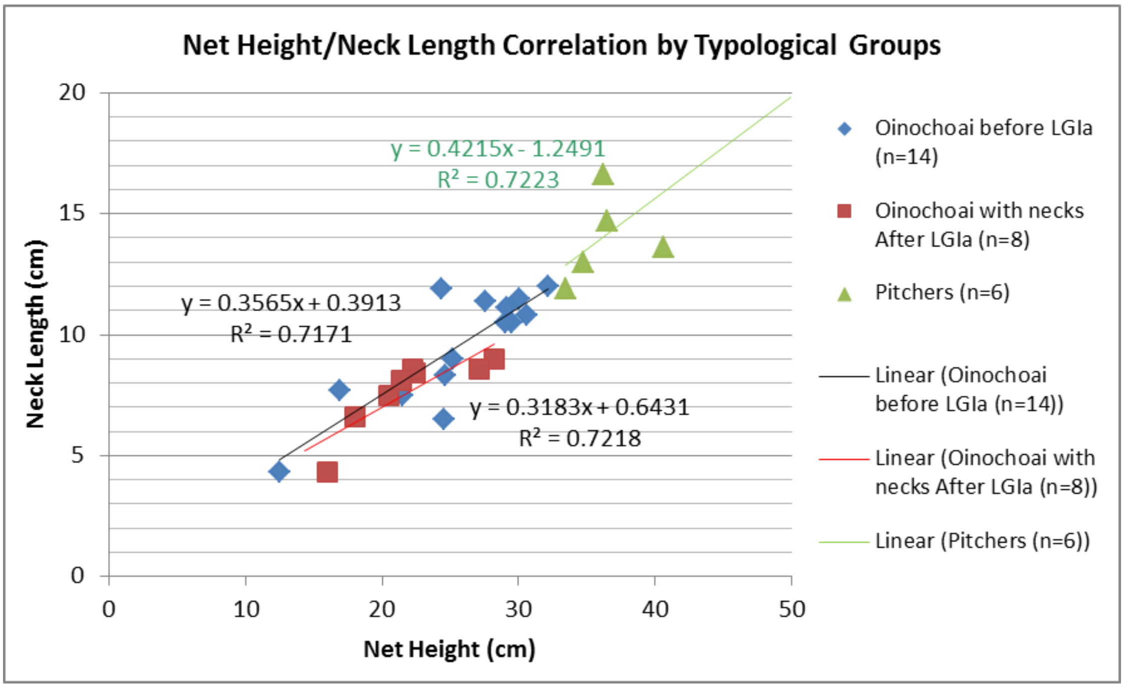

Figure 69: Scatter-graph of correlation between net height and neck length. Athenian/Attic pouring vessels from the *Agora, Kynosarges,* and the British School's at Athens collections with complete profiles.

Figure 69 presents the correlation of neck length to net height for 24 pouring vessels with necks and complete profiles. Nine neck-less trefoil *oinochoai* have been left out. According to the graph, the regression lines for *oinochoai* dating before and after LGIa appear close together. The regression line for the group before LGIa follows the equation y = 0.3565x + 0.3913 (where y = neck length and x = net height). In other words, the neck lengths of these *oinochoai* are roughly equal to 35.65% of a vessel's net height. The difference of 0.3913 cm is too small to be considered. The coefficient of determination of the regression line (R^2=0.7171) shows weak statistical correlation (71.71%).

A similar pattern is noted for the regression line of trefoil *oinochoai* produced after LGIa. There, the regression line follows the equation y = 0.3183x + 0.6431 (where y = neck length and x = net height). In this group, neck lengths are roughly equal to 31.83% of a vessel's net height, while the difference of 0.6431 cm is too small to be considered. Similarly to the regression line for *oinochoai* before LGIa, the coefficient of determination (R^2=0.7218) shows weak statistical correlation (72.18%).

The proportional pattern for LGII pitchers is unclear. The regression line for 6 vessels in Figure 69 follows the equation y = 0.4215x – 1.2491 (where y = neck length and x = net height). In other words, neck lengths of Attic pitchers are roughly equal to 42.15% of their net height reduced by a difference of 1.25 cm. The coefficient of determination of this regression line shows 72.23% statistical correlation (R^2=0.7223), which is equally weak to the correlation of trefoil *oinochoai*.

According to the above comparison, it is likely that similar patterns might have existed in the conceptualisation of necks between *oinochoai* and pitchers; however, these cannot be securely confirmed due to the ambivalent statistical correlations of the regression lines.

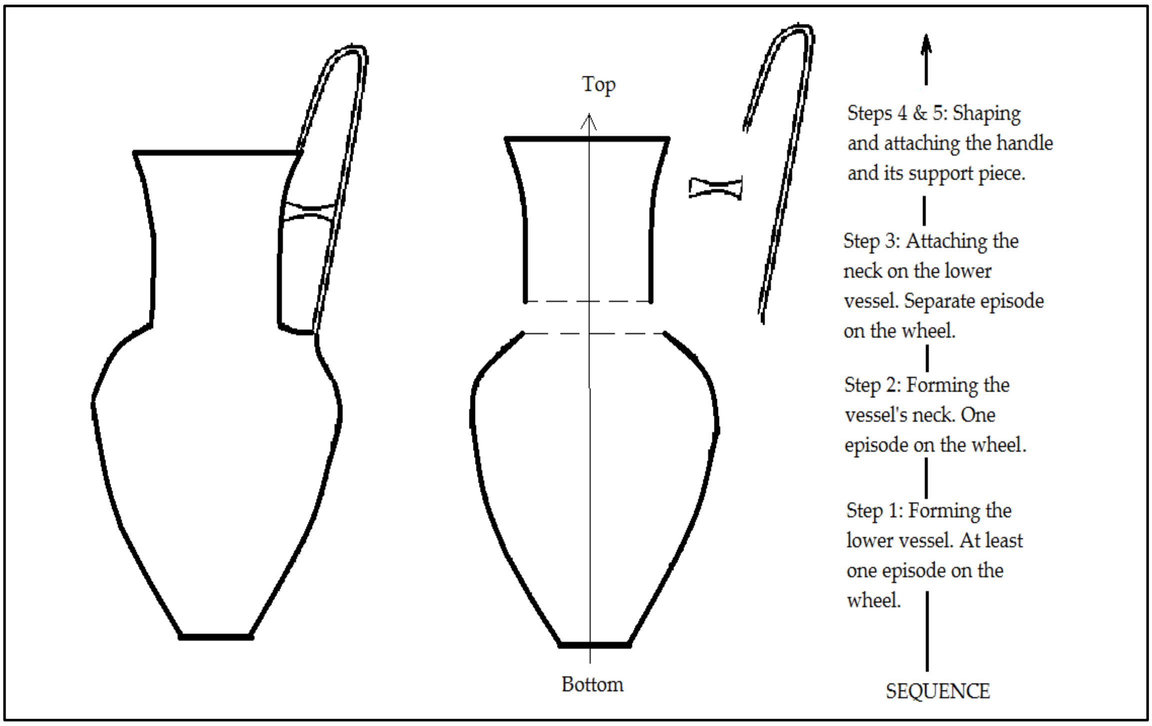

Figure 70: The assembling process of Geometric pitchers.

From a *chaîne opératoire* perspective, both pouring vessels follow a similar sequence in their assembling processes; therefore, they share common features of partonomy. The assembling process of *oinochoai* followed at least six steps before LGIa, or at least three steps after LGIa, when ring bases and necks were not popular any more (Figure 67). The same assembling process for pitchers included at least five steps, despite the fact that such vessels did not have ring bases and trefoil mouths (Figure 70). The necks of both typological classes were formed and attached during separate episodes on the potter's wheel; therefore, it could be likely that potters shared some similar conceptualisations with regard to neck lengths. In the above assemblage these conceptualisations cannot be clearly mapped and more samples are required. The situation is different with regard to handle attachment heights.

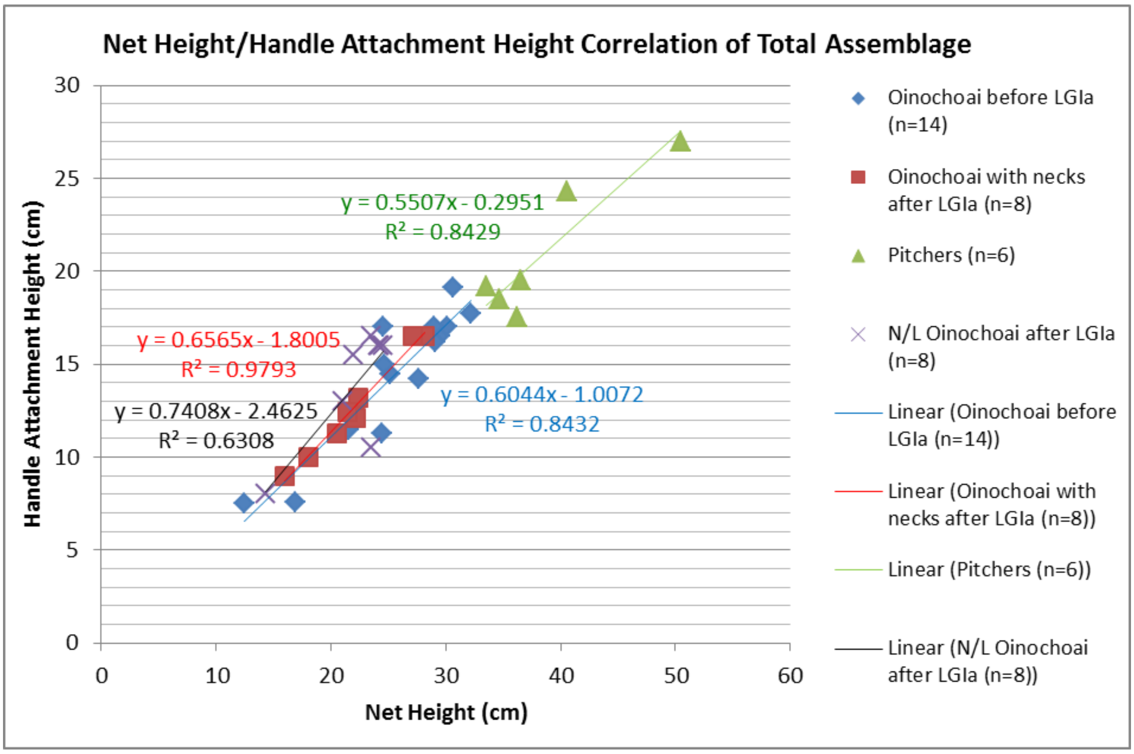

Figure 71: Scatter-graph of correlation between net height and handle attachment height. Athenian/Attic pouring vessels from the *Agora, Kynosarges,* and the British School's at Athens collections with complete profiles.

Figure 71 presents the correlation of handle attachment height to net height for 36 out of 37 pouring vessels with complete profiles from the three sites. Neck-less trefoil *oinochoe* P12115 is partly reconstructed with plaster and its handle attachment height could be wrong; therefore, it was left out. Figure 71 also plots the correlation for neck-less *oinochoai* separately due to their distinct shape. According to the graph, the regression lines for the two *oinochoai* groups dating before and after LGIa follow two different patterns. The regression line for the standard *oinochoa*i group before LGIa follows the equation y = 0.6044x – 1.0072 (where y = handle attachment height and x = net height). The handles of these *oinochoai* are attached roughly at 60.44% of a vessel's net height with a difference of 1.0072 cm. The coefficient of determination of the regression line (R^2=0.8432) shows 84.32% correlation of variables, which is relatively satisfactory.

The regression line for standard trefoil *oinochoai* produced after LGIa suggests a different pattern: the line follows the equation y = 0.6565x – 1.8005 (where y = handle attachment height and x = net height). In this group handles are attached at roughly 65.65% of a vessel's net height reduced by an average of 1.8 cm. By contrast to *oinochoai* produced before LGIa, the coefficient of determination of those dating after LGIa (R^2=0.9793) shows 97.93% statistical correlation, which is nearly perfect. The regression line for neck-less trefoil *oinochoai* produced after LGIa suggests no clear pattern. It follows the equation y = 0.7408x – 2.4625 and the coefficient of determination (R^2=0.6308) shows weak statistical correlation.

According to the above, it is likely that the handles of standard trefoil *oinochoai* were attached with some specific conceptions that could relate to distinct technological traditions: before LGIa handles were attached at roughly 60% (or 4/5) or a vessel's net height, while after LGIa at roughly 66% of a vessel's net height. The second pattern shows similarity with the proportions of handle attachment height to net height of neck-handled amphorae, noted in Chapter 4: both wares have their handles attached at roughly 2/3 of a vessel's net height (between 65% and 68%). The coefficients of determination suggest that the group of standard trefoil *oinochoai* after LGIa shows less variability compared to that before LGIa; therefore, the conceptualisation of such vessels was more standardised in the late phases of the Geometric era. Neck-less trefoil *oinochoai* do not suggest any clear pattern at this stage and will be re-examined later (Section 5.4).

The regression line for the same proportion of 6 Late Geometric pitchers in Figure 71 follows the equation y = 0.5507x – 0.2951 (where y = handle attachment height and x = net height). In other words, the handles of Attic LGII pitchers are attached at roughly 55% of a vessel's net height, while the difference of 0.2951 cm is too small to be considered. The coefficient of determination of this regression line (R^2=0.8429) suggests 84.29% statistical correlation, which is relatively satisfactory.

This pattern could relate to a different technological tradition, where pitcher handles were attached roughly above the middle of a vessel's height axis.

5.1.2 The *Kerameikos* cemetery

The analysis of metrical features (metrics) and proportions of medium sized pouring vessels from *Kerameikos* is conducted on 24 artefacts with complete profiles. The assemblage comprises of 19 decorated *oinochoai* (one of which is neck-less), 1 *oinochoe-lekythos* and 4 pitchers. All vessels have been recovered in burials and their grave contexts are recorded in Charts 5.4 and 5.5.

In the original publication of *oinochoai* from *Kerameikos*, Karl Kübler (1954) recorded only height measurements. All other features in Charts 5.4 and 5.5 were measured in smaller scale through published photographs and then calculated in real scale based on the original real net height measurements. To ensure the accuracy of calculated measurements, 5 *oinochoai* from the *Kerameikos* assemblage were chosen for macroscopic analysis and an accuracy test was carried out similarly to that in Chapter 4 for large containers (Chart 5.6). During this accuracy test, it was initially verified that the height measurements recorded by Kübler (1954) were correct. Then, real base diameters were obtained after macroscopic examination, which were compared to the ones calculated though published photographs for the same artefacts. According to Chart 5.6, the difference between real and calculated base diameters for the *Kerameikos oinochoai* ranges between -0.4 cm and +0.5 cm. Furthermore, differences between real and calculated proportions of base diameter to net height range between -1.7% and +2.6%. This test shows that differences between real and calculated metrical features exist; however, they are too small to affect the analysis results.

According to the correlation of base diameter and net height in Figure 72, the total assemblage of pouring vessels forms three distinct clusters. Cluster 1 comprises of 12 vessels from different chronological periods, ranging from EGII to LGIIb. All vessels have net heights below 25 cm. This cluster includes every Late Geometric *oinochoe* from the entire assemblage:

Cluster 1	Ware Type	Chronology	Context
2139	Oinochoe	EGII	Grave 38
2145	Oinochoe	EGII-MGI	Grave 42
1253	Oinochoe	EGII-MGI	Grave 43
298	Oinochoe	MGII	Grave 22
379	Oinochoe	MGII	Grave 23
397	Oinochoe	MGII	Grave 35
274	Oinochoe	MGII-LGIa	Grave 31
874	N/L Oinochoe	LGIa	Grave 9
1327	Oinochoe	LGIb	Grave 48
341	Oinochoe	LGIb	Grave 71
814	Oinochoe	LGIIa	Grave 90
369	Oinochoe	LGIIb	Grave 57

Cluster 2 comprises of 6 *oinochoai*, all dating in periods before LGIa:

Cluster 2	Ware Type	Chronology	Context
928	Oinochoe	EGII	Grave 2
927	Oinochoe	EGII	Grave 2
2148	Oinochoe	EGII-MGI	Grave 41
862	Oinochoe	MGI-MGII	Grave 11
300	Oinochoe	MGII	Grave 22
880	Oinochoe	MGII-LGIa	Grave 25

In this cluster, vessel heights range between 25 cm and 30 cm, while base diameters appear more diverse compared to those of cluster 1. Cluster 3 comprises of all pitchers:

Cluster 3	Ware Type	Chronology	Context
819	Pitcher	LGIIa	Grave 79
821	Pitcher	LGIIa	Grave 93
393	Pitcher	LGIIa-LGIIb	Grave 33
399	Pitcher	LGIIb	Grave 16

This cluster is the most distinct of all. Vessels are taller than 30 cm and their base diameters do not diversify. All pitchers date in LGII. Similarly to the pitchers from *Kynosarges* and the collections of the British School at Athens, pitchers from *Kerameikos* stand out with regard to their chronological and typological properties.

Finally, Figure 72 shows that two vessels are loners: firstly, *oinochoe-lekythos* 1141 (MGII) is the smallest of all artefacts. This vessel was originally added in the assemblage to test whether *oinochoai-lekythoi* cluster with other typological classes. Figure 72 suggests that such shapes stand out due to their broad bases and short heights. Secondly, *oinochoe* 2149 is the largest vessel in the entire assemblage and stands out even in relation to pitchers. Based on its height (40.7cm), 2149 could also classify as a giant trefoil *oinochoe*; however, the lack of distinct guidelines for the characterisation of such vessels and the tendency of scholars to see giant *oinochoai* as a LGI phenomenon (e.g. Brann 1961a; Galanakis 2013) prevent such characterisation for 2149. Instead, this vessel is treated as a standard trefoil *oinochoe* that happens to be larger compared to average pouring vessels from *Kerameikos*, and was also treated as such by Kübler (1954, 235). Similarly to the cluster with the largest neck-handled amphorae from *Kerameikos* and the cluster with the largest trefoil *oinochoai* from the *Agora*, 2149 has been produced in the period between EGII and MGI.

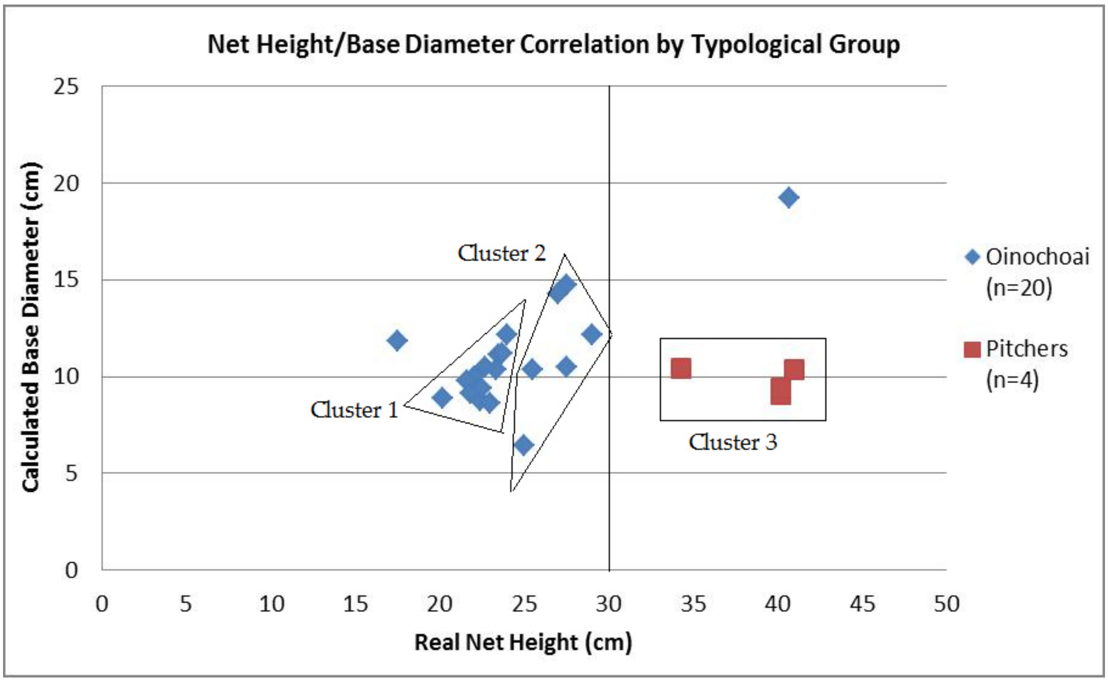

Figure 72: Scatter-graph of correlation between net height and base diameter. Athenian *oinochoai* and pitchers from the *Kerameikos* cemetery with complete profiles.

According to the above, all *oinochoai* produced after LGIa and all LGII pitchers show lesser degree of artefact variability compared to *oinochoai* produced before LGIa. Late Geometric vessels appear standardised and are likely to suggest the presence of distinct technological traditions in their production, similar to those discussed in Section 5.1.1.

The analysis of mean proportions across two broader chronological groups based on the data recorded in Chart 5.3 shows fluctuations in standard deviations. More specifically, the proportions of neck length to net height and base diameter to net height of *oinochoai* produced after LGIa are smaller compared to those before

LGIa. By contrast, mean proportions of handle attachment height to net height show the opposite pattern:

	Calculated Proportion of Handle Attachment Height to Net Height (%)	Calculated Proportion of Neck Length to Net Height (%)	Calculated Proportion of Rim Diameter to Net Height (%)	Calculated Proportion of Base Diameter to Net Height (%)	Calculated Proportion of Base Diameter to Rim Diameter (%)
		Oinochoai between EGII amd MGII-LGIa			
Count	13	15	N/A	15	N/A
Mean	50.1	44.4	N/A	45.9	N/A
Max.	60.2	56.8	N/A	67.8	N/A
Min.	45.7	33.3	N/A	25.8	N/A
St.Dev.	4.08	5.50	N/A	9.14	N/A
		Oinochoai after LGIa			
Count	4	4	N/A	5	N/A
Mean	59.4	37.1	N/A	42.0	N/A
Max.	66.7	41.7	N/A	45.3	N/A
Min.	54.2	34.4	N/A	37.5	N/A
St.Dev.	5.31	3.27	N/A	2.97	N/A

Even though the total *oinochoai* assemblage from *Kerameikos* comprises of 20 vessels (15 before and 5 after LGIa) the proportion of handle attachment height to net height could only be calculated for 17 vessels. This is due to the nature of some published photographs, which were taken from angles that prevent full visibility of the handles. Furthermore, mean proportions for pitchers show low standard deviations with exception of the proportion of handle attachment height to net height:

	Calculated Proportion of Handle Attachment Height to Net Height (%)	Calculated Proportion of Neck Length to Net Height (%)	Calculated Proportion of Rim Diameter to Net Height (%)	Calculated Proportion of Base Diameter to Net Height (%)	Calculated Proportion of Base Diameter to Rim Diameter (%)
		Pitchers (all LGII)			
Count	4	4	4	4	4
Mean	55.0	38.8	40.9	25.4	62.0
Max.	61.8	40.6	44.9	30.3	67.5
Min.	50.0	33.7	36.8	22.6	57.7
St.Dev.	5.04	3.40	4.00	3.46	4.07

According to the above comparisons, it is likely that the neck lengths of Late Geometric *oinochoai* and pitchers were formed by potters based on specific conceptualisations, perhaps regulated by technological traditions. These resulted to lesser artefact variability, which is expressed in lower standard deviations in the above means. By contrast, the proportion of handle attachment height to net height follows the opposite pattern: *oinochoai* produced before LGIa exhibit smaller standard deviation and could be more standardised as opposed to those produced after LGIa. Both assumptions require further investigation.

Figure 73 plots the correlation between neck length and net height for 19 Geometric *oinochoai* with necks and 4 pitchers. By contrast to the material from the *Agora*, *Kynosarges* and the British School's collections, pouring vessels from *Kerameikos* show different patterns of proportional increase between the two metrical features. Furthermore regression lines either follow unclear patterns or show limited statistical correlation.

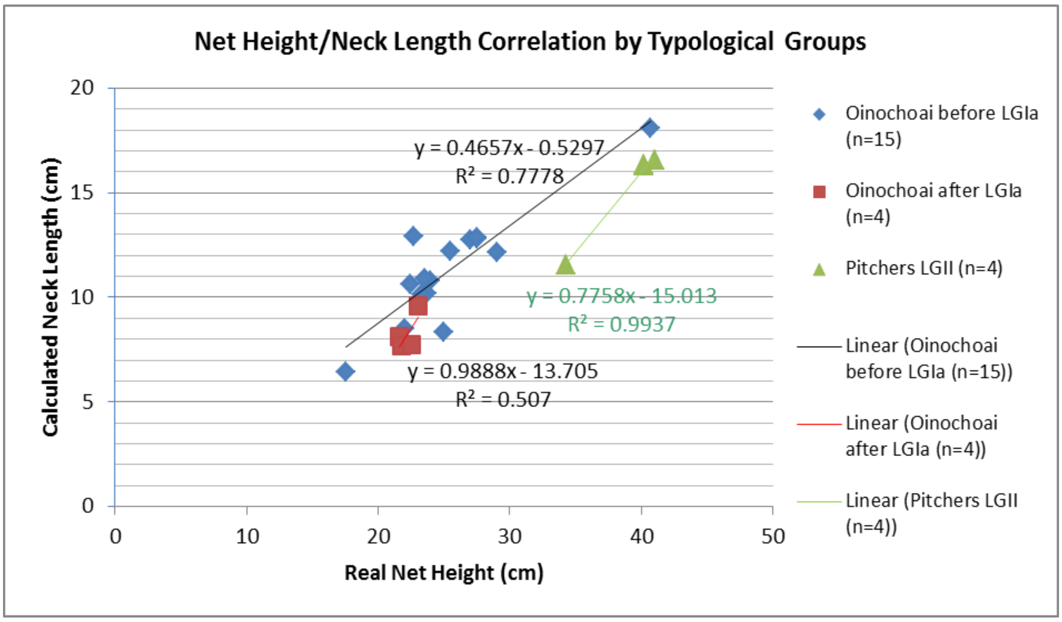

Figure 73: Scatter-graph of correlation between net height and neck length with regression lines. Athenian *oinochoai* and pitchers from the *Kerameikos* cemetery with complete profiles.

More specifically, the regression line for trefoil *oinochoai* between EGII and MGII-LGIa follows the equation y = 0.4657x – 0.5297 (where y = neck length and x = net height). For this chronological group necks are roughly equal to 46.57% of a vessel's net height, while the difference of 0.5297 cm is too small to be considered.

For this specific assemblage the coefficient of determination of the regression line (R^2=0.7778) shows weak statistical correlation at 77.78%.

According to the same scatter-graph, all trefoil *oinochoai* produced after LGIa appear closely clustered and no clear regression pattern is visible. Their regression line follows the equation y = 0.9888x – 13.705 (where y = neck length and x = net height), which is hard to explain. It could mean that neck lengths of Late Geometric *oinochoai* are roughly equal (99%) to their net height, reduced by an average of 13.7 cm. The coefficient of determination of this regression line (R^2=0.507) shows weak statistical correlation (50.7%). This unclear pattern is most likely due to the sample's nature and size.

A similarly unclear pattern is noted with regard to Late Geometric pitchers: their regression line follows the equation y = 0.7758x -15.013. This pattern could mean that neck lengths of pitchers are roughly equal to 77.58% of their net height, reduced by an average of 15 cm. The coefficient of determination of this regression line (R^2=0.9937) shows perfect statistical correlation at 99.37%, which makes things more complicated to understand.

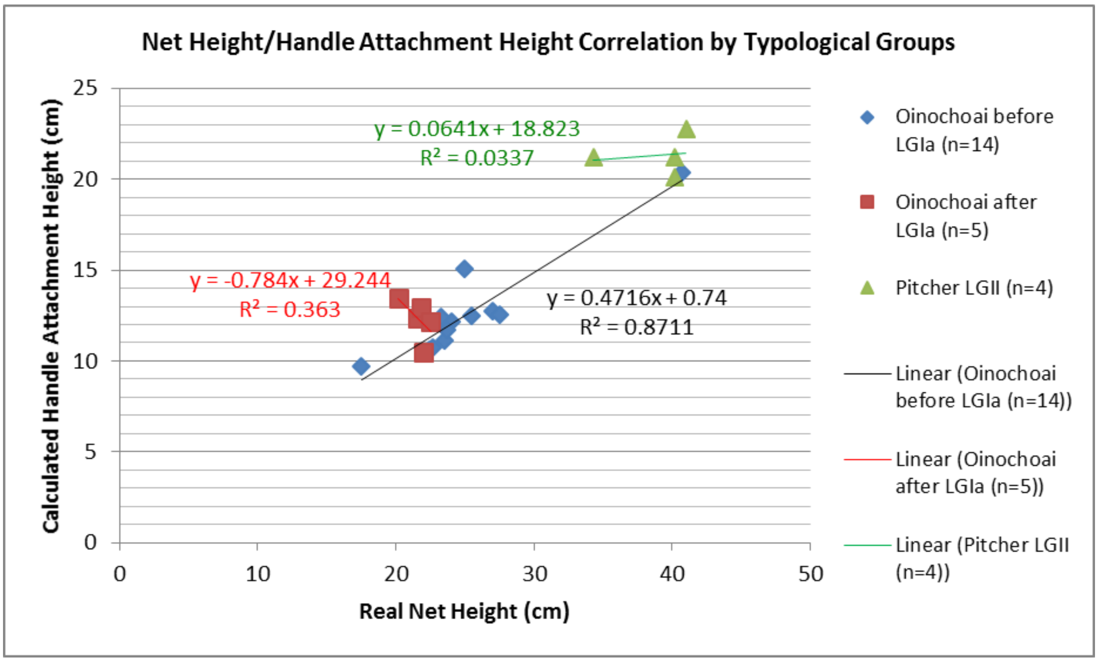

Figure 74: Scatter-graph of correlation between net height and handle attachment height with regression lines. Athenian *oinochoai* and pitchers from the *Kerameikos* cemetery with complete profiles.

The situation with the proportions of handle attachment height to net height for the *Kerameikos* assemblage is again problematic. According to the scatter-graph in Figure 74, all *oinochoai* produced after LGIa and all pitchers show regression lines that are difficult to interpret.

The regression line for Late Geometric *oinochoai* is y = -0.7884x + 29.244 and the coefficient of determination (R^2=0.363) shows weak statistical correlation (36.3%). This equation does not change even if neck-less trefoil *oinochoe* 874 is left out of the data set. The same can be said with regard to pitchers, where the regression line follows the equation y = 0.0641x + 18.823, showing almost no statistical correlation (3.37% based on R^2=0.0337). The only regression line that makes some sense is that for *oinochoai* produced before LGIa. According to the graph, their regression line follows the equation y = 0.4716x + 0.74. This group of *oinochoai* from *Kerameikos* has their handles attached at roughly 47.16% of a vessel's net height, while the difference of 0.74 cm is too small to be considered. Furthermore, the coefficient of determination of this regression line (R^2=0.8711) shows relatively satisfactory statistical correlation at 87.11%.

According to the above scatter graphs, the material from *Kerameikos* is problematic and no clear patterns are visible. The main problem is the small sample size and the dense clustering of all Late Geometric pouring vessels (both pitchers and *oinochoai*). This clustering is unlikely to verify patterns similar to the ones noted for the same proportions discussed for the *Agora-Kynosarges*-British School assemblage. A larger statistical sample of intact vessels is necessary to supplement the above study.

5.1.3 The British Museum collections

The analysis of metrical features (metrics) and proportions of medium sized pouring vessels from the collections of the British Museum is conducted on 23 artefacts with complete profiles. The assemblage comprises of 10 decorated trefoil *oinochoai* (2 of which are giant), 1 *oinochoe-lekythos*, and 12 pitchers (recorded in Charts 5.7 and 5.8). All vessels derive from unknown contexts and are characterised as broadly Attic by Coldstream (2010), apart from those of suspected Athenian origin. Pitcher GR1877,1207.10 is probably from Phaleron and was added to test any similarities between Athens and other Attic fineware production centres.

In the British Museum assemblage, pitchers were the only vessels that could accommodate an accuracy test. For this test, published net height measurements were used to estimate rim diameters through photographs, which were then compared to real rim diameters included in the original publication by Coldstream (2010). According to the test (Chart 5.9), the difference between real and calculated rim diameters for these vessels ranges between -0.8 cm and +0.5 cm. The difference between real and calculated proportions of rim diameter to net height ranges between -1.9% and +1.6%. In Chart 5.9 pitcher GR1977,1211.4 could not allow clear calculation of rim diameter due to a large chip missing along its rim; therefore, this vessel was not included in the accuracy test. According to Chart 5.9, the differences between real and estimated metrical features are too small to affect the analysis results and bias is expected to be limited.

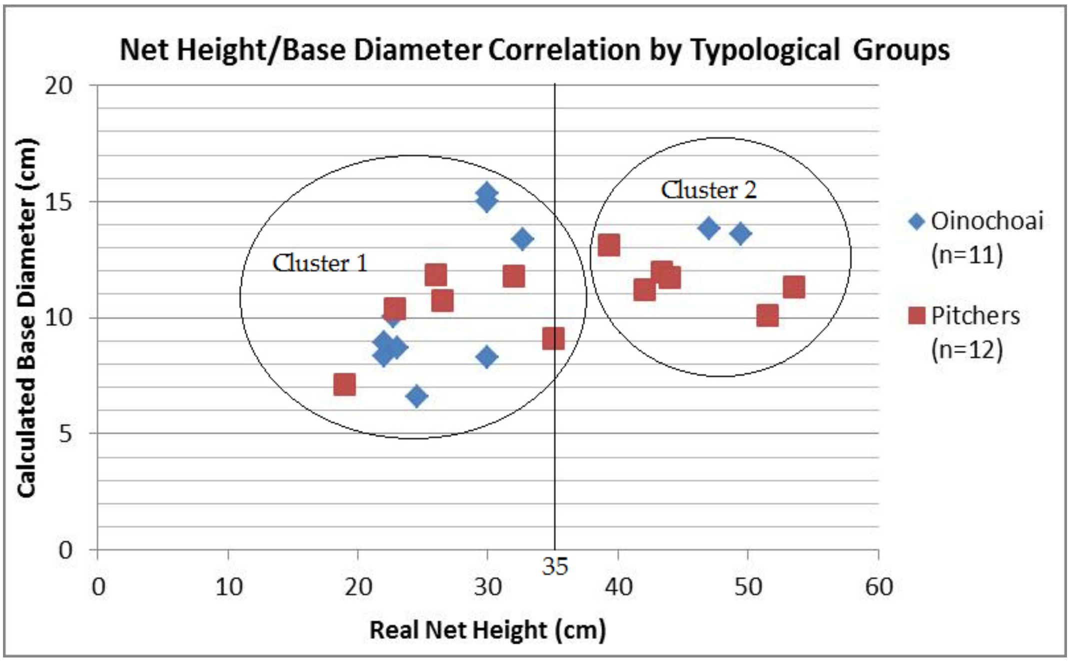

Figure 75: Scatter-graph of correlation between net height and base diameter. Decorated Attic *oinochoai* and pitchers from the British Museum with complete profiles.

Figure 75 plots the correlation of base diameter and net height for the above assemblage. According to that graph, both types of vessels are mixed and scattered in a different way compared to the assemblages discussed in sections 5.1.1 and 5.1.2. Despite the high degree of scattering, pouring vessels form two clusters. Cluster 1 comprises of 14 pots: 8 *oinochoai*, 1 *oinochoe-lekythos* and 5 pitchers (3 of which with short necks). The chronological range of this cluster spans over 200 years, as it dates between LPG and LGIIb:

Cluster 1	Ware Type	Date	Origin
GR1950,0228.1	Oinochoe	LPG	Probably Athens
GR1950,0228.2	Oinochoe	EGI	Probably Athens
GR1868,0110.768	Oinochoe Lekythos	MGI	Attica
GR1977,1207.50	Oinochoe	MGI-MGII	Probably Athens
GR1977,1207.11	Oinochoe	MGII	Probably Athens
GR1977,1207.12	Oinochoe	MGII	Probably Athens
GR1878,0812.8	Pitcher	LGIa	Attica
GR1977,1211.4	Pitcher (short neck)	LGIb	Probably Athens
GR1977,1207.14	Pitcher (short neck)	LGIb	Probably Athens
GR1912,0718.1	Pitcher (short neck)	LGIIa	Athens
GR1977,1207.13	Oinochoe	LGIIa	Probably Athens
GR1920,1014.4	Oinochoe	LGIIa	Attica
GR1877,1207.12	Oinochoe	LGIIa	Attica
GR1842,0728.826	Pitcher	LGIIb	Attica

The general characteristic of this cluster is that all vessels are shorter than 35 cm and their base diameters show greater variability compared to the second cluster. Cluster 2 comprises of 9 vessels: 2 giant trefoil *oinochoai* and 7 pitchers:

Cluster 2	Ware Type	Date	Origin
GR1877,1207.10	Pitcher	LGIb	Possibly Phaleron
GR1977,1207.10	Pitcher	LGIb	Probably Athens
GR1977,1207.8	Oinochoe Giant	LGIIa	Probably Athens
GR1977,1207.9	Oinochoe Giant	LGIIa	Probably Athens
GR1977,1211.3	Pitcher	LGIIa	Probably Athens
GR1913,1113.1	Pitcher	LGIIb	Attica
GR1916,0108.2	Pitcher	LGIIb	Attica
GR1912,0522.1	Pitcher	LGIIb	Attica
GR1905,1028.1	Pitcher	LGIIb	Attica

This cluster is more homogeneous compared to cluster 1, as all vessels date between LGIb and LGIIb. Pottery in this cluster is taller than 35 cm, which is normal for pitchers and giant *oinochoai*.

Figure 75 suggests a trend that was not observed earlier in the analysis of the *Agora*-*Kynosarges*-British School and *Kerameikos* assemblages: even though *oinochoai* and pitchers from previous sites diversified clearly at heights of 33 cm and 30 cm respectively, pitchers from the British Museum appear in smaller heights and mix together with *oinochoai*. This makes it difficult to see clear artefact variability patterns.

The analysis of mean proportions across two broader chronological groups based on the information presented in Chart 5.8 shows that standard deviations for all of *oinochoai* produced after LGIa are smaller compared to those produced before LGIa:

	Calculated Proportion of Handle Attachment Height to Net Height (%)	Calculated Proportion of Neck Length to Net Height (%)	Real Proportion of Rim Diameter to Net Height (%)	Calculated Proportion of Base Diameter to Net Height (%)	Calculated Proportion of Base Diameter to Rim Diameter (%)
		Oinochoai before LGIa			
Count	4	6	N/A	6	N/A
Mean	54.9	39.5	N/A	40.1	N/A
Max.	62.4	45.0	N/A	51.1	N/A
Min.	50.5	32.3	N/A	26.9	N/A
St.Dev.	5.48	5.65	N/A	10.67	N/A
		Oinochoai after LGIa			
Count	5	5	N/A	5	N/A
Mean	57.3	35.5	N/A	34.6	N/A
Max.	64.7	38.2	N/A	40.6	N/A
Min.	53.1	31.1	N/A	27.4	N/A
St.Dev.	4.56	2.68	N/A	5.81	N/A

Even though all *oinochoai* from the British Museum number 11 vessels in total (6 before and 5 after LGIa) the proportion of handle attachment height to net height could only be calculated for 9 vessels. This is due to the nature two published photographs, which were taken from angles that prevent full visibility of handles. By contrast to previous comparisons of mean proportions for pitcher, this assemblage shows high standard deviations that are due to high variability within the statistical sample:

	Calculated Proportion of Handle Attachment Height to Net Height (%)	Calculated Proportion of Neck Length to Net Height (%)	Real Proportion of Rim Diameter to Net Height (%)	Calculated Proportion of Base Diameter to Net Height (%)	Calculated Proportion of Base Diameter to Rim Diameter (%)
		LG Picthers			
Count	12	12	11	12	11
Mean	54.4	38.1	48.6	32.2	64.9
Max.	65.2	60.0	63.6	45.5	95.3
Min.	26.7	24.7	39.8	19.6	49.3
St.Dev.	11.15	10.06	7.67	8.91	14.18

According to the above comparisons, it is likely that neck lengths and handle attachment heights of *oinochoai* produced after LGIa were formed on specific conceptions, which were not necessarily followed before LGIa. The lower standard deviation in the above means suggests lesser artefact variability. Both assumptions are investigated below.

Figure 76 presents the correlation on neck length to net height for all *oinochoai* and pitchers from the British Museum. By contrast to the unclear patterns from *Kerameikos*, this assemblage follows similar proportional patterns to those observed for the *Agora, Kynosarges* and British School vessels. Furthermore, all regression lines appear parallel and two of them merge almost completely. *Oinochoe* GR1877,1207.10 is a loner which stands out. This specific vessel probably comes from *Phaleron*; therefore, it may be the product of a different *chaîne opératoire* which did not follow the technological patterns seen in the production of Athenian or other Attic pouring vessels.

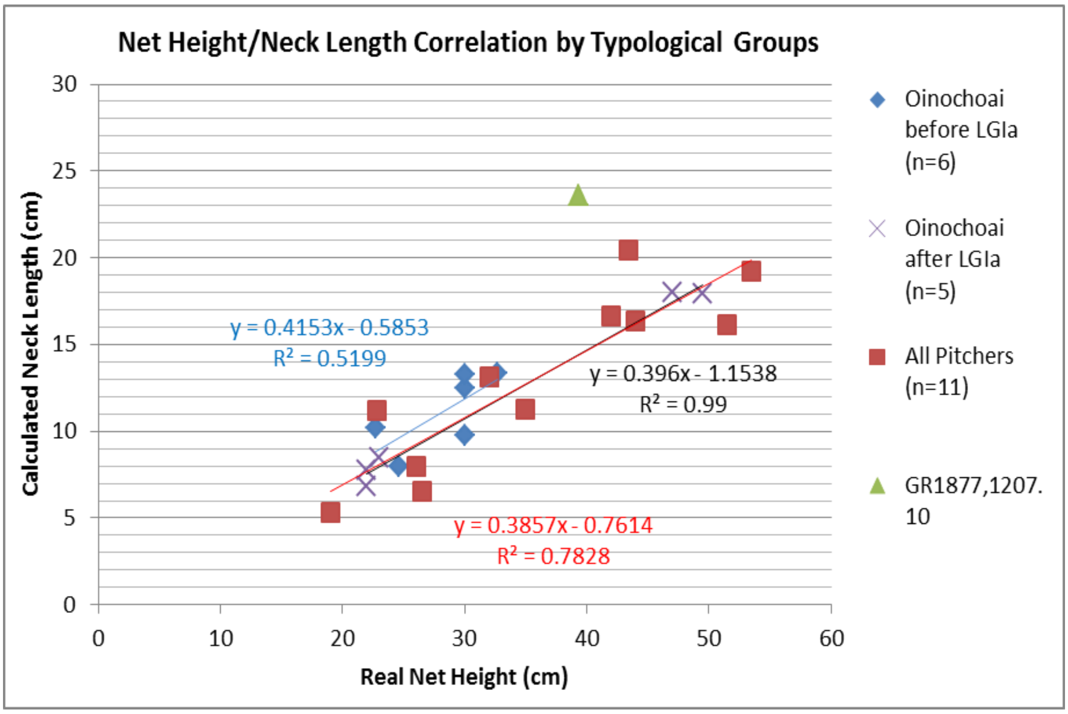

Figure 76: Scatter-graph of correlation between net height and neck length with regression lines. Attic *oinochoai* and pitchers from the British Museum with complete profiles.

According Figure 76, the regression line for trefoil *oinochoai* before LGIa follows the equation y = 0.4153x – 0.5853 (where y = neck length and x = net height). This means that neck lengths of early trefoil *oinochoai* are roughly equal to 41.53% of a vessel's net height, while the difference of 0.5853 cm is too small to be considered. For this specific assemblage the coefficient of determination (R^2=0.5199) shows weak statistical correlation (51.99%). The same regression line for *oinochoai* produced after LGIa shows a clearer pattern. The regression line follows the equation y = 0.396x – 1.1538, which means that the necks of Late Geometric trefoil *oinochoai* are roughly 39.6% of a vessel's net height reduced by 1.15 cm. The coefficient of determination of this regression line (R^2=0.99) shows perfect statistical correlation (99%).

All pitchers from the same assemblage follow a similar regression line with Late Geometric *oinochoai* and both lines merge almost completely. The regression line for pitchers follows the equation y = 0.3857x – 0.7614 (where y = neck length and x = net height). The coefficient of determination of this regression (R^2=0.7828) shows 78.28% statistical correlation, which is not entirely satisfactory. As all pitchers date in the Late Geometric era, the merging of their regression line with that for LG *oinochoai* could imply the presence of shared conceptualisations in the production of both wares: their necks were formed roughly at 40% (or 2/5) of a vessel's net height; however, this suggestion must be treated with caution due to the different statistical correlations of both regression lines.

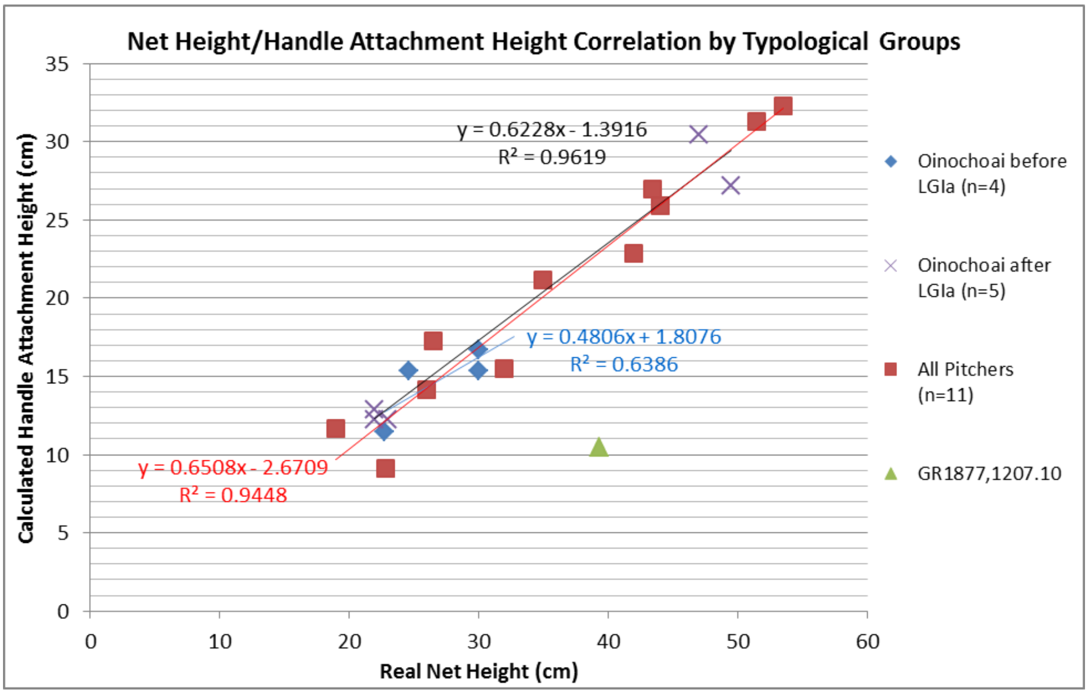

Figure 77: Scatter-graph of correlation between net height and handle attachment height with regression lines. Attic *oinochoai* and pitchers from the British Museum with complete profiles.

Similar patterns are noted in Figure 77 with regard to the proportion of handle attachment height to net height. In this scatter-graph, all *oinochoai* produced before LGIa follow the regression line y = 0.4806x + 1.8076, while the coefficient of determination (R^2=0.6386) shows weak statistical correlation (63.68%). However, the same regression line for *oinochoai* after LGIa follows the equation y = 0.6228x-1.3916 (where y = handle attachment height and x = net height). The coefficient of determination (R^2=0.9619) shows strong statistical correlation (96.19%). According to this pattern, the handles of *oinochoai* produced after LGIa were attached at roughly 62.28% of a vessel's net height reduced by roughly 1.4 cm.

The regression line for Late Geometric pitchers in Figure 77 almost merges with that of *oinochoai* from the same period. Their regression line follows the equation y = 0.6508x – 2.6709, which means that vessel handles were attached at roughly 65% of a vessel's net height reduced by an average of 2.67cm. The coefficient of determination of this regression line (R^2=0.9448) shows strong statistical correlation (94.48%). It is likely that the handles of Late Geometric pitchers and *oinochoai* were attached at similar heights, a little below 2/3 (or 66.67%) of a vessel's net height.

According to the above, the assemblage from the British Museum verifies the smaller degree of artefact variability of Late Geometric pouring vessels, as opposed to the Early and Middle Geometric ones. Furthermore, there are strong indications that the conceptualisation of Late Geometric *oinochoai* and pitchers followed similar proportional patterns. This is more evident with regard to the proportion of handle attachment height to net height, where the statistical correlation of the regression lines of both vessel types is high. In general, the British Museum assemblage exhibits more similarities with the *Agora-Kynosarges*-British School assemblage, as opposed to that from *Kerameikos*.

5.2 ANALYSIS OF FABRICS

Fabric analysis is conducted on 25 Athenian *oinochoai* from the *Agora*, summarised in Chart 5.10. According to hand specimen examination, the fabrics encountered in this assemblage are the same as the ones described in Chapter 4, for large sized containers. All vessels have been produced from the same fabric, which comes in two similar variants. Variant 1 is finer and harder, while variant 2 is softer, relatively 'coarser' and more calcareous (see Chapter 3). By contrast to large ceramic containers, almost all Athenian *oinochoai* were produced from variant 1 and their Munsell (1975) colours mainly belong to the upper 5YR series. The most prevailing fracture colour is 5YR 5/4. There is only one sample, P18618, which was produced from variant 2 and dates in EGII.

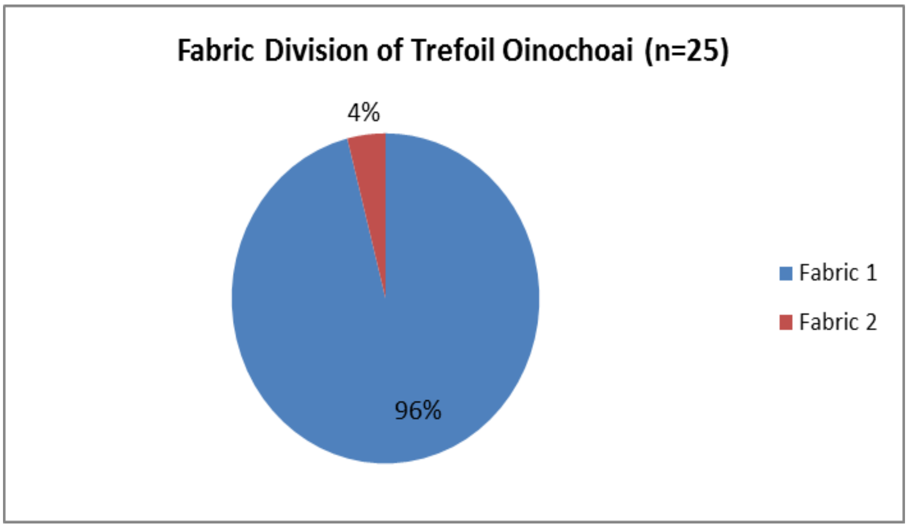

Figure 78: Fabric division for 25 *oinochoai* from the Athenian *Agora.*

According to Figure 78, variant 1 comprises 96% of the examined material. This fabric was used for the production of various *oinochoai* regardless of the period of their production and context of recovery. The use of a single fabric is again indicative of a strong technological tradition in clay selection, manipulation and tempering practices.

5.3 ANALYSIS OF DECORATIVE TECHNOLOGY

The analysis of decorative technology is conducted on a total of 56 pouring vessels (both complete pots and sherds) from three sites. The assemblage from the Athenian *Agora* comprises of 47 decorated *oinochoai* (Chart 5.11). The assemblage from the *Kynosarges* burials comprises of 1 *oinochoe* and 1 pitcher, and the assemblage from the British School's collections comprises of 2 *oinochoai* and 5 pitchers. The latter two assemblages are examined together due to their small size (Chart 5.12).

5.3.1 The Athenian *Agora*

Decorative colours of *oinochoai* from the Athenian *Agora* follow the same pattern observed for large sized containers from the same context (see section 2.3.1). According to Figure 79, 94% of the samples dating before LGIa are painted with colours of Group 1 (black or brownish black). The same colours prevail in the period after LGIa (93%); however, next to them there appear colours of Group 2 (brownish red or red) at 4% and Group 3 (orange or reddish yellow) at 3%. According to the comparison, colours for the decoration of *oinochoai* were highly standardised across time with only few exceptions. Colour Group 3 should be treated as a Late Geometric phenomenon with limited presence.

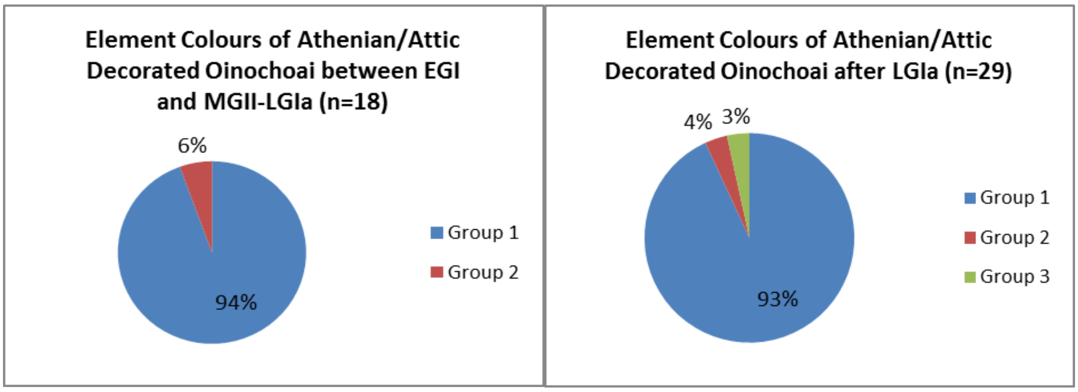

Figure 79: Comparison of decorative element colours of Athenian decorated *oinochoai* from the *Agora*.

Additionally, the period between EGI and MGII-LGIa is characterised by the dominance of coated vessels, similarly to the case of closed ceramic containers. According to Figure 80, vessels produced with black or brown/black coated surfaces (colour Group 1) comprise 89% of the assemblage. Red or brownish red coated *oinochoai* (Group 2) comprise 5% of the assemblage and only 6% of all vessels are uncoated. By contrast, after LGIa the majority of the samples (62%) are uncoated and the vessels coated in colours of Group 1 drop down to 38%. During the same period red and brownish red coatings (colour Group 2) disappear.

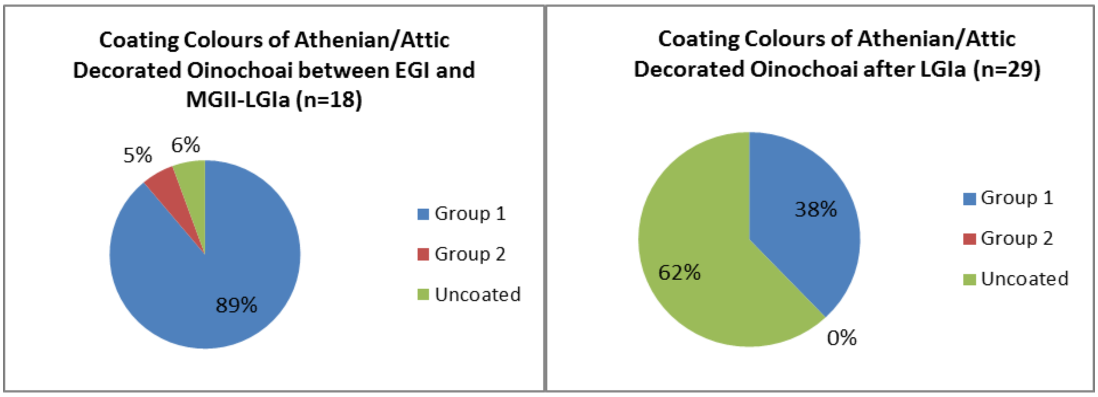

Figure 80: Comparison of coating colours of Athenian decorated *oinochoai* from the *Agora.*

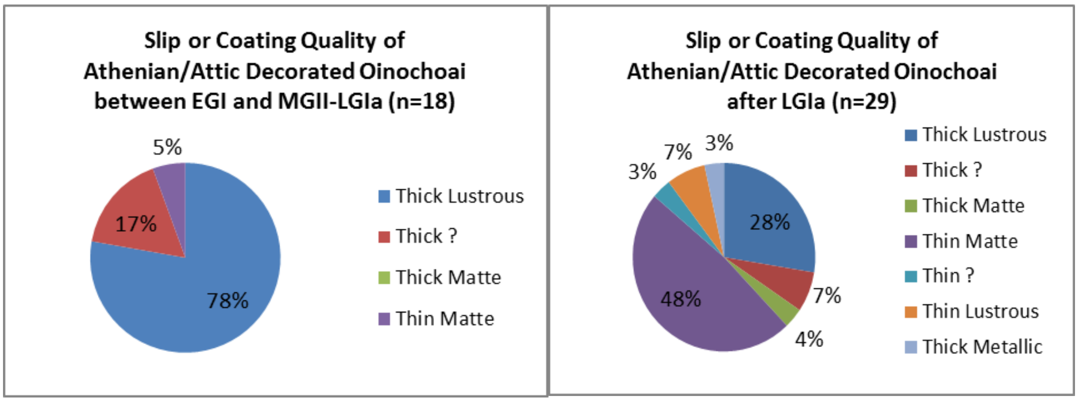

Figure 81: Slip or coating quality of Athenian decorated *oinochoai* from the *Agora.*

Despite the decline of coating practices after LGIa, Figure 81 shows that the quality of external treatments of the Late Geometric period is more diverse: it includes thin lustrous coatings and thick metallic sheens, which do not exist in the earlier assemblage.

The above analysis suggests that Late Geometric *oinochoai* show greater artefact variability compared to those produced between EGII and MGII-LGIa with regard to their decorative characteristics. Late Geometric vessels are by majority uncoated and this could be due to the spread of the figurative style after c.760 BC, which required larger 'blank' surfaces for the painters to work on. The presence of more than one decorative colours and the existence of different qualities of coatings during the same period shows advances in the preparation of paints resulting to multiple chemical compositions, also related to advances in firing control. Similarly to elaborately decorated amphorae discussed in Chapter 4, the practice of coating the external surfaces of *oinochoai* declined significantly in Late Geometric times but it was never abandoned completely.

5.3.2 The *Kynosarges* burials and the collections of the British School at Athens

The assemblage of *oinochoai* from those two sites is small to produce certain conclusions; however, according to the information presented in Chart 5.12, the assemblage probably complies with the patterns observed for *oinochoai* from the *Agora* with regard to their coatings and decorative colours. The decoration of Late Geometric pitchers appears to be homogeneous. All pots presented in Chart 5.12 are painted with motifs in colours of Group 1 and all vessels are covered with a thin matte wash in the colour of the original clay. The decoration and external treatment of pitchers follows the same characteristics described earlier for Late Geometric *oinochoai*.

5.4 SUMMARY AND DISCUSSION OF ANALYSIS OF POURING VESSELS

The analysis of artefact variability of trefoil *oinochoai* and pitchers suggests that both pouring vessels bear technological similarities and must be treated as products of the same *chaîne opératoire*. Even though standard trefoil *oinochoai* were produced all along the 9th and 8th centuries BC, neck-less, broad and giant trefoil *oinochoa*i, and pitchers appeared for the first time during the Late Geometric period. Neck-less trefoil *oinochoai* were the products of a simplified *chaîne opératoire* with fewer steps compared to that of standard trefoil *oinochoai*. Their production was probably meant to cover increasing consumption demands for pouring vessels during Late Geometric times. Still, neck-less vessels bear the same properties with every other pouring vessels of that time. Pitchers and giant trefoil *oinochoai* were produced in larger sizes compared to standard, neck-less and broad trefoil *oinochoai*. Furthermore, pitchers exhibited greater standardisation with regard to their metrical features and decorative characteristics compared to all other typologies. There are some indications that the potters who produced pitchers had similar conceptions with those who produced all other pouring vessels, particularly in the shaping of their necks and the attachment of their handles.

The analysis of metrical features and proportions in this chapter shows that there is a chronological boundary in the production of Geometric trefoil *oinochoai*, set at the beginning of LGIa. Early and Middle Geometric vessels exhibit greater artefact variability compared to Late Geometric, which cluster closely with regard to their net height and base diameter measurements. By contrast to amphorae examined in Chapter 4, technological traditions in the production of *oinochoai* were not the same across time. The strongest technological traditions in their *chaîne opératoire* were most likely established in the Late Geometric period.

The regression lines for the proportion of neck length to net height for *oinochoai* produced before LGIa show that necks range between 35% and 47% of a vessel's net height; however, all regression lines show weak statistical correlation:

Oinochoai before LGIa		
Agora, Kynosarges & BSA collections:	$y = 0.3565x + 0.3913$	$R^2 = 0.7171$
Kerameikos:	$y = 0.4657x - 0.5297$	$R^2 = 0.7778$
British Museum:	$y = 0.4153x - 0.5853$	$R^2 = 0.5199$

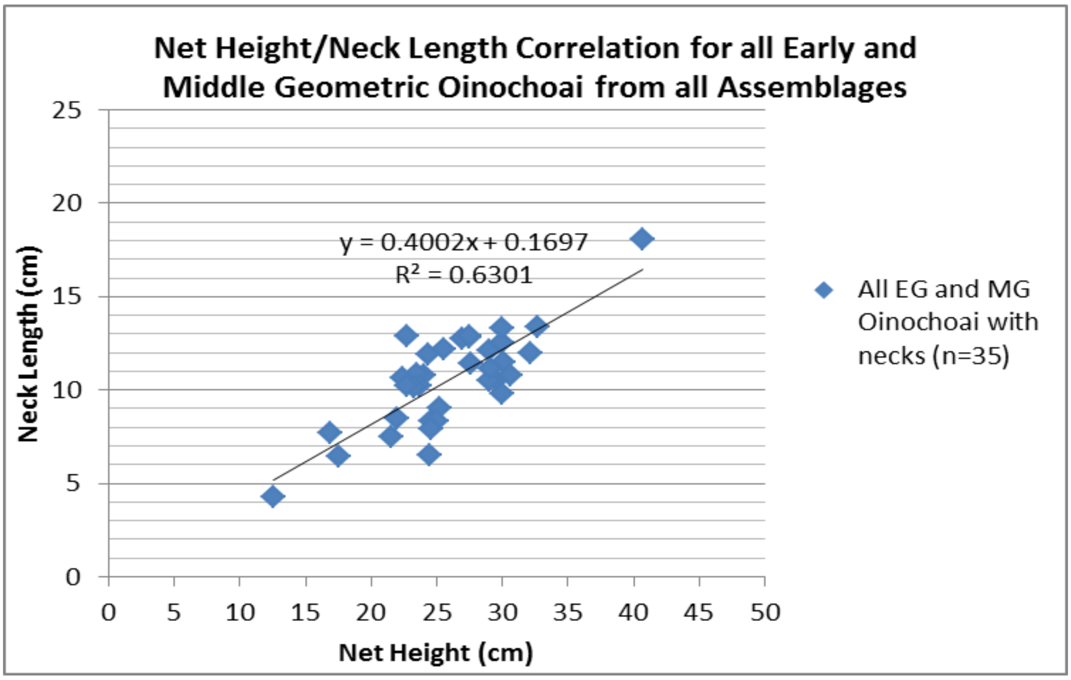

Figure 82: Scatter-graph of correlation between net height and neck length. Athenian/Attic pouring vessels produced before LGIa from the *Agora, Kynosarges, Kerameikos,* British School at Athens and British Museum collections with complete profiles.

Comparing assemblages that were measured with different techniques (e.g. artefact handling as opposed to published photographs) could be relatively problematic. Still, the scatter-graph for the proportion of neck length to net height for a total of 35 vessels with necks from all sites in Figure 82 verifies the above degree of uncertainly. According to the graph, Early and Middle Geometric *oinochoai* with necks appear highly scattered and their regression line follows the equation $y = 0.4002x + 0.1697$. In other words, *oinochoai* necks were produced at an average of 40% in relation to a vessel's net height. The coefficient or determination of this regression line (R^2=0.6301) shows weak statistical correlation (63.01%).

The comparison of the same proportions for *oinochoai* produced after LGIa is confusing due to nature of the *Kerameikos* assemblage. The regression for *Kerameikos* makes no particular sense due to the nature of the sample:

Oinochoai after LGIa		
Agora, Kynosarges & BSA collections:	$y = 0.3611x - 0.2606$	$R^2 = 0.7621$
Kerameikos :	$y = 0.9888x - 13.705$	$R^2 = 0.507$
British Museum:	$y = 0.396x - 1.1538$	$R^2 = 0.99$

Still, the regressions from the *Agora-Kynosarges*-British School and British Museum assemblages suggest that the necks of such *oinochoai* were produced at a proportion between 36% and 40% of a vessel's net height. This range is smaller compared to that for Early and Middle Geometric vessels. The regression for the assemblage from the British Museum shows almost perfect statistical correlation, which could indicate a distinct technological tradition.

The same thing is noted with regard to the same proportion for pitchers, which all come from the Late Geometric era. There, regression lines show that neck lengths range between 38% and 42% in relation to a vessel's net height, even though the pattern for the *Kerameikos* assemblage does not match:

LGII Pitchers		
Agora, Kynosarges & BSA collections:	$y = 0.4215x - 1.2491$	$R^2 = 0.7223$
Kerameikos :	$y = 0.7758x - 15.013$	$R^2 = 0.9937$
British Museum:	$y = 0.3857x - 0.7614$	$R^2 = 0.7828$

Although the regression from *Kerameikos* shows perfect statistical correlation, it makes no sense due to the nature of this assemblage. Furthermore, the coefficients of determination for the other two regression lines show ambivalent statistical correlation.

Despite this unclear situation, the correlation of neck length to net height for a total of 17 *oinochoai* with necks and 22 pitchers produced after LGIa from all five sites in Figure 83 suggests at least one technological tradition with high certainty. According to the scatter-graph, the regression line for *oinochoai* follows the equation y = 0.3822x – 0.6189. In other words, necks of LG *oinochoai* were formed roughly 38.22% of a vessel's net height, while the difference of 0.6189 cm too small to be considered. The coefficient of determination of this regression line (R^2=0.9555) shows strong statistical correlation (95.55%).

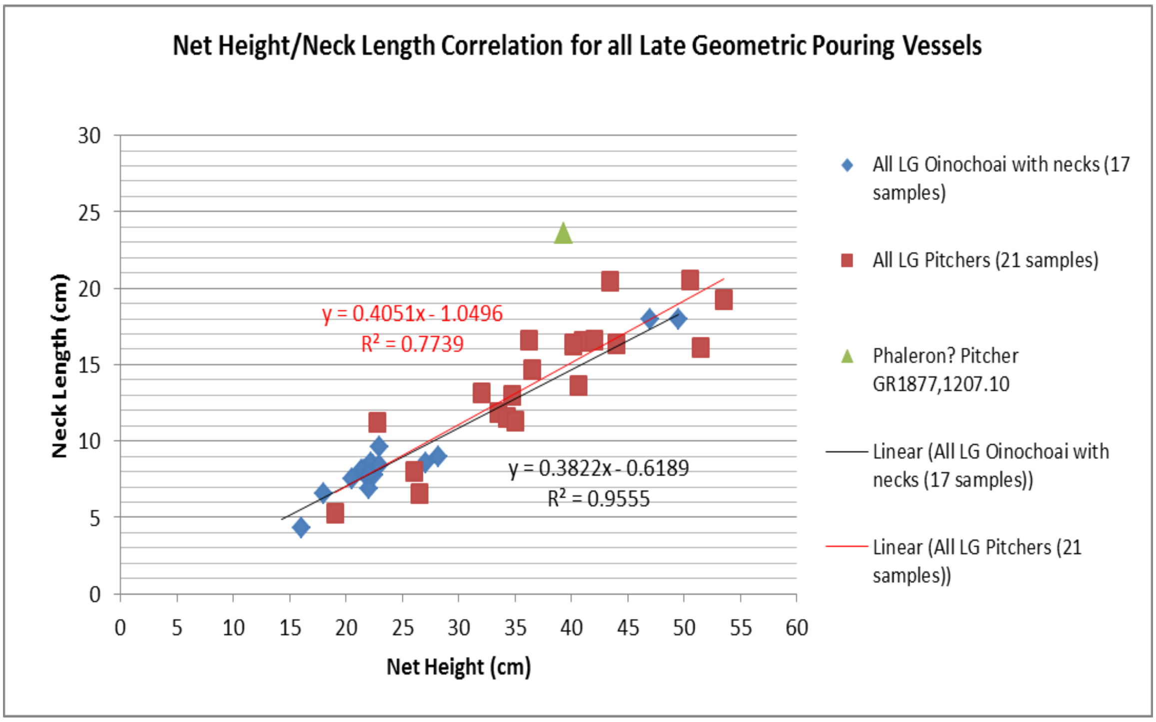

Figure 83: Scatter-graph of correlation between net height and neck length. Athenian/Attic pouring vessels produced after LGIa from the *Agora, Kynosarges, Kerameikos,* British School at Athens and British Museum collections with complete profiles.

The same proportion for pitchers in Figure 83 follows the equation y = 0.4051x – 1.0496 and partly merges with the regression line of *oinochoai*. In other words, the necks of these vessels were formed at roughly 40.51% of a vessel's net height reduced by 1 cm. The coefficient of determination of the regression line (R^2=0.7739) does not show satisfactory statistical correlation (77.39%). It is interesting that the only pitcher suspected to be from *Phaleron* stands out. This vessel is most likely the product of a different workshop compared to all other vessels.

The identification of distinct patterns related to the proportion of handle attachment height to net height of pouring vessels is clearer compared to their proportion of neck length to net height. Regression lines for *oinochoai* produced before LGIa show that handles were attached at heights between 47% and 60% of a vessel's net height; therefore, they suggest high degree of artefact variability:

Oinochoai before LGIa		
Agora, Kynosarges & BSA collections:	y = 0.6044x - 1.0072	R^2 = 0.8432
Kerameikos:	y = 0.4716x + 0.74	R^2 = 0.8711
British Museum:	y = 0.4806x + 1.8076	R^2 = 0.6386

According to the coefficients of determination, the assemblages from the *Agora-Kynosarges*-British School and *Kerameikos* show relatively satisfactory statistical correlations; however, the regression line from the British Museum assemblage must be treated with caution.

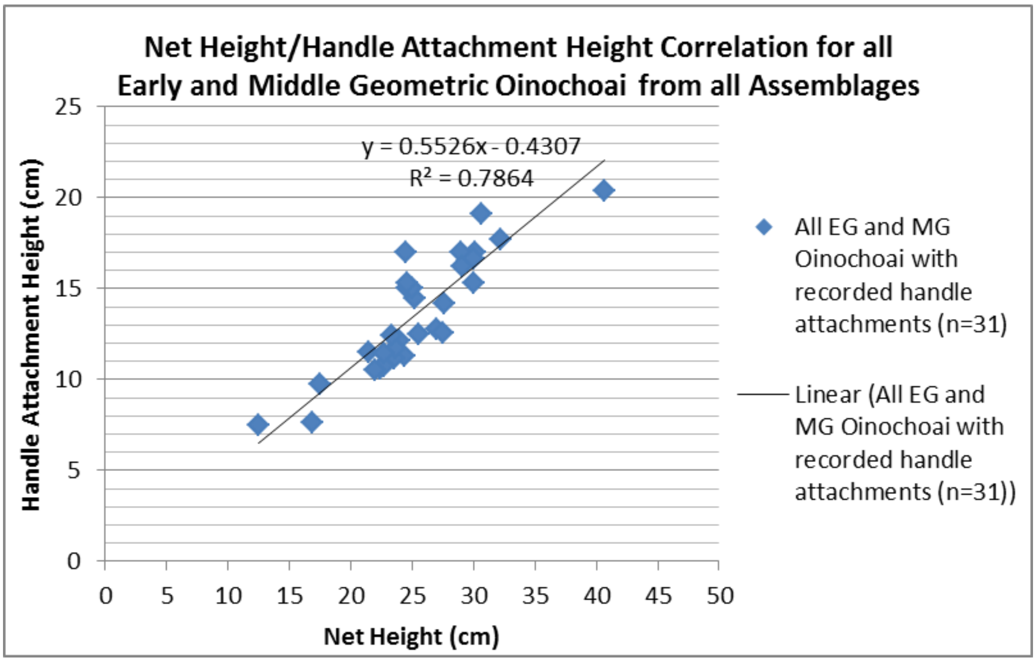

Figure 84: Scatter-graph of correlation between net height and handle attachment height. Athenian/Attic pouring vessels produced before LGIa from the *Agora, Kynosarges, Kerameikos,* British School at Athens and British Museum collections with complete profiles.

The scatter-graph for the proportion of handle attachment height to net height for a total of 31 EG and MG *oinochoai* with recorded handle attachments in Figure 84 verifies the above degree of uncertainly. According to the graph, Early and Middle Geometric *oinochoai* appear to be relatively scattered and their regression line follows the equation y = 0.5526x - 0.4307. In other words, the handles of *oinochoai* were attached at roughly 55.26% of a vessel's net height, while the difference of 0.4307 cm is too small to be considered. The coefficient or determination of this regression line (R^2=0.7864) shows weak statistical correlation.

By contrast, the situation with *oinochoai* produced after LGIa is different. Regression lines for standard trefoil *oinochoai* from the *Agora-Kynosarges*-British School and British Museum assemblages show high statistical correlation (above 96%), and therefore, low degree of artefact variability. The handles of such *oinochoai* were attached between 62% and 66% of a vessel's net height:

Oinochoai after LGIa		
Agora, Kynosarges & BSA collections:	y = 0.6565x - 1.8005	R² = 0.9793
(N/L) *Agora, Kynosarges* & BSA collections:	y = 0.7408x - 2.4625	R² = 0.6308
Kerameikos :	y = -0.784x + 29.244	R² = 0.363
British Museum:	y = 0.6228x - 1.3916	R² = 0.9619

The *Kerameikos* assemblage and all neck-less vessels from the *Agora-Kynosarges*-British School assemblage stand out: their regression lines make little sense and their statistical correlation is weak.

The same phenomenon is noted with regard to Late Geometric pitchers. Regression lines from all assemblages except *Kerameikos* suggest variations in handle attachment heights that range between 55% and 65%. Statistical correlation varies: it is relatively satisfactory for the *Agora-Kynosarges*-British School assemblage and strong for the British Museum assemblage:

LG Pitchers		
Agora, Kynosarges & BSA collections:	y = 0.5507x - 0.2951	R² = 0.8429
Kerameikos :	y = 0.0641x + 18.823	R² = 0.0337
British Museum:	y = 0.6508x - 2.6709	R² = 0.9448

Figure 85 plots the proportion of handle attachment height to net height for a total of 18 *oinochoai* and 21 pitchers with recorded handle attachments from all sites. The scatter-graph verifies that vessels produced after LGIa exhibit clear regression patterns, parallel alignment and high degrees of statistical correlation. According to the graph, Late Geometric *oinochoai* form a regression line that follows the equation y = 0.6042x - 0.3899. In other words, the handles of *oinochoai* produced after LGIa were attached at roughly 60% of a vessel's net height, while the difference of 0.3899 cm is too small to be considered. The coefficient or determination of this regression line (R^2=0.9491) shows strong statistical correlation (94.91%).

The same regression line for Late Geometric pitchers follows the equation y = 0.6156x - 2.0422 and runs parallel to that of *oinochoai*. This means that the handles of pitchers were attached at roughly 61.56% of a vessel's net height, reduced by an average of 2 cm. The coefficient of determination of this regression line (R^2=0.8998) shows relatively strong statistical correlation (90%). Once again, the pitcher suspected to come from Phaleron is a loner.

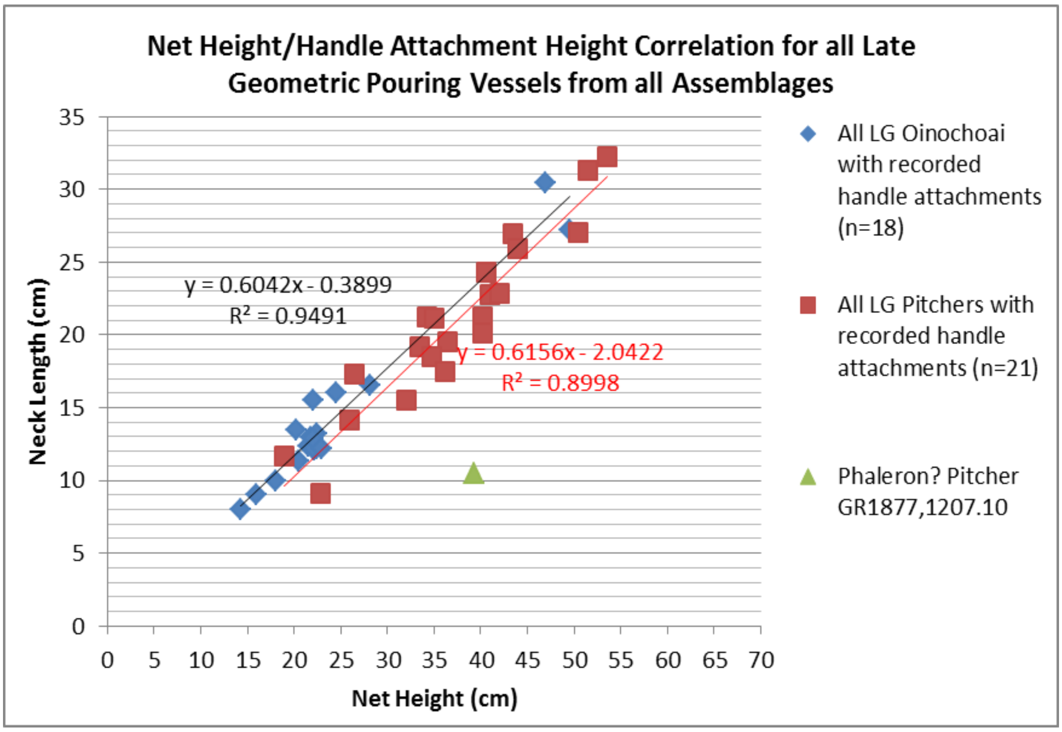

Figure 85: Scatter-graph of correlation between net height and handle attachment height. Athenian/Attic pouring vessels produced after LGIa from the *Agora, Kynosarges, Kerameikos,* British School at Athens and British Museum collections with complete profiles.

According to the above comparisons of two basic proportions, it is clear that Late Geometric pouring vessels were more standardised compared to their Early and Middle Geometric counterparts. The lesser degree of artefact variability of pottery produced after LGIa is likely to suggest a small number of workshops or artisans involved in the production of pouring vessels. By contrast, the higher degree of artefact variability during the earlier Geometric phases suggests more workshops and greater diversity. Although some distinct patterns for conceptualising different constituent vessel parts might have existed among potters before LGIa, these never became a tradition in the same sense that this was noted for amphorae in Chapter 4. Artefact variability continued after LGIa; however the lesser degree of scattered variables and the relatively higher degree of statistical correlation of regression patterns suggest the establishment of specific technological traditions in vessel conceptualisation during Late Geometric times. The neck lengths of standard trefoil *oinochoai* were formed to be roughly 37.5% of a vessel's net height, or in other words roughly shorter that 2/5 (40%). The same conception might have existed for pitchers, although statistical correlation is questionable. Secondly, the handles of all Late Geometric *oinochoai* (regardless typological class) were consciously attached at roughly (60%) of a vessel's height axis, or in other words at roughly 3/5. The same proportion (roughly 61%) was also followed in the conceptualisation of pitchers. The statistical correlations of the regressions related to handle attachment heights for *oinochoai* and pitchers are likely to suggest a strong technological tradition, followed by almost every Late Geometric workshop.

The Late Geometric material without context coming from the British Museum and the collections of the British School at Athens shows great similarities with that from the *Agora, Kerameikos* and *Kynosarges*. It is more than likely that all samples from the British Museum and the British School are not only Athenian, but also produced at the same site as all other pouring vessels. According to Papadopoulos (2003) this production site matches the *Agora*. Furthermore, if a small group of Athenian potters or workshops were responsible for the entire production of Late Geometric pouring vessels, it is likely that this production monopolised a large portion of the broader Attic market. The pitchers coming from the British Museum are a good example in support of this point: all of them exhibit great similarities with the *Kerameikos* and *Kynosarges* clusters, with exception of GR1877,1207.10, which is probably the product of a *Phaleron* workshop.

The strongest technological tradition noted in the production of pouring vessels (and more specifically *oinochoai*) relates to the use of a single fabric all across two centuries. Hand specimen examination reveals that the majority of *oinochoai* from the Athenian *Agora* were produced out of the same clay as amphorae (variant 1).

The dominant colours used for decorative elements and coatings of pouring vessels all across the Geometric era were black and brown black (Colour Group 1). The period between EGI and MGII-LGIa was characterised by a general use of thick lustrous or matte coatings on the external surfaces of *oinochoai*. This practice began to decline after LGIa and was gradually replaced by a preference in thin matte slips or plain washes in the colour of the original clay. This easier way of finishing vessels was most likely related to the spread of the figurative style in pottery decoration. Still, thick-coating was never abandoned completely and continued to be practised all along the Late Geometric period by exhibiting patterns of greater variability in quality by contrast to earlier times. Such patterns are likely to suggest that there were larger numbers of painters involved in the decoration of Late Geometric pouring vessels compared to the potters who manufactured them. Painters practised the same coating techniques as those from earlier times and also enriched them with innovative ideas (e.g. the metallic effect of highly lustrous sheens). By contrast, the decoration of pitchers was standardised: all vessels were painted with brown or black motifs and none carried coated surfaces.

According to the above conclusions, it is highly likely that the production of pouring vessels faced significant changes sometime at the beginning of LGIa. The shapes of *oinochoai* became more standardised, probably as a result of fewer workshops or artisans involved in their production. At the same time, neck-less, wide and giant *oinochoai*, and pitchers appeared alongside as distinct shapes, yet produced with the same conceptualisations as standard trefoil *oinochoai*. Despite the lower degree of artefact variability with regard to their metrical features and proportions, Late Geometric *oinochoai* exhibited higher variability with regard to their external treatments and decoration. The most possible explanation is that despite the reduction in the numbers of potters or workshops involved in the shaping of such pots, their decoration passed to the hands of a larger number of artisans. Some of these painters were highly experienced in elaborate coating techniques. In that sense, *oinochoai* are the best vessel class to demonstrate that the work of painters and potters was separate, at least after LGIa.

CHAPTER 6: ANALYSIS OF SMALL DRINKING VESSELS

This chapter investigates artefact variability of Attic Geometric drinking vessels, and more specifically of *kantharoi* and *skyphoi*. Small sized drinking pots comprise the vast majority of the material examined in this thesis. Macroscopic analysis is conducted on 165 ceramic artefacts in total. These are 153 vessels with complete profiles and 12 incomplete vessels or sherds. The majority of this material (149 artefacts or 90.3%) comes from Athens, while 16 pieces (or 9.7%) have been identified as broadly Attic by Coldstream (2003b; 2010).

This chapter argues that according to metrical features, proportions and fabrics, the production of small drinking vessels was broadly standardised all across the Geometric period. Even though there were technological traditions regulating their production, the degree of internal variability among statistical clusters suggests that the conceptualisation of such pots was not strict and potters enjoyed certain freedom in their work. The production of Attic Geometric *skyphoi* involved a large number of potters, some of which specialised in specific sub-typologies. Their workshops were probably not clustered in a single production site but they were scattered in different locations. The decorative characteristics of *kantharoi* were highly standardised by contrast to those of *skyphoi*. The decoration of *skyphoi* exhibited higher degree of artefact variability and experimentation not only in relation to *kantharoi*, but also in relation to any other ceramic class examined in previous chapters. This technological variability became stronger after MGII, suggesting that painters of *skyphoi* enjoyed some freedom in their work similar to that of potters.

6.1 ANALYSIS OF METRICAL FEATURES AND PROPORTIONS

6.1.1 The Athenian Agora (supplemented by the *Kynosarges* burials and the collections of the British School at Athens)

The analysis of metrical features and proportions of small drinking vessels is conducted on 47 pots with complete profiles (14 *kantharoi* and 33 *skyphoi*) according to the methods described in Chapter 3. From this assemblage, 36 vessels come from the Athenian *Agora* (11 *kantharoi* and 25 *skyphoi*), 7 from the *Kynosarges* burials (1 *kantharos* and 6 *skyphoi*) and 4 from the collections of the British School at Athens (2 *kantharoi* and 2 *skyphoi*). Metrical features and proportions of all drinking vessels from *Kynosarges* and the British School's collections are analysed in a single section, together with the *Agora* pottery due to their typological and stylistic similarities. For the total assemblage of 47 pots with complete profiles, 13 vessels come from burial contexts (6 *kantharoi* and 7 *skyphoi*), 30 come from mixed non-burial deposits (6 *kantharoi* and 24 *skyphoi*), while the archaeological context of 4 vessels is unknown (2 *kantharoi* and 2 *skyphoi*). Charts 6.1 and 6.3 present metrical features and proportions for the *Agora* assemblage, and Charts 6.4 and 6.5 record the same features for the *Kynosarges* and British School assemblages. In addition to this study, Chart 6.2 presents another 11 pieces (4 *kantharoi* and 7 *skyphoi*) with some surviving metrical features coming from incomplete or fragmented pottery from the Athenian *Agora*. These fragments are not used in the analysis of metrical features and proportions; however, they supplement the analysis of fabrics and decorative technology further below.

The first thing to notice in the comparison between *skyphoi* and *kantharoi* in Chart 6.1 is that the rim diameters of the latter are by majority deformed. Rim deformations often exceed 1cm. By contrast, all rim diameters of *skyphoi* are uniform. Both wares are wheel made and manufactured during a single episode on the potter's wheel. Footed vessels or pots with ring bases were probably produced during two episodes on the wheel. In general, the *chaîne opératoire* of both typological classes shows similarities with regard to the initial steps of their forming processes. Rim deformations for *kantharoi* most likely occurred during the second step of their production, the handle attachment stage, which was different compared to that of *skyphoi*. According to Figure 86, the handles of *kantharoi* were stuck vertically on the vessel's walls on two contact points along a vessel's external surface: one right at the side of the rim and another one further below it, towards the middle of the vessel's walls. By contrast, the handles of *skyphoi* were stuck horizontally on the vessel's walls, on a contact area that did not touch the rim.

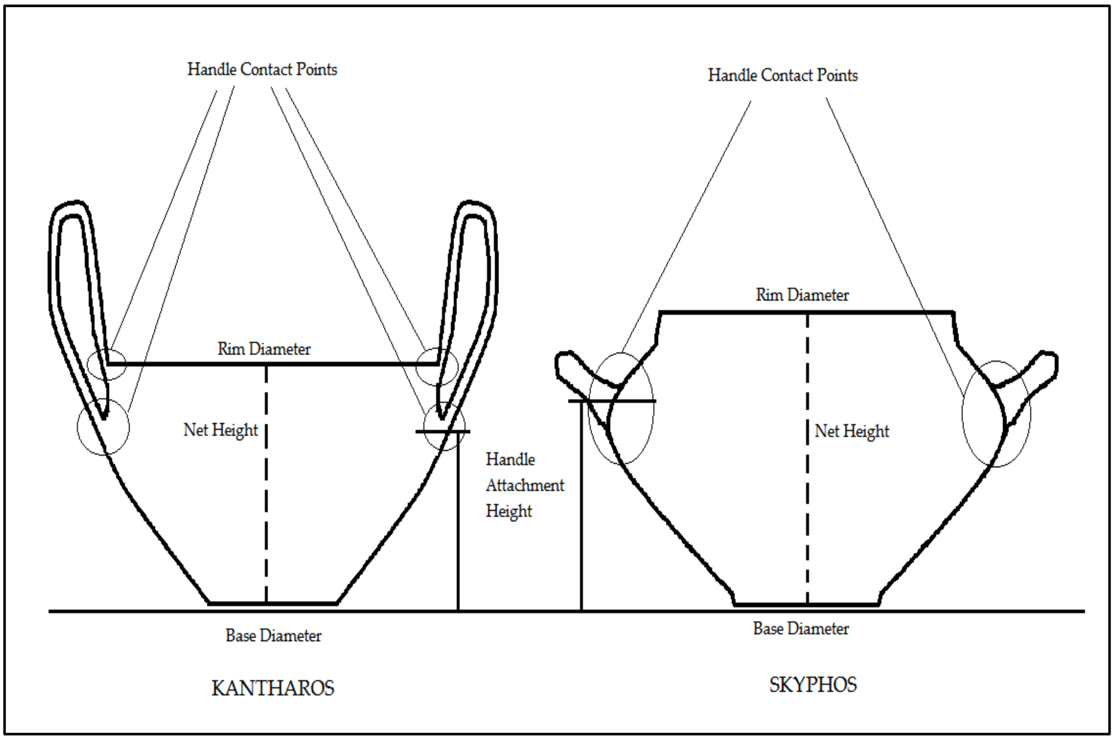

Figure 86: Different handles attachment techniques for *kantharoi* and *skyphoi.*

The rim deformation of *kantharoi* was most likely due to excessive pressure along the rim during the effort to attach the handles, resulting to alterations in their rim diameter axis. Furthermore, during the sequence of manufacture from base to rim (bottom to top), the thickest areas of a drinking vessel were located towards its base and the thinnest towards its rim, which was formed at the very end of the first episode on the potter's wheel. As the rim was the thinnest part of a *kantharos*, the attachment of its handles resulted to easier deformations due to hand pressure. By contrast, the attachment of *skyphoi* handles on the sides of the vessel, on areas with thicker walls, resulted to homogenous shapes without deformations along the rim axis.

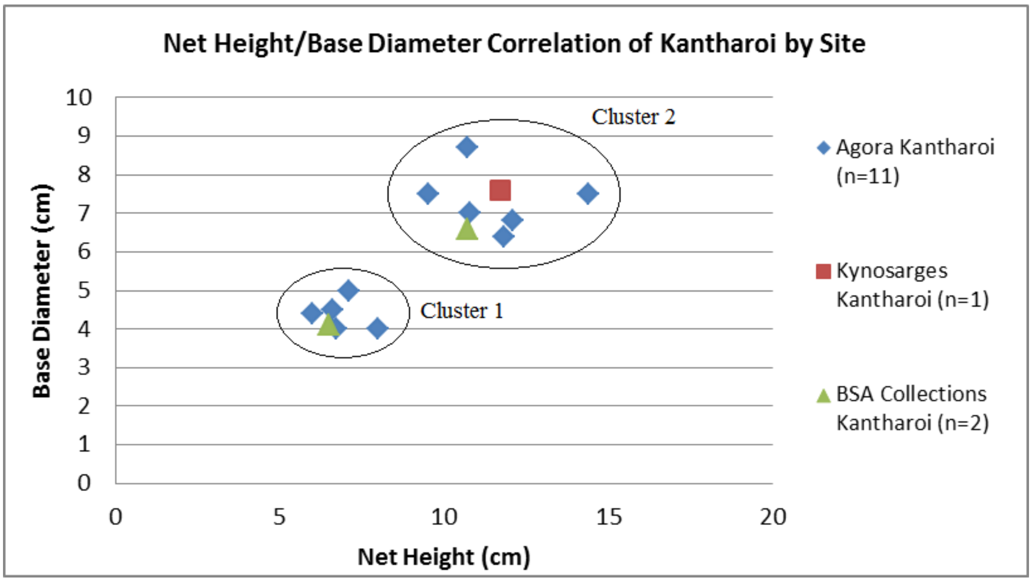

Figure 87: Scatter-graph of correlation between net height and base diameter. Athenian/Attic *kantharoi* from the *Agora, Kynosarges,* and the British School's at Athens collections with complete profiles.

Due to lack of clear rim diameter measurements for *kantharoi*, their comparison with *skyphoi* takes place in relation to their net height and base diameter measurements. According to the correlation presented in Figure 87, *kantharoi* form two distinct clusters. Cluster 1 comprises of 6 *kantharoi* dating between MGII-LGIa and SG, which show low degree of artefact variability. All vessels are of small sizes, including the footed SG *kantharos* P7196:

Cluster 1	Ware Type	Context	Chronology
P7080	Kantharos Small H/L H/H	non-BR	MGII-LGIa
P4961	Kantharos Small H/L H/H	BR	LGIIa
P4973	Kantharos Small H/L H/H	BR	LGIIa
P4976	Kantharos Small H/L H/H	non-BR	LGIIa
A123	Kantharos Small H/L H/H	non-BR	LGII
P7196	Kantharos Footed L/H	non-BR	SG

Cluster 1 is characterised by net heights below 8cm and base diameters bellow 6cm. By contrast, cluster 2 is more scattered compared to cluster 1, and shows greater artefact variability. It comprises of 8 vessels dating between MG and SG times, which belong to two sub-classes: low-handled *kantharoi* of normal sizes and high-handled *kantharoi*:

Cluster 2	Ware Type	Context	Chronology
P6420	Kantharos L/H	non-BR	MG
K1	Kantharos H/L H/H	BR	MGII
P15123	Kantharos H/L H/H	BR	LGIb
P4775	Kantharos H/L H/H	BR	LGIb-LGIIa
P17192	Kantharos ?	non-BR	LGIIa
P4887	Kantharos H/L H/H	BR	LGIIb
A344	Kantharos H/H	non-BR	LGIIb
P7476	Kantharos H/H	non-BR	SG

According to the above, it appears likely that the production of small sized *kantharoi* was more standardised compared to that of normal sized pots. Both types of *kantharoi* show no distinct chronological patterns and they cluster according to size instead of chronological period. Furthermore, the artefacts from *Kynosarges* and the British School's collections blend nicely with the material from the *Agora*, suggesting that all vessels were produced based on similar conceptualisations.

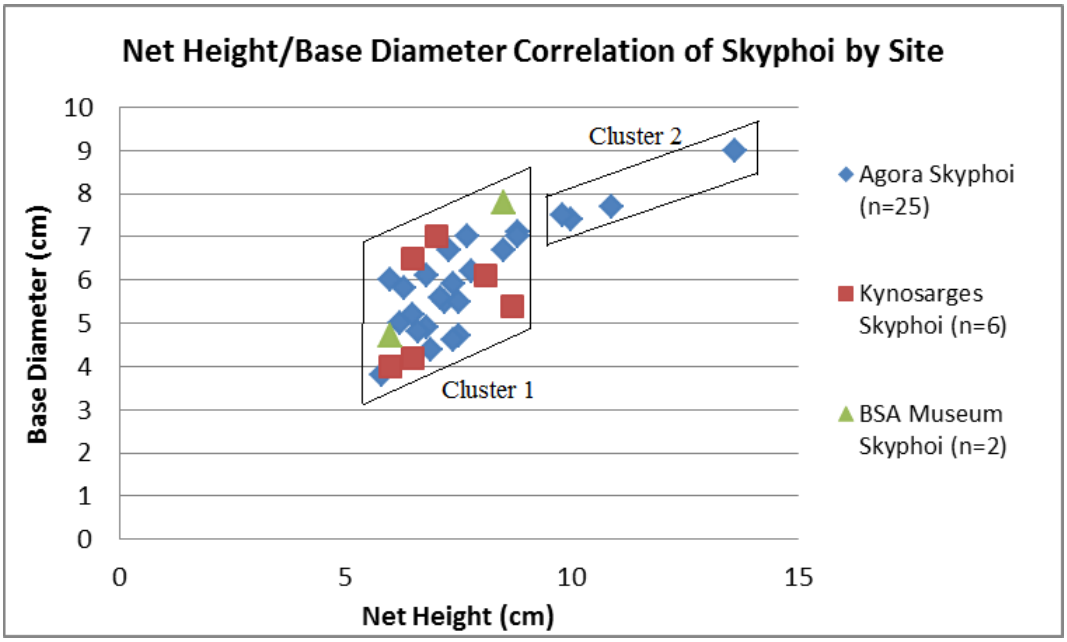

Figure 88: Scatter-graph of correlation between net height and base diameter. Athenian/Attic *skyphoi* from the *Agora, Kynosarges,* and the British School's at Athens collections with complete profiles.

The situation with *skyphoi* from the same contexts is slightly different. According to Figure 88, *skyphoi* form two clusters that are not entirely distinct. Cluster 1 is the largest and comprises of 29 vessels of mixed dates suggesting no distinct chronological groupings:

Cluster 1	Ware Type	Context	Chronology
P27944	Skyphos	non-BR	MGII
P32895	Skyphos	non-BR	MGII
P32891	Skyphos	non-BR	MGII
P27941	Skyphos	non-BR	MGII
P27942	Skyphos	non-BR	MGII
P27943	Skyphos	non-BR	MGII
K10	Skyphos	BR	MGII
K88	Skyphos	BR	MGII-LGIa
P8221	Skyphos Wide	non-BR	MGII-LGIa
P8231	Skyphos Wide Fr.	non-BR	MGII-LGIa
P8224	Skyphos Frs	non-BR	MGII-LGIa
P8222	Skyphos	non-BR	MGII-LGIa
P8233	Skyphos Frs	non-BR	MGII-LGIa
P8223	Skyphos	non-BR	MGII-LGIa
P12112	Skyphos Fr.	non-BR	LGIb-LGIIa
P12111	Skyphos	non-BR	LGIb-LGIIa
P12109	Skyphos	non-BR	LGIb-LGIIa
P21799	Skyphos	non-BR	LGIb-LGIIa
P12110	Skyphos	non-BR	LGIb-LGIIa
A342	Skyphos Gadrooned	Unknown	LGIb-LGIIa
A343	Skyphos	Unknown	LGIIa
K2	Skyphos Wide	BR	LGIIa
P22431	Skyphos	non-BR	LGIIa-LGIIb
K3	Skyphos	BR	LGIIb
K5	Skyphos	BR	LGIIb
K6	Skyphos	BR	LGIIb
P22428	Skyphos	non-BR	LGIIb-EPA
P4615	Skyphos	BR	SG
P4659	Skyphos	non-BR	SG

Cluster 1 includes all vessels from *Kynosarges* and the British School's collections. By contrast to *Kantharoi*, *skyphoi* from *Kynosarges* appear on the margins of this rhomboid cluster, suggesting a production that was probably distinct although not entirely different compared to the *Agora* vessels. Furthermore, two *skyphoi* from *Kynosarges* (K10 and K88) show a distinct conceptualisation that is not noted on any other vessel: their heights and base diameters are equal (see Chart 6.4). As both vessels date close to MGII, it appears likely that these were the products of the same potter or workshop. Finally, the only gadrooned *skyphos* (*sensu* Coldstream 1968; 2003b, 345) stands at the top margin of the rhomboid cluster: A342 has the broadest base (7.8 cm) and the largest height (8.5 cm) in the entire assemblage. This vessel is likely to suggest that drinking cups imitating metallic prototypes were produced larger than other pots, perhaps copying some features of the metallic originals (see Borell 1978, 93-4 and Markoe 1985, 117-27); however, their broader conceptualisation was not entirely distinct.

Cluster 2 comprises of 4 vessels, which exhibit net heights above 9 cm. With exception of P21807, the rest are three wide *skyphoi* dating in MGII-LGIa. All three vessels have been recovered in the same context (Well D12:3) and their clustering is likely to suggest that they were the products of the same workshop:

Cluster 2	**Ware Type**	**Context**	**Chronology**
P8230	Skyphos Wide	non-BR	MGII-LGIa
P8229	Skyphos Wide	non-BR	MGII-LGIa
P8225	Skyphos Wide Frs	non-BR	MGII-LGIa
P21807	Skyphos Fr.	non-BR	LGIb-LGIIa

According to the above, the production of *skyphoi* is homogeneous with no characteristic variations, neither with regard to specific sub-typologies, nor with regard to specific chronological periods. The majority of vessels form a single and large cluster, in which minor internal variability is likely to suggest differences among workshops. This cluster suggests a low degree of artefact variability connected to standardisation in the production of such vessels.

By contrast to *oinochoai* studied in Chapter 5, the production of drinking vessels with ring bases was probably not popular during the Geometric period. In this study, it is only 5 out of 33 *skyphoi* that carry ring bases, dating between MGII and LGIIa:

***Skyphoi* with Ring Bases**	**Chronology**
P32981	MGII
P8229	MGII-LGIa
K88	MGII-LGIa
A342	LGIb-LGIIa
A343	LGIIa

Kantharoi with ring bases are 4 out of 14 vessels in total, dating between EGI and the early 7th century (SG style):

***Kantharoi* with Ring Bases**	**Chronology**
P19247	EGI
K1	MGII
P17565	EPA
P7196	SG

The small number of drinking vessels with ring bases verifies that the production of *skyphoi* and *kantharoi* was standardised even though some exceptions existed through time. By contrast to *oinochoai* with ring bases, the production of which was popular until the beginning of the Late Geometric era (see Chapter 5), drinking vessels were mostly produced with flat bases all across two centuries.

The possibility of standardisation in the production of drinking vessels could be attributed to specific technological traditions that regulated the conceptualisation of such shapes. A comparison of mean proportions for *kantharoi* and *skyphoi* according to the data recorded in Charts 6.3 and 6.5 from all three sites reveals low standard deviations for the proportion of handle attachment height to net height:

	Proportion of Handle Attachment Height to Net Height (%)	Proportion of Rim Diameter to Net Height (%)	Proportion of Base Diameter to Net Height (%)	Proportion of Base Diameter to Rim Diameter (%)
		Kantharoi		
Count	11	N/A	14	N/A
Mean	57.6	N/A	64.2	N/A
Max.	66.7	N/A	81.3	N/A
Min.	49.3	N/A	50.0	N/A
St.Dev.	6.39	N/A	9.56	N/A
		Skyphoi		
Count	30	33	33	33
Mean	61.2	170.9	78.1	45.9
Max.	73.2	225.0	100.0	57.4
Min.	49.4	135.1	62.1	34.2
St.Dev.	4.99	22.54	11.28	5.18

The *kantharoi* assemblage used for the calculation of this proportion comprises of 11 out of 14 vessels, and the *skyphoi* assemblage comprises of 30 out of 33 vessels. These reduced numbers are due to pots with no recorded handle attachments, either because their handles are missing or they are reconstructed with plaster and expected to be inaccurate. Furthermore, the low standard deviation in the proportion of base diameter to rim diameter for *skyphoi* (5.18) is likely to suggest a second pattern that requires further investigation.

According to the correlation of handle attachment height to net height in Figure 89, the regression line for *skyphoi* follows the equation y = 0.703x – 0.6618 (where y = handle attachment height and x = net height). In other words the handles of *skyphoi* were attached roughly at 70% (or 7/10) of a vessel's net height. The difference of 0.6618 cm is too small to be considered. The coefficient of determination of the regression line (R^2=0.9073) shows relatively strong statistical correlation at 90.73%. *Kantharoi* produce a similar regression pattern, parallel to that of *skyphoi*: it follows the equation y = 0.6947x – 0.9822 (where y = handle attachment height and x = net height). The equation shows that the handles of *kantharoi* were attached roughly at 69.5% of a vessel's net height. Again, the difference of 0.9822 cm is small to be considered. The coefficient of determination (R^2=0.9475) shows strong statistical correlation (94.75%).

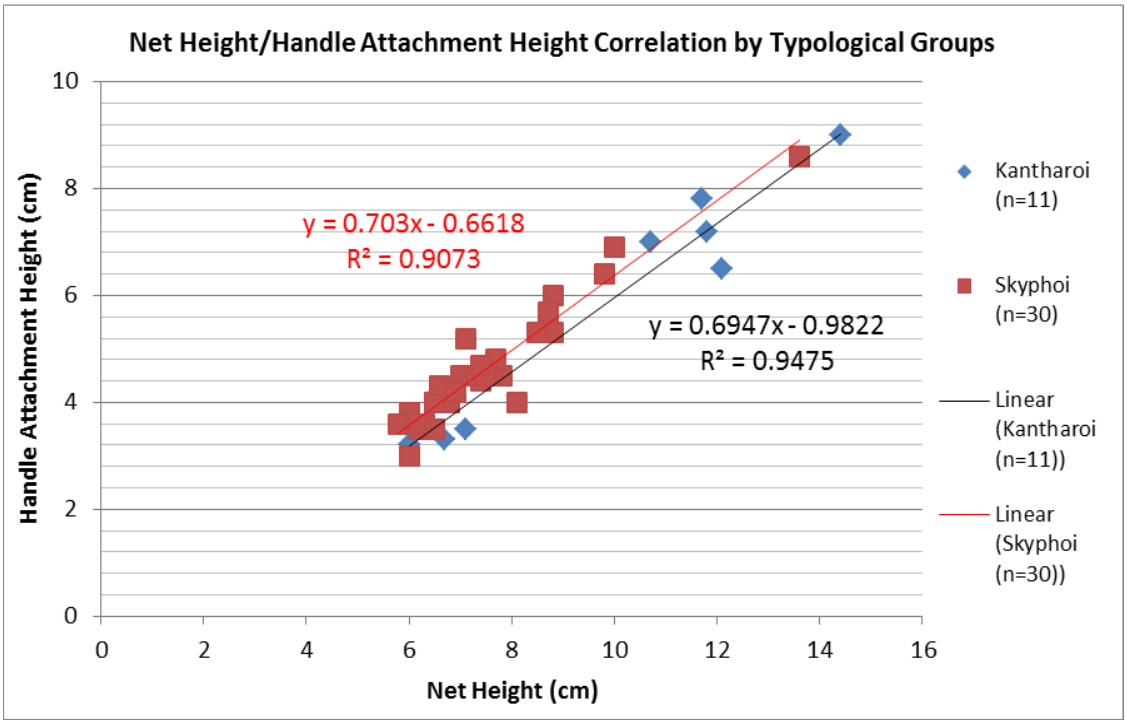

Figure 89: Scatter-graph of correlation between net height and handle attachment height. Athenian/Attic drinking vessels from the *Agora, Kynosarges* and the British School's at Athens collections with complete profiles and recorded handles.

Based the above, the production of *kantharoi* and *skyphoi* followed similar conceptualisations, which indicate connections in the *chaîne opératoires* of both typological classes. The handles of both wares were attached at roughly 70% (or 7/10) of a vessel's net height all across the Geometric era, and this was a strong technological tradition in the production of such pottery. The coefficients of determination of the regression lines in Figure 89 suggest that the statistical correlation for *kantharoi* is slightly higher compared to that of *skyphoi*. This observation shows that the production of *kantharoi* was more standardised compared to the latter.

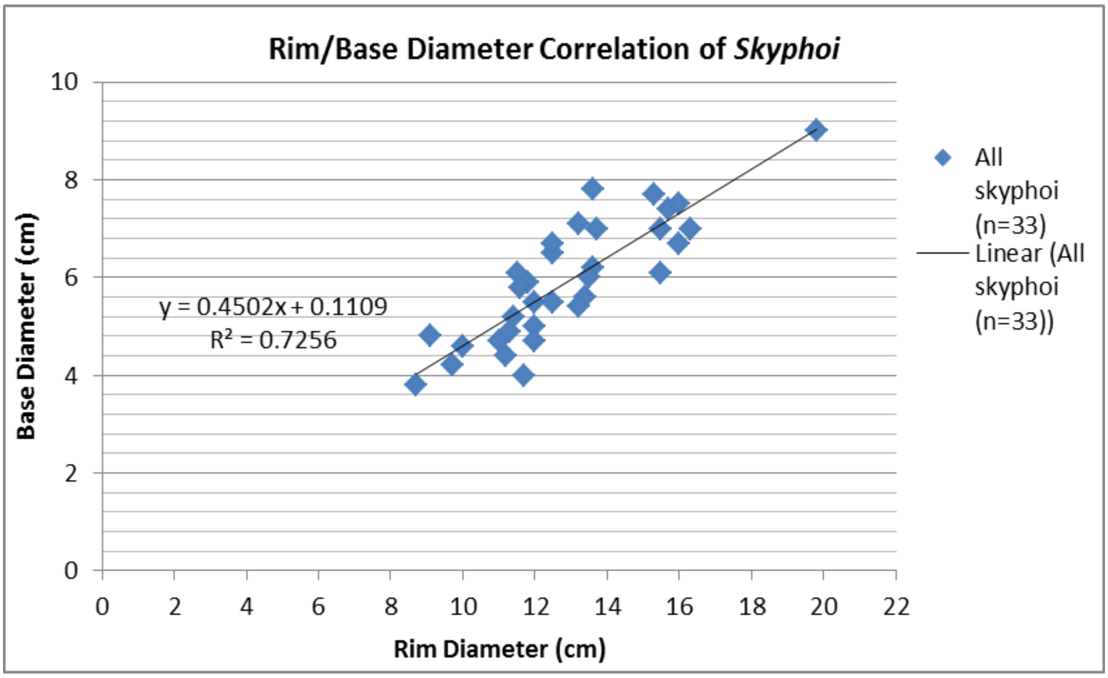

Figure 90: Scatter-graph of correlation between rim and base diameter. Athenian/Attic *skyphoi* from the *Agora, Kynosarges,* and the British School's at Athens collections with complete profiles, shown all together.

A high degree of standardisation in the production of *skyphoi* is also noted with regard to the low standard deviation (5.18) of the mean proportion of base diameter to rim diameter explained earlier. This proportion cannot be studied for *kantharoi*, as their rims are highly deformed. The correlation of the two metrical features in Figure 90 shows that the vessels are highly scattered. The regression line for 33 *skyphoi* with complete profiles from three sites follows the equation y = 0.4502x + 0.1109 (where y = base diameter and x = rim diameter). The coefficient of determination (R^2=0.7256) shows weak statistical correlation (72.56%).

A second correlation of the same assemblage divided by different sites in Figure 91 shows that the *Agora* material is scattered closer to the regression line. The material from *Kynosarges* and the British School's collections stands on the margins of the cluster comprised of the *Agora* vessels. The regression line for 25 *skyphoi* from the *Agora* follows the equation y = 0.4502x + 0.1109 (where y = base diameter and x = rim diameter). The coefficient of determination (R^2=0.8215) shows slightly stronger statistical correlation compared to the regression line in Figure 90, even though the percentage of correlation is not entirely satisfactory (82.15%).

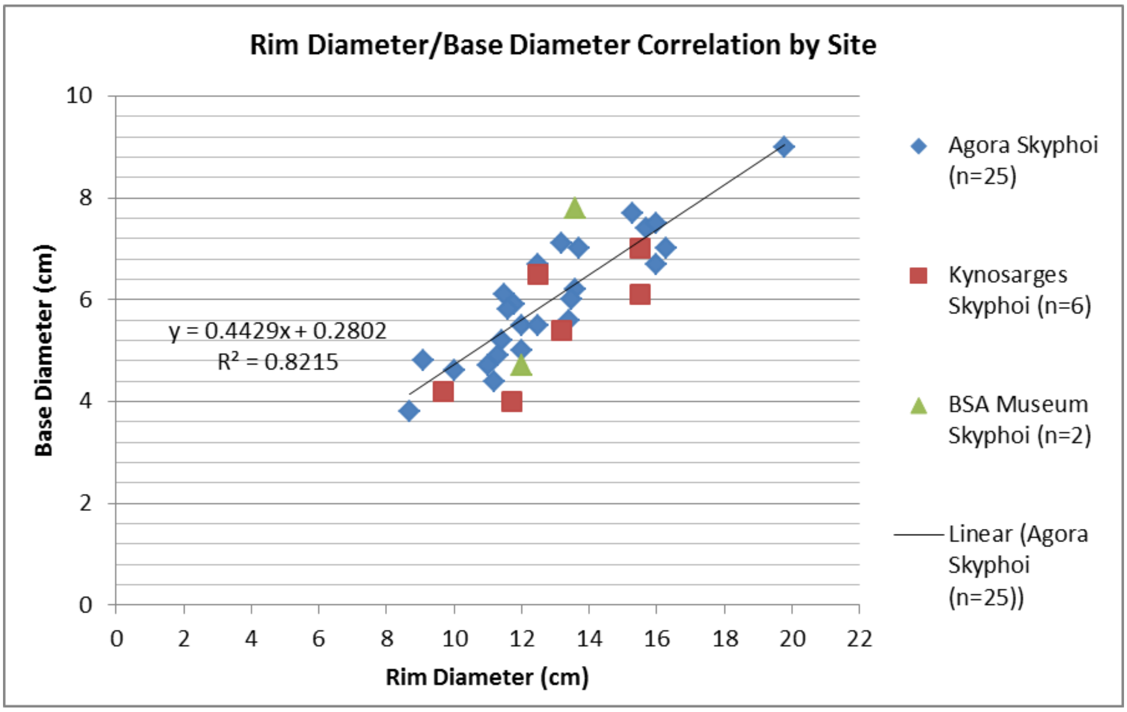

Figure 91: Scatter-graph of correlation between rim and base diameter. Athenian/Attic *skyphoi* from the *Agora, Kynosarges,* and the British School's at Athens collections with complete profiles, shown separately.

According to both graphs, the proportional relationship between the two metrical features of *skyphoi* is likely to follow a specific pattern, where base diameters are roughly 44% or 45% of a vessel's rim diameter. This relationship could be due to distinct conceptualisations followed in the production of *skyphoi*, although variations were common. Such variations are likely to explain the low degree of statistical correlation of the regression lines in Figures 90 and 91. The metrical features for the *Kynosarges* material are more scattered compared to those from the *Agora*, which is likely to suggest that these pots were produced by different workshops or another group of potters.

6.1.2 The *Kerameikos* cemetery

The analysis of metrical features and proportions of small drinking vessels from the *Kerameikos* cemetery is conducted on 95 artefacts with complete profiles. The assemblage comprises of 69 decorated *skyphoi* and 26 *kantharoi*. All vessels have been recovered in burials and their grave contexts are recorded in Charts 6.6 and 6.7.

In the original publication of *kantharoi* from *Kerameikos*, Karl Kübler (1954) only recorded their net height measurement, which he noted as height without handles (*Höhe ohne Henkeln*). Unfortunately, for the metrical features of *skyphoi* he did not show the same degree of consistency: some vessels were recorded by their height and others by their maximum diameter. Here, Chart 6.6 records real net heights only for the *skyphoi* published with this measurement in the original *Kerameikos* volume. A second column records calculated net heights for those *skyphoi* that were originally published by their maximum diameter. All other metrical features in Charts 6.6, 6.7, 6.8 and 6.9 were measured in smaller scale through published photographs and were then calculated in real scale based on the original real net height or real maximum diameter measurements. Even though rim diameters could have been calculated for *kantharoi*, these measurements and their related proportions were not included in any of the charts. Similarly to the *Agora* assemblage, the rim diameters of *kantharoi* from *Kerameikos* are expected to be deformed.

To ensure the accuracy of calculated measurements, 5 *skyphoi* from the *Kerameikos* assemblage were chosen for macroscopic analysis and two separate accuracy tests were conducted similarly to those in Chapters 4 and 5, presented in Charts 6.10 and 6.11. During these accuracy tests, real rim and base diameters and real proportions or rim and base diameters to net height were compared to the ones that were calculated though published photographs for the same artefacts. According to Chart 6.10, the differences between real and calculated base diameters for the *Kerameikos skyphoi* range between -0.2 cm and +0.9 cm. Differences between real and calculated proportions of base diameter to net height range between -2.4% and +6.1%. Even though differences in base diameters are less than ±1 cm, differences in the percentages of proportions of base diameter to net height occasionally exceed 5%, which raises the possibility of statistical bias. For this reason, a second test was carried out in relation to rim diameters. According to Chart 6.11, differences between real and calculated rim diameters for the same pots range between -0.9 cm and +0.3 cm. Differences between real and calculated proportions of rim diameter to net height range between -4.6% and +4.2%. Despite the lower degree of statistical bias demonstrated in the second test, calculated metrical features for drinking vessels need to be treated with caution.

Both accuracy tests show that the analysis of drinking vessels from *Kerameikos* is more problematic compared to that of closed ceramic containers and pouring vessels. Firstly, a height or diameter difference of ±1 cm for large or medium sized vessels is likely to be negligible in relation to the overall size of a vessel. However, in the case of drinking cups, such differences up to ±1 cm could mean significant bias due to the smaller sizes of such pots. Secondly, vessel deformations are not always clear through published photographs and originally recorded measurements are likely to describe maximum metrical features instead of mean metrical features. In this case, bias is likely due to different recording strategies and the more deformed the vessels, the more the bias.

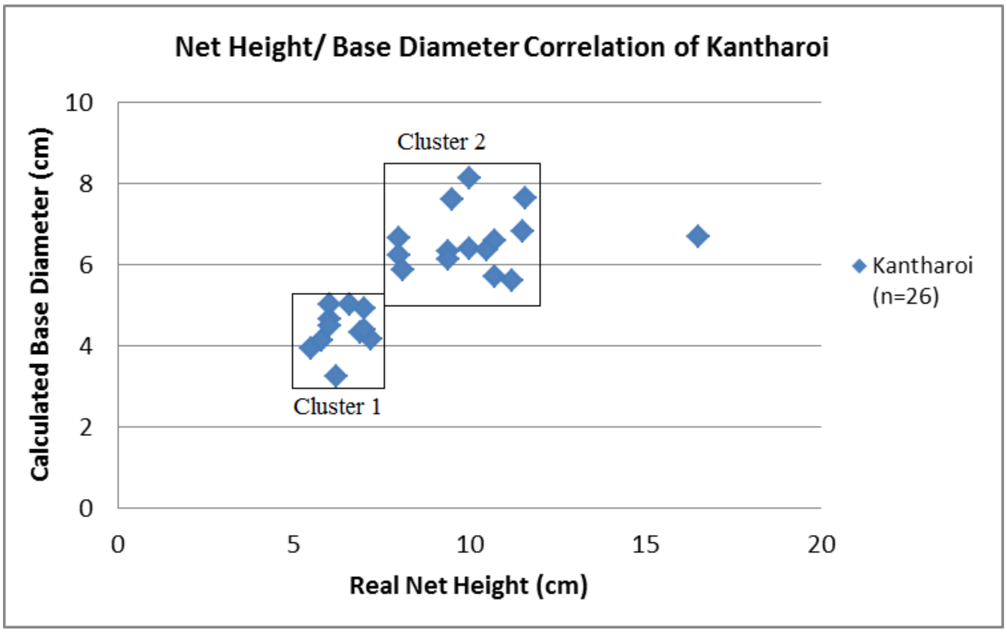

Figure 92: Scatter-graph of correlation between net height and base diameter. Athenian *kantharoi* from the *Kerameikos* cemetery with complete profiles.

According to the correlation of base diameter and net height for the *Kerameikos kantharoi* in Figure 92, the assemblage forms two distinct clusters with similar properties compared to the *Agora kantharoi*. Cluster 1 comprises of 11 vessels, which are all small *kantharoi* (with heights smaller than 8cm), either with high or low handles, two of which are footed. This cluster shows no distinct chronological properties. Vessels range between EGI and SG times:

Cluster 1	Ware Type	Chronology	Context
951	Kantharos Small L/H	EGI	Grave 3
936	Kantharos Small Footed L/H	EGI	Grave 3
943	Kantharos Small Footed L/H	EGI	Grave 3
1302	Kantharos Small H/L H/H	LGIa-LGIb	Grave 50
1340	Kantharos Small H/L H/H	LGIIa-LGIIb	Grave 49
1341	Kantharos Small H/L H/H	LGIIa-LGIIb	Grave 49
1345	Kantharos Small H/L H/H	LGIIa-LGIIb	Grave 49
320	Kantharos Small H/H	LGIIb	Grave 56
323	Kantharos Small H/H	LGIIb	Grave 57
324	Kantharos Small H/H	LGIIb	Grave 57
1229	Kantharos Small H/L H/H	SG	Grave 66

Cluster 2 comprises of 14 vessels, which are all typical *kantharoi* with high or low handles. One vessel, 1251, is footed. This cluster appears more scattered compare to cluster 1 and includes different sub-typologies. Vessels date between EGII and LGIIa, suggesting no distinct chronological patterns:

Cluster 2	Ware Type	Chronology	Context
929	Kantharos L/H	EGII	Grave 2
251	Kantharos L/H	EGII	Grave 74
246	Kantharos L/H	EGII	Grave 75
1251	Kantharos Footed L/H	EGII-MGI	Grave 43
237	Kantharos H/L H/H	MGII	Grave 23
239	Kantharos H/L H/H	MGII	Grave 23
285	Kantharos H/L H/H	MGII	Grave 29
390	Kantharos H/L H/H	MGII	Grave 34
400	Kantharos H/L H/H	MGII	Grave 35
258	Kantharos H/L H/H	MGII	Grave 69
373	Kantharos H/L H/H	LGIb	Grave 24
364	Kantharos H/H	LGIb-LGIIa	Grave 21
268	Kantharos H/H	LGIb-LGIIa	Grave 28
817	Kantharos H/H	LGIIa	Grave 90

Finally, the footed *kantharos* 930 is a loner. This vessel is different compared to all other footed *kantharoi* due to its longer foot, which could have functioned as a handle. According to the above, *kantharoi* from *Kerameikos* diversify according to size instead of typological or chronological variation.

The correlation of net height and base diameter for the *Kerameikos skyphoi* in Figure 93 shows that the majority of vessels form a distinct triangular cluster. In this cluster there is a minor degree of artefact variability, which relates to specific sub-typologies. Firstly, all wide *skyphoi* with stirrup handles (Coldstream 1968, 18) dating between EGII and MGI are gathered at the top corner of the triangular cluster.

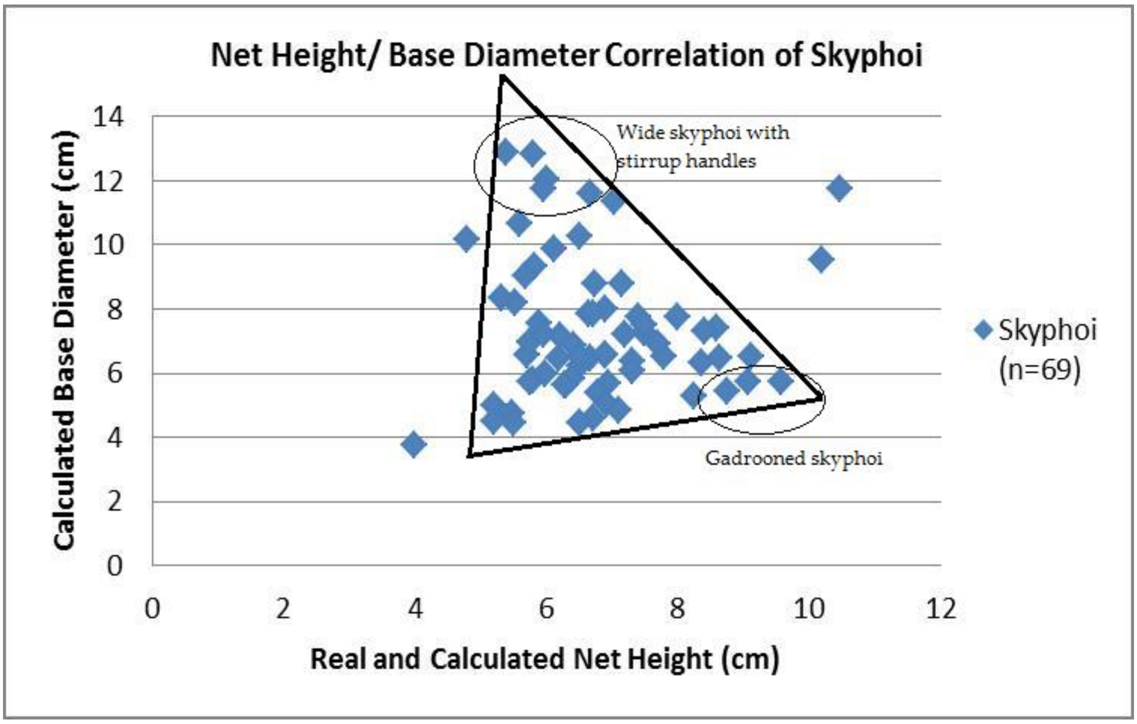

Figure 93: Scatter graph of correlation between net height and base diameter. Athenian *skyphoi* from the *Kerameikos* cemetery with complete profiles.

Secondly, all gadrooned *skyphoi* dating in LGI are gathered at the bottom right corner of the triangular cluster. These two patterns are likely to suggest that both sub-groups are the products of distinct *chaîne opératoires* or workshops. They were probably produced in characteristic sizes although their conceptualisation never diverted from the main norm. Figure 93 also shows that 4 pots stand out and need to be treated as loners. These vessels come from different chronological periods and typological sub-groups:

828	Skyphos	MGII	Grave 86
1301	Skyphos	LGIa-LGIb	Grave 50
342	Skyphos Wide H/L	LGIb	Grave 71
818	Skyphos Wide	LGIIa	Grave 90

According to the above comparisons from *Kerameikos*, the production of both *skyphoi* and *kantharoi* appears standardised and follows no patterns of significant change across time. The comparison of mean proportions for all vessels based on the information recorded in Charts 6.8 and 6.9 shows that the lowest standard deviations are encountered in the proportion of handle attachment height to net height:

	Calculated Proportion of Handle Attachment Height to Net Height (%)	Calculated Proportion of Rim Diameter to Net Height (%)	Calculated Proportion of Base Diameter to Net Height (%)	Calculated Proportion of Base Diameter to Rim Diameter (%)
	Kantharoi			
Count	26	N/A	26	N/A
Mean	54.2	N/A	67.1	N/A
Max.	69.6	N/A	83.3	N/A
Min.	22.2	N/A	40.5	N/A
St.Dev.	9.48	N/A	11.00	N/A
	Skyphoi			
Count	69	69	69	69
Mean	56.7	198.6	111.6	55.4
Max.	88.5	330.4	239.1	77.8
Min.	45.0	132.1	60.0	32.9
St.Dev.	8.25	45.62	40.81	10.11

The lesser degree of artefact variability is likely to suggest a technological tradition in the production of such drinking vessels, similar to the one observed in the previous section for the *Agora* material. Furthermore, the proportion of base diameter to rim diameter for *skyphoi* requires further investigation despite that its standard deviation is relatively high (10.11).

The correlation of handle attachment height to net height in Figure 94 shows that *kantharoi* and *skyphoi* from *Kerameikos* are relatively scattered, even though a central tendency is clear for *skyphoi*. According to the graph, both wares follow regression patterns that are no different compared to those from the *Agora-Kynosarges*-British School assemblage. The regression line for *kantharoi* follows the equation y = 0.7097x - 1.3636 (where y = handle attachment height and x = net height). This means that the handles of these vessels were attached at a height of roughly 71% of a vessel's net height, with a small difference of 1.36 cm. The coefficient of determination ($R^2 = 0.8638$) shows relatively satisfactory statistical correlation (86.38%). The regression line for *skyphoi* follows the equation y = 0.673x – 0.8208 (where y = handle attachment height and x = net height). This means that the handles of *skyphoi* were attached at roughly 67.3% of a vessel's net height, while the difference of 0.8208 cm is small to be considered. This percentage could also be translated as a fraction of 2/3 or 67% of a vessel's net height. The same fraction was noted with regard to handle attachment heights of neck-handled amphorae in Chapter 4. The coefficient of determination of this regression line (R^2=0.8585) shows relatively satisfactory statistical correlation (85.85%).

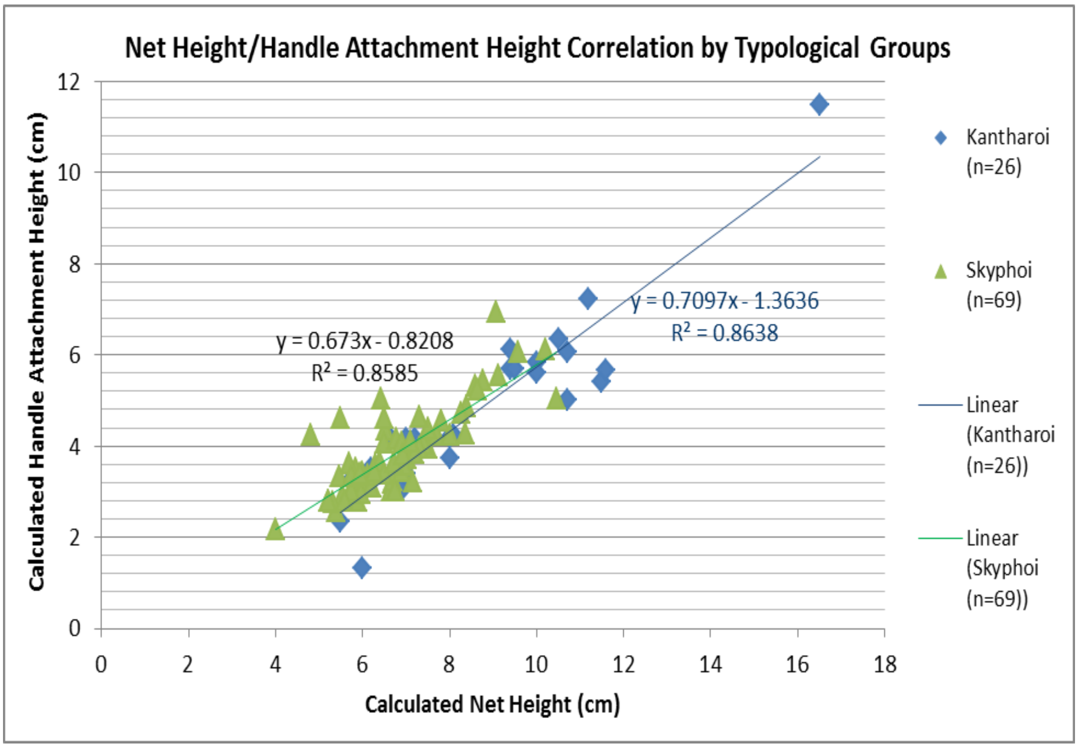

Figure 94: Scatter-graph of correlation between net height and handle attachment height with regression lines. Athenian drinking vessels from the *Kerameikos* cemetery with complete profiles and recorded handles.

Despite the overall variation and the relatively satisfactory degrees of statistical correlation of both regression lines, the material from *Kerameikos* suggests similar patterns to the ones observed for the *Agora*-*Kynosarges*-British School assemblage. The handles of *kantharoi* were attached at roughly 70% of a vessel's net height (or 7/10) and those of *skyphoi* at roughly 67% (or at a fraction of 2/3). This pattern probably relates to a technological tradition that was followed across two centuries, even though artefact variability within the typological clusters suggests that several vessels diverted from the main norm.

According to the correlation of base diameter to rim diameter for the *Kerameikos skyphoi* in Figure 95, there appears to be no clear regression pattern as opposed to the one noted with regard to the same proportion for the *Agora skyphoi*. Although the vessels from *Kerameikos* are closely congregated in a triangular cluster, their regression line suggests no distinct pattern. It follows the equation y = 0.7209x – 2.1449 and the coefficient of determination (R^2=0.5843) shows weak statistical correlation. Despite the presence of a central tendency in this cluster, the possibility of a distinct technological tradition is highly unlikely due to the way scattering takes place. According to the graph, *skyphoi* with broader base diameters exhibit greater variability in their rim diameters; hence, they spread widely above and below the regression line towards the right side of the graph.

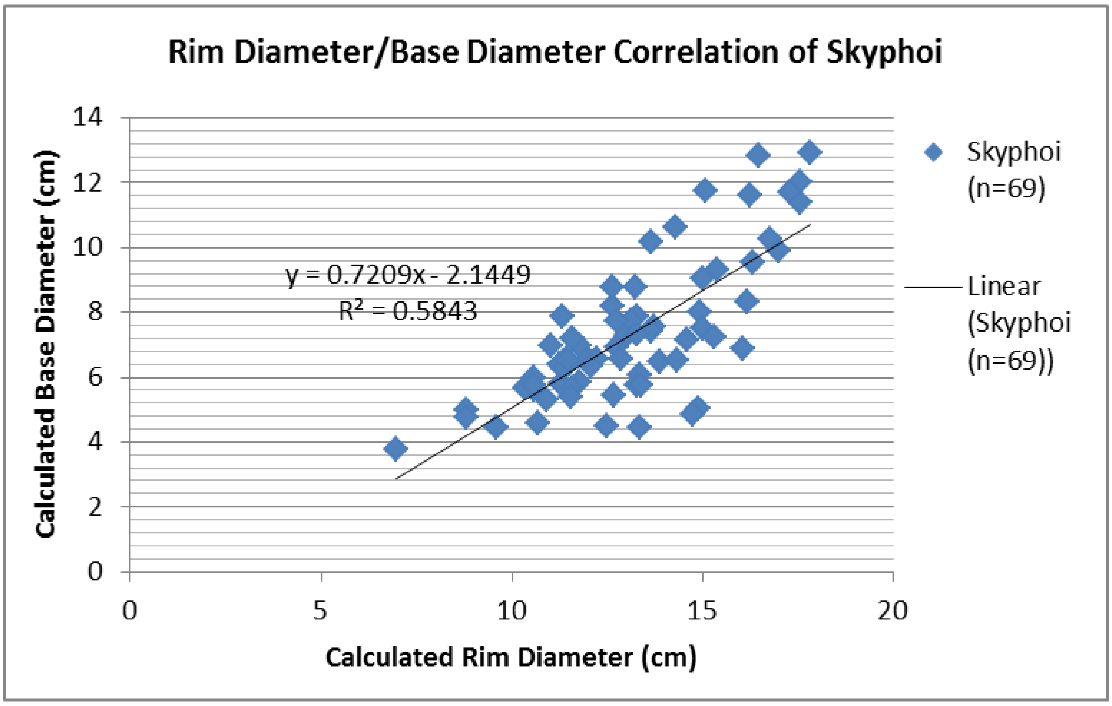

Figure 95: Scatter-graph of correlation between rim diameter and base diameter with regression line. Athenian *skyphoi* from the *Kerameikos* cemetery with complete profiles.

6.1.3 The British Museum collections

The analysis of metrical features and proportions of small drinking vessels from the collections of the British Museum is conducted on 12 *skyphoi* with complete profiles, recorded in Charts 6.12 and 6.13. The assemblage from the British Museum does not contain any *kantharoi*. All vessels derive from unknown contexts and are characterised as broadly Attic by Coldstream (2010), apart from those of suspected Athenian origin.

Calculated measurements for the British Museum *skyphoi* were tested in a similar manner as the assemblages of closed ceramic containers and pouring vessels presented in Chapters 4 and 5. During this test, published net height measurements were used to calculate rim diameters through photographs, which were then compared to real rim diameters included in the original publication by Coldstream

(2010). According to the test (Chart 6.14), differences between real and calculated rim diameters range between -0.8 cm and +0.3 cm. Differences between real and calculated proportions of rim diameter to net height range between -9.7% and +4.8%. Similarly to the *Kerameikos* assemblage, rim diameter differences for the British Museum vessels range below ±1 cm; however, differences in the proportions of rim diameter to net height often exceed 5%, showing that calculated measurements are relatively biased. This is most likely due to the smaller size of these pots: a net height difference of -0.8 cm is insignificant with regard to a 45 cm amphora; however, it is quite significant when referring of a 6 cm *skyphos*. Such differences up to ±1 cm are likely to produce large variations in the percentages between different metrical features of small drinking cups as opposed to larger vessels. Similarly to the *Kerameikos* assemblage, the analyses results for the British Museum *skyphoi* must be treated with caution.

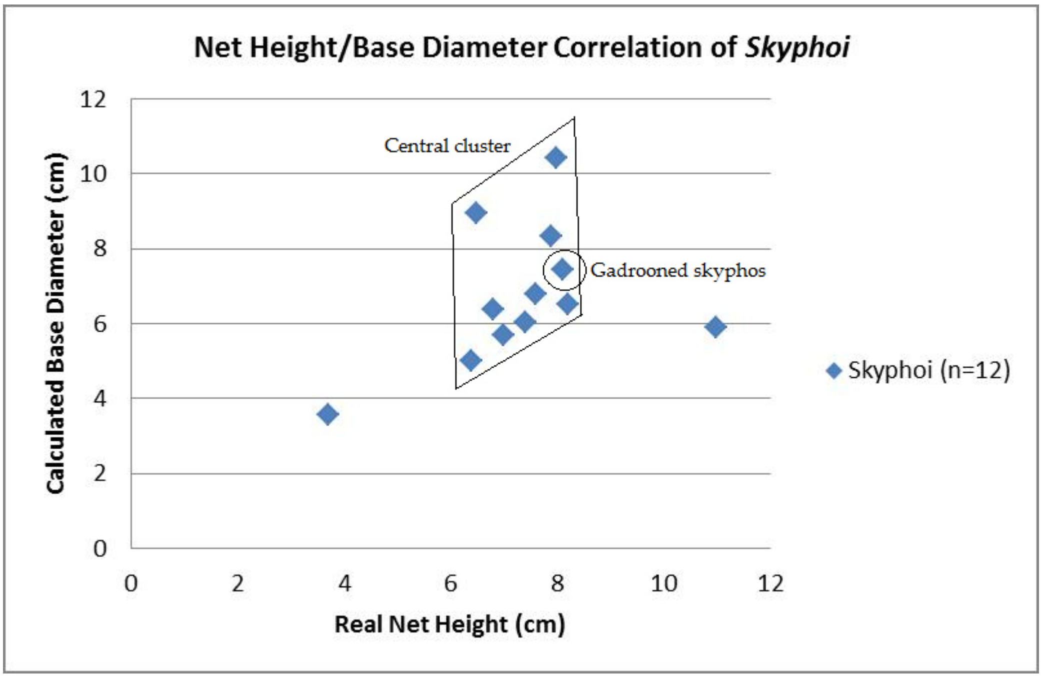

Figure 96: Scatter-graph of correlation between net height and base diameter. Athenian/Attic *skyphoi* from the British Museum with complete profiles.

According to the correlation of net height and base diameter in Figure 96, vessels appear scattered forming a loose central cluster comprised of 10 *skyphoi*. The only gadrooned sample appears on the cluster's margins suggesting that is possibly the product of a distinct workshop. Furthermore, two vessels are loners: the first is a typical *skyphos*, GR1914,0407.1, with almost equal base diameter and net height resembling K10 and K88 from *Kynosarges*; the second vessel is the only wide *skyphos* with high lip in the entire assemblage (GR1977,1207.30). Similarly to the previous assemblages, the central cluster from the British Museum does not follow any specific chronological patterns. All vessels date between EGII and LGIa times.

A comparison of mean proportions for the British Museum *skyphoi* according to the data recorded in Chart 6.13 suggests high standard deviations and a large degree of artefact variability within the assemblage. The lowest standard deviations relate to the proportions of handle attachment height to net height, and base diameter to rim diameter. The same patterns have been observed in all previous assemblages; however, in this assemblage technological traditions are unlikely:

	Calculated Proportion of Handle Attachment Height to Net Height (%)	Real Proportion of Rim Diameter to Net Height (%)	Calculated Proportion of Base Diameter to Net Height (%)	Calculated Proportion of Base Diameter to Rim Diameter (%)
Count	12	12	12	12
Mean	48.0	166.2	93.2	56.0
Max.	60.6	197.4	137.5	73.7
Min.	34.5	140.9	53.5	38.0
St.Dev.	9.06	21.04	22.94	11.38

According to the scatter-graph in Figure 97, the regression line for the proportion of handle attachment height to net height for *skyphoi* is y = 0.5907x – 0.762 (where y = handle attachment height and x = net height). This means that their handles have been attached at roughly 59% of a vessel's net height, while the difference of 0.762 cm is small to be considered. The coefficient of determination of this regression line (R^2=0.7378) shows weak statistical correlation (73.78%). Unlike the previous assemblages, the British Museum *skyphoi* show a weak pattern that is biased for two possible reasons: firstly, calculated measurements could be wrong due to vessel deformations or due to different recording strategies followed in the original publication by Coldstream (2010). Secondly, it could be that a large portion of this material is not Athenian and has been produced by following different conceptualisations compared to distinctively Athenian assemblages. In the second case, it is likely that artefacts from the *Agora, Kynosarges* and *Kerameikos* were shaped according to specific conceptions followed only by central Athenian workshops, which were not followed by workshops of the Athenian periphery. In this case, the assemblage from the British Museum, which is of unknown context, is likely to produce a biased regression line due to vessels coming from mixed production sites.

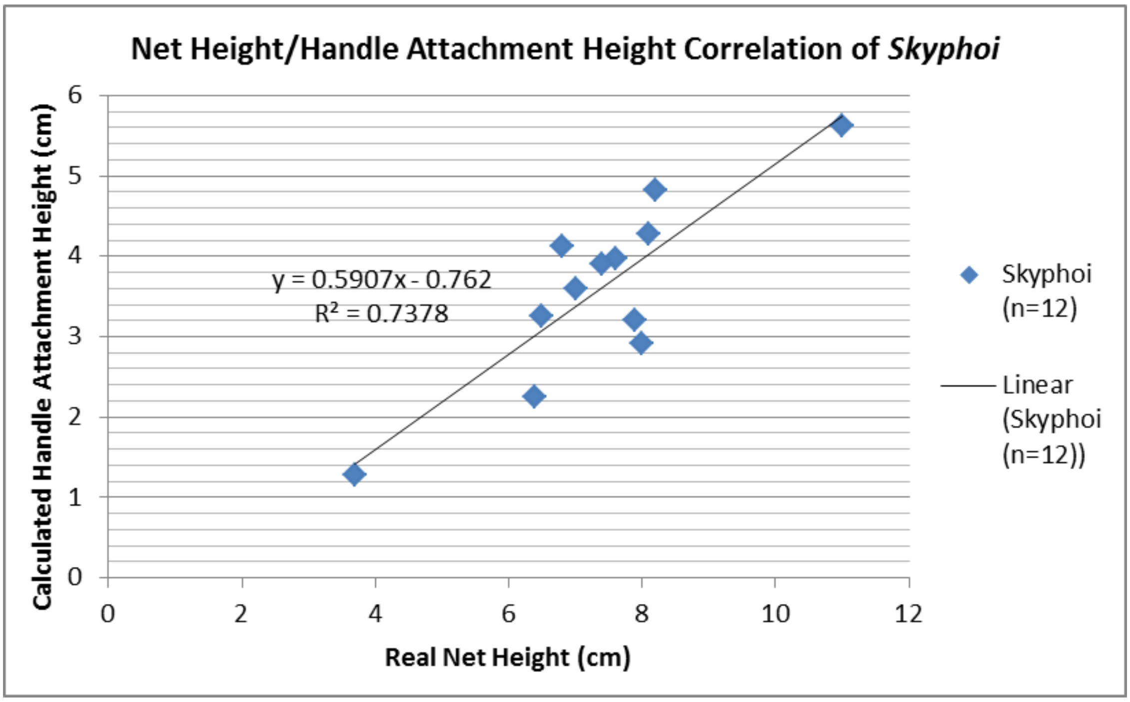

Figure 97: Scatter-graph of correlation between net height and handle attachment height with regression line. Athenian/Attic *skyphoi* from the British Museum with complete profiles and recorded handles.

The same thing is noted in Figure 98 with regard to the correlation between rim diameter and base diameter of the same assemblage. According to the graph, pottery appears highly scattered. The regression line follows the equation y = 0.4103x + 1.7688 and the coefficient of determination (R^2=0.3238) shows weak statistical correlation (32.38%).

According to the above statistics, the material from the British Museum is diverse and cannot suggest any clear patterns. There is likelihood that this problem is due to its mixed origin, although calculation bias must not be overruled.

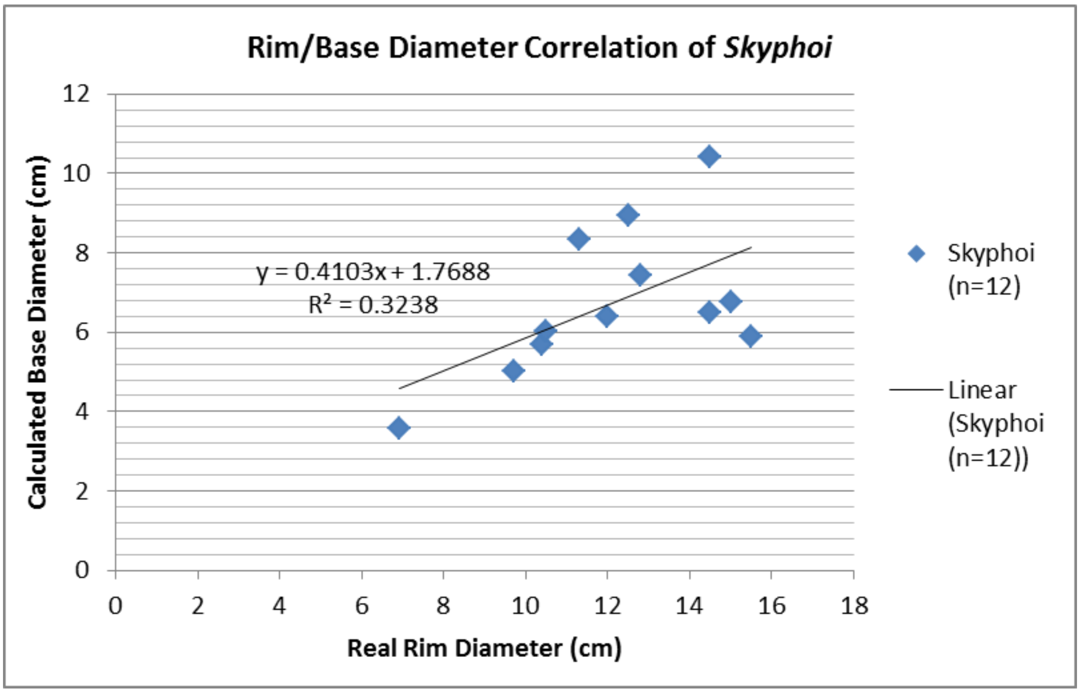

Figure 98: Scatter graph of correlation between rim and base diameters with regression line. Athenian/Attic drinking vessels from the British Museum with complete profiles.

6.2 ANALYSIS OF FABRICS

Fabric analysis is conducted on 12 *skyphoi* and 9 *kantharoi* from the Athenian *Agora*, the results of which are summarised in Chart 6.15. According to hand specimen examination, all *kantharoi* and the majority of *skyphoi* were produced from variant 1 and their Munsell (1975) colours primarily belong to the upper 5YR series. This is the same fabric as the one described in Chapters 4 and 5, and appears to be dominant across different Athenian fineware groups. Only two *skyphoi*, P32895 and P22431, have been produced from variant 2. Similarly to the assemblages of large ceramic containers and medium sized pouring vessels, variant 2 is the least popular, comprising 10% of the examined samples (Figure 99). Still, this percentage is significantly higher compared to the percentage of large ceramic containers and pouring vessels produced from the same variant. The only Corinthianising *skyphos* (P5286) is also made from variant 1. The use of a single fabric for the majority of drinking vessels verifies a strong technological tradition in clay selection, manipulation and tempering processes.

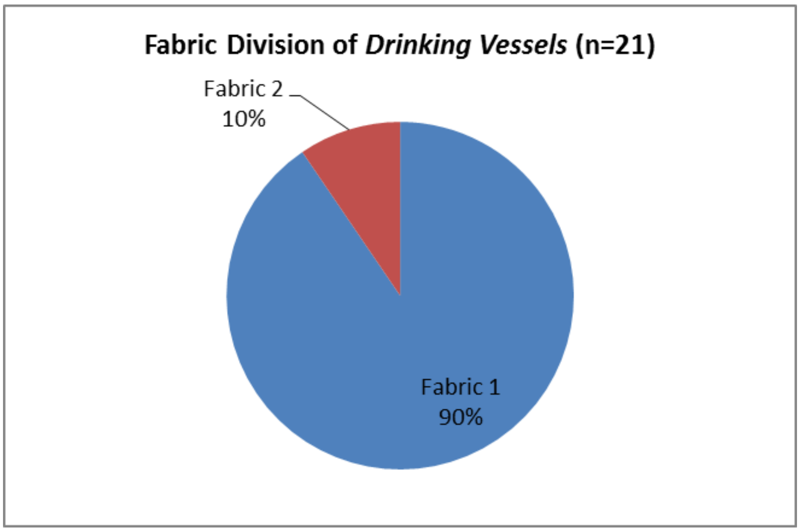

Figure 99: Fabric division for 12 *skyphoi* from the Athenian *Agora.*

6.3 ANALYSIS OF DECORATIVE TECHNOLOGY

The analysis of decorative technology is conducted on 18 *kantharoi* and 40 *skyphoi* (both complete vessels and sherds) coming from the Athenian *Agora*, the *Kynosarges* burials and the collections of the British School at Athens. Results are presented in Charts 6.16 and 6.17. Such analysis for small drinking pots requires a different approach compared to that for large ceramic containers and medium sized pouring vessels. By contrast to close-shaped finewares, *kantharoi* and *skyphoi* are significantly smaller and their shape is open; therefore, decorative elements, coatings and slips appear both on their external and internal surfaces simultaneously.

The vast majority of drinking vessels examined in this chapter were produced with internal coatings and this practice was followed without interruption across the entire Geometric era. Only exception is the SG footed low-handled *kantharos* P7196, which is completely uncoated and undecorated. Three other *skyphoi*, K2 and K3 from *Kynosarges*, and P12112 from the *Agora*, are not internally coated but internally decorated with various motifs. Still, their internal decoration covers all their surfaces and could have functioned similarly to a thick coating.

Internal coatings might have had practical use in drinking: they probably prevented the liquid content (perhaps wine) to come in contact with the porous clay surfaces of the vessel, resulting to alterations in flavour. Had this been the case though, then the flavour of the liquid content would have been already altered after contact with the clay surfaces of the pouring vessel or larger container that was served from, as such pots were internally uncoated. Another explanation could be that internal coatings served aesthetic purposes or functions related to the broader social notions behind drinking practices. Whatever the practical importance or social agency, coatings were essential elements of the technological *chaîne opératoire* of small drinking vessels.

The large majority of *skyphoi* and *kantharoi* analysed in this project are also coated on the lower half of their external surface, which limits any other form of decoration on the upper half of a vessel's body. In that sense, all *skyphoi* and *kantharoi* (with exception of P7196) carry a form of treatment on both their external and internal surfaces.

According to Chart 6.16, all decorated *kantharoi* are painted in black or brown black colours (Colour Group 1). Two vessels are fully coated and they both belong to the early phases of the Geometric era: P19247 (EGI) and P6420 (MG). Finally, it is only 3 out of 18 vessels that carry no coated surfaces (P7476, P7196 and P1765) and all come from the 7th century BC (SG or EPA styles). According to Figure 100, uncoated vessels that have been treated with a thin matte wash comprise 17% of the entire assemblage.

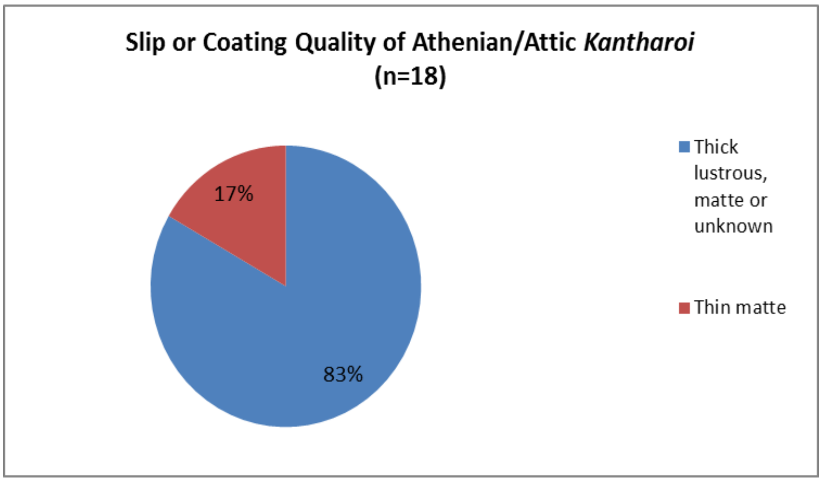

Figure 100: Comparison of slip or coating quality of Athenian/Attic *kantharoi* from the *Agora, Kynosarges,* and the British School's at Athens collections.

Despite the small sample, decorative characteristic of *kantharoi* show some similarities with closed ceramic containers and pouring vessels. Firstly, the dominant colour for decorative elements and coated surfaces is black or brown black. Secondly, although thick coatings were applied on the internal and lower external surfaces of such vessels across different chronological periods, the production of fully coated vessels was restricted during the earlier phases of the Geometric period. The main difference between *kantharoi* and other vessel classes is that undecorated and uncoated pots are noted after the end of the Geometric era, circa 700 BC; by contrast, the practice of coating in other vessel groups declines right after LGIa.

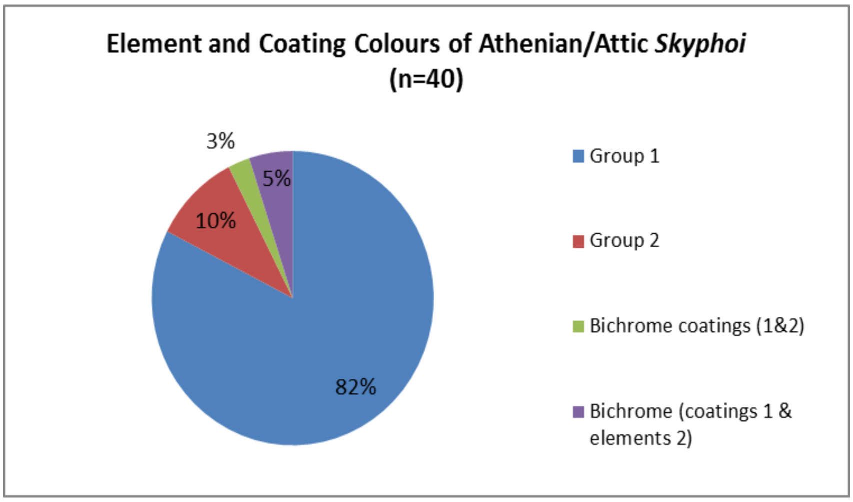

Figure 101: Comparison of decorative element and coating colours of Athenian/Attic *skyphoi* from the *Agora, Kynosarges,* and the British School at Athens collections.

The analysis of *skyphoi* shows that their decoration was less standardised to that of *Kantharoi* and some effort was carried out to produce bichrome vessels, in colours of Group 1 and 2. According to Chart 6.17 and Figure 101, 82% of the *skyphoi* are decorated in black or brown black colours. This pattern follows the general decorative norm observed on other vessel classes discussed in previous chapters. A relatively large percentage of *skyphoi* (10%) is decorated in red or brown red colours (Group 2) and this is not restricted during any specific chronological period. According to Chart 6.17, the pattern begins as early as MGII. One vessel (P8225) is coated with two different colours (red on its upper and black on its lower half), while two vessels (P8222 and P8223) carry red decorative elements on their upper body and black coatings on their lower body. All three vessels have been found in the same context (well D12:3) and belong to the MGII-LGIa transition; therefore, it is likely to be products of the same workshop if not the same painter.

Macroscopic analysis shows that such bichrome appearance should not be attributed to a random firing accident, rather to the painter's conscious choice. Although it is not clear if the painter consciously aimed to produce a bichrome effect, it is more likely that there was a deliberate choice to spread thick layers of paint on the lower half of these vessels, and use a less thick and perhaps more diluted paint of similar composition for the upper half.

According to Chart 6.17, there are only 4 out of 40 *skyphoi* (10%) that are fully coated, all dating between MGII-LGIa and SG. The main norm for the majority of vessels is to have thick coatings (either lustrous or matte) on their lower halves. Still, this practice follows a distinct chronological pattern: according to Figure 102, during the period before MGII-LGIa 48% of the *skyphoi* have a lustrous external appearance; however, after LGIb this percentage drops down to zero and the vast majority of vessels carry thick matte coatings. The abandonment of lustrous in favour of matte coatings during the Late Geometric period is unlikely to coincide with a move towards simplicity in pottery production similar to the one noted for pouring vessels in Chapter 5. Had this been the case, similarly to the external treatments of *amphorae* and *oinochoai*, both coating practices would have been abandoned simultaneously.

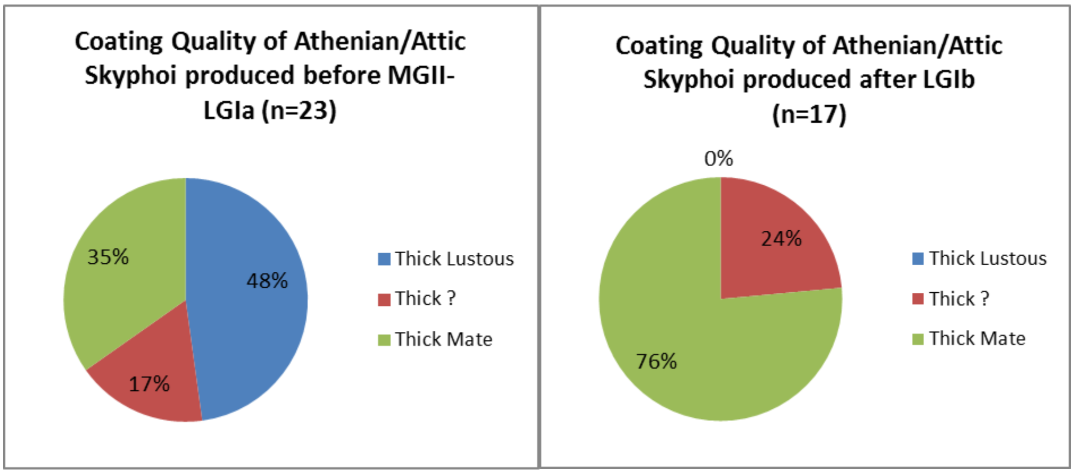

Figure 102: Comparison of coating quality of Athenian/Attic *skyphoi* from the *Agora, Kynosarges,* and the British School at Athens collections before and after LGI.

In conclusion, despite their broader standardisation *skyphoi* and *kantharoi* demonstrate a different approach from artisans during the *chaîne opératoire* of each ware. *Skypho*i were more elaborately decorated compared to *kantharoi* or to any other fineware examined in this thesis, and subject to greater variability and experimentation with regard to colours and external treatments. In that sense, it appears likely that *skyphoi* painters enjoyed significant freedom compared to the painters involved in the decoration of other wares. By contrast, the decoration of *kantharoi* was standardised and followed the patterns noted in the decoration of large containers and medium sized pouring vessels, with only one difference: coating practices in the production of this group did not decline in the Late Geometric but during the 7th century BC.

6.4 SUMMARY AND DISCUSSION OF ANALYSIS OF DRINKING VESSELS

The analysis of *kantharoi* and *skyphoi* shows that both vessel types follow similar conceptualisations in their shaping characteristics and must be treated as products of the same *chaîne opératoire*. *Kantharoi* exhibit greater degree of deformation compared to *skyphoi* because of having their handles attached adjacent to their rims. Their rim diameter measurements and related proportions needed to be left out due to potential bias.

The analysis of metrical features shows that *kantharoi* form distinct clusters according to their sizes. In these clusters, small *kantharoi* with heights below 8 cm and base diameters below 6 cm appear more standardised compared to their larger equivalents. *Skyphoi* form dense and robust triangular clusters which suggest lesser degree of artefact variability compared to *kantharoi* and a more standardised production. Some characteristic shapes such as wide *skyphoi* with stirrup handles and gadrooned *skyphoi* are plotted at the edges of these clusters, suggesting that their production and their *chaîne opératoire* might have been distinct. This is more likely for the case of gadrooned *skyphoi*, the production of which probably copied some conceptualisations from the *chaîne opératoire* of metallic vessels (see Borell 1978, 93-4 and Markoe 1985, 117-27). Despite this fact, such typological variants never diverted from the technological traditions followed in the production of other *skyphoi*, particularly with regard to their proportions and fabrics.

The analysis of metrical features reveals that the *Kynosarges* and British School material might have been produced at different workshops compared to that from the *Agora*. Furthermore, all drinking vessels from all five assemblages follow no distinct groupings based on their period of production and context of recovery. In that sense, their production must be regarded as homogeneous and standardised across time.

The analysis of proportions shows that some technological traditions might have existed in the partonomy of small drinking vessels, particularly in relation to their handle attachment heights. Regression lines suggest similar proportions of handle attachment height to net height for *kantharoi* and *skyphoi*, although the production of the second might have included two traditions that were followed simultaneously. More specifically, the handles of *kantharoi* were attached at roughly 70-71% of a vessel's net height, which is translated as a fraction of 7/10. The statistical correlation for the *Kerameikos* assemblage is weaker compared to other assemblages, while no *kantharoi* from the collections of the British Museum were included in this thesis:

Kantharoi		
Agora, Kynosarges , BSA Collections *Kantharoi*	y = 0.703x – 0.6618	R^2=0.9073
Kerameikos Kantharoi	y = 0.7097x - 1.3636	R^2 = 0.8638

The handles of *skyphoi* from the *Agora, Kynosarges* and British School collections have been attached similarly at a fraction slightly below 7/10 of a vessel's net height, and more specifically at 69.5%. However, the handles of *skyphoi* from *Kerameikos* show an average handle attachment height at about 67.3%:

Skyphoi		
Agora, Kynosarges , BSA Collections *Skyphoi*	y = 0.6947x – 0.9822	R^2=0.9475
Kerameikos Skyphoi	y = 0.673x – 0.8208	R^2=0.8585
British Museum *Skyphoi*	y = 0.5907x – 0.762	R^2=0.7378

Even though this percentage is close to the fraction of 7/10, it is also close to the fraction of 2/3 of a vessel's net height, which was noted with regard to the same proportion for neck-handled amphorae. In this sense, the handle attachment height of the *Kerameikos skyphoi* could suggest a second technological tradition, in which handles were attached between 70% and 66% of a vessel's net height; however, the regression for *Kerameikos* shows weaker statistical correlation compared to the *Agora-Kynosarges*-British School assemblage. The only assemblage that does not follow any clear pattern and is likely to suggest no distinct technological tradition is that from the British Museum: not only its average handle attachment height is low (59%), but also its degree of statistical correlation in not satisfactory (73.78%).

The material from the British Museum is problematic. In general, all mean proportions show high standard deviations suggesting a large degree of variability. It is likely that calculated measurements obtained for this material are biased due to different recording strategies followed in the original publication by Coldstream (2010) and the present macroscopic analysis. However, another explanation could be likely: the assemblage from the British Museum comprises of vessels of unknown provenance, some of which are Athenian and others that are broadly Attic. It is likely that the workshops operating in the Athenian periphery followed different conceptualisations in their *chaîne opératoires* by contrast to the central Athenian workshops. As the material from the British Museum is mixed, its proportional features are likely to divert from the main Athenian norm noted in the *Agora* and *Kerameikos* vessels; therefore, regressions are subject to weaker statistical correlation.

The material from the *Agora* (mainly) suggests a second possible technological tradition with regard to the proportion of base diameter to net height. This is set roughly at 45%; however, the vessels from *Kerameikos* and the British Museum do not verify the same pattern:

Skyphoi		
Agora, Kynosarges , BSA Collections *Skyphoi*	y = 0.4502x + 0.1109	R^2=0.7256
Agora (only) *Skyphoi*	y = 0.4529x + 0.2802	R^2=0.8215
Kerameikos Skyphoi	y = 0.7209x – 2.1449	R^2=0.5843
British Museum *Skyphoi*	y = 0.4103x + 1.7688	R^2=0.3238

According to the above, the only strong technological tradition in the production of drinking vessels relates to their handle attachment heights. Exceptions are also common suggesting a degree of freedom and flexibility in vessel conceptualisation.

Hand specimen examination shows that the strongest technological tradition in the production of drinking vessels relates to clay selection, levigation and tempering practices. There is a strong preference in the use of fabric variant 1, which is also common in the production of larger wares such as containers and pouring vessels (see Chapter 4 and 5). Variant 2 is less popular and only noted in the production of some *skyphoi*. The only Corinthianising vessel in the entire assemblage (*skyphos* P5286) is also produced from variant 1.

In relation to their decorative characteristics, *kantharoi* appear more standardised compared to *skyphoi* and follow patterns noted in the decoration of other ware groups. Their decorative colours are black or brown black (Group 1) and their coating characteristics follow two chronological patterns. Firstly, fully coated *kantharoi* belong to the period before MGII-LGIa. This is also noted with regard to neck-handled amphorae and *oinochoai* in previous chapters. Secondly, all uncoated and undecorated vessels come from the 7^{th} century BC. By contrast, the decline of coating practices for other fineware groups takes place directly after MGII-LGIa, during the period that coincides with the generalised use of figurative style decoration.

The decoration of *skyphoi* is slightly different compared to *kantharoi* and shows a larger degree of variability. Even though the dominant decorative colour is black or brown black (Group 1), after MGII there appears a relatively large portion of artefacts decorated in red or red brown colours (Group 2). Even though *skyphoi* were never produced without coated surfaces, thick lustrous coatings were probably abandoned sometime during the beginning of the Late Geometric period, and were replaced by thick matte coatings. Furthermore, around MGII-LGIa there appear some conscious attempts from painters to produce bichrome vessels, bearing either two different coatings, or different combinations of colours used for coatings and decorative elements simultaneously. In general, this tendency towards polychromic decoration could relate to greater experimentation and freedom in the decoration of *skyphoi* as opposed to the decoration of other wares. Such variability could also be due to experienced painters involved in the production of *skyphoi* compared to those involved in the *chaîne opératoires* of *kantharoi* or even larger pots. Finally, given the large amount of drinking vessels produced by Geometric workshops, the work of painters and potters involved in such production was probably intense and demanding; however, there was room for experimentation in their technological choices, suggesting a similar degree of artistic freedom in their work.

CHAPTER 7: MICROSCOPIC ANALYSIS OF GEOMETRIC AND ORIENTALISING FINEWARES

The previous three chapters investigated artefact variability across three broader fineware groups through macroscopic analysis conducted on a total of 391 ceramic pieces. The analysis focused on some aspects of the ceramic *chaîne opératoire* such as the conceptualisation of ceramic vessels and the use of natural resources in ceramic production. Macroscopic analyses were based on metrical features, proportions and assembling characteristics of Attic decorated finewares, fabric classifications and patterns in decorative practices across time.

This chapter presents an independent pilot study on a small ceramic assemblage from the Athenian *Agora*, selected from the same contexts as the material discussed in the previous three chapters, and analysed with three techniques: Hand Specimen examination (HS), Thin Section Analysis (TSA) and Scanning Electron Microscopy (SEM). This pilot project has two aims: firstly, to investigate whether fabric variations identified macroscopically through hand specimen examination in previous chapters are the same as the ones identified with the use of more sophisticated microscopic techniques. Secondly, to examine whether the developments of vessel forms, assembling proportions and decorative technologies discussed so far could have also required alterations in core manufacturing processes such as of clay selection and clay manipulation (levigation and tempering).

Microscopic analysis is conducted on 17 finewares, belonging to the same three ware groups discussed in previous chapters: large ceramic containers, medium sized pouring vessels and small drinking vessels (Figure 103). More specifically, the samples come from 5 amphorae, 3 *oinochoai* and 9 open vessels, either drinking cups or small sized *kraters*. The material was offered for microscopic analysis with the courtesy of the American School of Classical Studies at Athens and sampling permit was obtained from the Greek Archaeological Services (permit reference: ΥΠΑΙΘΠΑ/ΣΥΝΤ/Φ44/64642/2881). All fragments come from wells and relate to mixed deposits, divided in four chronological groups:

Sample Quantity	Chronology	Context
4	EG (c.900-850 BC)	Well P8:3
4	MG (c.850-760 BC)	Well L6:2
5	LG (c.760-700 BC)	Well P7:3
4	7th Century	Well R17:5

The samples from deposit R17:5 come from the broader 7th century BC and are difficult to date precisely.

		List of samples for microscopic analysis				
No.	Sample No.	Ware Type	Chronology	Context of recovery	Detailed description of artefact	Description of decoration
1	AS1813	Amphora	PA	Protoattic well R17:5, context ΠΑ169.	Neck fragment of a large wheel-made closed vessel, and more specifically an amphora.	The sample contains part of a brown external decorative band.
2	AS1814	Amphora	LG	Late Geometric well P7:3, section Σ, context Σ763.	Base fragment from a large wheel-made closed vessel, and more specifically a broad-base amphora.	Undecorated.
3	AS1815	Cup	LG	Late Geometric well P7:3, section Σ, context Σ735.	Rim and upper body fragment from a small wheel-made open vessel, and more specifically a cup.	The sample contains part of the original black internal slip and part of an external black decorative band.
4	AS1816	Amphora SOS	End of LG	Late Geometric well P7:3, section Σ, context Σ735.	Body fragment from a large wheel-made vessel, and more specifically from an early SOS amphora type.	The sample contains part of a thick orange external slip or part of the original decoration.
5	AS1817	Oinochoe or Olpe	LG	Late Geometric well P7:3, section Σ, context Σ735.	Shoulder and body fragment from a small wheel-made closed vessel, and more specifically an oinochoe or olpe.	The sample contains part of the matte-black external slip.
6	AS1818	Krater	LG	Late Geometric well P7:3, section Σ, context Σ735.	Upper body fragment from a large wheel-made open vessel, and more specifically a krater.	The sample contains part of the original internal black slip, yet no part of original external decorative bands.
7	AS1819	Kotyle or Skyphos	PA	Protoattic well R17:5, context ΠΑ169.	Rim and body fragment from a small wheel-made vessel, and more specifically a kotyle or skyphos.	The sample contains part of the original red/brown internal slip, yet none of the external decorative bands.
8	AS1820	Kotyle or Skyphos	PA	Protoattic well R17:5, context ΠΑ169.	Body fragment from a medium size wheel-made open vessel, and more specifically a kotyle or skyphos.	The sample contains part of the matte-black internal slip and a small part from a black external decorative line.

AS1821	Krater or Dinos	PA	Protoattic well R17:5, context ΠΑ169.	Body fragment from a large wheel-made open vessel, and more specifically a krater or dinos.	The sample contains part of the original brown/red internal slip and part of a brown decorative spiral from the external surface.
AS1822	Oinochoe	MG	Middle Geometric well L6:2, section H, context H67.	Base fragment from a large broad-based wheel-made vessel, and more specifically an oinochoe.	The sample contains no decoration, yet the external surface is lightly slipped in the original clay colour.
AS1823	Krater or Skyphos	MG	Middle Geometric well L6:2, section H, context H67.	Body fragment including part of the handle from a large open wheel-made vessel, and more specifically a krater or a large skyphos.	The sample was extracted from the handle. It contains no decoration or slip.
AS1824	Cup	MG	Middle Geometric well L6:2, section H, context H67.	Base fragment from a small open wheel-made vessel, and more specifically a one-handled cup with broad base.	The sample contains part of the black-matte internal and external slip.
AS1825	Amphora	MG	Middle Geometric well L6:2, section H, context H67.	Rim fragment from a large wheel-made vessel, and more specifically an amphora.	Undecorated.
AS1826	Oinochoe	EG	Early Geometric Well P8:3, opposite the Stoa of Attalos, peer 18, section Σ, context Σ754.	Body fragment from a closed wheel-made vessel, and more specifically an oinochoe.	The sample contains small portion of two brown/black external decorative bands.
AS1827	Skyphos	EG	Early Geometric Well P8:3, opposite the Stoa of Attalos, peer 18, section Σ, context Σ754.	Rim fragments from a middle size open wheel-made vessel, most likely from a skyphos.	The sample contains parts of the black internal and external coating.
AS1828	Cup	EG	Early Geometric Well P8:3, opposite the Stoa of Attalos, peer 18, section Σ, context Σ754.	Body fragment with traces of the handle attachment from a small wheel-made vessel, and more specifically a one-handled cup.	The sample contains part of the external orange/black decorative slip and part of the internal orange coating.
AS1829	Amphora N-H	EG	Early Geometric Well P8:3, opposite the Stoa of Attalos, peer 18, section Σ, context Σ754.	Neck fragment with traces of handle and handle-attachment from a big wheel-made vessel, and more specifically a neck-handled amphora.	The sample contains part of the external black decorative paint.

Figure 103: List of ceramic samples for microscopic analysis.

This chapter demonstrates that hand specimen characterisations match the ones under more sophisticated microscopic techniques. All tests verify that Geometric and Orientalising finewares were produced from the same fabric, resulting in the same two variants discussed in previous chapters. Furthermore, a comparison of clay-pastes and coatings used in Geometric and Orientalising pottery production reveals that both materials were of similar chemical composition; however, there are indications that during the early 7th century BC some painters might have used coatings of different chemical composition compared to the clays used to produce the same vessels.

7.1 HAND SPECIMEN EXAMINATION (H.S.)

In the previous chapters, hand specimen examination was conducted on broken or cracked areas along the surfaces of ceramic artefacts. In this project, hand specimen examination is conducted on fresh breaks, which are examined with a 10X hand lens under artificial light. Fabric identification procedures are the same as the ones followed in the previous three chapters. According to the analysis, all 17 samples are produced out of the same fabric, which comes in two variants: Variant 1 is the finest fabric and variant 2 is a slightly coarser and more calcareous version of variant 1. Both variants are the same as the ones described in chapters 3, 4 and 5, and again, variant 1 is the most prevailing and used in the production of different wares across four chronological periods:

Sample No.	Ware type	Chronology	Fabric (H.S.)
AS1813	Amphora	PA	1
AS1821	Krater or Dinos	PA	1
AS1819	Kotyle or Skyphos	PA	1
AS1820	Kotyle or Skyphos	PA	2
AS1814	Amphora	LG	1
AS1816	Early SOS Amphora	LG	1
AS1818	Krater	LG	1
AS1817	Oinochoe or Olpe	LG	1
AS1815	Cup	LG	2
AS1825	Amphora	MG	2
AS1823	Krater or Skyphos	MG	1
AS1822	Oinochoe	MG	1
AS1824	Cup	MG	1
AS1829	Neck-handled Amphora	EG	1
AS1826	Oinochoe	EG	1
AS1827	Skyphos?	EG	1
AS1828	Cup	EG	2

According to the pie chart in Figure 104, variant 1 comprises the majority of samples (76%). It is only 4 out of 17 samples that belong to variant 2, which comprise 24% of the total assemblage.

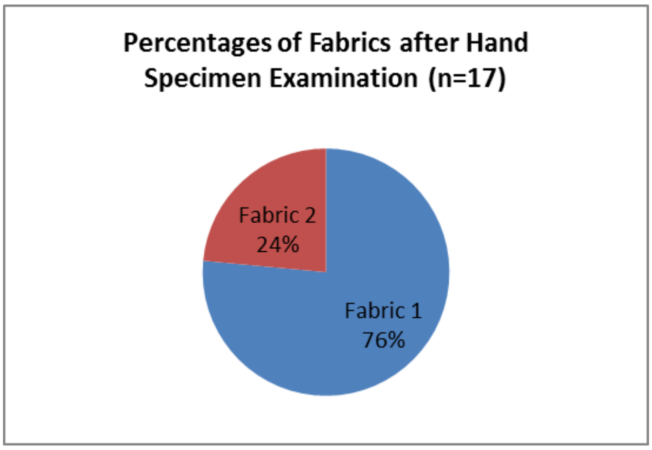

Figure 104: Percentages of fabrics after Hand Specimen Examination.

7.2 THIN SECTION ANALYSIS (T.S.A.)

Even though there are different ways of describing thin sections and recording relevant information (e.g. Freestone 1987), a researcher's choice depends primarily on the nature of his/her questions. Freestone (1995) summarises the issues assessed with the use of ceramic petrography, the main application of which is in the study of artefact provenance. In the present microscopic project, all artefacts have been identified as Athenian and hand specimen examination has verified the existence of one major fabric, not only used across different periods of time, but also in the production of different wares.

In such cases where only one fabric is noted in a large geographical area, variations within this fabric can be established with simple methods, based on the size, shape and proportions of non-plastic inclusions (e.g. Peacock 1971). This form of textural analysis (*sensu* Freestone 1995, 113-4) is useful for the investigation of clay recipes in relation to different workshops producing pottery from the same clay (Middleton *et al.* 1985, 64; Freestone 1991, 405; Freestone 1995, 113-4; Darvill & Timby 1982; Streeten, 1982). Textural analyses are not always detailed -especially in fine fabrics- and should be supplemented with descriptions of clay micromass, groundmass and main inclusions based on their frequency of occurrence (e.g.

Whitbread 1989). Freestone (1991, 401) argues that such analyses are time consuming and not always comprehendible to the non-experts; however, a characterisation based on texture and micromass is probably the best option in relation to the finewares examined in this project.

The fabric descriptions below are presented according to the conventions established by Whitbread (1986; 1989). The abbreviations used are as follows: PPL = plain-polarised light; XPL = cross-polarised light; TCF = textural concentration features. The relationship c:f:v $_{0.125\ mm}$ refers to the percentages among coarse inclusions, fine inclusions and voids, and the inclusion diameter limit between coarse and fine grains is set at 0.125 mm. Frequency labels: predominant >70%, dominant 50-70 %, frequent 30-50 %, common 15-30 %, few 5-15 %, very few 2-5 %, rare 0.5-2 %, very rare <0.5 %. Size of voids: mega >2 mm, macro 0.5-2 mm, meso 0.05-0.5 mm, micro <0.05 mm.

7.2.1 Descriptions of fabric variants

Variant 1 (Figures 105 and 106):

I Microstructure

(a) Dense microstructure; very few to rare meso and microvaughs, often with recrystallised infill of calcareous matter (marl or lime), most likely because of post depositional conditions.

(b) Single or double spaced porphyric related distribution.

(c) Perfect parallel orientation to the vessel walls.

II Groundmass

1. Homogeneous.
2. Optically inactive. The colour ranges from yellowish-brown in PPL to dark red to brown in XPL (x40)
3. Inclusions

   c:f:v $_{0.125\ mm}$ = 20:77: 3- 14:85:1

   The inclusions are very well to extremely well sorted with clear unimodal distribution, ranging between angular to rounded.

   Composition: No distinction is made between coarse and fine inclusions.

   Common:

   1. Monocrystalline quartz – predominantly very fine angular to rounded grains smaller than 0.05 mm. AS1816 (SOS amphora)

contains only angular quartz grains.

Few:

1. Monocrystalline quartz - angular to sub-angular grains with sizes between 0.05 mm and 0.12 mm, often cloudy.
2. Lime – very fine grains of mixed angularity smaller than 0.05 mm
3. Biotite and yellow mica laths between 0.02 mm and 0.25 mm.

Very few:

1. Iron ores – well rounded or elongated mottles ranging between 0.2 mm and 0.35 mm; often mixed with angular quartz particles of silt size (AS1818, AS1819); sometimes large coarse and round particles between 0.3 mm and 1 mm forming agglomerates with silt size quartz and exhibiting clear dehydration cracks (AS1813).
2. Schist – tabular, elongated fine or random shaped coarse grains between 0.02 mm and 0.3 mm, containing smaller than silt size yellow mica, brown mica and quartz. Schist grains have merged margins and are very difficult to differentiate within the dense groundmass.
3. Lime – elongated and well rounded, occasionally subrounded, with clear and rarely merged boundaries, sometimes occurring as scattered particles that have been partly burnt; range between 0.1 mm and 0.2 mm.

Rare:

1. Polycrystalline quartz – equigranular, between 0.05 mm and 0.2 mm.
2. Marl and quartz agglomerates – elongated or randomly shaped grains between 0.2 mm and 0.4 mm. They are probably naturally occurring grains of marl with angular or sub-angular quartz, perhaps related to rock formations close to coastal regions (AS1817).

Very rare:

1. Feldspar – fine silt size particles mixed with larger grains up to 0.1 mm, always altered from high firing temperatures. Very difficult to spot (AS1824).

III Textural Concentration Features

Tcf = between 1% and 5%

Few to rare rounded clay pellets with clear or sharp to merging boundaries, neutral to low optical density and concordant orientation. Dark brown or black in PPL (x40), often dark brown with rounded black spots of 0.1 mm maximum diameter in PPL (x40), bright brown to red in XPL (x40). Constituents: The larger ones (between 0.35 mm and 1 mm) contain silt size quartz, yellow mica needles and often fine schist grains; all are medium to well sorted and exhibit fine internal orientation. The finer and smaller clay pellets (between 0.2 mm to 0.35 mm) contain no inclusions. Exceptional cases are AS1816 (Late Geometric SOS amphora), AS1827 (Early Geometric open vessel, perhaps *skyphos*) and AS1829 (Early Geometric neck-handled amphora). They contain few agglomerates (between 5% and 7%) that appear to be the same large clay pellets described above, mixed with concentrations of iron. The exact nature of these agglomerates could not be determined.

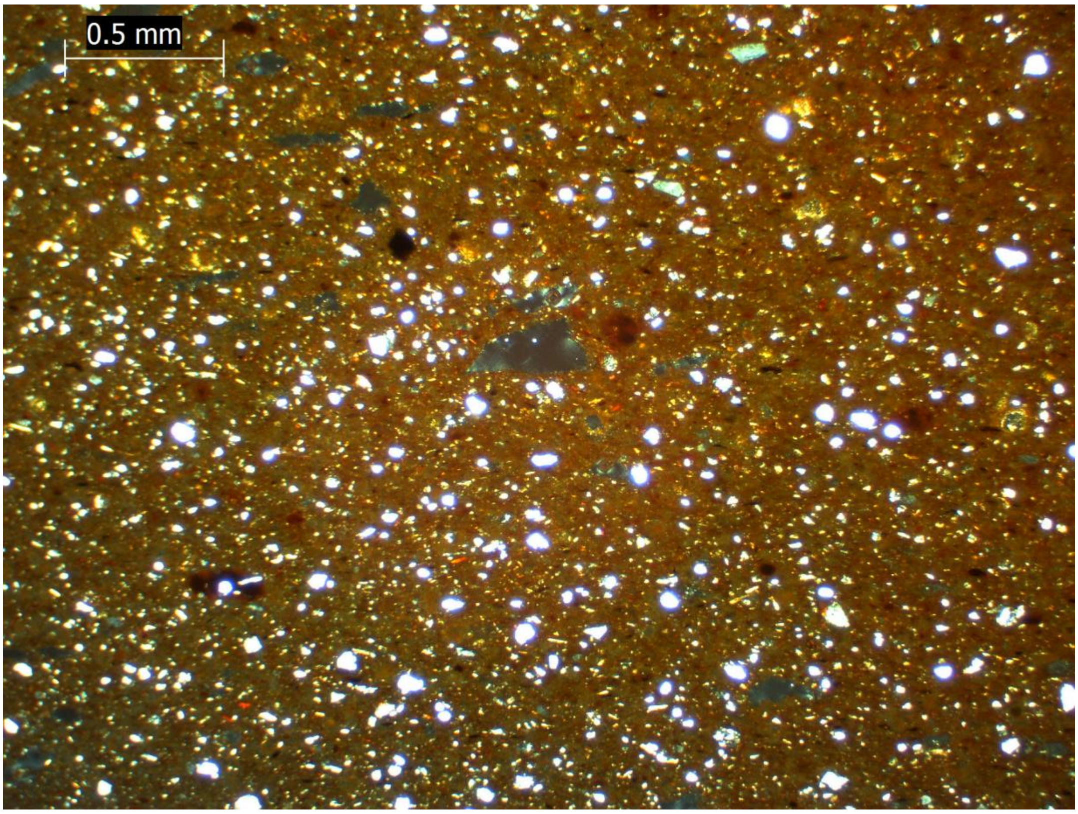

Figure 105: Variant 1 - Thin section of AS1826 (EG *Oinochoe*), 4X0.10 magnification, XPL.

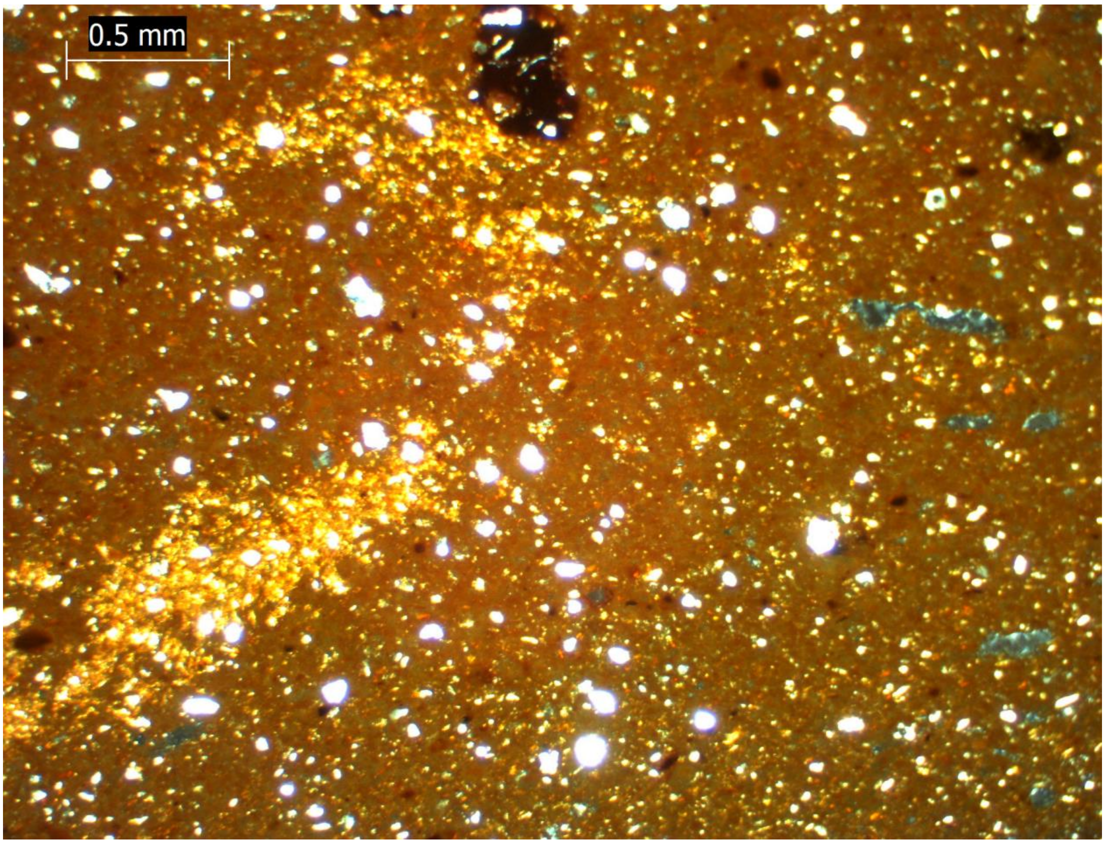

Figure 106: Variant 1 – Thin section of AS1813 (PA Amphora), 4X0.10 magnification, XPL.

Variant 2 (Figures 107 and 108):

I Microstructure

(a) Dense microstructure; few to rare meso and microvaughs, often with recrystallised infill of calcareous matter (marl or lime), most likely because of post depositional conditions.

(b) Single or double spaced porphyric related distribution.

(c) Perfect parallel orientation to the vessel walls.

II Groundmass

1. Somewhat heterogeneous, with a variation caused from a combination of perhaps post depositional recrystallisation and unequal distribution of marl particles below silt size.
2. Optically inactive. The colour ranges from yellowish-brown with greyish zones in PPL to dark red to brown in XPL (x40)
3. Inclusions

   $c{:}f{:}v_{\ 0.125\ mm}$ = 32:61:7 – 25:74:1

The inclusions are well sorted with clear unimodal distribution, ranging between angular to subrounded.

Composition: No distinction is made between coarse and fine inclusions.

Common:

1. Monocrystalline quartz – rarely with undulatory extinction, predominantly very fine angular to sub-angular grains smaller than 0.05 mm.
2. Lime – predominantly very fine grains of mixed angularity smaller than 0.05 mm
3. Marl and quartz agglomerates – elongated or randomly shaped coarse grains very difficult to differentiate from each other. They often appear in combinations of distinct grains and dense random formations, creating the visual effect of zones along the fracture. They are probably naturally occurring grains of marl with angular or sub-angular quarts, perhaps related to rock formations close to coastal regions (AS1820, AS1825).

Few:

1. Monocrystalline quartz - angular to sub-angular grains with sizes between 0.05 mm and 0.15 mm, often cloudy.
2. Schist – tabular, elongated or random shaped grains between 0.05 mm and 0.2 mm, containing smaller than silt size yellow mica, brown mica and quartz.
3. Biotite and yellow mica laths between 0.02 mm and 0.2 mm.
4. Lime – elongated or rounded to subangular grains with merged boundaries and less commonly clear boundaries; often appear as scattered particles that have been partly burnt and exhibit irregular shapes; range between 0.1 mm and 0.4 mm.

Very few:

1. Iron ores – well rounded or elongated ranging between 0.05 mm and 0.1 mm; rarely mixed with angular quartz particles of silt size (AS1825). AS1828 (Early Geometric cup) is an exceptional case, containing iron rich particles mixed with angular quartz and coarse lime.

Rare:

1. Polycrystalline quartz – equigranular, between 0.05 mm and 0.2 mm.

Very rare:

1. Feldspar – silt size, always transformed after firing.

III Textural Concentration Features

Tcf = between 5% and 10% (of total field)

Few rounded clay pellets with clear or sharp to merging boundaries, neutral to low optical density and concordant orientation. Dark brown or black in PPL (x40), often dark brown with rounded black spots of 0.1 mm maximum diameter in PPL (x40), bright brown to red in XPL (x40). Constituents: The larger ones (between 0.35 mm and 1 mm) contain mostly silt size angular to sub-angular quartz, while sometimes yellow mica needles and fine schist grains; all are medium to well sorted and exhibit fine internal orientation. In very few cases, large sized clay pellets contain no inclusions. The finer and smaller clay pellets (between 0.1 mm to 0.35 mm) contain no inclusions at all.

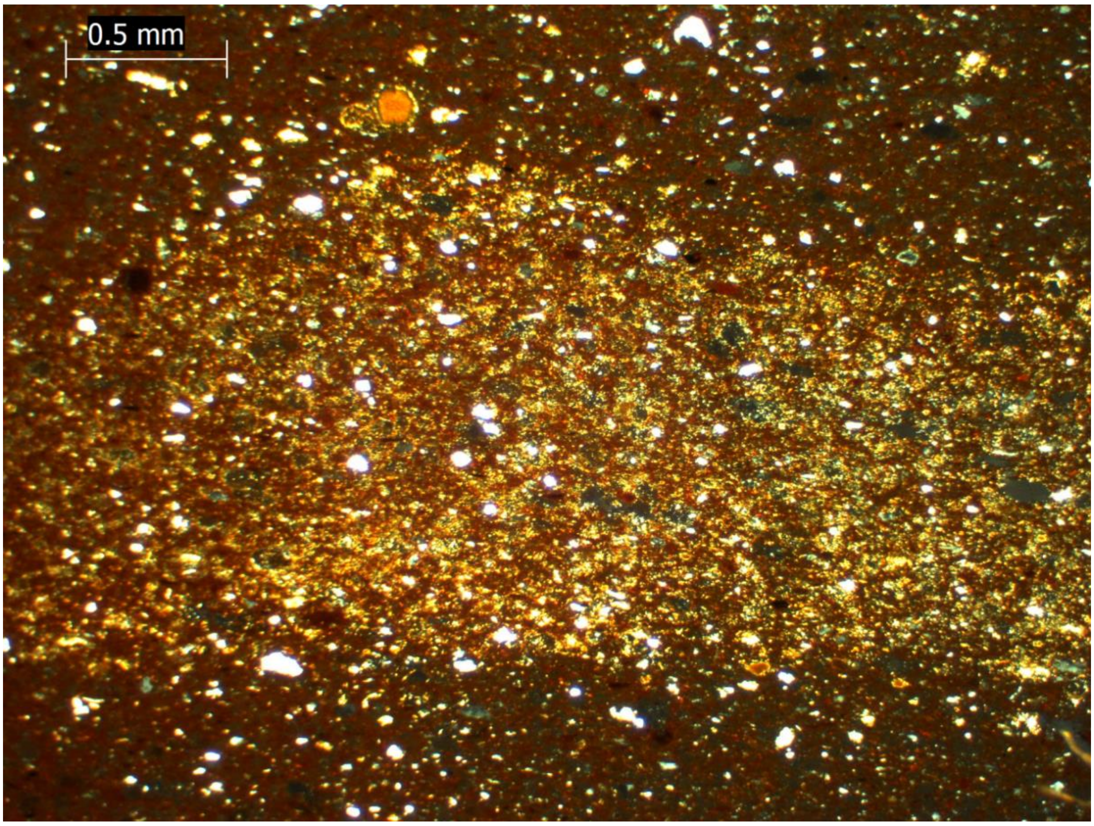

Figure 107: Variant 2 – Thin section of AS1820 (PA *Kotyle* or *Skyphos*), 4X0.10 magnification, XPL.

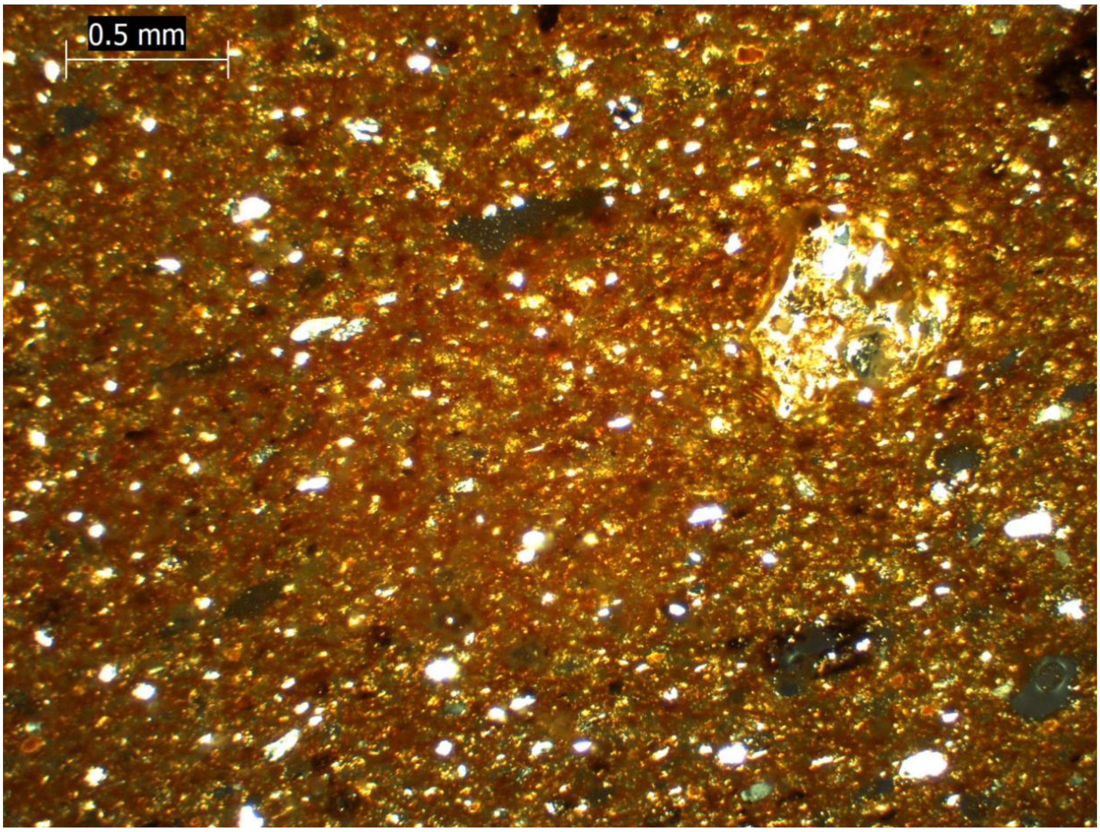

Figure 108: Variant 2 – Thins section of AS1825 (MG Amphora), 4X0.10 magnification, XPL.

7.2.2 Conclusions of Thin Section Analysis

Thin section analysis verifies that all samples are made out of the same fabric, which is a mixture of sandy sedimentary clay and marl. This fabric matches the geological composition around the Athenian *Agora* (Gaïtanakis 1982), which is composed of the Cretaceous Athenian 'schist' and other Quaternary sediments. The Athenian 'schist' is not a typical medium-grade metamorphic rock as is commonly described in geology; instead, it is a lightly metamorphosed sedimentary rock that has not been fully transformed to schist or gneiss.

This typical Athenian fabric ranges from very fine to extremely fine depending on its levigation, and is encountered in two variants (Figure 109) that differentiate according to their calcareous content: Variant 1 is tempered at a maximum of 10% with lime or marl and variant 2 contains lime/marl up to a maximum of 15%. The presence of different concentrations of lime or marl in this fabric could indicate three possibilities:

1. Lime/Marl was a naturally occurring temper in Athenian clays and was

found naturally mixed in different quantities with other sedimentary and/or metamorphic clays. This possibility is also in accordance with the local geology of Athens (Gaïtanakis 1982).

2. There might have been different levigation techniques employed by the potters to control the amounts of calcareous inclusions in their clays. In that case, fabric variations are possibly due to different fabrication strategies.
3. Some ancient potters purposely quarried clays that contained more lime/marl compared to the typical clay used in Athenian fineware production, selected from specific locations around local clay beds. In that case, fabric variations are the result of different quarrying strategies. It is also likely that one of their sources was located closer to the coastal regions.

Sample No.	Ware type	Chronology	Fabric (H.S.)	Fabric (T.S.A.)
AS1813	Amphora	PA	1	1
AS1821	Krater or Dinos	PA	1	1
AS1819	Kotyle or Skyphos	PA	1	1
AS1820	Kotyle or Skyphos	PA	2	2 (e.f.)
AS1814	Amphora	LG	1	1
AS1816	Early SOS Amphora	LG	1	1
AS1818	Krater	LG	1	2
AS1817	Oinochoe or Olpe	LG	1	1(e.f.)
AS1815	Cup	LG	2	2
AS1825	Amphora	MG	2	2
AS1823	Krater or Skyphos	MG	1	1
AS1822	Oinochoe	MG	1	1
AS1824	Cup	MG	1	1 (e.f.)
AS1829	Neck-handled Amphora	EG	1	1 (e.f.)
AS1826	Oinochoe	EG	1	1 (e.f.)
AS1827	Skyphos?	EG	1	1 (e.f.)
AS1828	Cup	EG	2	2

Figure 109: Comparison of fabrics under Hand Specimen and Thin Section.
KEY: e.f.(=extremely fine), H.S. (=Hand Specimen), T.S.A. (=Thin Section Analysis).

With regard to their fabrication, none of the two variants contains real coarse tempers (e.g. grog or other large aplastic rock fragments). As noted in Figure 109, large sized Late Geometric neck-handled transport amphorae of the SOS class are made out of the same fabric as medium sized pouring vessels and small drinking cups. In general, tempering fine clays with coarse inclusions (especially grog) increases the mechanical strength of pottery, particularly for vessels that are required to be durable to external mechanical shock (Skibo 1992; Rice 2005, 354-63). Transport vessels are more likely to carry such temper as opposed to serving or drinking vessels. In the case of Athenian Geometric and Orientalising finewares, however, this is not the case. It is more likely that ancient Athenian potters knew and trusted the quality of local clays, which performed equally well without coarse tempers. The quantities of fine aplastic inclusions that were naturally mixed in the local clays (e.g. quartz) would increase the hardness and durability of such fabrics, especially if fired in temperatures above 850 °C (Kilikoglou *et al*. 1998).

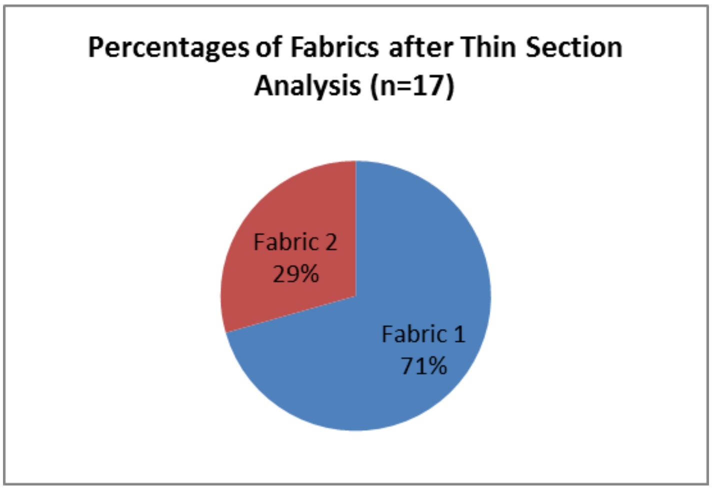

Figure 110: Percentages of fabrics after Thin Section Analysis.

Figure 109 also shows that the samples that were identified to belong to variants 1 and 2 after hand specimen examination match almost perfectly to those characterised as the same variants under thin section analysis. More specifically, four samples (AS1820, AS1815, AS1825 and AS1828) have been successfully identified as variant 2 with the use of both techniques, while 12 samples have been identified as variant 1. It is only one out of 17 samples, AS1818, which was characterised as variant 1 under hand specimen examination, yet it was proved to belong to variant 2 under thin section analysis. This misinterpretation is due to the dense texture of Athenian clays, which does not always allow clear identification of very small inclusions such as lime particles below silt size, particularly under low magnification (10X); therefore, hand specimen examination may not always be accurate. Still, it can be argued that both techniques point towards the same characterisations and the results obtained through hand specimen examinations are the same as the ones obtained through thin section microscopy. According to the pie chart presented in Figure 110, thin section analysis shows that the most frequent fabric is variant 1 (71%), while 29% of the samples belong to variant 2.

7.3 SCANNING ELECTRON MICROSCOPY (S.E.M.)

7.3.1 Analysis of ceramic pastes

SEM-EDX analysis of polished cross sections was conducted on 16 out of 17 samples from the Athenian *Agora* (Figure 111). Spectra were acquired at four areas along the surfaces of the cross sections (Figure 112), and all readings were normalised and calculated as oxides (see Appendix 2). AS1820 could not be analysed with this technique due to the small sample size extracted from the original sherd, which was enough only for thin section microscopy.

Sample No.	Ware type	Period	Fabric			Mean Oxide concentrations (%)										
			H.S.	T.S.	SEM	NaOH	MgO	Al_2O_3	SiO_2	KOH	CaO	TiO_2	Cr_2O_3	MnO	Fe_2O_3	NiO
AS1813	Amphora	PA	1	1	1	0.9	4.6	15.7	55.0	3.3	8.3	0.8	0.1	0.2	11.1	0.1
AS1821	Krater or Dinos	PA	1	1	1	0.4	5.3	16.6	54.0	3.1	9.9	0.9	0.2	0.2	9.2	0.1
AS1819	Kotyle or Skyphos	PA	1	1	1	0.4	5.5	17.3	53.3	3.5	7.6	1.1	0.2	0.2	11	0.1
AS1820	Kotyle or Skyphos	PA	2	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
AS1814	Amphora	LG	1	1	1	0.6	5.3	17.2	54.5	3.2	9.3	0.9	0.1	0.2	8.7	0
AS1816	Early SOS Amphora	LG	1	1	1	0.4	4.6	17.2	56.2	3.8	6.9	1.2	0.1	0.1	9.6	0.0
AS1818	Krater	LG	1	2	2	0.5	5.5	16.5	53.5	2.9	10.6	1.2	0.1	0.1	9.1	0
AS1817	Oinochoe or Olpe	LG	1	1	1	0.4	4.6	16.9	58.2	3.7	5.3	1.0	0.1	0.1	9.8	0
AS1815	Cup	LG	2	2	2	0.6	4.6	15.8	53.5	2.9	10.1	1.1	0.2	0.1	11.2	0.1
AS1825	Amphora	MG	2	2	2	1.0	5.2	15.5	49.9	2.4	13.2	1.1	0.1	0.1	11.5	0
AS1823	Krater or Skyphos	MG	1	1	1	0.3	6.0	18.0	53.7	3.8	5.8	0.8	0.1	0.2	11.1	0.1
AS1822	Oinochoe	MG	1	1	1	0.7	4.7	16.5	56.4	3.6	8.7	0.9	0.1	0.1	8.4	0.1
AS1824	Cup	MG	1	1	1	0.5	5.0	16.5	56.6	3.2	7.8	1.0	0.1	0.1	9.1	0.1
AS1829	Amphora N-H	EG	1	1	1	1.1	5.6	16.6	55.6	3.2	7.6	1.1	0.1	0.1	9.1	0.1
AS1826	Oinochoe	EG	1	1	1	1.0	5.3	16.8	56.2	3.5	6.8	0.9	0.2	0.2	9	0.1
AS1827	Skyphos?	EG	1	1	1	1.0	5.9	16.3	53.0	2.9	9.4	1.1	0.1	0.1	10.1	0.1
AS1828	Cup	EG	2	2	2	0.8	4.5	14.8	55.1	3.0	12.3	0.9	0.1	0.1	8.2	0.1

Figure 111: Comparison of fabrics after Hand Specimen examination (H.S.), Thin Section Analysis (T.S.) and Scanning Electron Microscopy (S.E.M.).

According the mean oxide concentrations presented in Figure 111, the first thing to notice is the homogeneity of all samples with regard to their sodium, magnesium, aluminium, silicon, potassium, titanium, chromium, manganese, iron and nickel oxides. The similarities among these concentrations verify the existence of a single fabric used in Athenian Early Iron Age fineware production, which was also typical across four chronological periods. At the same time, SEM-EDX analysis verifies the existence of at least two variants of this fabric based on mean CaO concentrations. Variant 1 contains CaO up to 10%, while the same concentration in variant 2 exceeds 10%.

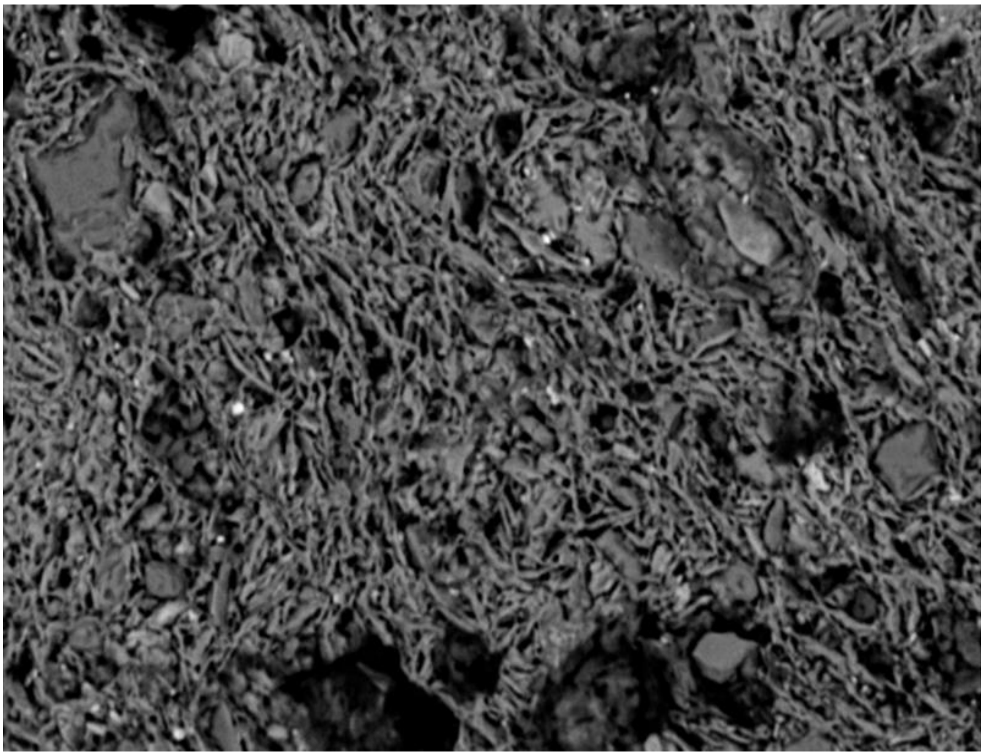

Figure 112: Example of polished cross section of AS1817 under SEM-EDX showing the microstructure of the vessel's paste (500X magnification).

Figure 111 shows that there are only 4 out of 16 samples produced from variant 2: AS1818, AS1815, AS1825, and AS1828. All the remaining samples have been produced from variant 1, which is the most dominant. According to Figure 113, variant 1 comprises 75% of the assemblage, as opposed to variant 2, which comprises 25% of the assemblage. Furthermore, all samples that have been identified as variants 1 or 2 under SEM-EDX match the same characterisations under thin section analysis (Figure 111). The comparison shows that both techniques point towards the same results.

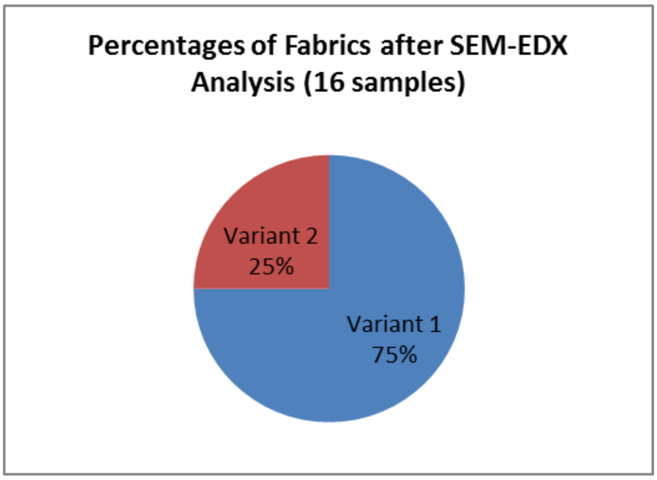

Figure 113: Percentages of fabrics after SEM-EDX analysis.

7.3.2 Analysis of coatings and paints

In the previous three chapters there was an analysis of decorative technologies based on simple colour descriptions and identification of slip or coating quality through macroscopic examination. In this pilot project, the coatings and paints of six decorated samples were initially recorded macroscopically by following the same conventions used in previous chapters (Figure 114). Then, the same decorative features were analysed under SEM-EDX microscopy to investigate their chemical composition. SEM-EDX analysis was carried on four points along the external surfaces of the samples' cross sections (Figure 115) and all spectra were normalised and calculated as oxides similarly to the analysis of pastes (see Appendix 2).

CHART OF DECORATIVE/ TECHNOLOGICAL CHARACTERISTICS							
Artefact information				Colour Groups		Slip or Coating Quality	
Sample No.	Ware Type	Chronology	Context of Recovery	External Elements	Internal Coatings	Thickness	External Appearance
AS1821	Krater or Dinos	PA	Well R17:5	2	2	Thick	Matte
AS1818	Krater	LG	Well P7:3	1	1	Thick	?
AS1824	Cup	MG	Well L6:2	1	1	Thick	Lustrous?
AS1828	Cup	EG	Well P8:3	3	3	Thick	Matte
AS1829	Amphora N-H	EG	Well P8:4	1		?	?
AS1826	Oinochoe	EG	Well P8:5	1		?	?

Figure 114: Decorative/technological characteristics of six test samples.

According to the chart in Figure 114, the six samples have been decorated with colours that belong to three groups: black (Group 1), brown/red (Group 2) and orange (Group 3). Thick internal coatings survive in four open shaped vessels, while two carry only external decorative elements. This small assemblage is suitable for microscopic investigation of decorative technologies as it represents the most typical ranges of colours and external treatments that have been encountered during macroscopic examinations in earlier chapters.

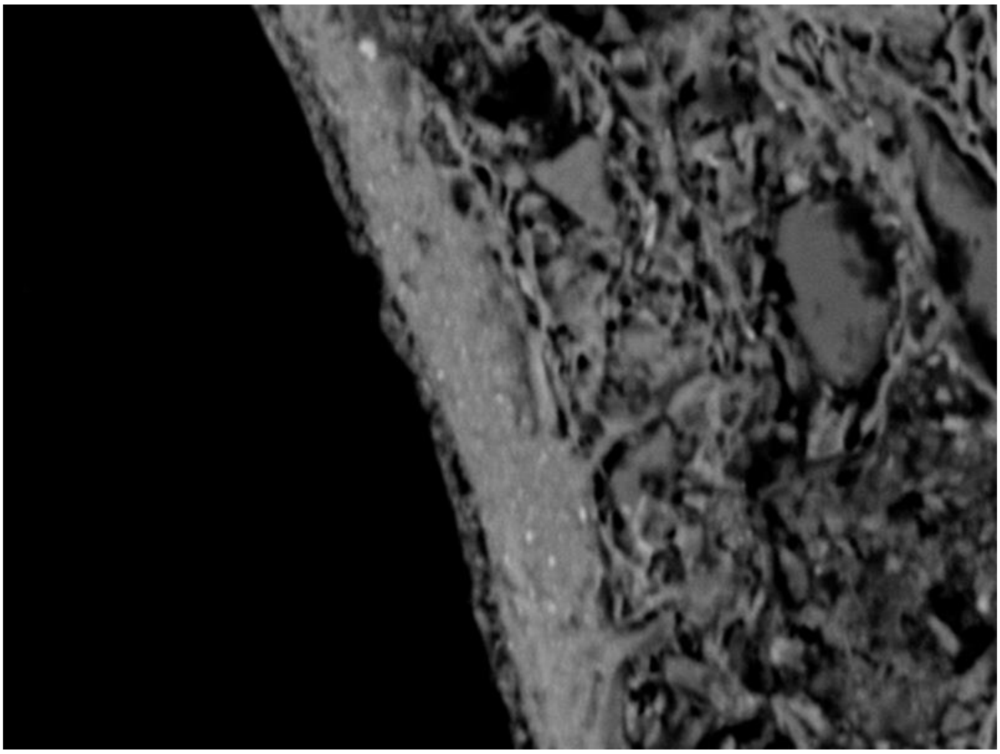

Figure 115: Example of polished cross section of AS1818 under SEM-EDX showing an internal coating covering the vessel's paste (500X magnification).

Sample No.	Period	Area	Mean Oxide Concentrations (%)									
			NaOH	MgO	Al_2O_3	SiO_2	KOH	CaO	TiO_2	Cr_2O_3	MnO	Fe_2O_3	NiO
AS1821	PA	Slip or Coating	0.8	6.2	15.2	49.2	1.3	8.8	1.6	0.2	0.2	16.6	0.1
AS1818	LG	Slip or Coating	1.1	2.8	26.4	44.6	9.5	1.4	0.6	0.1	0.2	13.3	0
AS1824	MG	Slip or Coating	0.3	2.1	29.8	47.3	4.8	0.4	0.6	0.1	0.1	14.5	0
AS1828	EG	Slip or Coating	0.8	2.4	28.7	47.0	5.9	1.3	0.4	0	0.1	13.4	0.1
AS1829	EG	Decorative Paint	0.6	2.0	30.1	44.5	7.1	0.4	0.4	0	0.1	14.7	0
AS1826	EG	Decorative Paint	2	2	27.9	44.1	8.5	0.5	0.5	0	0.2	14.1	0.1

Figure 116: Mean oxide concentrations (%) of coated/painted surfaces under SEM-EDX.

SEM-EDX analysis in Figure 116 shows that all samples have been decorated with iron rich paints/coatings, the content of which exceeds 13% in iron oxide. Despite their colour variations, the chemical composition of paints/coatings is the same: they are clay-based substances with high contents of silica and aluminium oxides refined or enriched to contain high quantities of iron (also see Tite *et al.* 1982).

Figure 117 presents a comparison of chemical compositions between paints used either for decorative elements or slips/coatings, and clay pastes for the same samples. The comparison suggests that mean concentrations of iron oxides in painted/coated areas are significantly higher than the same concentrations in vessel pastes. Sample AS1821 is exceptional and requires further investigation. This sherd comes from a 7th century BC *krater* or *dinos* and has been treated with a coating, which contains the highest iron and magnesium oxide concentrations in the entire assemblage (Figure 117).

Sample No.	Period	Area	Mean Oxide Concentrations (%)										
			NaOH	MgO	Al_2O_3	SiO_2	KOH	CaO	TiO_2	Cr_2O_3	MnO	Fe_2O_3	NiO
AS1821	PA	Slip or Coating	0.8	6.2	15.2	49.2	1.3	8.8	1.6	0.2	0.2	16.6	0.1
		Paste	0.4	5.3	16.6	54.0	3.1	9.9	0.9	0.2	0.2	9.2	0.1
AS1818	LG	Slip or Coating	1.1	2.8	26.4	44.6	9.5	1.4	0.6	0.1	0.2	13.3	0
		Paste	0.5	5.5	16.5	53.5	2.9	10.6	1.2	0.1	0.1	9.1	0
AS1824	MG	Slip or Coating	0.3	2.1	29.8	47.3	4.8	0.4	0.6	0.1	0.1	14.5	0
		Paste	0.5	5.0	16.5	56.6	3.2	7.8	1.0	0.1	0.1	9.1	0.1
AS1828	EG	Slip or Coating	0.8	2.4	28.7	47.0	5.9	1.3	0.4	0	0.1	13.4	0.1
		Paste	0.8	4.5	14.8	55.1	3.0	12.3	0.9	0.1	0.1	8.2	0.1
AS1829	EG	Decorative Paint	0.6	2.0	30.1	44.5	7.1	0.4	0.4	0	0.1	14.7	0
		Paste	1.1	5.6	16.6	55.6	3.2	7.6	1.1	0.1	0.1	9.1	0.1
AS1826	EG	Decorative Paint	2	2	27.9	44.1	8.5	0.5	0.5	0	0.2	14.1	0.1
		Paste	1	5.3	16.8	56.2	3.5	6.8	0.9	0.2	0.2	9	0.1

Figure 117: Comparison of mean oxide concentrations in slips/coatings/paints and pastes.

Furthermore, Figure 117 shows that all five Geometric samples have been painted or coated with materials of similar compositions to their pastes. In general, potassium and aluminium oxides appear in larger concentrations in the coatings/paints than in the pastes of these sherds. By contrast, titanium, calcium, silica, magnesium and sodium oxides appear in smaller concentrations in their coatings/paints than in their pastes. The Protoattic sample AS1821 follows a different pattern. Even though iron oxides are found in larger concentrations in its slip, all other elements exhibit the exact opposite pattern compared to the ones from the Geometric period.

This observation generates a series of interesting questions with regard to Protoattic pottery. Firstly, has the coating of AS1821 been fabricated differently compared to Geometric coatings, and does this relate to a distinct 7th century BC technological practice? Secondly, was its coating produced from the same clay as the vessel's paste by the use of a different levigation technique, or could it be the product of a different clay source? To answer these questions it is necessary to conduct further analysis on a larger assemblage of Protoattic sherds in the future.

7.4 DISCUSSION

7.4.1 Clay composition and provenance

This section discusses issues of provenance in relation to the composition of Athenian clays by combining data from previous publications. A main problem encountered in such comparisons is that previous studies employed different analytical techniques compared to this project, which also targeted different questions with regard to the nature of Attic clays. This section focuses primarily on the results of Thin Section Analysis.

According to present analysis, all Athenian Geometric and Orientalising finewares have been produced from the same fabric, which is a mixture of a fine sedimentary clay and fine lime-rich clay (most likely marl). This fabric comes in two variants that differentiate according to the sizes of their 'coarse' inclusions (mainly clay pellets and iron), and according to their calcareous contents. Variant 1 is finer and less calcareous (up to 10%), while variant 2 is slightly coarser and more calcareous than variant 1 (above 10%). Despite some difficulty in identifying these two variants under Hand Specimen examination, Thin Section Analysis and Scanning Electron Microscopy prove that their identification is correct.

As explained in Chapter 2, previous studies on Attic fabrics have discussed the existence of at least four clay sources exploited by Athenian pottery workshops: the '*Amaroussi*' clays, located in the modern municipality of *Marousi* (circa 11.5 km Northeast of the Athenian *Agora*); the *Iera Odos* clays (also known as *Sacred Way*) located less than 1 km from the Athenian *Agora*; the cape *Kolias* clays, located at the area of *Agios Kosmas* (circa 9 km South of the Athenian *Agora*); and the *Koukouvaounes* clays, located in the modern municipality of *Metamorphosi* (circa 10 km North-Northeast of the Athenian *Agora*) (Noble 1966; Farnsworth 1970; Gautier 1975; Fillieres *et al*. 1983; Jones *et al*. 1986, 150). The source of *Iera Odos* is the closest to the production site of the *Agora* suggested by Papadopoulos (2003), where the present 17 samples derive from.

Farnsworth (1970) described the *Iera Odos* clays as white and fine textured, by contrast to the red fine-textured clays from the source of *Amaroussi*. In an analysis of two modern clay samples from these two sources with the use of X-Ray Diffraction (XRD), Farnsworth (1970) characterised the red *Amaroussi* clays as illitic and relatively free of non-clay minerals[38]. Even though red clays were described as ideal for black glazed pottery, Farnsworth (1970, 17) explained that their high degree of shrinkage would have made it difficult to work with; therefore, Athenian potters would need to mix red clays with white clays such as those from *Iera Odos*, which contained large quantities of chlorite and montmorillonite together with illite. Of these constituents, chlorite is non-plastic with high degree of crystallinity, and therefore visible under X-Ray Diffraction (XRD).

The microscopic techniques discussed in the present chapter were designed to trace minerals based on their optical properties through Thin Section Analysis or chemical composition through Scanning Electron Microscopy (Rice 2005, 379-82, 401-2; Pollard *et al*. 2007, 118-20). By contrast, X-Ray Diffraction, which was used by Farnsworth (1970), is suitable for the identification of crystalline structures within the clay matrix (Rice 2005, 382; Pollard *et al*. 2007, 120); thus, the technique is more relevant to a discussion on shrinkage and plasticity. In the present Thin Section Analysis project, the main constituent mineral in all samples is fine-grained

[38] Illite is very fine grained muscovite mica.

quartz; therefore, the typical Athenian fabric is described as sedimentary as opposed to illitic, despite the frequent presence of micas under thin section. Farnsworth (1970, 17) explains that quartz is normally encountered in such samples; however, its peak would vanish under the peak of illite in X-Ray Diffraction, for both red and white Athenian clays.

Due to the use of different microscopic techniques, this project could not verify if the clays used in Geometric and Orientalising fineware production match the *Amaroussi* or *Iera Odos* sources, or if they are a mixture of both. In general, the fracture colour of Geometric clays is 5YR 7/3 and 7/4; therefore, they are neither white nor red as the modern clay samples examined by Farnsworth (1970). Again, colour variations are due to different parameters such as tempered inclusions (particularly iron or calcium-rich), firing temperatures, post-depositional deterioration, and finally human perception (Rice 2005, 331-46); hence, they are subject to bias.

An earlier study by Farnsworth (1964) included Thin Section Analysis on few Archaic coarsewares from Athens. These belonged to a different typological class and chronological period compared to the 17 samples that were thin-sectioned in this project. The main rocks present in Archaic coarsewares were quartzite and schist. Quartzite grains consisted of smaller interlocking grains of quartz, feldspars, and micas up to 10%. Schist fragments consisted of quartz, feldspars, biotite and dominantly muscovite mica. Quartz and feldspar grains found in Athenian coarse pottery were often strained, which is characteristic in metamorphic rock formations. Additionally, there was presence of heavy minerals related to aluminium silicates such as sillimanite, kyanite and staurolite, also characteristic in areas with metamorphic parent rocks (Farnsworth 1964, 223). According to Farnsworth (1964, 223) this geological content was common for both *Amaroussi* red clays and *Iera Odos* white clays. Quartz appeared to be a natural temper instead of artificial and the finer versions of Athenian clays were refined in such ways that only the finest inclusions remained present (Farnsworth 1964, 223). The 17 Geometric and Orientalising samples that were thin-sectioned in this project are of similar geological composition as the Archaic coarseware samples analysed by Farnsworth (1964); however, they have been levigated to expel large coarse and non-plastic tempers such as schist, feldspar and quartzite. In all 17 samples, fine schist and polycrystalline quartz are rare inclusions, while feldspars are almost absent or very difficult to identify due to alterations related to firing.

One of the finewares examined by Farnsworth (1964, 227) was a rim from a 5th century BC stemless cup, noted as sample 13. Its thin section showed a well settled fabric, which still retained some characteristically Athenian impurities, particularly fine flakes of muscovite (sericite). All inclusions exhibited good orientation as the result of the fast wheel (Farnsworth 1964, 227). The thin section of Farnsworth's sample 13 (1964, pl.68) matches the majority of thin sections presented in this project. It appears likely that Athenian finewares exhibited thorough levigation and their texture was very fine all along the Geometric and Orientalising periods. The same levigation techniques probably continued until Classical times. The only marked difference between the samples examined by Farnsworth (1964) and those analysed in this project is that the former have not been described as calcareous. It is highly unlikely that Farnsworth's samples contained no calcareous inclusions at all, as marls are common in the geology of Athens (Gaïtanakis 1982). Instead, it is more likely that such clays were purposely quarried or levigated to contain a minimum of calcareous tempers. All Geometric and Orientalising finewares analysed in this chapter were found to contain significant quantities of calcium carbonates in their paste and this is likely due to specific levigation or quarrying practices during the chronological periods under examination.

Gautier (1975) analysed ten Late Geometric vase samples of the '*Dipylon* style' from the Louvre Museum (mainly burial amphorae) with the use of Thin Section microscopy. Her study revealed that the *Dipylon* fabric denoted as Type M was a deliberate mixture of a red plastic clay with marl (Gautier 1975, 43-4). Her thin sections LM32 and LM33 (Gautier 1975, pl.3) correspond to variant 2 from this project. Apart from calcareous inclusions, Gautier's Fabric M contained abundant and well sorted quartz and mica (Gautier 1975, 29). Such inclusions were also typical in other Athenian fabrics presented in her study from the Orientalising period: samples LM43 and LM53 (Gautier 1975, 37-8, p.1-2) denoted as Fabric C were made from dense argillaceous clays, abundant in fine quartz and mica. The same exact inclusions characterise all Geometric and Orientalising samples examined in this project.

According to Gautier (1975, 53-6), the production of Athenian Late Geometric finewares made from Fabric M was destined for limited local consumption. The paste of Fabric M was a deliberate mixture of two clays, one argillaceous and one calcareous. Late Geometric production was followed by that of the 7th century BC, which exhibited features of experimentation: potters produced vessels from clays with different though geologically neighbouring tempers, which differentiated only in relation to sorting (e.g. Fabrics C and D) (Gautier 1975, 53-6).

This study shows that the use of mixed clays was neither limited in the Late Geometric period, nor restricted to the production of burial amphorae. Furthermore, SEM-EDX analysis suggests that the chemical composition of Attic clays did not exhibit huge variation in CaO concentrations; therefore, it is difficult to say that some vessels were deliberately tempered with more marl compared to others. By contrast, it is highly likely that these clays were naturally mixed in the local geological beds close to the Athenian *Agora*, matching perhaps Farnswoth's (1970) white clays of *Iera Odos*. The presence of lime and quartz agglomerates noted in samples of variant 2 under thin section could also mean a simultaneous exploitation of coastal clays between the 9th and 7th centuries BC, matching perhaps Gautier's sample from Cape *Kolias* (1975, 55-6).

Whatever the case, the mixing of different clays as a conscious fabrication practice, leading to the existence of different clay recipes, could neither be proven nor ruled out. Instead, it is more likely that the technological choices of Athenian potters related to different quarrying and refinement strategies instead of clay-mixing practices. This explanation is also in accordance with Liddy's (1996, 488) observations, who noted Attic fabrics resolving into multiple composition groups across different chronological periods (more in section 7.4.2). His possible explanations included the exploitation of similar clay beds, the wide natural variation in clay compositions within the same region, and the effect of different potters' practices in preparing the clay (Liddy 1996, 488-9).

7.4.2 Distinctiveness of Athenian fabrics

It is important to clarify that Athenian Geometric and Orientalising fabrics are characteristically different compared to fineware fabrics used in other Early Iron Age production sites. Because of the nature of this pilot study, comparisons on the fineness of textures and inclusions among different fabric groups can only relate to Thin Section Analysis, as this is the only technique to reveal such information.

Thin sections of Protocorinthian *aryballoi* of the middle 7th century BC show that the white clays of *Arcocorinth* look equally settled and fine-grained as Athenian clays; however, they contain large inclusions that are typical in highly calcareous sources (e.g. shale), which are not encountered in Athens (Farnsworth 1970, 11-12). Furthermore, other Corinthian finewares produced from red or white clays from the *Acrocorinth*, even those from Classical and Hellenistic times, retain large coarse inclusions such as quartzite, schist and spotted shale (Farnsworth 1970, 9-13). Again, such inclusions are not encountered in Athenian Geometric and Orientalising finewares, even though fine schist has been noted in Athenian coarse wares of the Archaic period (Farnsworth 1964).

The study by Whitbread (1995) on Greek transport amphorae with the use of Thin Section Analysis has shown that the typical Archaic fabrics contain large aplastic inclusions and coarse tempers. Archaic Corinthian amphorae, for example, contain large and coarse grains of mudstone, which are characteristic in the local geology. By contrast, the fine fabric of the early SOS transport amphora AS1816 from the Athenian *Agora* is unusual for the production of such vessels. The present study shows that its thin section is closer to the Athenian fabrics used for Classical decorated finewares noted by Gautier (1975).

A recent analysis on Early Iron Age fabrics from Knossos (Boileau & Whitley 2010) shows that the local fabric for painted semi-finewares and finewares bears similarities with the Athenian variant 1. More specifically, the fine Knossian fabric of Group 6 was used continuously in pottery production from the transition between the Subminoan and the Early Protogeometric period, until the Early Orientalising period. This chronological span relates to a period longer than four centuries (Coldstream 1968, 330-1). The preference in this fabric must have followed a strong technological tradition similar to the one noted in Early Iron Age Athens. Furthermore, the typical Knossian fineware clay is sandy, containing the largest amounts of fine and rounded monocrystalline quartz compared to any other local fabric. Biotite mica is frequent and clay pellets with merging boundaries are common to rare (Boileau & Whitley 2010, 249-52). Such fine inclusions are also typical in both Athenian Geometric and Orientalising variants; however, the Athenian texture is denser with less voids and the micromass is not mottled, which is the case for Knossian finewares. Furthermore, Knossian clays carry very few to absent grains of chert, calcimudstone, sandstone and serpentinite (Boileau & Whitley 2010, 249-52). Again, these inclusions are not encountered in Athenian clays.

The Athenian variant 1 bears similarity with a fabric of possible Euboean origin from Knossos, KN70 (Boileau & Whitley 2010, pl.3-f). KN70 comes from an Orientalising SOS transport amphora which has been stylistically identified as Euboean. Its fabric is definitely not the same as the one from the Attic Early SOS transport amphora AS1816, even though it resembles: both pastes are characterised by fine and well sorted silicate inclusions; however, the Euboean fabric contains dark grey clay pellets set in a dark red groundmass (Boileau & Whitley 2010, 236).

Finally, the Athenian variant 2 bears characteristic similarities with a Cycladic fabric from Knossos, KN24 (Boileau & Whitley 2010, pl.3-a). KN24 is made from calcareous-rich clay with frequent mica laths and sub-rounded monocrystalline quartz grains (Boileau & Whitley 2010, 235). It resembles the Athenian variant 2 with regard to its density and quality of inclusions, although it is probably more calcareous.

Despite some fabric similarities among Attic, Knossian, Euboean and Cycladic finewares, the present pilot study shows that Athenian production was favoured by high quality clay resources, which made Athenian fineware fabrics distinct.

7.4.3 Geometric and Orientalising pastes in relation to the pastes of other periods

This section compares the results of the present SEM-EDX study with other elemental analyses conducted in the past, with particular interest in the fluctuation of CaO and Fe_2O_3 contents[39]. The aim is to investigate possible chronological patterns in the clay recipes used in Attic/Athenian fineware production, an issue that has already been suggested by Gautier (1975) and Liddy (1996). It must be clarified that such comparisons can be misleading due the different laboratory standards used in the application of different analytical techniques (SEM, OES, NAA, etc.) (Liddy 1996, 478). The results discussed in this section must be treated with caution.

[39] In reality there are more than one iron oxides that are found in pottery (e.g. FeO, Fe_2O_3, Fe_3O_4, etc.), which are not always distinguishable under the SEM. In the current study Fe_2O_3 is used conventionally.

According to the mean oxide concentrations for 16 samples from the Athenian *Agora* grouped in four chronological periods (Figure 118), the typical clay in Geometric and Orientalising fineware production contains SiO_2 between 54.1% and 55.2%; Al_2O_3 between 16.1% and 16.7%; MgO between 4.9% and 5.3%; CaO between 8.4% and 9%; Fe_2O_3 between 9.1% and 10.4%; and finally, other oxides in low percentages. Figure 118 also suggests no distinct pattern with regard to the chronological period of these samples.

	Mean Oxide Concentrations per Chronological Group(%)										
	NaOH	**MgO**	**Al_2O_3**	**SiO_2**	**KOH**	**CaO**	**TiO_2**	**Cr_2O_3**	**MnO**	**Fe_2O_3**	**NiO**
PA				**Protoattic**							
Count	3	3	3	3	3	3	3	3	3	3	3
Mean	0.6	5.1	16.5	54.1	3.3	8.6	0.9	0.2	0.2	10.4	0.1
St.dev.	0.29	0.47	0.80	0.85	0.20	1.18	0.15	0.06	0.00	1.07	0.00
LG				**Late Geometric**							
Count	5	5	5	5	5	5	5	5	5	5	5
Mean	0.5	4.9	16.7	55.2	3.3	8.4	1.1	0.1	0.1	9.7	0.0
St.dev.	0.10	0.45	0.58	2.01	0.43	2.26	0.13	0.05	0.04	0.95	0.05
MG				**Middle Geometric**							
Count	4	4	4	4	4	4	4	4	4	4	4
Mean	0.6	5.2	16.6	54.1	3.2	8.9	0.9	0.1	0.1	10.0	0.1
St.dev.	0.30	0.57	1.03	3.11	0.61	3.13	0.13	0.01	0.05	1.52	0.05
EG				**Early Geometric**							
Count	4	4	4	4	4	4	4	4	4	4	4
Mean	1.0	5.3	16.1	55.0	3.2	9.0	1.0	0.1	0.1	9.1	0.1
St.dev.	0.13	0.60	0.91	1.39	0.26	2.44	0.12	0.05	0.05	0.78	0.00

Figure 118: Mean oxide concentrations of 16 samples under the SEM, divided in chronological groups.

This observation is by contrast different to Liddy's (1996) study on Attic Geometric imports from Knossos North Cemetery with the use of Atomic Absorption Spectroscopy. As explained in Chapter 2, his study showed the presence of two distinct composition clusters that belonged to specific chronological periods: cluster 3/4 contained predominantly Protogeometric to Middle Geometric samples (10^{th} and 9^{th} centuries BC), and cluster 3/5 contained Middle Geometric to Late Geometric samples (8^{th} century BC) (Liddy 1996, 478). Liddy's comparison of mean concentrations of Ca between clusters 3/4 and 3/5 showed that the Middle to Late Geometric cluster 3/5 contained larger amounts of Ca (8.42%) compared to the Protogeometric to Middle Geometric cluster 3/4 (3.19%) (Liddy 1996, 508, table 7).

By contrast, SEM analysis conducted in this project shows that mean CaO concentrations appear to be relatively steady across four chronological periods (Figure 118).

This absence of chronologically distinct fabric groups could be due to the different nature of SEM-EDX microscopy as opposed to Atomic Absorption Spectroscopy used by Liddy (1996), or due to the small sample size included in this study. However, Liddy (1996, 476) notes that his clusters 3/4 and 3/5 could be a similar cluster in the data space, and one needs to be cautious because of some uncertainty regarding the true origin of some samples. It is more than likely that the study by Liddy (1996) included vessels of broadly Attic provenance, as opposed to this study, where all vessels come from the Athenian *Agora*. The existence of production centres in Attica, which exploited clay sources with higher CaO contents compared to the typical Athenian clays has already been noted by Boardman & Schweizer (1973, 270) with regard to an Attic Archaic sample from Perati. In that sense, the results of the present study need to be compared with previous studies focused solely on Athenian finewares.

The study by Fillieres *et al*. (1983) with the use of Neutron Activation Analysis on a group of test pieces, figurines and potsherds from the Athenian *Agora* showed three chronologically distinct fabric groups: the Classical and Hellenistic Group A, the Protogeometric Group B, and the Subgeometric Group C. The study did not include any material from the Geometric period. The differences among these three groups of Attic clays meant that:

> "…either separate clay sources were used during each of these periods or that some other significant changes in the traditions of fabrication had occurred" (Fillieres *et al*. 1983, 62).

During this study, a modern clay sample from Cape *Kolias* matched the Subgeometric Group C (Fillieres *et al*. 1983, 61). Group A failed to match the sample from *Amaroussi*, which according to textual sources was supposed to be the clay source of Classical Attic pottery production (Fillieres *et al*. 1983, 61).

The concentrations of CaO and Fe_2O_3 offered by Filliere *et al*. (1983, 61) after Neutron Activation Analysis are the following:

Oxide concentrations in Fillieres *et al*. (1983, 61)		
Chronological Group	**CaO (%)**	**Fe_2O_3 (%)**
Protogeometric (PG)	9.1	7.4
Subgeometric (SG)	13.1	6.1
Classical	7.0	8.2

According to the study by Boardman and Schweizer (1973, 270) on 6th century BC Athenian workshops with the use of Optical Emission Spectroscopy, the same oxide concentrations for the Archaic period are:

Oxide Concentrations in Boardman & Schweizer (1973, 270-1)		
Chronological Group	**CaO (%)**	**Fe_2O_3 (%)**
Archaic from Athens	3.0 - 7.0	5.0 - 10.0

Finally, the study by Prag *et al*. (1975, 170, fig.5a) on Athenian Hellenistic black-glazed finewares offers the following oxide concentrations:

Oxide Concentrations in Prag *et al* . (1975, 170, fig.5a)		
Chronological Group	**CaO (%)**	**Fe_2O_3 (%)**
Hellenistic	2.0 - 7.0	6.0 - 19.0

In a comparison of the above data and the means presented in Figure 118 after present SEM-EDX analysis, mean calcium and iron oxide concentrations show the following chronological patterns:

FLUCTUATION OF CaO AND Fe_2O_3 ACROSS DIFFERENT CHRONOLOGICAL PERIODS									
	Protogeometric	Early Geometric	Middle Geometric	Late Geometric	Subgeometric (style) - 7th century BC	Protoattic - 7th century BC	Late Archaic - 6th century BC	Classical	Hellenistic
CaO	9.1%	9.0%	8.9%	8.4%	13.1%	8.6%	3-7%	7.0%	2-7%
Fe_2O_3	7.4%	9.1%	10.0%	9.7%	6.1%	10.4%	5-10%	8.2%	6-19%

According to calcium oxide fluctuation, there appears a gradual decline in the use of calcareous fabrics in Athenian fineware production from the Protogeometric to the Hellenistic era, which is interrupted only for the production of Subgeometric wares. Subgeometric pottery is the most calcareous of all chronological groups. Furthermore, iron oxide fluctuation does not follow any distinct chronological pattern, but again, Subgeometric pottery is distinct, containing the lowest percentages of iron.

It is important to clarify that there is no such thing as a Subgeometric period (see Chapter 2); the term refers to a ceramic style of the Geometric period that continued to be produced in the early 7^{th} century BC. High concentrations of calcium oxide in Subgeometric pottery in conjunction with low iron contents can be explained as a preference in more calcareous clays connected with the production of this specific ceramic style. This practice probably declined together with the Subgeometric style in the following periods.

As explained earlier, a comparison of element concentrations based on different analytical techniques must be treated with caution. According to the fluctuations of calcium oxide noted in different chronological groups, there are two possible explanations. Firstly, it is likely that earlier Iron Age Athenian pottery production exploited clay sources with higher calcareous contents compared to later times. Secondly, clay levigation techniques gradually improved from the Protogeometric to the Hellenistic period, resulting to less calcareous fabrics. Subgeometric pottery is exceptional and is likely to represent a conscious choice by potters to produce finewares from the most calcareous clays they could find. The reasons why this occurred are unfortunately unknown. Experimentation could be a possible explanation; however, this must be addressed in another microscopic project, which will include sufficient Subgeometric material.

7.4.4 Paints, slips, coatings and pastes

This section discusses the results after Scanning Electron Microscopy for the chemical compositions of pastes, slips, coatings and paints presented in section 7.3.2. Discussion is carried out in relation to previous studies, which examined the crystalline structure and microstructure of the same features with the use of other analytical techniques. The aim of this section is to elucidate to what extent colour and quality of external treatments were due to the chemical compositions of paints, slips and coatings.

Figure 116 shows that the chemical compositions of paints and slips/coatings of decorated finewares under SEM-EDX are similar regardless of their colour and external appearance as these have been macroscopically recorded in Figure 114. The decorated areas of the five Geometric samples exhibit higher concentrations of iron and aluminium oxides, and lower concentrations of silicon oxides in comparison to their pastes (Figure 117). One Protoattic sample (AS1821) stands out: its coating contains the highest readings in iron, silicon, calcium, titanium and magnesium oxides, and the lowest readings in aluminium oxide compared to any other sample (Figure 116). The decoration of this specific sherd shows different features compared to its Geometric counterparts and is highly likely to be the product of a different technological choice. This technological choice should be attributed to the painter who decorated it, as the potter who made it used the same typical Athenian clay, which matches the pastes of all other samples (Figure 117). In that sense, AS1821 could prove that the division of labour between potters and painters in Orientalising workshops was not only present, but also defined by a different range of technological choices. As the sample is too small to produce certain conclusions, this suggestion must be treated with caution.

The paints of Attic Classical pottery have been studied with the use of Scanning Electron Microscopy, Optical Microscopy, Electron Microprobe Analysis and X-Ray Diffraction by Tite *et al*. (1982). Their study demonstrated that the paint of Attic vessels was likely produced from the refinement of the same clay used for pastes, by the extraction of its heavier impurities through the dissolution and suspension of the mixture in water. The composition of the typical Attic paint, described as intentionally red or black gloss, was found to contain higher aluminium to silicon ratios, higher percentages of iron oxide, and lower contents of magnesium and calcium oxides compared to the typical Athenian paste (Tite *et al*. 1982, 121). In terms of mineralogy, the black gloss of Attic finewares contained a spinel of magnetite-hercynite (Fe_3O_4 – $FeAl_2O_4$) and the red gloss was identified to contain hematite (Fe_2O_3). By contrast, the paste used for the body of the vessels contained a combination of hematite, quartz, anorthite, diopside/wollastonite, and ghelenite (Tite *et al*. 1982, 121). The present SEM-EDX analysis between pastes and coatings/slips verifies the same observations regarding aluminium, silicon, iron, magnesium, titanium and calcium oxide ratios; however, only with regard to the Geometric samples.

The quality of 4th century Attic glosses has also been examined with the use of X-Ray Diffraction by Marie Farnsworth (1970). According to Farnsworth:

> "…besides possessing a clay high in illite which made a glossy black glaze, the Athenians used the same red clay (modified by less plastic

white) for the fabric and this assured an ideal condition for glaze adherence" (Farnsworth 1970, 19).

This suggestion explains why Athenian potters could not use completely different clays with significant differences in their mineral constituents, one for the paste and another for the gloss. It must be noted that the black gross described by Tite *et al.* (1982) and the glossy black glaze according to Farnsworth (1970) are exactly the same as the thick lustrous coatings described in this thesis.

According to the study by Tite *et al.* (1982) the chemical composition of Attic paints was similar across different wares and resulted to glossy external appearances in black or red colours. The intentionally red or black gloss on the vessels' surfaces could have resulted in a single firing cycle divided in three steps: oxidised, reduced and re-oxidised (Tite *et al.* 1982). Noble (1960; 1966) suggested that the firing cycle of Attic red-figured and black-figured wares was divided in four steps instead of three: (1) firing under oxidised conditions up to 800 ºC; (2) firing under reduced conditions between 800 ºC and 945 ºC; then, followed by cooling up to a temperature of 900 ºC - or perhaps 875 ºC (in Noble 1960, 318); (3) re-oxidised firing at 900 ºC -or perhaps 875 ºC as explained in Noble (1960, 318); and (4) gradual cooling in oxidising conditions until the vessel was removed completely from the kiln (Noble 1966, 167). Whatever the case in Classical Athens, the test pieces recovered at the Athenian *Agora* (Papadopoulos 2003) suggest that kiln control was most likely similar -if not the same- in Attic Early Iron Age pottery production.

In the present study, it is more likely that the decorative colours and external appearances that were recorded macroscopically with simple conventions were achieved through different firing combinations. Variations in temperature[40] and duration of the three-stage firing cycle were more likely responsible for the external appearance of decorated finewares instead of an intentional choice in the use of paints with specific chemical composition. The presence of bichrome *skyphoi* noted after MGII-LGIa in Chapter 6 is a paradox that requires further investigation and

[40] Temperatures are studied trough the effect of vitrification, which takes place between 750 ºC and 800 ºC depending on the nature of the clay. Calcareous clays (containing CaO above 6%) show initial vitrification at temperatures between 800 ºC and 850 ºC in oxidised conditions, and between 750 ºC and 800 ºC in reduced conditions (Maniatis and Tite 1981, 61). Thermomechanical analysis on Geometric test pieces from the Athenian *Agora* proved that vessels were fired in a range between 700 ºC and 850 ºC "regardless of time period, context or fabric colour" (Schilling 2003, 332).

targeted SEM-EDX analysis in the future. For bichrome vessels it could be likely that such effects were produced due to the application of paint in layers of different thickness along the vessel's walls; alternatively, post-depositional deterioration may be responsible for this phenomenon.

7.5 CONCLUSIONS OF MICROSCOPIC ANALYSIS

The present microscopic project on 17 Geometric and Orientalising sherds from the Athenian *Agora* verifies that the fabric characterisations obtained through macroscopic examination (Hand Specimen) are the same as those analysed under more sophisticated microscopic techniques (T.S.A. and S.E.M.). According to all analyses, Athenian finewares were made from the same fabric all across three centuries (9^{th}-7^{th} centuries BC), which resulted in two similar variants diversified according to their coarse tempers and calcareous content. Both variants were common in the local clay beds, while technological choices must have varied in relation to quarrying and levigating strategies employed by potters or workshops.

According to previous studies (Jones *et al*. 1986, 168), analytical tests on Attic vessels indicate that different clays and procedures were employed as functions of time and ceramic type. Furthermore, experimentations in fabrication techniques became popular in the Early Archaic period and fabrics became standardised by reaching to the Classical era (Gautier 1975, 55-6). Liddy (1996, 489) points to the direction that experimentations might have already begun towards the end of the Middle Geometric period, particularly regarding the use of calcareous clays.

The present study could not prove the popularity of experimentations in the levigation or fabrication of clays between Early Geometric and Protoattic times, at least in relation to the production of finewares. By contrast, all samples were found similar under thin section. There are some variants containing lime-quartz or iron-quartz agglomerates; however, these cannot be regarded as products of conscious experimentation. The only difference with significant importance observed under SEM-EDX relates to the concentrations of CaO in each sample. Again, the existence of sherds with larger or smaller concentrations of CaO in their fabrics does not follow any specific chronological or typological pattern.

Although Gautier (1975) ties the use of 'mixed' fabrics with the production of fine *Dipylon*-style vessels, this observation must expand: such fabrics were simultaneously used in the production of other Geometric and Orientalising wheel-made decorated pots. Despite the symbolic or ceremonial role of such vessels in feasting and Attic burial rites, it is interesting to note that vessels with practical functions such as early SOS transport amphorae were also made from the same fine fabric.

The existence of deliberate clay-mixing strategies based on the potters' conscious technological choices could neither be proven, nor ruled out. It is more likely that such 'clay-mixtures' were naturally present in the local clay beds. If there were some technological choices involved, these would have probably related to quarrying or levigating (clay refinement) strategies.

Finally, SEM-EDX analysis proves that iron rich clays were used all along the Geometric and Orientalising period for the production of decorative paints and coatings. These were produced from the refinement of the original pastes of the vessels and their iron oxide contents were by far higher compared to those in the pastes. Colour variations on the decorated areas most likely occurred as a result of firing conditions instead of chemical compositions.

The use of iron rich clays for the production of coatings, slips and paints cannot be connected with advances in ceramic decoration across time. Potters employed the same levigation techniques to produce iron rich suspensions from the very Early Geometric, if not earlier. During the popularity of the figurative style in the Late Geometric period (c.760 BC), potters and painters were already using the same recipes. Therefore, stylistic changes are highly unlikely to have caused technological advances with regard to the levigation of paints and coatings. An interesting exception is the Protoattic sample AS1821. Its coating could have been the product of a different levigation procedure, or it might have been produced from completely different clay compared to the sample's paste. Whatever the case, AS1821 could be the product of some technological experimentation; however, further investigation is necessary through the analysis of a larger number of decorated Protoattic samples.

CHAPTER 8: FINAL DISCUSSION

8.1 SOCIAL CHANGES AND PRODUCTION RESPONSE

This section addresses the questions originally set in the introductory chapter of this thesis in relation to the conclusions presented at the end of each analytical chapter (4-7). The addressed questions are two: firstly, were social changes responsible for technological advances in the ceramic production sequence (*chaîne opératoire*) of Attic Geometric and Orientalising finewares? And secondly, what was the potters' response to these social changes?

8.1.1 When did social changes occur in Early Iron Age Attica?

As noted in Chapter 2, defining what consists of social transformation in Early Iron Age Attica and when this took place is not an easy and straight-forward task. There has been a lot of discussion by a number of scholars who do not necessarily agree on this issue, and their arguments have pointed out different types of social transformations occurring in different phases of the Geometric and Orientalising eras. In order to answer the above questions, it is important to summarise the points presented by each scholar.

Anthony Snodgrass (1977, 11) was the first to argue that towards the middle of the 8th century BC Greece faced a significant demographic expansion. In Attica in particular, the steep rise in the numbers of burials at *Kerameikos* and other peripheral cemeteries suggest that c.760 BC society faced a population growth, which probably led to the territorial unification (*synoikismos*) and rise of the Athenian *polis*. This period of social change (LGIa) coincided with the time of the *Dipylon*-master workshop and the increasing popularity of figurative style decoration.

In his *Burial and Ancient Society,* Ian Morris (1987, 216) noted three periods of social change according to the fluctuations from primary cremation to inhumation:

(a) The end of the Middle Geometric period (c.760 BC or MGII-LGIa).
(b) The beginning of the Orientalising period (c.700 BC or LGIIb-EPA).
(c) The end of the Archaic era (c.600 BC).

Morris (1987) agreed with Snodgrass (1977; 1980) that LGIa was a period of important social change, also followed by a second one during the transition between LGIIb and EPA. However, he argued that both were not the result of population expansion, but political struggle between the nobles (*agathoi*) and the non-elites (*kakoi*) (Morris 1987, 94-6). In his opinion, the non-elites were responsible for the rise of visible burials noted by Snodgrass (1977, 11) during LGI, as before that time their dead were disposed in ways that did not leave trace in the archaeological record. Furthermore, towards the turning of the 7th century BC he saw a reaction by the elites, who re-asserted the social order that existed in Athens prior to LGIa, leading to a new reduction in the number of visible burials (Morris 1987, 22-6).

Morris (1987, 22-6) saw that the reaction of the elites against the non-elites during the beginning of the 7th century BC was a step backwards from the political developments that were meant to follow a century later, leading to the rise of the Athenian democracy. Similarly, Osborne (1989) noted a strong sense of conservatism in the Protoattic style, which could justify the existence of a plethora of social groups in Athens during the early 7th century BC (Osborne 1989, 320-1).

By contrast to Morris (1987), in his *Style and Society in Dark Age Greece* Whitley (1991) suggested five different periods of social change between Protogeometric and Late Geometric times. These changes did not relate to political struggles but to age, gender and social status distinctions projected through Attic funerary rites:

1. The Sub-Mycenaean era, characterised by lack of distinct demarcation among person-types (Whitley 1991, 181).
2. The Protogeometric period, during which the choice of artefacts placed in burials and also the painted motifs on pottery underlined and emphasised sex distinctions (Whitley 1991, 115, 182).
3. The 9th century BC (from EGI until MGI), where artefacts and ceramic styles showed selectivity and exclusivity in relation to sex and wealth of the dead (Whitley 1991, 136, 182).
4. The early 8th century BC (between MGII and LGI), where the same pattern continued; however, by the end of this period (around the middle of the 8th century BC) there appeared dissolution. The complexity of ceramic decoration and variability of painted motifs stopped being gender specific and aimed to symbolise wealth and social status (Whitley 1991,

157-61).

5. The late 8th century BC (during LGII), which marked the complete breakdown of aristocratic order. During that time burials became uniform and there was less exclusivity in the consumption of exotica and ceramic forms. Pottery production became regulated by increasing elite demands and person distinctions followed a new pattern: instead of diversifying between males and females (based on sex), burials aimed to mark differences among adults and infants (based on age) (Whitley 1991, 177-80, 182-3).

Whitley (1991, 183) suggested that the increasing interest in adulthood in combination with the uniformity of LGII funerary rites reflected a form of *isonomia* among social groups, probably attributed to the early formation of the Athenian *polis*. Furthermore, Whitley (2000, 229-30) noted the decline of rich female burials after LGII and argued that this specific phenomenon should be seen as an Athenian paradox (Whitley 2000, 230; also in Osborne 1989; Whitley 1994b). He saw that during the Orientalising period women were represented on Attic finewares as mourners or monsters; however, in burials they did not exist as recognisable social types who could have played an important role in society (Whitley 2000, 230-1).

By contrast to Whitley (2000), Langdon (2006; 2008) saw that gender restructure in Attica took place right after LGI, in a time when Geometric iconography was used to define new social roles for women. In her opinion, figural art displayed ideological symbolisms in order to construct social identity and gender hierarchy within the community, during the rise of the Athenian *polis* (Langdon 2008, 3-11).

Laughy (2010, 49-50) argued that the increase in the number of burials in Athens and the Attic countryside during LGII indicate access to formal burial by non-aristocratic social groups[41]. Such groups of low social status probably managed to earn enough wealth in order to compete with the aristocrats that reserved the right of elaborate burial in previous times (Laughy 2010, 49-53).

[41] Laughy (2010, 49-50) defines these groups as low social classes, also referenced as such by Alexandridou (2015); however, the presence of class distinctions in Early Iron Age Athens according to the typical Marxist sense is highly unlikely. Duplouy (2006) carefully avoids any discussion on social class and defines such social groups based on their aristocratic prestige. This could have been hereditary or also constructed. In this thesis the term social group is considered more appropriate compared to the term social class.

Alexandra Alexandridou (forthcoming) argues that recent funerary evidence suggest that Attic LGII burials do not reflect Morris' (1987, 205) political *isonomia* between elites and non-elites. Instead, they reveal divisions based on age and gender that demarcate kinship groups. Still, by the early 7th century BC this funerary representation of kinship comes to an end: females become invisible and adult males are the only survivors in the archaeological record (Alexandridou, forthcoming; also noted by Whitley 1991; 2000).

8.1.2 Production response during the social changes of the 9th and late 8th centuries BC

After summarising the views of previous scholars on social transformations of the Geometric and Orientalising eras, it is time to move to the relationship between pottery production and social change. The first two periods under examination are the 9th century BC (between EGI and MGI) and the late 8th century BC (the period after LGII). During these two periods, Whitley (1991, 181-3; 2000, 229-30) notes important changes in relation to gender and social status.

Present macroscopic analysis shows that three of the largest vessel groups encountered in this project date in the period between EGII and MGI. More specifically, these are the largest decorated neck-handled amphorae from *Kerameikos* (925, 254, 2136, 2140 and 1249); the largest *oinochoe* from *Kerameikos* (2149) and the largest group of *oinochoai* from the *Agora* (P18618, P18622, P6204, P6164, P552 and P6409); and finally, the characteristic wide *skyphoi* with stirrup handles from *Kerameikos* (2143, 2144, 888 and 889). The production of all these vessels matches the period of selectivity and exclusivity in relation to sex and wealth noted by Whitley (1991, 136, 182) in 9th century BC burials, and more specifically between EGI and MGI. As noted in previous chapters, all these vessels are most likely the products of distinct workshops or potters.

Secondly, the tallest closed ceramic containers from the Athenian *Agora* and the British Museum collections have been produced after LGII and four of them (P4980, P32887, P4768 and P16990) come from burial deposits. Chapter 4 also suggests that amphorae of distinct conceptualisation related to experimentations (e.g. P4768, P16990 and GR1927,0411.1) and new shapes (e.g. SOS amphora 1298) date in periods after LGII. The production dates of these vessels match the collapse of social order and the rise of distinctions between adults and children suggested by

Whitley (1991, 177-83; 2000, 231) towards the end of the 8^{th} century BC.

According to this project, it appears likely that there was some sort of response in fineware production during these two periods of noted social changes. Both periods mark the manufacture of exceptionally large vessels, some of which shaped on conceptualisations that stood away from the technological traditions of the Geometric era. Still, both assemblages are exceptional and do not comply with the general tendency in fineware production.

Whitley (1991, 11-12) argues that the decoration of Attic Geometric finewares was not only an issue of technical or artistic accomplishment, but also the product of specific social demand; therefore, the development of Attic Early Iron Age styles depended upon a strong social logic. The present thesis cannot argue against the possibility of a strong social logic behind Attic Early Iron Age decoration; however, it suggests that the broader *chaîne opératoire* of Attic decorated finewares was subject to strong technological traditions that remained unchanged for at least two (if not three) centuries, despite the changing nature of society. Such technological traditions related to the use of specific natural resources and to the presence of distinct conceptualisations in the shaping of different fineware classes.

More specifically, the strongest technological tradition in the production of all finewares examined in this thesis relates to the use of a single fabric, which results in two similar variants that are difficult to distinguish under hand specimen examination. None of the two variants contains large-sized tempers (e.g. grog or large rock fragments), which is highly unusual, particularly for the production of thick-walled vessels such as amphorae. Furthermore, Attic Corinthianising vessels, such as *skyphos* P5286, are produced again from the same fabric. Microscopic analysis conducted in Chapter 7 proves that this fabric was in use across three centuries (9^{th}-7^{th} centuries BC) and its variants derived from local geological formations.

The analysis of metrical features and proportions conducted in Chapters 4 and 5 reveals that closed ceramic containers were highly standardised regardless of their period of production, and also all Late Geometric pouring vessels. Potters followed some pre-existing conceptualisations that functioned as traditional archetypes. According to the discussion on typologies presented in Section 3.2.4, it is likely that such archetypal forms originated from similar shapes of the Submycenaean and Protogeometric period. In this project, standardisation was noted with regard to two strong technological traditions. In the first tradition, the necks of closed ceramic container were produced at roughly 30% of a vessel's net height, and those of Late Geometric standard trefoil *oinochoai* and pitchers at 37.5% of a vessel's net height. In the second technological tradition, the handles of neck-handled amphorae (banded or elaborately decorated) and *hydriae* were attached at a proportion of roughly 2/3 of a vessel's net height (roughly between 67% and 69%), while the handles of all Late Geometric *oinochoai* -regardless of typological class- and pitchers were attached at roughly 60% and 61.5% respectively. The handles of both *kantharoi* and *skyphoi* were attached at similar heights, between 70-71% of a vessel's net height (or at a fraction of 7/10), although the *Kerameikos skyphoi* assemblage could suggest that a second technological tradition existed simultaneously to the first one.

According to the above observations, the dominance of strong technological traditions over such a long period of time is likely to suggest that the social logic interwoven in fineware production was weaker compared to how Whitley (1991, 11-12) describes it. In fact, if there was a strong social logic, this was most likely confined to ceramic decoration. According to this thesis, the core aspects of fineware production were never meant to change or adjust, regardless of the changes noted in consumption demands over time.

8.1.3 Production response during the social changes c.760 BC

The presence of strong technological traditions in Attic Geometric and Orientalising fineware production characterised the work of potters instead of painters. As argued in previous chapters, painters probably enjoyed greater freedom in their work, particularly after the expansion of figurative style decoration circa 760 BC. If this is the case, then could it be likely that the social changes after LGIa noted by Morris (1987, 216) and Langdon (2008, 10, 63) were responsible for major changes in ceramic production? The answer is probably no.

According to the present study, the Late Geometric period is characterised by two major changes related to the decoration and external treatment of some specific fineware types: firstly, there is a decline in the use of thick external coatings for elaborately decorated amphorae and *oinochoai*, and secondly, there is an expansion of decorative colours used for coatings and painted motifs for the same typologies. Despite the fact that these two changes are likely to relate to the spread of figurative decoration, both patterns are not general in Late Geometric fineware production. By contrast, specific wares such as banded amphorae and pitchers were decorated in a standardised manner all along the Geometric era, with black or brown black colours applied on uncoated surfaces. Secondly, colour variability on *skyphoi* begins as early as MGII, while the decline of coating practices on *kantharoi* is noted after the end of the Late Geometric period. Finally, the imitation of metallic sheens on the external surfaces of *oinochoai* and the gadrooning of *skyphoi* appear for the first time during LGIa[42] but become stronger after LGIb. At that time coating practices are already in decline in the external treatment of other vessels.

With regard to the general patterns noted on Attic finewares, this study demonstrates that the production of the Late Geometric period is characterised by two distinct events, none of which related to decoration and external treatments: firstly, the appearance of new shapes, and secondly, the beginning of standardisation in the manufacture of pouring vessels. Again, the technological choices connected to both phenomena are highly unlikely to relate to any social changes during that time.

More specifically, during LGIa there is the first appearance of shapes such as monumental *Dipylon*-style amphorae, giant *oinochoai*, pitchers, broad and neck-less trefoil *oinochoai*. Galanakis (2013, 37) notes that the first three were "invented" by the *Dipylon* Master. According to the *chaîne opératoire* theory, however, ceramic shapes are not invented but conceptualised (*sensu* Van der Leeuw 1994, 136-7); therefore, such shapes are products of innovative conceptualisation.

The introduction and manufacture of innovative shapes c.760 BC could have reflected the consumption demands of competing elites in Late Geometric burial rites as these have been suggested by Morris (1987, 97-104) and Whitley (1991, 177, 182-3). Boardman (1998, 25) suggests that the only shapes connected solely to elite consumption were monumental amphorae and this study demonstrates that their production required a completely different *chaîne opératoire* compared to any other fineware. Even though shapes such as neck-less trefoil *oinochoai*, giant *oinochoai* and pitchers were newly introduced during LGIa, the *chaîne opératoire* that produced them was not. Furthermore, pots of district sizes and innovative conceptualisation were also produced during periods before and after 760 BC, and more specifically during EGII-MGI and after LGII. In general, the introduction of

[42] Pottery imitating metallic prototypes is thought to have related to status display; however, Vickers and Gill (1994) doubt whether such pots demonstrate aristocratic consumption.

new shapes during LGIa cannot be seen as the result of social transformations, with exception perhaps of monumental amphorae.

Monumental *Dipylon*-style vessels were the distinct products of a *chaîne opératoire* based on combined techniques such as hand-building, wheel-finishing and possibly moulding (see below); therefore, it is not entirely correct to categorise such vessels as 'wheel-made finewares'. They resembled typical amphorae as their constituent parts could have been formed on a wheel; however, their assembling procedure was probably not. The only sample examined in this thesis, neck fragment P22435 (Burr 1933, 570-1), weights c.14 Kg in fired state[43]. If the neck of an amphora is roughly 25% of a vessels weight, then the total weight of the entire vessel would have been c.56 Kg in fired state. If one adds another 25% of maximum water weight-loss after drying and firing (Rice 2005, 65), then the gross weight of the pot at the end of its forming process would have been c.70 Kg. It is highly unlikely that an average Geometric potter's wheel could have supported such weight without collapsing, not to mention the amount of kinetic energy that would have been required to spin such weight on the wheel; therefore, it is more likely that the assembling of monumental amphorae was executed on a low-speed turntable.

Hasaki (2002, 224) notes that *Dipylon*-style amphorae did not fit inside an average Geometric kiln; thus, such vessels were probably fired on their own. If this is indeed the case, then their production could have been seasonal following the model suggested by Arafat & Morgan (1989). According to Coldstream (1968, 42-6; also Knigge 1988, 20-4), the production of such vessels began during LGIa but declined sometime in LGII; therefore, it reflects a chronologically distinct trend. It could be likely that the production of monumental amphorae was not only seasonal and specific to burial customs, but also destined to satisfy a short-lived consumption demand.

In relation to their manufactural complexity, monumental *Dipylon*-style vessels could have been produced with the use of moulding techniques, similar to those employed in tile production[44]. The presence of a vertical crack on P22435 could explain a vertical joint on the edges of parallel slabs, resembling flat

[43] In its present condition, P22435 weights c.16.5 Kg after excessive restoration. This includes the adjustment of three short iron bars vertically under the neck joint on the vessel's broken shoulders, which allow the sherd to stand straight. The weight of the neck sherd without the three iron bars is estimated c.14 Kg.

[44] For the *chaîne opératoire* of Protocorinthian tiles see Sapirstein (2009).

rectangular tiles. Even though there are no excavated tiles coming from Geometric Athens, the earliest known samples from the Old Temple of Apollo at Corinth date in the beginning of the 7th century BC (Weinberg 1939, 595; Roebuck 1955, 156-7; Winter 1994, 12-16). Production techniques are likely to date earlier than that time: tiles were used during Middle Helladic II at Lerna (Wiencke 2000) and Protocorinthian tiles have been characterised as a post-Mycenaean re-invention (Williams 1980, 346; Robinson 1984, 55-7). After Corinth, tile production expanded during the late 7th and 6th centuries BC in the rest of the Peloponnese, Attica and Asia Minor (Wikander 1990). The earliest antefixes from the *Acropolis* suggest that tile-making was known in Athens during the early 7th century (Wikander 1990, 285); however, it is not entirely sure if tile production techniques were known to Athenian craftsmen during the 8th century BC.

It is also likely that monumental *Dipylon*-style vessels were assembled in cylinders instead of slabs, following techniques that matched the production of *pithoi*. If this is the case, then the vertical crack on P22435 could be due to a post-depositional accident. Even though there have not been any *pithoi* recovered in Early Iron Age Athens, there are many 8th century BC vessels from Zagora in Andros[45], and strong traditions in the production of such shapes also existed in Late Geometric and Orientalising Cyclades, Crete and Rhodes (Ebbinghaus 2005). Particularly at Knossos, such shapes date back to the Subminoan-Early Protogeometric period (Catling & Coldstream 1996). Papadopoulos (1998) argues that shapes with Cretan influence were already known in Athens since MGI: *krater* P6163 from the *Agora* was originally conceptualised as a *hydria*; however, the potter decided to cut the vessel in half before firing it and produced a bucket-shape that resembled Cretan Early Iron Age storage vessels.

Future X-Ray analysis of monumental *Dipylon*-style amphorae is likely to reveal the secrets of their *chaîne opératoire*; whatever the case though, this *chaîne opératoire* was significantly different compared to typical Athenian wheel-made amphorae of regular sizes. Both vessel classes resembled in their fine fabric, while the painters who decorated them were certainly the same artisans as those involved in the production of every other fineware class. In conclusion, the *chaîne opératoire* of monumental vessels must be viewed as a mixture of innovative conceptualisation

[45] For the *chaîne opératoire* of the Zagora *pithoi* see McLoughlin (2011).

and employment of traditional technologies. Such vessels served specific elite consumption demands during LGI times and cannot be treated as regular finewares.

The second important change noted in pottery production c.760 BC relates to the increasing standardisation of pouring vessels. As explained in Chapter 5, the shapes of trefoil *oinochoai* of the Early and Middle Geometric periods were more diverse compared to those produced after LGIa. During the Late Geometric production moved towards greater standardisation and artefact variability declined. Even though pitchers and neck-less trefoil *oinochoai* were definitely new shapes, their conceptualisation was equally standardised and their proportional features similar to those of standard trefoil *oinochoai*. Furthermore, the *chaîne opératoire* of neck-less pouring vessels was simpler compared to any other shape. Such pots did not have ring bases and necks, and they were produced during fewer episodes on the potter's wheel that allowed production to move faster.

A possible explanation of this standardisation and faster production of pouring vessels could relate to increasing consumption demands during Late Geometric times. Instead of opening new workshops or allowing more potters to be involved in the manufacture of *oinochoai* and pitchers, Athenian craftsmen decided to meet these demands with specialisation in ceramic production (*sensu* Rice 1987, 189). This led to a decrease in the number of artisans and workshops, and the conceptualisation of pouring vessels became more standardised compared to the earlier phases of the Geometric era. It is interesting that this response did not occur in the production of large ceramic containers and small drinking vessels.

The increasing consumption demands for specific finewares circa 760 BC may not necessarily relate to social changes connected to political or gender restructure. In fact, they are more likely related to a population increase similar to the one suggested by Snodgrass (1977, 1980): a demographic expansion at the beginning of the Late Geometric would have naturally resulted to an expansion of the consumer community. Again, the relationship between demographic expansion and increasing fineware consumption is indirect and this study cannot suggest any clearer patterns.

8.1.4 Production response during the social changes c.700 BC

Moving to the final period of social change, Morris (1987, 216-7), Osborne (1989) and Whitley (1994b; 2000) suggest that the Athenian society reverted to a form of social conservatism circa 700 BC, which also affected the production of

Early Protoattic pottery. Unfortunately, the material used in the current project is not adequate to address the response of ceramic production of the early 7th century BC.

Based on the amphora material analysed in Chapter 4, the conceptualisation of large ceramic containers during LGIIb-EPA does not differ at all compared to the rest of the 8th century BC. Chapter 6 offers evidence that the production of undecorated *kantharoi* was an entirely Protoattic phenomenon. Still, the lack of adequate 7th century BC samples in this project makes it difficult to see the broader response of ceramic production during that time, and therefore, the project needs to expand in this direction in the future.

Despite its small sample size, the assemblage for the microscopic pilot study in Chapter 7 explains some basic aspects of Orientalising ceramic production. As noted earlier, all Geometric and Orientalising finewares were produced from the same exact fabric, which came in two variants of similar geological composition. According to Chapter 7, it is almost certain that Orientalising fabrication practices were the same as those of the Geometric period. Only exception might have been vessels of the Subgeometric style. Comparisons between present and previous analytical results (see Fillieres *et al*. 1983, 61) show that SG clays were deliberately chosen from highly calcareous geological formations and were different compared to those used in the production of typical Geometric and Orientalising decorated finewares.

Furthermore, the work of potters and painters might have diversified in relation to the technologies they employed right after c.700 BC. This assumption is based on the microscopic analysis of a single Protoattic sherd in Chapter 7 (AS1821). Even though the chemical composition of paints and pastes of all Geometric finewares was similar, the paint of AS1821 could have been produced from different clay (or through different levigation) as opposed to the vessel's paste. If some of the painters who decorated PA pots were different artisans compared to the potters who shaped them, it would be interesting to see if the chemical composition of their favourite paint matches non-Athenian clay sources.

Sarah Morris (1984) has already argued that early 7th century BC 'Athenian' production was once in the hands of Aeginetan workshops. Whitley (1994b, 66), however, has argued against her point that the most characteristic Athenian Orientalising shapes were unknown to Aegina and the most typical Aeginetan shapes have not been encountered in Athenian contexts; therefore, Aeginetan and Attic

Orientalising fineware productions must be treated separately. As Morris' (1984) analysis was based on ceramic decoration and connoisseurship (more in Section 8.2), her suggestion probably meant that early 7th century BC 'Athenian' decoration was once in the hands of Aeginetan painters. AS1821 could be the product of such artistic complication: although its potter used typically Athenian clay to shape the pot, its painter used a paint that one cannot be entirely sure of its Athenian provenance. Microscopic analysis on a larger assemblage of decorated Protoattic samples is necessary to test this hypothesis in the future. Still, AS1821 definitely shows that its potter and painter -if they were indeed two separate artisans- collaborated for the production of this pot; therefore, an analysis targeting the involvement of different craftsmen in Athenian Orientalising fineware production may not necessarily prove the drastic takeover by Aeginetans suggested by Morris (1984).

8.1.5 Final conclusion

Section 8.1 demonstrates that despite some exceptional patterns in Athenian fineware production during two periods coinciding with Whitley's (1991, 181-3) social changes of the 9th and late 8th century BC, the broader Geometric *chaîne opératoire* was highly standardised and practised by specialised potters. The only real adaptation in consumption demands was noted in the production of pouring vessels after LGIa, which became more standardised compared to earlier periods. This standardisation was most likely due to increasing consumption demands for this specific vessel class. By contrast, the production of large containers was never subject to significant changes and the production of drinking vessels was characterised by freedom in the work both painters and potters all along the Geometric era.

Whatever the relationship between the spread of the figurative style after c.760 BC and the social changes noted by Morris (1987, 216) and Langdon (2008, 10-11, 63), these events affected neither the technological properties of ceramic decoration nor the broader production sequence of Attic Geometric finewares. Monumental *Dipylon*-style amphorae were the only newly introduced vessels that could relate to the social changes of LGIa; however, their *chaîne opératoire* was significantly different to any other vessel class and such products cannot be examined together with ordinary wheel-made finewares. Finally, this project suggests that standardisation in Attic fineware production continued during the 7th century BC, although a separate project on Protoattic and Subgeometric vessels is required to prove this.

8.2 MODES OF PRODUCTION, LABOUR DIVISION AND THE NUMBERS OF ATTIC GEOMETRIC WORKSHOPS

This section discusses the conclusions presented in sections 8.1 and 8.2 in relation to Attic Early Iron Age modes of ceramic production and labour division. Furthermore, it addresses the numbers of Attic Geometric workshops in conjunction with the studies by Davison (1961) and Coldstream (1968).

8.2.1 The presence of nucleation in Attic Geometric fineware production

As noted in Chapters 4 and 5, large ceramic containers and pouring vessels without contexts from the collections of the British Museum and the British School at Athens comply with the general patterns noted for assemblages of known contexts from the *Agora* and *Kerameikos*. This means that vessels without recorded contexts are not only Athenian, but also produced by the same workshops as every other large ceramic container and pouring vessel in this thesis. Chapter 5 also demonstrates that despite the homogeneity of metrical features and proportions among all LG pouring vessel from all sites, there is one pitcher that stands out, and this is probably the product of a *Phaleron* workshop (GR1877,1207.10). These facts suggest that the most standardised products of Athenian workshops are likely to relate to a single production site.

Amphorae were produced with highly standardised characteristics regardless of the function they intended to cover. The most standardised of all large containers, banded-neck handled amphorae, were most likely produced for domestic consumption. The majority of such vessels have been recovered in the lower contexts of Geometric wells at the Athenian *Agora.* According to Shear (1993, 384-6) they were originally used to extract water but they were accidentally dropped and abandoned in these wells. By contrast, elaborately decorated amphorae found in the same contexts are likely to relate to later filling that took place during the Archaic period (Shear 1993, 384-6), or they could be production debris discarded by ceramic workshops of the Geometric period (Papadopoulos 2003, 274-6). Banded neck-handled amphorae have also been found in burials at *Kerameikos*, even though they comprise a small portion of the total ceramic assemblage. It is likely that Geometric amphorae were produced for distinct primary functions, in this case domestic versus ceremonial; however, secondary functions could have been mixed.

The standardisation between both typological classes of amphorae, and also their similarity with *hydriae*, suggests that all of them were produced during the same *chaîne opératoire* by a small number of specialists who communicated with each other. Such potters were most likely clustered in the same production site, matching Peacock's (1982, 9) nucleated workshop model. Furthermore, based on the recovery contexts of such vessels, their production probably took place inside the later Classical Athenian *Agora*, matching the model suggested by Papadopoulos (2003, 276).

The same suggestion is also likely for the workshops that produced pouring vessels; however, their larger degree of standardisation in Late Geometric times suggests that their production was nucleated only after c.760 BC. Before that time, Early and Middle Geometric *oinochoai* were probably produced in more than one sites. Furthermore, the *chaîne opératoire* of pouring vessels shows great similarity with that of large ceramic containers, particularly in the use of the same fabric, and also the conceptualisation and assembling of both wares in at least three constituent vessel parts. Only exception is neck-less *oinochoai*; however, such vessels are no different compared to others in relation to their proportional characteristics. Finally, pitchers are a hybrid ceramic shape that combines the proportional characteristics of *oinochoai* and the partonomy of amphorae, particularly with regard to the sizes of their necks. The above evidence suggest that the potters who produced Late Geometric pouring vessels were in some sort of communication with the potters who produced large containers, if they were not the same artisans. Their workshops were probably connected and production was nucleated within the same site at the Athenian *Agora*.

The case of drinking vessels is distinct. The standardisation in the shaping of *kantharoi* suggests that some sub-typologies (e.g. small *kantharoi* with high handles) were produced by a small number of potters; however, it is not entirely clear if their workshops were clustered in the *Agora*. The production of *skyphoi* was standardised in a broad and rather loose sense; still, their relatively high degree of artefact variability suggests that there used to be some degree of freedom in the work of both potters and painters. This freedom could be connected to a larger number of workshops or individual artisans involved in their production. This pattern does not relate to any specific chronological period; however, the decorative features of *skyphoi* suggest that an increase in the numbers of painters is likely to be placed around MGII.

By contrast to the nucleated production of large containers and pouring vessels, the production of *skyphoi* was probably scattered across different locations, one of which supplied the buriers at *Kynosarges*. It appears likely that the production of *skyphoi* was in the hands of individual workshops, matching the model suggested by Peacock (1982, 8). Even though some of these workshops might have been located at the *Agora*, artefact variability of *skyphoi* suggests absence of nucleation in their production.

8.2.2 Patterns of specialisation and labour division strategies noted in the production of Geometric *skyphoi*

Chapter 6 demonstrates that *skyphoi* production was sub-specialised according to some specific shapes: all gadrooned LGI *skyphoi* and wide *skyphoi* with stirrup handles (EGII-MGI to MGI) were probably made by two distinct workshops or potters. Furthermore, artefact variability suggests that the total number of potters involved in *skyphoi* production was larger compared to those who produced other vessel classes. This paradox is hard to interpret.

A possible explanation could be that the production of *skyphoi* was practised independently by a number of artisans who purposely wished to be involved and specialised in this specific *chaîne opératoire.* The only example of similar specialisation comes from early 6th century BC Athens: Tleson and his brother Ergoteles were Athenian Black-Figure potters who produced solely Little-master cups. Their signatures referred to them as potters; however, attribution studies suggest that both of them were also the painters who decorated their vessels (Boardman 1974, 60). Tleson's name has been found on at least 105 cups (Beazley 1956, 178-83) and his brother's name on another 3 cups (Beazley 1956, 162). Furthermore, their father Nearchos was also a potter whose name was singed on 8 pots, the majority of which were drinking vessels (4 *kantharoi*, 2 cups, 1 *aryballos* and 1 plaque) (Beazley 1956, 82-3). Tleson and his family is a good example of artisans specialised in small vessels, which they shaped and decorated at the same time. It could be likely that similar specialisation existed in Early Iron Age Athens and began as early as the Geometric period.

The other possible explanation for the *skyphoi* paradox relates to labour division and apprenticeship. A bold assumption could be that the specialisation in specific shapes in Attic Geometric fineware production was part of a broader labour division scheme among artisans. The production of small shapes was likely connected to some intermediate stages of apprenticeship for both potters and painters before they moved on to *chaîne opératoires* that required greater specialisation (e.g. monumental *Dipylon*-style amphorae). In that sense, the idea of apprenticeship in Geometric Athens was not only based on the duration of mastering the potter's wheel (Roux & Corbetta 1989), but also on the learning transition from shaping simple forms to shaping complex vessels built from more than one constituent parts.

If this is the case, it could be likely that the entire Attic Geometric fineware production was regulated by a strong notion of hierarchy across different *chaîne opératoires*, interconnected as steps of a learning process that introduced the apprentice to the gradual mastering of specific shapes. Drinking vessels were probably an intermediate stage of ceramic practice. As suggested elsewhere (Langdon 2015; Smyrnaios forthcoming), the production of miniature vessels was the initial stage of apprenticeship for young potters in Late Geometric Athens and it probably depended on child labour.

8.2.3 The number of Attic Geometric workshops

The final issue of this discussion is the number of Attic Geometric workshops. As noted in Chapter 2, Davison (1961) suggested at least 35 individual artists, divided in 17 broader workshops or artisan groups, which spread between the Late Geometric and the Orientalising periods. By contrast, Coldstream (1968, 29-82) argued in favour of 21 groups, comprised of 8 individual painters, 9 large workshops and 4 affiliated artists expanding across 60 years of the Late Geometric period. Both studies paint the picture of a diverse and lively production in Late Geometric Attica, which included a relatively large number of artisans and workshops; however, the specialisation and standardisation noted in the present study shows that the numbers of 'workshops' suggested by Davison (1961) and Coldstream (1968) are by far too many and need to be revised.

If one accepts Coldstream's (1968, 29-82) estimations for at least 21 artisans in Late Geometric fineware production, of which only 9 were owners of large workshops, it is difficult to explain why their numbers dropped steeply in the following years. According to J.M. Cook (1935) and Davison (1961) there are only three identified painters for the early 7th century BC, which is a paradox as fineware production increased. For Protoattic pottery, it could be likely that the lack of large Athenian workshops was due to the relocation of production from Athens to Aegina, which according to Sarah Morris (1984) took place towards the middle of the 7th century BC, and more specifically between late EPA and MPA times. Still, the situation becomes more problematic when examining the numbers given by Webster (1972, 2), who identifies at least 14 painters and painter groups for the period between 600 BC and 575 BC. These are again fewer compared to those noted by Davison (1961) and Coldstream (1968) for the Late Geometric and Orientalising periods in total. It is only between 575 BC and 550 BC when Attic fineware production picks up again: for this period Webster (1972, 2) identifies 43 painters and painter groups in total. So, why is it that Attic ceramic 'workshops' reduced after the end of the Late Geometric, while it took roughly 125 years for workshop practice to recover?

The answer is simple: the numbers of Attic 'workshops' suggested by Davison (1961) and Coldstream (1968, 29-82) refer to painters instead of potters. The potters were most likely few from the beginning of the Geometric period -if not earlier- and remained such until the middle of the 6th century BC, when Black Figure style became popular and production increased significantly. The 6th century BC also matches the rise of the large *ergasteria* according Peacock's (1982, 9-10) model of ceramic production. Webster (1972, 2) notes that during the 3rd quarter of the 6th century BC there were 43 potters involved in the production of 18 wares, which were decorated by 65 painter groups, 59 of which identified as individual artists. Again, the numbers for painters are larger than those for potters, and nothing suggests that this was not the case in earlier times.

According to the analyses presented in this thesis, the production of complex closed shapes (large containers and pouring vessels) was highly standardised, particularly after LGIa. It was practised by specialised potters who followed distinct conceptualisations based on strong technological traditions. Their workshops were most likely nucleated in a single production site in the Athenian *Agora* and their number was small. Changes in the production of such vessels related either to the introduction of new shapes or to the size increase of already popular shapes. Still, both changes did not cause any broadening of workshop practice or increase in the number of potters involved in it. In fact, the production of pouring vessels shows the exact opposite: even though four new shapes were introduced in ceramic production during the Late Geometric period (neck-less trefoil *oinochoai*, giant *oinochoai*, broad *oinochoai* and pitchers) standardisation increased and production was most likely regulated by a smaller group of specialised potters compared to earlier times.

According to the present study, it is only the production of *skyphoi* that was probably in the hands of a large number of individual artisans. Furthermore, there must have been at least one major workshop involved in the production of monumental amphorae, which operated seasonally, and a separate workshop that produced SOS transport amphorae towards the end of the 8th century BC. This project cannot identify the exact number of Attic Geometric and Orientalising workshops; however, it is more than likely that the production of large and complex shapes in the Late Geometric period was controlled by fewer workshops compared to the nine ones identified by Coldstream (1968).

8.3 CONTRIBUTION OF PRESENT STUDY, LIMITATIONS AND SUGGESTIONS FOR FUTURE WORK

As material culture is inseparable from social interaction, the analysis of technological and social aspects involved in its production are essential in understanding the forces controlling its evolution through time. This thesis introduces a technological approach based on the *chaîne opératoire* theory, which contributes to the discussion on the relationship between technology, style and society in Attic Geometric and Orientalising fineware production.

In relation to its practical methodology, this technological approach targets artefact variability (*sensu* Schiffer & Skibo 1997) across different fineware groups. The presence or absence of standardisation in ceramic products marks the circulation of technological traditions (*sensu* Sillar & Tite 2000), which once orchestrated ancient ceramic *chaîne opératoires*. Aim of this approach is to elucidate the role of the potter and his attitude towards technological traditions in relation to the changing nature of consumption demands within the society. The role of the potter is studied through the isolation of his technological choices (*sensu* Sillar & Tite 2000) made along the *chaîne opératoire* steps, and by examining them in relation to archaeological evidence and dates of significant social changes noted in previous studies. Here, the analysis of technological choices was limited in three core aspects: the conceptualisation (*sensu* Van der Leeuw 1994) of different ceramic shapes, the use of raw materials (*sensu* Van der Leeuw 1993) and the use of decorative technologies.

If applied in a practical study on archaeological ceramics, this approach is also subject to a number of limitations. Firstly, it requires a large number of intact vessels to be measured macroscopically for obtaining core metrical features and estimating their relevant proportions. Such intact vessels may not always be available or accessible for a number of reasons. Secondly, this approach requires an adequate sample for microscopic analysis, which may not be easily accessible due to legislation restrictions. The present study offers two separate strategies devised in order to overcome such practical obstacles.

Firstly, macroscopic analysis of metrical features and proportions can target an adequate number of vessels of complete profile, accessed and studied macroscopically *in situ*, supplemented by a number of vessels in display, studied through published photographs. To ensure the quality of statistical results, this project introduces accuracy tests that can prove useful for future research in the study or ceramic artefacts through published illustrations. Secondly, fabric analysis can target a large assemblage of fragmented pottery, examined macroscopically in hand specimen, supplemented by a smaller assemblage of similar shapes examined microscopically. The present comparisons between Hand Specimen Examination, Thin Section Analysis and Scanning Electron Microscopy show that this strategy is useful in the identification of fabrics and the investigation of fabrication practices. Furthermore, targeted SEM-EDX analysis is useful in the investigation of decorative technologies.

With particular reference to Attic Geometric and Orientalising finewares, this thesis offers some new conclusions that need to be considered next to our current understanding of Attic Early Iron Age society:

1. Despite some adaptation during periods of significant social changes, the

broader production of Attic Geometric finewares was highly standardised, practised by specialised potters, and regulated by strong technological traditions.

2. The production of *skyphoi* was a paradox: even though such shapes were relatively standardised in a loose sense, the potters and painters involved in their production probably enjoyed a higher degree of artistic freedom compared to their colleagues who were involved in the production of other vessel classes. It could be likely that the broader *chaîne opératoire* of Attic Geometric finewares was regulated by specialised labour division subject to the potters' own preferences. Alternatively, the total production was subject to a strict pattern of hierarchy, during which simple shapes (e.g. *skyphoi*) were produced during intermediate apprenticeship stages for potters and painters who moved later on to the production of more complex shapes (e.g. amphorae). The production of monumental *Dipylon*-style vessels was distinct.
3. Despite differences in the conceptualisation and function of Attic decorated finewares, all vessels were produced from the same fabric and were decorated with paints of similar chemical composition for at least three centuries. The production of Subgeometric vessels and the decoration of Protoattic pottery might have followed different technological traditions compared to other 7th century BC production modes.
4. The production of large closed ceramic containers and medium sized pouring vessels was most likely clustered in a single site. This clustering allowed a small number of potters to communicate and regulate a highly standardised and specialised ceramic production. The cluster matches the model of nucleated workshops suggested by Peacock (1982) and was probably located in the later Classical Athenian *Agora* as suggested by Papadopoulos (2003). By contrast, the production of *skyphoi* was probably scattered in different locations and regulated by individual workshops (*sensu* Peacock 1982).
5. The numbers of Attic Geometric workshops suggested by Davison (1961) and Coldstream (1968) are relatively high and also relate to painters instead of potters. Their numbers need to be revised.

Despite the above conclusions, this study needs to expand in the future in order to cover some gaps in relation to Orientalising fineware production, which is currently underexplored. Firstly, intact Protoattic vessels must be studied macroscopically and compared to the present Geometric finewares for the investigation of continuity of technological traditions between the 8th and 7th centuries BC. Secondly, microscopic analysis of fabrics and further analysis of chemical compositions between pastes and coatings is necessary for a better characterisation of 7th century BC ceramic technologies. Such microscopic study must include both Protoattic and Subgeometric pottery. Additionally, the present methodology could expand in a separate discussion on the conceptualisation of Attic Submycenaean and Protogeometric vessels, which is likely to reveal similar standardisation and technological traditions as the ones noted during the Geometric period. In fact, some of the archetypal forms followed by Geometric potters are likely to have related to 11th and 10th century BC vessel shapes. This suggestion requires further investigation.

Finally, it must be specified that the features investigated in this thesis characterise the *chaîne opératoire* of Attic decorated finewares. According to the study by Strack (2007), the production of coarse hand-made pottery in Early Iron Age Attica included a plethora of popular shapes that were produced independently and regardless of the technological advances in the production of wheel-made vessels. Furthermore, the production of undecorated coarse wares continued for public and private consumption during Classical (Rotroff and Oakley 1992) and Hellenistic times (Rotroff 2006). It is highly likely that this production followed different conceptualisations and technological traditions compared to that of decorated finewares. A similar analysis of metrical features and proportions is likely to verify this point in the future.

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CHARTS

CHARTS FOR CHAPTER 4

		Metrical Features of Closed Ceramic Containers from the *Agora*							
		(Vessels Preserving Complete Profile)							
Thesis No.	Inventory No.	Ware Type	Context	Chronology	Net Height (cm)	Rim Diameter (cm)	Base Diameter (cm)	Length of Neck (cm)	Handle Attachment Height (cm)
44	P19228	S-H Amph.	BR	EGI	40	19	12.8	11.5	20.5
2	P3747	N-H Amph.	non-BR	MGI	32.2	12	8	10.7	20
1	P6400	N-H Amph.	non-BR	MGI?	47.5	14.5	13	14	30
24	P6410	Banded N-H Amph.	non-BR	MG	30.5	12.5	10.8	8.3	21
25	P6423	Banded N-H Amph.	non-BR	MG	41.7	15.3	10.2	12.7	25.5
30	P27937	N/L Banded N-H Amph.	non-BR	MGII	25.7	11.8	10	N/L	18
3	P7141	N-H Amph.	non-BR	MGII-LGIa	56.3	17.5	14	17	38
54	P26727	Hydria	non-BR	LG	47.1	14	11.2	13	31.2
26	P21578	Banded N-H Amph.	non-BR	LGIa	40.5	15.3	11.1	12	26.8
4	P5422	N-H Amph.	BR	LGIa	33	14	8.5	11.5	20.3
5	P12105	N-H Amph.	non-BR	LGIb-LGIIa	33.4	16.2	11.3	8.7	22.3
55	P4980	Hydria	BR	LGIIa	51	17.5	13.7	15	34.5
32	P17198	N/L Banded N-H Amph.	non-BR	LGIIa	16.6	11	7.4	N/L	10
31	P17197	N/L Banded N-H Amph.	non-BR	LGIIa	23.6	11	9	N/L	16.2
7	P16990	N-H Amph.	BR	LGIIa	72.5	29	17	13.5	52.5
6	P32887	N-H Amph.	BR	LGIIa	88	32	18.5	25	59
27	P4613	Banded N-H Amph.	BR	LGIIb	42.3	18	11.9	12.1	28.3
34	P23669	N/L Banded N-H Amph.	non-BR	LGIIb-EPA	30.5	14.7	11.8	N/L	20.5
33	P23656	N/L Banded N-H Amph.	non-BR	LGIIb-EPA	26.5	14.3	9.5	N/L	15
29	P23660	Banded N-H Amph.	non-BR	LGIIb-EPA	40	19	10	10.5	25.5
35	P23658	N/L Banded N-H Amph.	non-BR	LGIIb-EPA	22.4	13	8.8	N/L	14.5
28	P26242	Banded N-H Amph.	non-BR	LGIIb-EPA	39	17.7	12.2	12	24.5
8	P4768	N-H Amph.	BR	SG-EPA	69.5	18.9	14.4	11.5	51.2

Chart 4.1: Metrical features of 23 closed ceramic containers with complete profiles from the Athenian *Agora* in chronological order. KEY: N-H (=neck-handled), S-H (=shoulder-handled), BR (=burial context), N/L (=neck-less).

Surviving Metrical Features of Closed Ceramic Containers from the *Agora*								
		(Incomplete or Fragmented Vessels and Individual Shers)						
Thesis No.	Inventory No.	Ware Type	Context	Chronology	Rim Diameter (cm)	Base Diameter (cm)	Length of Neck (cm)	Handle Attachment Height (cm)
36	P6997	Banded N-H Amph.	non-BR	LPG		11.6		25.8
156	K84	N-H Amph.neck fr.	BR	MGII	16.3		12	
39	P27939	Banded N-H Amph.	non-BR	MGII-LGIa		11.5		25
38	P27938	Banded N-H Amph.	non-BR	MGII		12.4		29.2
37	P6411	Banded N-H Amph.	non-BR	MG		13.4		27.7
172	A204	N-H Amph. neck fr.	Unknown	MGII-LGIa	13		15.5	
11	P8248	N-H Amph.	non-BR	MGII-LGIa		17.1		
12	P21707	N-H Amph.	non-BR	LGIa	21			
15	P13767	N-H Amph.	non-BR	LGIa		13.9		35.3
13	P7280	N-H Amph. neck fr.	non-BR	LGIb	20.8		18.5	
58	P12124	Hydria	non-BR	LGIb-LGIIa	14.5	10.6		
41	P4978	Banded N-H Amph.	non-BR	LGIIa		10		
42	P17199	N-H Amph. Banded neck fr.	non-BR	LGIIa	c.16		10.5	
16	P4886	N-H Amph. neck fr.	non-BR	LGIIa	19.2		19	
43	P22435	N-H Amph. Dipylon neck fr.	non-BR	LGIIa-LGIIb	50.4		46	
17	P22439	N-H Amph. neck fr.	non-BR	LGIIa-LGIIb	15.4			
60	P23674	Hydria	non-BR	LGIIb-EPA		11.5	12.5	29.5
18	P23888	N-H Amph.	non-BR	LGIIb-EPA		9.6	27.5	
160	K16	Amph.? (decorated)	BR	EPA	9			
21	P7492	N-H Amph. frs	non-BR	SG		9.8		
61	P4614	Hydria	non-BR	SG		11.1		

Chart 4.2: Surviving metrical features of 21 fragmented closed ceramic containers with incomplete profiles from the Athenian *Agora* in chronological order. KEY: N-H (=neck-handled), S-H (=shoulder-handled), BR (=burial context).

		Proportions of Closed Ceramic Containers from the *Agora*							
		(Vessels Preserving Complete Profile)							
Thesis No.	**Inventory No.**	**Ware Type**	**Context**	**Chronology**	**Proportion of Handle Attachment Height to Net Height (%)**	**Proportion of Neck Length to Net Height (%)**	**Proportion of Rim Diameter to Net Height (%)**	**Proportion of Base Diameter to Net Height (%)**	**Proportion of Base Diameter to Rim Diameter (%)**
44	P19228	S-H Amph.	BR	EGI	51.3	28.8	47.5	32.0	67.4
2	P3747	N-H Amph.	non-BR	MGI	62.1	33.2	37.3	24.8	66.7
1	P6400	N-H Amph.	non-BR	MGI?	63.2	29.5	30.5	27.4	89.7
24	P6410	Banded N-H Amph.	non-BR	MG	68.9	27.2	41.0	35.4	86.4
25	P6423	Banded N-H Amph.	non-BR	MG	61.2	30.5	36.7	24.5	66.7
30	P27937	N/L Banded N-H Amph.	non-BR	MGII	70.0		45.9	38.9	84.7
3	P7141	N-H Amph.	non-BR	MGII-LGIa	67.5	30.2	31.1	24.9	80.0
54	P26727	Hydria	non-BR	LG	66.2	27.6	29.7	23.8	80.0
26	P21578	Banded N-H Amph.	non-BR	LGIa	66.2	29.6	37.8	27.4	72.5
4	P5422	N-H Amph.	BR	LGIa	61.5	34.8	42.4	25.8	60.7
5	P12105	N-H Amph.	non-BR	LGIb-LGIIa	66.8	26.0	48.5	33.8	69.8
55	P4980	Hydria	BR	LGIIa	67.6	29.4	34.3	26.9	78.3
32	P17198	N/L Banded N-H Amph.	non-BR	LGIIa	60.2		66.3	44.6	67.3
31	P17197	N/L Banded N-H Amph.	non-BR	LGIIa	68.6		46.6	38.1	81.8
7	P16990	N-H Amph.	BR	LGIIa	72.4	18.6	40.0	23.4	58.6
6	P32887	N-H Amph.	BR	LGIIa	67.0	28.4	36.4	21.0	57.8
27	P4613	Banded N-H Amph.	BR	LGIIb	66.9	28.6	42.6	28.1	66.1
34	P23669	N/L Banded N-H Amph.	non-BR	LGIIb-EPA	67.2		48.2	38.7	80.3
33	P23656	N/L Banded N-H Amph.	non-BR	LGIIb-EPA	56.6		54.0	35.8	66.4
29	P23660	Banded N-H Amph.	non-BR	LGIIb-EPA	63.8	26.3	47.5	25.0	52.6
35	P23658	N/L Banded N-H Amph.	non-BR	LGIIb-EPA	64.7		58.0	39.3	67.7
28	P26242	Banded N-H Amph.	non-BR	LGIIb-EPA	62.8	30.8	45.4	31.3	68.9
8	P4768	N-H Amph.	BR	SG-EPA	73.7	16.5	27.2	20.7	76.2

Chart 4.3: Basic proportions of 23 closed containers with complete profiles from the Athenian *Agora* in chronological order. KEY: N-H (=neck-handled), S-H (=shoulder-handled), N/L (=neck-less), BR (=burial context).

Metrical Features of Closed Ceramic Containers (Preserving Complete Profile) from the *Kerameikos*									
Thesis No.	Inventory No.	Ware Type	Date	*Kerameikos* Context	Real Net Height (cm)	Calculated Rim Diameter (cm)	Calculated Base Diameter (cm)	Calculated Neck Length (cm)	Calculated Handle Attachment Height
184	2132	N-H Amph.	EGI	Grave 1	64.5	21.7	15.6	19.7	43.5
185	925	N-H Amph.	EGII	Grave 2	72.8	19.1	17.0	23.8	46.0
186	926	N-H Amph.	EGII	Grave 2	35.7	11.8	8.8	12.1	22.5
188	254	N-H Amph.	EGII	Grave 74	72.5	20.0	16.2	24.9	44.4
189	253	N-H Amph.	EGII	Grave 74	38.5	14.4	10.8	14.8	22.1
187	2136	N-H Amph.	EGII	Grave 38	76.2	20.7	16.3	24.5	48.4
212	412	S-H Amph.	EGII	Grave 14	37.5	18.1	12.5	10.5	21.4
217	2146	B-H Amph.	EGII-MGI	Grave 41	69.5	21.5	15.7	22.5	N/A
190	2140	N-H Amph.	EGII-MGI	Grave 42	77.5	22.8	16.3	25.5	49.3
191	1249	N-H Amph.	EGII-MGI	Grave 43	72.5	19.4	15.8	21.5	48.9
219	1250	N/L Banded N-H Amph.	EGII-MGI	Grave 43	29.8	15.1	10.1	N/L	20.2
213	234	S-H Amph.	MGI	Grave 76	49	22.2	12.9	15.0	25.8
192	884	N-H Amph.	MGI	Grave 13	45.6	16.0	12.2	15.0	28.7
193	2155	N-H Amph.	MGI	Grave 36	46.6	15.7	10.3	16.2	28.5
194	866	N-H Amph.	MGI	Grave 37	59	19.3	15.1	19.3	37.9
195	859	N-H Amph.	MGI-MGII	Grave 11	49	16.5	11.5	17.0	30.0
214	890	S-H Amph.	MGI-MGII	Grave 12	55	23.5	15.1	18.3	31.5
220	894	N/L Banded N-H Amph.	MGI-MGII	Grave 12	22	13.1	9.9	N/L	16.0
196	291	N-H Amph.	MGII	Grave 22	57.5	18.5	14.1	17.3	37.7
221	296	N/L Banded N-H Amph.	MGII	Grave 22	30.5	10.9	9.6	N/L	18.3
197	236	N-H Amph.	MGII	Grave 23	48	16.0	12.6	16.0	30.5
198	242	N-H Amph.	MGII	Grave 23	26.3	8.5	8.5	9.9	15.1
215	284	S-H Amph.	MGII	Grave 29	45.2	19.0	11.9	15.8	22.3
222	289	N/L Banded N-H Amph.	MGII	Grave 29	28.2	13.9	9.1	N/L	20.6
199	277	N-H Amph.	MGII	Grave 30	38.8	13.1	11.9	11.5	25.3
216	825	S-H Amph.	MGII	Grave 86	51.5	21.8	12.3	18.9	26.1
200	255	N-H Amph.	MGII	Grave 69	41	15.8	10.3	15.4	23.5
223	783	Hydria	MGII-LGIa	Grave 89	37	12.5	10.8	9.6	23.7
224	784	Hydria	MGII-LGIa	Grave 89	36.1	12.0	10.5	10.9	22.1
201	272	N-H Amph.	MGII-LGIa	Grave 31	47.6	15.3	11.1	15.9	28.6
202	1306	N-H Amph.	LGIa-LGIb	Grave 50	30.4	14.6	12.6	11.8	17.0
203	377	N-H Amph.	LGIb	Grave 24	44.8	14.5	8.8	16.1	26.2
204	346	N-H Amph.	LGIb	Grave 71	52.4	15.4	10.0	16.5	33.7
205	385	N-H Amph.	LGIb-LGIIa	Grave 72	52	17.6	13.2	18.4	31.2
206	267	N-H Amph.	LGIb-LGIIa	Grave 28	41.9	14.9	9.7	14.0	25.5
207	337	N-H Amph.	LGIIa-LGIIb	Grave 59	41	16.5	11.6	11.6	27.6
208	656	N-H Amph.	LGIIa-LGIIb	Grave 97	65	21.1	15.2	18.2	45.1
209	n.n.	N-H Amph.	LGIIb	Grave 52	67.5	21.6	17.4	18.1	46.6
210	850	N-H Amph.	LGIIb	Grave 85	60	21.1	14.6	16.2	40.5
218	1315	Banded N-H Amph.	LGIIb-EPA	Grave 51	40.5	16.3	10.5	11.1	26.1
211	1298	N-H Amph. SOS	SG	Grave 64	65	14.3	13.0	12.4	48.1

Chart 4.4: Metrical features of 41 closed ceramic containers with complete profiles from the *Kerameikos* cemetery in chronological order. KEY: N-H (=neck-handled), S-H (=shoulder-handled), B-H (=belly-handled), N/L (=neck-less).

Basic Proportions of Closed Ceramic Containers (Preserving Complete Profile) from *Kerameikos*									
Thesis No.	Inventory No.	Ware Type	Date	*Kerameikos* Context	Calculated Proportion of Handle Attachment Height to Net Height (%)	Calculated Proportion of Neck Length to Net Height (%)	Calculated Proportion of Rim Diameter to Net Height (%)	Calculated Proportion of Base Diameter to Net Height (%)	Calculated Proportion of Base Diameter to Rim Diameter (%)
184	2132	N-H Amph.	EGI	Grave 1	67.4	30.5	33.7	24.2	71.9
185	925	N-H Amph.	EGII	Grave 2	63.1	32.6	26.2	23.4	89.2
186	926	N-H Amph.	EGII	Grave 2	62.9	34.0	33.0	24.7	75.0
188	254	N-H Amph.	EGII	Grave 74	61.2	34.3	27.6	22.4	81.1
189	253	N-H Amph.	EGII	Grave 74	57.3	38.5	37.5	28.1	75.0
187	2136	N-H Amph.	EGII	Grave 38	63.6	32.1	27.1	21.4	78.9
212	412	S-H Amph.	EGII	Grave 14	57.0	28.0	48.4	33.3	68.9
217	2146	B-H Amph.	EGII-MGI	Grave 41	N/A	32.4	31.0	22.5	72.7
190	2140	N-H Amph.	EGII-MGI	Grave 42	63.6	32.9	29.4	21.0	71.4
191	1249	N-H Amph.	EGII-MGI	Grave 43	67.4	29.7	26.8	21.7	81.1
219	1250	N/L Banded N-H Amph.	EGII-MGI	Grave 43	67.7	N/L	50.8	33.8	66.7
213	234	S-H Amph.	MGI	Grave 76	52.6	30.7	45.3	26.3	58.1
192	884	N-H Amph.	MGI	Grave 13	62.9	33.0	35.1	26.8	76.5
193	2155	N-H Amph.	MGI	Grave 36	61.1	34.7	33.7	22.1	65.6
194	866	N-H Amph.	MGI	Grave 37	64.3	32.7	32.7	25.5	78.1
195	859	N-H Amph.	MGI-MGII	Grave 11	61.2	34.7	33.7	23.5	69.7
214	890	S-H Amph.	MGI-MGII	Grave 12	57.2	34.8	42.8	27.5	64.4
220	894	N/L Banded N-H Amph.	MGI-MGII	Grave 12	72.6	N/L	59.7	45.2	75.7
196	291	N-H Amph.	MGII	Grave 22	65.6	30.0	32.2	24.4	75.9
221	296	N/L Banded N-H Amph.	MGII	Grave 22	60.0	N/L	35.7	31.4	88.0
197	236	N-H Amph.	MGII	Grave 23	63.6	33.3	33.3	26.3	78.8
198	242	N-H Amph.	MGII	Grave 23	57.3	37.5	32.3	32.3	100.0
215	284	S-H Amph.	MGII	Grave 29	49.3	35.0	42.1	26.4	62.7
222	289	N/L Banded N-H Amph.	MGII	Grave 29	72.9	N/L	49.2	32.2	65.5
199	277	N-H Amph.	MGII	Grave 30	65.3	29.6	33.7	30.6	90.9
216	825	S-H Amph.	MGII	Grave 86	50.7	36.6	42.3	23.9	56.7
200	255	N-H Amph.	MGII	Grave 69	57.3	37.5	38.5	25.0	64.9
223	783	Hydria	MGII-LGIa	Grave 89	64.0	25.8	33.7	29.2	86.7
224	784	Hydria	MGII-LGIa	Grave 89	61.3	30.1	33.3	29.0	87.1
201	272	N-H Amph.	MGII-LGIa	Grave 31	60.0	33.3	32.2	23.3	72.4
202	1306	N-H Amph.	LGIa-LGIb	Grave 50	56.0	38.7	48.0	41.3	86.1
203	377	N-H Amph.	LGIb	Grave 24	58.5	35.9	32.4	19.7	60.9
204	346	N-H Amph.	LGIb	Grave 71	64.4	31.5	29.5	19.2	65.1
205	385	N-H Amph.	LGIb-LGIIa	Grave 72	60.0	35.4	33.8	25.4	75.0
206	267	N-H Amph.	LGIb-LGIIa	Grave 28	60.9	33.3	35.5	23.2	65.3
207	337	N-H Amph.	LGIIa-LGIIb	Grave 59	67.4	28.3	40.2	28.3	70.3
208	656	N-H Amph.	LGIIa-LGIIb	Grave 97	69.4	27.9	32.4	23.4	72.2
209	n.n.	N-H Amph.	LGIIb	Grave 52	69.1	26.8	32.0	25.8	80.6
210	850	N-H Amph.	LGIIb	Grave 85	67.6	27.0	35.1	24.3	69.2
218	1315	Banded N-H Amph.	LGIIb-EPA	Grave 51	64.5	27.4	40.3	25.8	64.0
211	1298	N-H Amph. SOS	SG	Grave 64	74.0	19.0	22.0	20.0	90.9

Chart 4.5: Basic proportions of 41 closed containers with complete profiles from the *Kerameikos* cemetery in chronological order. KEY: N-H (=neck-handled), S-H (=shoulder-handled), B-H (=belly-handled), N/L (=Neck-less), N/A (=not applicable).

Thesis No.	Inventory No.	Ware Type	Date	Context	Real Rim Diameter (cm)	Calculated Rim Diameter (cm)	Difference of Rim Diameter (cm)	Real Proportion of Rim Diameter to Net Height (%)	Calculated Proportion of Rim Diameter to Net Height (%)	Difference of Proportion of Rim Diameter to Net Height (%)
186	926	N-H Amph.	EGII	Grave 2	12.0	11.8	0.2	33.6	33.0	-0.6
217	2146	B-H Amph.	EGII-MGI	Grave 41	21.5	21.5	0.0	30.9	31.0	0.1
214	890	S-H Amph.	MGI-MGII	Grave 12	24.0	23.5	0.5	43.6	42.8	-0.9
195	859	N-H Amph.	MGI-MGII	Grave 11	17.8	17.5	0.3	36.3	35.7	-0.6
222	289	N/L Banded N-H Amph.	MGII	Grave 29	14.0	13.9	0.1	49.6	49.2	-0.5
207	337	N-H Amph.	LGIIa-LGIIb	Grave 59	16.7	16.5	0.2	40.7	40.2	-0.5

Chart 4.6: Accuracy test between real and calculated measurements for 6 amphorae from the *Kerameikos* cemetery.

	Metrical Features of Closed Ceramic Containers from the British Museum								
			(Vessels Preserving Complete Profile)						
Thesis No.	Inventory No.	Ware Type	Date	Origin	Real Net Height (cm)	Real Rim Diameter (cm)	Calculated Base Diameter (cm)	Calculated Neck Length (cm)	Calculated Handle Attachment Height
344	GR1978,0701.8	N-H Amph.	MPG-LPG	Probably Athens	42	15.5	12.2	12.2	25.3
345	GR1978,0701.9	N-H Amph.	MPG-LPG	Probably Athens	32	11.5	10.7	9.1	20.7
356	GR1978,0701.7	B-H Amph.	LPG	Probably Athens	35	20	11.8	10.2	N/A
346	GR1977,1207.1	N-H Amph.	MGI	Probably Athens	44.5	15.5	11.4	15.3	27.4
347	GR2000,0524.1	N-H Amph.	MGI	Athens	55.5	17.5	14.3	19.0	33.8
348	GR1977,1211.2	N-H Amph.	MGI	Probably Athens	58.5	18	15.2	19.0	36.8
349	GR1977,1207.5	N-H Amph.	MGII	Probably Athens	43.8	14.5	9.4	15.1	26.2
350	GR1977,1207.2	N-H Amph.	MGII	Probably Athens	48	16	10.5	17.7	26.1
351	GR1977,1207.49	N-H Amph.	MGII-LGIa	Probably Athens	60	20.5	19.7	16.0	40.3
352	GR1977,1207.3	N-H Amph.	LGIb	Probably Athens	48	15.6	8.5	14.0	32.3
353	GR1914,0413.1	N-H Amph.	LGIIa	Attica	59.5	23	11.8	18.9	38.3
354	GR1977,1202.1	N-H Amph.	LGIIa	Probably Athens	47	16.5	9.9	16.1	29.3
355	GR1927,0411.1	N-H Amph.	LGIIb	Attica	76.2	26.5	13.3	29.7	43.8

Chart 4.7: Metrical features of 13 closed ceramic containers with complete profiles from the British Museum in chronological order. KEY: N-H (=neck-handled), S-H (=shoulder-handled), B-H (=belly-handled), N/A (=not applicable).

	Basic Proportions of Closed Ceramic Containers from the British Museum								
			(Vessels Preserving Complete Profile)						
Thesis No.	Inventory No.	Ware Type	Date	Origin	Calculated Proportion of Handle Attachment Height to Net Height (%)	Calculated Proportion of Neck Length to Net Height (%)	Real Proportion of Rim Diameter to Net Height (%)	Calculated Proportion of Base Diameter to Net Height (%)	Calculated Proportion of Base Diameter to Rim Diameter (%)
344	GR1978,0701.8	N-H Amph.	MPG-LPG	Probably Athens	60.2	29.1	36.9	29.1	78.9
345	GR1978,0701.9	N-H Amph.	MPG-LPG	Probably Athens	64.7	28.4	35.9	33.3	92.8
356	GR1978,0701.7	B-H Amph.	LPG	Probably Athens	N/A	29.2	57.1	33.7	59.0
346	GR1977,1207.1	N-H Amph.	MGI	Probably Athens	61.6	34.4	34.8	25.6	73.5
347	GR2000,0524.1	N-H Amph.	MGI	Athens	60.8	34.2	31.5	25.8	81.9
348	GR1977,1211.2	N-H Amph.	MGI	Probably Athens	63.0	32.4	30.8	25.9	84.3
349	GR1977,1207.5	N-H Amph.	MGII	Probably Athens	59.8	34.6	33.1	21.5	64.9
350	GR1977,1207.2	N-H Amph.	MGII	Probably Athens	54.4	36.8	33.3	21.9	65.8
351	GR1977,1207.49	N-H Amph.	MGII-LGIa	Probably Athens	67.2	26.7	34.2	32.8	95.9
352	GR1977,1207.3	N-H Amph.	LGIb	Probably Athens	67.3	29.2	32.5	17.7	54.5
353	GR1914,0413.1	N-H Amph.	LGIIa	Attica	64.4	31.7	38.7	19.8	51.2
354	GR1977,1202.1	N-H Amph.	LGIIa	Probably Athens	62.3	34.2	35.1	21.1	60.0
355	GR1927,0411.1	N-H Amph.	LGIIb	Attica	57.5	39.0	34.8	17.5	50.3

Chart 4.8: Basic proportions of 13 closed containers with complete profiles from the British Museum in chronological order. KEY: N-H (=neck-handled), S-H (=shoulder-handled), N/A (=not applicable).

Thesis No.	Inventory No.	Ware Type	Date	Origin	Real Rim Diameter (cm)	Calculated Rim Diameter (cm)	Difference of Rim Diameter (cm)	Real Proportion of Rim Diameter to Net Height (%)	Calculated Proportion of Rim Diameter to Net Height (%)	Difference of Proportion of Rim Diameter to Net Height (%)
344	GR1978,0701.8	N-H Amph.	MPG-LPG	Probably Athens	15.5	15.9	0.4	36.9	37.9	1.0
345	GR1978,0701.9	N-H Amph.	MPG-LPG	Probably Athens	11.5	11.9	0.4	35.9	37.3	1.3
356	GR1978,0701.7	B-H Amph.	LPG	Probably Athens	20	19.7	-0.3	57.1	56.2	-1.0
346	GR1977,1207.1	N-H Amph.	MGI	Probably Athens	15.5	15.0	-0.5	34.8	33.6	-1.2
347	GR2000,0524.1	N-H Amph.	MGI	Athens	17.5	18.0	0.5	31.5	32.5	1.0
348	GR1977,1211.2	N-H Amph.	MGI	Probably Athens	18	17.3	-0.7	30.8	29.6	-1.1
349	GR1977,1207.5	N-H Amph.	MGII	Probably Athens	14.5	14.3	-0.2	33.1	32.7	-0.4
350	GR1977,1207.2	N-H Amph.	MGII	Probably Athens	16	15.2	-0.8	33.3	31.6	-1.8
351	GR1977,1207.49	N-H Amph.	MGII-LGIa	Probably Athens	20.5	21.2	0.7	34.2	35.3	1.2
352	GR1977,1207.3	N-H Amph.	LGIb	Probably Athens	15.6	14.9	-0.7	32.5	31.0	-1.5
353	GR1914,0413.1	N-H Amph.	LGIIa	Attica	23	22.4	-0.6	38.7	37.6	-1.0
354	GR1977,1202.1	N-H Amph.	LGIIa	Probably Athens	16.5	15.7	-0.8	35.1	33.3	-1.8
355	GR1927,0411.1	N-H Amph.	LGIIb	Attica	26.5	27.1	0.6	34.8	35.5	0.7

Chart 4.9: Accuracy test between real and calculated measurements for 13 amphorae from the British Museum.

		CHART OF FABRIC DESCRIPTIONS			
Thesis No.	**Inventory No.**	**Ware Type**	**Chronology**	**Munsell Colour**	**Fabric Type**
36	P6997	Banded N-H Amph.	LPG	5YR 7/4	1
2	P3747	N-H Amphora	MGI	5YR 6/4	1
45	P24842	B-H Amph. frs	MGI-MGII	5YR 6/4	1
37	P6411	Banded N-H Amph.	MG	5YR 7/4	1
24	P6410	Banded N-H Amph.	MG	5YR 7/3	1
46	P6413	Amphora? Base(s)	MG	Vitrified	?
56	P24840	Hydria fr.	MGII	5YR 7/4	1
39	P27939	Banded N-H Amph.	MGII	5YR 7/3	1
30	P27937	N/L Banded N-H Amph.	MGII	5YR 7/4	1
38	P27938	Banded N-H Amph.	MGII	5YR 7/4	1
10	P27953	N-H Amph. fr.	MGII	5YR 6/3	2
54	P26727	Hydria	LG	5YR 6/4	1
12	P21707	N-H Amph.	LGIa	5YR 7/3	1
13	P7280	N-H Amph. neck fr.	LGIb	5YR 6/6	1
40	P12434	Banded N-H Amph. neck fr.	LGIb-LGIIa	5YR 6/4	1
14	P12124	Hydria fr.	LGIb-LGIIa	5YR 7/4	1
55	P4980	Hydria	LGIIa	2.5YR 6/4	1
59	P17208	Hydria fr.	LGIIa	5YR 6/3	1
6	P32887	N-H Amph.	LGIIa	5YR 6/4	1
41	P4978	Banded N-H Amph.	LGIIa	5YR 6/4	1
7	P16990	N-H Amph.	LGIIa	2.5YR 6/4	2
32	P17198	N/L Banded N-H Amph.	LGIIa	7.5YR 7/4	1
16	P4886	N-H Amph. neck fr.	LGIIa	2.5YR 6/4	1
17	P22439	N-H Amph. neck fr.	LGIIa-LGIIb	5YR 7/3	1
43	P22435	N-H Dipylon Amph. neck fr.	LGIIa-LGIIb	5YR 6/4	1
49	P5499	Amphora? Fr. (decorated)	LGIIb	5YR 6/4	1
27	P4613	Amphora? Base fr.	LGIIb	5YR 7/3	1
35	P23658	Banded N-H Amph.	LGIIb-EPA	2.5YR 6/6	1
29	P23660	Banded N-H Amph.	LGIIb-EPA	5YR 7/4	1
51	P23420	Amphora ? Neck fr.	LGIIb-EPA	5YR 6/4	1
34	P23669	N/L Banded N-H Amph.	LGIIb-EPA	5YR 7/4	1
33	P23656	N/L Banded N-H Amph.	LGIIb-EPA	5YR 7/4	1
50	P18412	Amphora ? Wall fr.	LGIIb-EPA	5YR 7/4	1
22	P23888	N-H Amph.	LGIIb-EPA	5YR 7/6	1
28	P26242	Banded N-H Amph.	LGIIb-EPA	5YR 7/3	1
60	P23674	Hydria fr.	LGIIb-EPA	5YR 7/4	1
8	P4768	N-H Amph.	SG-EPA	2.5YR 6/4	1
61	P4614	Hydria fr.	SG	5YR 8/4	1
53	P1704	Amphora ? Rim	PA	5YR 6/4	1
23	P1708	Amphora ? fr.	PA	5YR 7/4	1

Chart 4.10: Fabric descriptions of 40 closed ceramic containers from the *Agora*.

	CHART OF DECORATIVE/ TECHNOLOGICAL CHARACTERISTICS							
Artefact information					**Colour Groups**		**Slip or Coating Quality**	
Thesis No.	**Inventory No.**	**Ware Type**	**Chronology**	**Context of Recovery**	**Elements**	**Coatings**	**Thickness**	**External Appearance**
	ATHENIAN DECORATED AMPHORAE FROM THE *AGORA*							
44	P19228	S-H Amph.	EGI	Grave	1	1	Thick	Lustrous
9	P17080	N-H Amph.neck fr.	EGII-MGI	Grave	1	1	Thick	Lustrous
2	P3747	N-H Amph.	MGI	Well	1	1	Thick	Matte
1	P6400	N-H Amphora	MGI?	Well	1	1	Thick	Lustrous
45	P24842	B-H Amph. frs	MGI-MGII	Well	1		Thin	Matte
10	P27953	N-H Amph. fr.	MGII	Well	1	1	Thick	Matte
3	P7141	N-H Amph.	MGII-LGIa	Outside House	1	1	Thick	Lustrous
11	P8248	N-H Amph.	MGII-LGIa	Well	1	1	Thick	?
12	P21707	N-H Amph.	LGIa	Well	1		Thin	Matte
15	P13767	N-H Amph.	LGIa	Well	1	1	Thick	?
4	P5422	N-H Amph.	LGIa	Grave	1		Thin	Matte
13	P7280	N-H Amph. neck fr.	LGIb?	Pit & Well	2	2	Thick	Matte
5	P12105	N-H Amph.	LGIb-LGIIa	Well	2	2	Thick	Matte
14	P23795	N-H Amph. neck fr.	LGIb-LGIIa	Well	2		Thin	Matte
16	P4886	N-H Amph. neck fr.	LGIIa	Grave	1		Thin	Matte
7	P16990	N-H Amph.	LGIIa	Grave	1		Thin	Matte
47	P15838	Amphora? Wall frs.	LGIIa	Grave	1	1	Thick	Lustrous
6	P32887	N-H Amph.	LGIIa	Grave	1	1	Thick	Lustrous
48	P5025	Amphora ? Wall fr.	LGIIa-LGIIb	Mixed Fill	1		Thin	Matte
17	P22439	N-H Amph. neck fr.	LGIIa-LGIIb	Well	2		Thin	Matte
43	P22435	N-H Amph. Dipylon neck fr.	non-BR	LGIIa-LGIIb	1		Thick	Matte
49	P5499	Amphora? fr.	LGIIb	Well	1		Thin	Matte
46	P4613	Amphora? Base fr.	LGIIb	Grave	1		Thin	Matte
19	P8382	N-H Amph. neck fr.	LGIIb-EPA	Pit	1	1	Thick	Lustrous
51	P23420	Amphora ? Neck fr.	LGIIb-EPA	Well	1		Thin	Matte
50	P18412	Amphora ? Wall fr.	LGIIb-EPA	Grave	1		Thin	Matte
18	P23888	N-H Amph.	LGIIb-EPA	Well	1	1	Thick	Matte
8	P4768	N-H Amph.	SG-EPA	Grave	1	1	Thick	Matte
20	P7491	N-H Amph. frs	SG	Pit & Well	1		Thin	Matte
21	P7492	N-H Amph. frs	SG	Pit & Well	1		Thin	Matte
22	P1706	Amphora ? fr.	PA	Outside House	2	2	Thick	?
52	P1712	Amphora? Rim fr.	PA	Outside House	2		Thin	Matte
53	P1704	Amphora ? Rim	PA	Outside House	1	1	Thin	Matte
23	P1708	Amphora ? fr.	PA	Outside House	1		Thin	Matte

Chart 4.11: Chart of decorative/technological characteristics of 34 Athenian decorated amphorae (no distinction) from the *Agora*.

	CHART OF DECORATIVE/ TECHNOLOGICAL CHARACTERISTICS							
Artefact information					**Colour Groups**		**Slip or Coating Quality**	
Thesis No.	**Inventory No.**	**Ware Type**	**Chronology**	**Context of Recovery**	**Elements**	**Coatings**	**Thickness**	**External Appearance**
	ATHENIAN BANDED NECK-HANDLED AMPHORAE FROM THE *AGORA*							
36	P6997	Banded N-H Amph.	LPG	Grave	1		Thin	Lustrous
37	P6411	Banded N-H Amph.	MG	Well	1		Thin	Matte
24	P6410	Banded N-H Amph.	MG	Well	1		Thin	Matte
25	P6423	Banded N-H Amph.	MG	Well	1		Thin	Matte
39	P27939	Banded N-H Amph.	MGII	Well	1		Thin	Matte
30	P27937	N/L Banded N-H Amph.	MGII	Well	1		Thin	Matte
38	P27938	Banded N-H Amph.	MGII	Well	1		Thin	Matte
26	P21578	Banded N-H Amph.	LGIa	Well	1		Thin	Matte
40	P12434	Banded N-H Amph. neck fr.	LGIb-LGIIa	Well	2		Thin	Matte
31	P17197	N/L Banded N-H Amph.	LGIIa	Pit	1		Thin	Lustrous
42	P17199	Banded N-H Amph. neck fr.	LGIIa	Pit	1		Thin	Matte
32	P17198	N/L Banded N-H Amph.	LGIIa	Pit	2		Thin	Lustrous
41	P4978	Banded N-H Amph.	LGIIa	Grave	2		Thin	Matte
35	P23658	N/L Banded N-H Amph.	LGIIb-EPA	Well	2		Thin	Matte
29	P23660	Banded N-H Amph.	LGIIb-EPA	Well	1		Thin	Matte
34	P23669	N/L Banded N-H Amph.	LGIIb-EPA	Well	1		Thin	Matte
33	P23656	N/L Banded N-H Amph.	LGIIb-EPA	Well	1		Thin	Matte
28	P26242	Banded N-H Amph.	LGIIb-EPA	Well	1		Thin	Matte

Chart 4.12: Chart of decorative/technological characteristics of 18 Athenian banded neck-handled amphorae from the *Agora.*

	CHART OF DECORATIVE/ TECHNOLOGICAL CHARACTERISTICS							
Artefact information					**Colour Groups**		**Slip or Coating Quality**	
Thesis No.	**Inventory No.**	**Ware Type**	**Chronology**	**Context of Recovery**	**Elements**	**Coatings**	**Thickness**	**External Appearance**
	ATHENIAN DECORATED *HYDRIAE* FROM THE *AGORA*							
56	P24840	Hydria fr.	MGII	Well	1		Thin	Matte
57	P8215	Hydria fr.	MGII-LGIa	Well	1	1	Thick	Lustrous
58	P12124	Hydria	LGIb-LGIIa	Well	3		Thin	Matte
54	P26727	Hydria	LG	Well	1	1	Thick	Lustrous
55	P4980	Hydria	LGIIa	Grave	1	1	Thick	Matte
59	P17208	Hydria fr.	LGIIa	Pit	1		Thin	Matte
60	P23674	Hydria	LGIIb-EPA	Well	1		Thin	Matte
61	P4614	Hydria	SG	Grave	1		Thin	Matte

Chart 4.13: Chart of decorative/technological characteristics of 8 Athenian *hydriae* from the *Agora.*

	CHART OF DECORATIVE/ TECHNOLOGICAL CHARACTERISTICS							
Artefact information					Colour Groups		Slip or Coating Quality	
Thesis No.	Inventory No.	Ware Type	Chronology	Context of Recovery	Elements	Coatings	Thickness	External Appearance
	ATHENIAN DECORATED AMPHORAE FROM THE *KYNOSARGES*							
156	K84	N-H Amph. neck fr.	MGII	Grave	2	2	Thick	Matte
157	K30	Amphora ? Neck fr.	LGIIa	Grave	2	2	Thick	Matte
158	K31	Amphora ? Wall fr.	LGIIb	Grave	1		Thin	Matte
159	K15	Amphora? Neck fr.	EPA	Grave	2		Thin	Matte
160	K16	Amphora? Neck fr.	EPA	Grave	2		Thin	Matte
	ATTIC DECORATED AMPHORAE FROM THE BRITISH SCHOOL AT ATHENS							
172	A204	N-H Amph. neck fr.	MGII-LGIa	Unknown	1	1	Thick	Lustrous
170	A517	Amphora ? Neck fr.	LGIIa	Unknown	2		Thin	Matte
171	A518	Amphora ? Neck fr.	LGIIa	Unknown	1		Thin	Matte

Chart 4.14: Chart of decorative technological characteristics of 8 Athenian decorated amphorae from *Kynosarges* and Attic decorated amphorae from the British School at Athens.

CHARTS OF CHAPTER 5

Metrical Features of Pouring Vessels (Preserving Complete Profile) from the *Agora* , *Kynosarges* and the BSA Museum									
Thesis No.	**Inventory No.**	**Ware Type**	**Context**	**Chronology**	**Net Height (cm)**	**Rim Diameter (cm)**	**Base Diameter (cm)**	**Length of Neck (cm)**	**Handle Attachment Height (cm)**
		Trefoil Oinochoai							
63	P18618	Oinochoe	non-BR	EGII	29.5	N/A	13.5	10.5	16.5
64	P18622	Oinochoe	non-BR	EGII	27.6	N/A	15	11.4	14.2
62	P18616	Oinochoe	non-BR	EGII	32.2	N/A	9.6	12	17.7
65	P6164	Oinochoe	non-BR	MGI	30.1	N/A	14.1	11.5	17
70	P553	Oinochoe	BR	MGI	29	N/A	9.7	10.5	17
69	P552	Oinochoe	BR	MGI	30.6	N/A	13.4	10.8	19.1
68	P6409	Oinochoe	non-BR	MGI	29.1	N/A	12.6	11.1	16.2
66	P6203	Oinochoe	non-BR	MGI	16.9	N/A	8.6	7.7	7.6
67	P6205	Oinochoe	non-BR	MGI	24.4	N/A	13.1	11.9	11.3
71	P3874	Oinochoe	non-BR	MGI	25.2	N/A	10.9	9	14.5
72	P18365	Oinochoe	non-BR	MGII	12.5	N/A	7.6	4.3	7.5
74	P6401	Oinochoe	non-BR	MGII	24.5	N/A	6.6	6.5	17
73	P27948	Oinochoe	non-BR	MGII	24.6	N/A	10.7	8.3	15
173	A298	Oinochoe	Unknown	MGII-LGIa	21.5	N/A	9.5	7.5	11.5
107	P21579	N/L Oinochoe Broad	non-BR	LGIa	14.3	N/A	8.2	N/L	8
174	A341	Oinochoe Broad	Unknown	LGIa	16	N/A	7.4	4.3	9
79	P4772	Oinochoe	BR	LGIb-LGIIa	22.4	N/A	8.2	8.4	13.2
99	P12120	N/L Oinochoe	non-BR	LGIb-LGIIa	24.5	N/A	11.6	N/L	16
75	P17194	Oinochoe	non-BR	LGIb-LGIIa	22.2	N/A	9.1	8.6	12.1
98	P12115	N/L Oinochoe	non-BR	LGIb-LGIIa	22.4	N/A	9.3	N/L	N/A
76	P12104	Oinochoe	non-BR	LGIb-LGIIa	28.2	N/A	10	9	16.5
97	P12108	N/L Oinochoe	non-BR	LGIb-LGIIa	22	N/A	9	N/L	15.5
77	P12433	Oinochoe	non-BR	LGIb-LGIIa	20.5	N/A	8.2	7.5	11.3
78	P12431	Oinochoe	non-BR	LGIb-LGIIa	18	N/A	7.9	6.6	10
100	P22427	N/L Oinochoe	non-BR	LGIIb	24.1	N/A	9.5	N/L	16
80	P23649	Oinochoe	non-BR	LGIIb-EPA	21.4	N/A	8.6	8.1	12.4
103	P23657	N/L Oinochoe	non-BR	LGIIb-EPA	21	N/A	8.4	N/L	13
102	P23655	N/L Oinochoe	non-BR	LGIIb-EPA	23.5	N/A	10.7	N/L	10.5
81	P23673	Oinochoe	non-BR	LGIIb-EPA	27.1	N/A	9.7	8.6	16.5
101	P23654	N/L Oinochoe	non-BR	LGIIb-EPA	23.5	N/A	9.3	N/L	16.5
104	P20729	N/L Oinochoe	non-BR	LGIIb-SG	24.2	N/A	9.7	N/L	16
		Pitchers							
162	K83	Pitcher BR	BR	LGIIa	36.5	16.6	11.8	14.7	19.5
176	A306	Pitcher	Unknown	LGIIa	33.5	15.5	10.2	11.9	19.2
175	A305	Pitcher	Unknown	LGIIa	34.7	16.6	10.8	13	18.5
177	A303	Pitcher	Unknown	LGIIa	50.5	21.3	13.5	20.5	27
178	A304	Pitcher	Unknown	LGIIa	40.6	16	12.5	13.6	24.3
179	A361	Pitcher	Unknown	LGIIb	36.2	17.5	10.3	16.6	17.5

Chart 5.1: Metrical features of 37 pouring vessels with complete profiles from the Athenian *Agora*, the *Kynosarges* burials and the collections of the British School at Athens in chronological order. KEY: BR (=burial context), N/L (=neck-less), N/A (=not applicable).

Surviving Metrical Features of Oinochoai (Incomplete or Fragmented)							
Thesis No.	**Inventory No.**	**Ware Type**	**Context**	**Chronology**	**Base Diameter (cm)**	**Length of Neck (cm)**	**Handle Attachment Height (cm)**
		Trefoil Oinochoai					
82	P3687	Oinochoe	non-BR	EGI	9		18.3
85	P27952	Oinochoe frs	non-BR	MGII	5.5	11.3	
83	P27951	Oinochoe neck fr.	non-BR	MGII		9.5	
84	P27950	Oinochoe fr.	non-BR	MGII		9.1	
161	K86	Oinochoe neck fr. BR	BR	MGII		10.2	
86	P2402	Oinochoe neck frs	non-BR	MGII-LGIa		7.7	
87	P15127	Oinochoe fr. BR	non-BR	LGIb	8.8		
88	P10224	Oinochoe part	non-BR	LGIb-LGIIa		11.2	
89	P12432	Oinochoe	non-BR	LGIb-LGIIa	8.4		9.7
91	P4923	Oinochoe neck fr.	non-BR	LGIIa-LGIIb		6.9	
105	P26813	Oinochoe neck fr.	non-BR	LGIIa-LGIIb		8	
90	P26827	Oinochoe fr.	non-BR	LGIIa-LGIIb	9.5		18
92	P19842	Oinochoe	non-BR	LGIIa-LGIIb	8	7	9.5
96	P24844	Giant Oinochoe part	non-BR	LGIIb-EPA	11		
95	P23675	Giant Oinochoe part	non-BR	LGIIb-EPA	11.4		

Chart 5.2: Metrical features of 16 fragmented *oinochoai* with incomplete profiles from the Athenian *Agora* and the *Kynosarges* burials in chronological order. KEY: BR (=burial context), fr/s (=fragment/s), N/L (=neck-less).

Basic Proportions of Pouring Vessels (Preserving Complete Profile) from the *Agora, Kynosarges* and the BSA Museum									
Thesis No.	Inventory No.	Ware Type	Context	Chronology	Proportion of Handle Attachment Height to Net Height (%)	Proportion of Neck Length to Net Height (%)	Proportion of Rim Diameter to Net Height (%)	Proportion of Base Diameter to Net Height (%)	Proportion of Base Diameter to Rim Diameter (%)
		Trefoil Oinochoai							
63	P18618	Oinochoe	non-BR	EGII	55.9	35.6	N/A	45.8	N/A
64	P18622	Oinochoe	non-BR	EGII	51.4	41.3	N/A	54.3	N/A
62	P18616	Oinochoe	non-BR	EGII	55.0	37.3	N/A	29.8	N/A
65	P6164	Oinochoe	non-BR	MGI	56.5	38.2	N/A	46.8	N/A
70	P553	Oinochoe	BR	MGI	58.6	36.2	N/A	33.4	N/A
69	P552	Oinochoe	BR	MGI	62.4	35.3	N/A	43.8	N/A
68	P6409	Oinochoe	non-BR	MGI	55.7	38.1	N/A	43.3	N/A
66	P6203	Oinochoe	non-BR	MGI	45.0	45.6	N/A	50.9	N/A
67	P6205	Oinochoe	non-BR	MGI	46.3	48.8	N/A	53.7	N/A
71	P3874	Oinochoe	non-BR	MGI	57.5	35.7	N/A	43.3	N/A
72	P18365	Oinochoe	non-BR	MGII	60.0	34.4	N/A	60.8	N/A
74	P6401	Oinochoe	non-BR	MGII	69.4	26.5	N/A	26.9	N/A
73	P27948	Oinochoe	non-BR	MGII	61.0	33.7	N/A	43.5	N/A
173	A298	Oinochoe	Unknown	MGII-LGIa	53.5	34.9	N/A	44.2	N/A
107	P21579	N/L Oinochoe Broad	non-BR	LGIa	55.9	N/L	N/A	57.3	N/A
174	A341	Oinochoe Broad	Unknown	LGIa	56.3	26.9	N/A	46.3	N/A
79	P4772	Oinochoe BR	BR	LGIb-LGIIa	58.9	37.5	N/A	36.6	N/A
99	P12120	N/L Oinochoe	non-BR	LGIb-LGIIa	65.3	N/L	N/A	47.3	N/A
75	P17194	Oinochoe	non-BR	LGIb-LGIIa	54.5	38.7	N/A	41.0	N/A
98	P12115	N/L Oinochoe	non-BR	LGIb-LGIIa	N/A	N/L	N/A	41.5	N/A
76	P12104	Oinochoe	non-BR	LGIb-LGIIa	58.5	31.9	N/A	35.5	N/A
97	P12108	N/L Oinochoe	non-BR	LGIb-LGIIa	70.5	N/L	N/A	40.9	N/A
77	P12433	Oinochoe	non-BR	LGIb-LGIIa	55.1	36.6	N/A	40.0	N/A
78	P12431	Oinochoe	non-BR	LGIb-LGIIa	55.6	36.7	N/A	43.9	N/A
100	P22427	N/L Oinochoe	non-BR	LGIIb	66.4	N/L	N/A	39.4	N/A
80	P23649	Oinochoe	non-BR	LGIIb-EPA	57.9	37.9	N/A	40.2	N/A
103	P23657	N/L Oinochoe	non-BR	LGIIb-EPA	61.9	N/L	N/A	40.0	N/A
102	P23655	N/L Oinochoe	non-BR	LGIIb-EPA	44.7	N/L	N/A	45.5	N/A
81	P23673	Oinochoe	non-BR	LGIIb-EPA	60.9	31.7	N/A	35.8	N/A
101	P23654	N/L Oinochoe	non-BR	LGIIb-EPA	70.2	N/L	N/A	39.6	N/A
104	P20729	N/L Oinochoe	non-BR	LGIIb-SG	66.1	N/L	N/A	40.1	N/A
		Pitchers							
162	K83	Pitcher	BR	LGIIa	53.4	40.3	45.5	32.3	71.1
176	A306	Pitcher	Unknown	LGIIa	57.3	35.5	46.3	30.4	65.8
175	A305	Pitcher	Unknown	LGIIa	53.3	37.5	47.8	31.1	65.1
177	A303	Pitcher	Unknown	LGIIa	53.5	40.6	42.2	26.7	63.4
178	A304	Pitcher	Unknown	LGIIa	59.9	33.5	39.4	30.8	78.1
179	A361	Pitcher	Unknown	LGIIb	48.3	45.9	48.3	28.5	58.9

Chart 5.3: Basic proportions of 37 pouring vessels with complete profiles from the Athenian *Agora,* the *Kynosarges* burials and the collections of the British School at Athens in chronological order. KEY: BR (=burial context), N/L (=neck-less), N/A (=not applicable).

Metrical Features of Pouring Vessels (Preserving Complete Profile) from *Kerameikos*									
Thesis No.	**Inventory No.**	**Ware Type**	**Chronology**	***Kerameikos* Context**	**Real Net Height (cm)**	**Calculate Rim Diameter (cm)**	**Calculated Base Diameter (cm)**	**Calculated Neck Length (cm)**	**Calculated Handle Attachment Height**
		Trefoil Oinochoai							
255	928	Oinochoe	EGII	Grave 2	25	N/A	6.5	8.3	10.8
226	927	Oinochoe	EGII	Grave 2	27.5	N/A	14.7	12.8	N/A
227	2139	Oinochoe	EGII	Grave 38	24	N/A	12.1	10.8	13.5
228	2148	Oinochoe	EGII-MGI	Grave 41	27	N/A	14.3	12.8	16.5
229	2149	Oinochoe (Giant)	EGII-MGI	Grave 41	40.7	N/A	19.2	18.1	23.2
230	2145	Oinochoe	EGII-MGI	Grave 42	23.5	N/A	11.1	10.9	12.9
231	1253	Oinochoe	EGII-MGI	Grave 43	23.7	N/A	11.2	10.2	13.0
244	1141	Oinochoe Lekythos	MGI	Grave 13	17.5	N/A	11.9	6.4	9.7
232	862	Oinochoe	MGI-MGII	Grave 11	25.5	N/A	10.4	12.2	14.3
233	298	Oinochoe	MGII	Grave 22	23.3	N/A	10.4	10.1	12.9
234	300	Oinochoe	MGII	Grave 22	27.5	N/A	10.5	12.9	16.1
235	379	Oinochoe	MGII	Grave 23	22.4	N/A	8.8	10.6	12.0
236	397	Oinochoe	MGII	Grave 35	22.7	N/A	10.5	12.9	10.5
237	880	Oinochoe	MGII-LGIa	Grave 25	29	N/A	12.1	12.1	N/A
238	274	Oinochoe	MGII-LGIa	Grave 31	22	N/A	10.0	8.5	13.0
243	874	Broad N/L Oinochoe	LGIa	Grave 9	20.2	N/A	8.9	N/L	14.7
239	1327	Oinochoe	LGIb	Grave 48	21.6	N/A	9.8	8.1	11.5
240	341	Oinochoe	LGIb	Grave 71	21.8	N/A	9.1	7.7	12.2
241	814	Oinochoe	LGIIa	Grave 90	23	N/A	8.6	9.6	N/A
242	369	Oinochoe	LGIIb	Grave 57	22.5	N/A	9.4	7.7	13.4
		Pitchers							
245	819	Pitcher	LGIIa	Grave 79	34.3	15.4	10.4	11.6	27.7
246	821	Pitcher	LGIIa	Grave 93	40.2	14.8	9.1	16.3	26.5
247	393	Pitcher	LGIIa-LGIIb	Grave 33	41	17.9	10.3	16.5	27.6
248	399	Pitcher	LGIIb	Grave 16	40.2	15.4	9.4	16.3	27.3

Chart 5.4: Metrical features of 24 pouring vessels with complete profiles from the *Kerameikos* cemetery in chronological order. KEY: N/L (=neck-less), N/A (=not applicable).

Basic Proportions of Pouring vessels (Preserving Complete Profile) from *Kerameikos*									
Thesis No.	**Inventory No.**	**Ware Type**	**Chronology**	***Kerameikos* Context**	**Calculated Proportion of Handle Attachment Height to Net Height (%)**	**Calculated Proportion of Neck Length to Net Height (%)**	**Calculated Proportion of Rim Diameter to Net Height (%)**	**Calculated Proportion of Base Diameter to Net Height (%)**	**Calculated Proportion of Base Diameter to Rim Diameter (%)**
		Trefoil Oinochoai							
255	928	Oinochoe	EGII	Grave 2	60.22	33.33	N/A	25.81	N/A
226	927	Oinochoe	EGII	Grave 2	N/A	46.49	N/A	53.51	N/A
227	2139	Oinochoe	EGII	Grave 38	50.55	45.05	N/A	50.55	N/A
228	2148	Oinochoe	EGII-MGI	Grave 41	47.22	47.22	N/A	52.78	N/A
229	2149	Oinochoe (Giant)	EGII-MGI	Grave 41	50.00	44.44	N/A	47.22	N/A
230	2145	Oinochoe	EGII-MGI	Grave 42	47.37	46.32	N/A	47.37	N/A
231	1253	Oinochoe	EGII-MGI	Grave 43	49.46	43.01	N/A	47.31	N/A
244	1141	Oinochoe Lekythos	MGI	Grave 13	55.56	36.67	N/A	67.78	N/A
232	862	Oinochoe	MGI-MGII	Grave 11	48.96	47.92	N/A	40.63	N/A
233	298	Oinochoe	MGII	Grave 22	53.26	43.48	N/A	44.57	N/A
234	300	Oinochoe	MGII	Grave 22	45.65	46.74	N/A	38.04	N/A
235	379	Oinochoe	MGII	Grave 23	47.42	47.42	N/A	39.18	N/A
236	397	Oinochoe	MGII	Grave 35	47.37	56.84	N/A	46.32	N/A
237	880	Oinochoe	MGII-LGIa	Grave 25	N/A	41.84	N/A	41.84	N/A
238	274	Oinochoe	MGII-LGIa	Grave 31	47.73	38.64	N/A	45.45	N/A
243	874	N/L Oinochoe	LGIa	Grave 9	66.67	N/L	N/A	43.94	N/A
239	1327	Oinochoe	LGIb	Grave 48	57.33	37.33	N/A	45.33	N/A
240	341	Oinochoe	LGIb	Grave 71	59.34	35.16	N/A	41.76	N/A
241	814	Oinochoe	LGIIa	Grave 90	N/A	41.67	N/A	37.50	N/A
242	369	Oinochoe	LGIIb	Grave 57	54.17	34.38	N/A	41.67	N/A
		Pitchers							
245	819	Pitcher	LGIIa	Grave 79	61.80	33.71	44.94	30.34	67.50
246	821	Pitcher	LGIIa	Grave 93	52.83	40.57	36.79	22.64	61.54
247	393	Pitcher	LGIIa-LGIIb	Grave 33	55.46	40.34	43.70	25.21	57.69
248	399	Pitcher	LGIIb	Grave 16	50.00	40.63	38.28	23.44	61.22

Chart 5.5: Basic proportions of 24 pouring vessels with complete profiles from the *Kerameikos* cemetery in chronological order. KEY: N/L (=neck-less), N/A (=not applicable).

Thesis No.	**Inventory No.**	**Ware Type**	**Date**	**Context**	**Real Base Diameter (cm)**	**Calculated Base Diameter (cm)**	**Difference of Base Diameter (cm)**	**Real Proportion of Base Diameter to Net Height (%)**	**Calculated Proportion of Base Diameter to Net Height (%)**	**Difference of Proportion of Base Diameter to Net Height (%)**
231	1253	Oinochoe	EGII-MGI	Grave 43	11.5	11.2	0.3	48.5	47.3	1.2
232	862	Oinochoe	MGI-MGII	Grave 11	10.2	10.4	-0.2	40.0	40.6	-0.6
233	298	Oinochoe	MGII	Grave 22	10.0	10.4	-0.4	42.9	44.6	-1.7
243	874	Oinohoe N/L	LGIa	Grave 9	9.4	8.9	0.5	46.5	43.9	2.6
239	1327	Oinochoe	LGIb	Grave 48	9.8	9.8	0	45.4	45.3	0.0

Chart 5.6: Accuracy test between real and calculated measurements for 5 *oinochoai* from the *Kerameikos* cemetery.

	Metrical Features of Pouring Vessels (Preserving Complete Profile) from the British Museum								
Thesis No.	**Inventory No.**	**Ware Type**	**Chronology**	**Origin**	**Real Net Height (cm)**	**Real Rim Diameter (cm)**	**Calculated Base Diameter (cm)**	**Calculated Neck Length (cm)**	**Calculated Handle Attachment Height (cm)**
		Trefoil Oinochoai							
357	GR1950,0228.1	Oinochoe	LPG	Probably Athens	24.6	N/A	6.6	7.9	15.3
358	GR1950,0228.2	Oinochoe	EGI	Probably Athens	30	N/A	8.3	9.8	N/A
365	GR1868,0110.768	Oinochoe Lekythos	MGI	Attica	30	N/A	15.0	12.5	16.7
359	GR1977,1207.50	Oinochoe	MGI-MGII	Probably Athens	32.7	N/A	13.3	13.3	N/A
360	GR1977,1207.11	Oinochoe	MGII	Probably Athens	30	N/A	15.3	13.3	15.3
361	GR1977,1207.12	Oinochoe	MGII	Probably Athens	22.7	N/A	10.0	10.2	11.5
362	GR1977,1207.13	Oinochoe	LGIIa	Probably Athens	22	N/A	8.4	7.7	12.2
363	GR1920,1014.4	Oinochoe	LGIIa	Attica	22	N/A	8.9	6.8	12.9
364	GR1877,1207.12	Oinochoe	LGIIa	Attica	23	N/A	8.7	8.4	12.2
366	GR1977,1207.8	Oinochoe Giant	LGIIa	Probably Athens	49.5	N/A	13.6	18.0	27.2
367	GR1977,1207.9	Oinochoe Giant	LGIIa	Probably Athens	47	N/A	13.8	18.0	30.4
		Pitchers							
368	GR1878,0812.8	Pitcher	LGIa	Attica	22.8	13	10.4	11.2	9.1
369	GR1877,1207.10	Pitcher	LGIb	Possibly Phaleron	39.3	25	13.1	23.6	10.5
370	GR1977,1207.10	Pitcher	LGIb	Probably Athens	43.4	21	12.0	20.5	26.9
377	GR1977,1211.4	Pitcher (short neck)	LGIb	Probably Athens	19	N/A	7.2	5.3	11.6
378	GR1977,1207.14	Pitcher (short neck)	LGIb	Probably Athens	26.5	14.5	10.7	6.6	17.3
371	GR1977,1211.3	Pitcher	LGIIa	Probably Athens	42	20	11.2	16.6	22.9
379	GR1912,0718.1	Pitcher (short neck)	LGIIa	Athens	26	12.4	11.8	8.0	14.2
372	GR1913,1113.1	Pitcher	LGIIb	Attica	51.5	20.5	10.1	16.2	31.3
373	GR1916,0108.2	Pitcher	LGIIb	Attica	32	16.5	11.8	13.1	15.5
374	GR1912,0522.1	Pitcher	LGIIb	Attica	44	17.5	11.7	16.3	25.9
375	GR1905,1028.1	Pitcher	LGIIb	Attica	53.5	22	11.3	19.2	32.3
376	GR1842,0728.826	Pitcher	LGIIb	Attica	35	15	9.1	11.3	21.1

Chart 5.7: Metrical features of 23 pouring vessels with complete profiles from the British Museum in chronological order. KEY: N/A (=not applicable)

	Basic Proportions of Pouring Vessels (Preserving Complete Profile) from the British Museum								
Thesis No.	Inventory No.	Ware Type	Chronology	Origin	Calculated Proportion of Handle Attachment Height to Net Height (%)	Calculated Proportion of Neck Length to Net Height (%)	Real Proportion of Rim Diameter to Net Height (%)	Calculated Proportion of Base Diameter to Net Height (%)	Calculated Proportion of Base Diameter to Rim Diameter (%)
		Trefoil Oinochoai							
357	GR1950,0228.1	Oinochoe	LPG	Probably Athens	62.4	32.3	N/A	26.9	N/A
358	GR1950,0228.2	Oinochoe	EGI	Probably Athens	N/A	32.7	N/A	27.6	N/A
365	GR1868,0110.768	Oinochoe Lekythos	MGI	Attica	55.6	41.7	N/A	50.0	N/A
359	GR1977,1207.50	Oinochoe	MGI-MGII	Probably Athens	N/A	40.8	N/A	40.8	N/A
360	GR1977,1207.11	Oinochoe	MGII	Probably Athens	51.1	44.3	N/A	51.1	N/A
361	GR1977,1207.12	Oinochoe	MGII	Probably Athens	50.5	45.0	N/A	44.1	N/A
362	GR1977,1207.13	Oinochoe	LGIIa	Probably Athens	55.6	35.2	N/A	38.0	N/A
363	GR1920,1014.4	Oinochoe	LGIIa	Attica	58.5	31.1	N/A	40.6	N/A
364	GR1877,1207.12	Oinochoe	LGIIa	Attica	53.1	36.7	N/A	37.8	N/A
366	GR1977,1207.8	Oinochoe Giant	LGIIa	Probably Athens	54.9	36.3	N/A	27.4	N/A
367	GR1977,1207.9	Oinochoe Giant	LGIIa	Probably Athens	64.7	38.2	N/A	29.4	N/A
		Pitchers							
368	GR1878,0812.8	Pitcher	LGIa	Attica	40.0	49.1	57.0	45.5	79.7
369	GR1877,1207.10	Pitcher	LGIb	Possibly Phaleron	26.7	60.0	63.6	33.3	52.4
370	GR1977,1207.10	Pitcher	LGIb	Probably Athens	62.1	47.1	48.4	27.6	57.0
377	GR1977,1211.4	Pitcher (short neck)	LGIb	Probably Athens	61.3	28.0	N/A	37.6	N/A
378	GR1977,1207.14	Pitcher (short neck)	LGIb	Probably Athens	65.2	24.7	54.7	40.4	73.9
371	GR1977,1211.3	Pitcher	LGIIa	Probably Athens	54.5	39.6	47.6	26.7	56.1
379	GR1912,0718.1	Pitcher (short neck)	LGIIa	Athens	54.5	30.7	47.7	45.5	95.3
372	GR1913,1113.1	Pitcher	LGIIb	Attica	60.8	31.4	39.8	19.6	49.3
373	GR1916,0108.2	Pitcher	LGIIb	Attica	48.4	41.0	51.6	36.9	71.5
374	GR1912,0522.1	Pitcher	LGIIb	Attica	58.9	37.1	39.8	26.6	66.9
375	GR1905,1028.1	Pitcher	LGIIb	Attica	60.3	36.0	41.1	21.2	51.5
376	GR1842,0728.826	Pitcher	LGIIb	Attica	60.4	32.3	42.9	26.0	60.8

Chart 5.8: Basic proportions of 23 pouring vessels with complete profiles from the British Museum in chronological order. KEY: N/A (=not applicable).

Thesis No.	Inventory No.	Ware Type	Date	Origin	Real Rim Diameter (cm)	Calculated Rim Diameter (cm)	Difference of Rim Diameter (cm)	Real Proportion of Rim Diameter to Net Height (%)	Calculated Proportion of Rim Diameter to Net Height (%)	Difference of Proportion of Rim Diameter to Net Height (%)
368	GR1878,0812.8	Pitcher	LGIa	Attica	13	13.3	-0.3	57.0	58.2	-1.2
369	GR1877,1207.10	Pitcher	LGIb	Possibly Phaleron	25	24.5	0.5	63.6	62.2	1.4
370	GR1977,1207.10	Pitcher	LGIb	Probably Athens	21	21.0	0.0	48.4	48.3	0.1
377	GR1977,1211.4	Pitcher (short neck)	LGIb	Probably Athens	N/A	N/A	N/A	N/A	N/A	N/A
378	GR1977,1207.14	Pitcher (short neck)	LGIb	Probably Athens	14.5	14.9	-0.4	54.7	56.2	-1.5
371	GR1977,1211.3	Pitcher	LGIIa	Probably Athens	20	20.8	-0.8	47.6	49.5	-1.9
379	GR1912,0718.1	Pitcher (short neck)	LGIIa	Athens	12.4	12.7	-0.3	47.7	48.9	-1.2
372	GR1913,1113.1	Pitcher	LGIIb	Attica	20.5	20.2	0.3	39.8	39.2	0.6
373	GR1916,0108.2	Pitcher	LGIIb	Attica	16.5	16.0	0.5	51.6	50.0	1.6
374	GR1912,0522.1	Pitcher	LGIIb	Attica	17.5	17.0	0.5	39.8	38.7	1.1
375	GR1905,1028.1	Pitcher	LGIIb	Attica	22	21.5	0.5	41.1	40.2	0.9
376	GR1842,0728.826	Pitcher	LGIIb	Attica	15	15.3	-0.3	42.9	43.8	-0.9

Chart 5.9: Accuracy test between real and calculated measurements for 12 pitchers from the British Museum.

Thesis No.	Catalogue No.	Ware Type	Chronology	Context	Munsell Colour	Fabric Type
62	P18616	Oinochoe	EGII	Non-BR	5YR 5/3	1
63	P18618	Oinochoe	EGII	Non-BR	2.5YR 6/6	2
68	P6409	Oinochoe	MGI	Non-BR	5YR 6/6	1
66	P6203	Oinochoe	MGI	Non-BR	5YR 6/4	1
71	P3874	Oinochoe	MGI	Non-BR	5YR 7/3	1
74	P6401	Oinochoe	MGII	Non-BR	5YR 6/6	1
85	P27952	Oinochoe frs	MGII	Non-BR	5YR 7/6	1
73	P27948	Oinochoe	MGII	Non-BR	5YR 6/4	1
83	P27951	Oinochoe neck fr.	MGII	Non-BR	5YR 7/4	1
86	P2402	Oinochoe neck frs	MGII-LGIa	Non-BR	5YR 8/4	1
108	P21580	N/L Oinochoe Broad fr.	LGIa	Non-BR	5YR 7/4	1
107	P21579	N/L Oinochoe Broad	LGIa	Non-BR	5YR 7/4	1
87	P15127	Oinochoe fr.	LGIb	BR	5YR 6/4	1
88	P10224	Oinochoe part	LGIb-LGIIa	Non-BR	6YR 6/4	1
79	P4772	Oinochoe	LGIb-LGIIa	BR	5YR 7/3	1
97	P12108	N/L Oinochoe	LGIb-LGIIa	Non-BR	5YR 7/6	1
99	P12120	N/L Oinochoe	LGIb-LGIIa	Non-BR	5YR 7/3	1
93	P7482	Oinochoe neck fr.	LGIIa-LGIIb	Non-BR	5YR 6/6	1
105	P26813	Oinochoe neck fr.	LGIIa-LGIIb	Non-BR	5YR 7/4	1
91	P4923	Oinochoe neck fr.	LGIIa-LGIIb	Non-BR	5YR 6/4	1
81	P23673	Oinochoe	LGIIb-EPA	Non-BR	5YR 6/3	1
80	P23649	Oinochoe	LGIIb-EPA	Non-BR	5YR 7/3	1
96	P24844	Giant Oinochoe part	LGIIb-EPA	Non-BR	2.5YR 5/4	1
95	P23675	Giant Oinochoe part	LGIIb-EPA	Non-BR	5YR 7/3	1
103	P23657	N/L Oinochoe	LGII-EPA	Non-BR	5YR 7/4	1

Chart 5.10: Fabric descriptions of 25 Athenian *oinochoai* from the *Agora* (BR = burial context).

	CHART OF DECORATIVE/ TECHNOLOGICAL CHARACTERISTICS							
Artefact information					Colour Groups		Slip or Coating Quality	
Thesis No.	Catalogue No.	Ware Type	Chronology	Context of Recovery	Elements	Coatings	Thickness	External Appearance
		ATHENIAN/ATTIC DECORATED OINOCHOAI FROM THE AGORA						
82	P3687	Oinochoe	EGI	Well	1	1	Thick	Lustrous
63	P18618	Oinochoe	EGII	Well	1	1	Thick	?
64	P18622	Oinochoe	EGII	Well	1	1	Thick	Lustrous
62	P18616	Oinochoe	EGII	Well	1	1	Thick	?
65	P6164	Oinochoe	MGI	Well	1	1	Thick	Lustrous
70	P553	Oinochoe	MGI	Grave	1	1	Thick	Lustrous
69	P552	Oinochoe	MGI	Grave	1	1	Thick	Lustrous
68	P6409	Oinochoe	MGI	Well	1	1	Thick	Lustrous
66	P6203	Oinochoe	MGI	Well	1	1	Thick	Lustrous
67	P6205	Oinochoe	MGI	Well	1	1	Thick	Lustrous
71	P3874	Oinochoe	MGI	Well	1	1	Thin	Lustrous
85	P27952	Oinochoe frs	MGII	Well	2	2	Thick	?
83	P27951	Oinochoe neck fr.	MGII	Well	1	1	Thick	Lustrous
73	P27948	Oinochoe	MGII	Well	1	1	Thick	Lustrous
84	P27950	Oinochoe fr.	MGII	Well	1	1	Thick	Lustrous
74	P6401	Oinochoe	MGII	Well	1	1	Thick	Lustrous
72	P18365	Oinochoe	MGII	Well	1	1	Thick	Lustrous
86	P2402	Oinochoe neck frs	MGII-LGIa	Pit	1		Thin	Matte
108	P21580	N/L Oinochoe Broad fr.	LGIa	Well	1		Thin	Matte
107	P21579	N/L Oinochoe Broad	LGIa	Well	1	1	Thick	Matte
87	P15127	Oinochoe fr.	LGIb	Grave	1	1	Thick	Lustrous
74	P17194	Oinochoe	LGIb-LGIIa	Pit	1	1	Thick	Lustrous
94	P25631	Giant Oinochoe part	LGIb-LGIIa	Well	1		Thin	Matte
98	P12115	N/L Oinochoe	LGIb-LGIIa	Well	1		Thin	Matte
76	P12104	Oinochoe	LGIb-LGIIa	Well	1		Thin	Matte
99	P12120	N/L Oinochoe	LGIb-LGIIa	Well	1		Thick	?
97	P12108	N/L Oinochoe	LGIb-LGIIa	Well	1		Thick	Lustrous
88	P10224	Oinochoe part	LGIb-LGIIa	Well	1		Thin	Lustrous
79	P4772	Oinochoe	LGIb-LGIIa	Grave	1	1	Thick	Lustrous
77	P12433	Oinochoe	LGIb-LGIIa	Well	1	1	Thick	Metallic
78	P12431	Oinochoe	LGIb-LGIIa	Well	1		Thin	Matte
89	P12432	Oinochoe	LGIb-LGIIa	Well	1	1	Thick	Lustrous
105	P26813	Oinochoe neck fr.	LGIIa-LGIIb	Well	1	1	Thick	Lustrous
93	P7482	Oinochoe neck fr.	LGIIa-LGIIb	Well	1		Thin	Matte
90	P26827	Oinochoe fr.	LGIIa-LGIIb	Well	1	1	Thin	Matte
91	P4923	Oinochoe neck Fr.	LGIIa-LGIIb	Surface fill	1	1	Thick	Lustrous
92	P19842	Oinochoe	LGIIa-LGIIb	Well	1		Thick	Lustrous
100	P22427	N/L Oinochoe	LGIIb	Well	3		Thin	Matte
96	P24844	Giant Oinochoe part	LGIIb-EPA	Well	2		Thin	Matte
80	P23649	Oinochoe	LGIIb-EPA	Well	1		Thin	Matte
103	P23657	N/L Oinochoe	LGIIb-EPA	Well	1		Thin	Matte
102	P23655	N/L Oinochoe	LGIIb-EPA	Well	1		Thin	Matte
95	P23675	Giant Oinochoe part	LGIIb-EPA	Well	1		Thin	?
81	P23673	Oinochoe	LGIIb-EPA	Well	1	1	Thick	?
101	P23654	N/L Oinochoe	LGIIb-EPA	Well	1		Thin	Matte
106	P17193	N/L Oinochoe	LGIIb-EPA	Pit	1	1	Thin	Lustrous
104	P20729	N/L Oinochoe	LGIIb-SG	Well	1		Thin	Matte

Chart 5.11: Chart of decorative/technological characteristics of 47 Athenian decorated trefoil *oinochoai* (all typologies) from the Athenian *Agora*, the *Kynosarges* burials and the collections of the British School at Athens.

	CHART OF DECORATIVE/ TECHNOLOGICAL CHARACTERISTICS							
Artefact information					Colour Groups		Slip or Coating Quality	
Thesis No.	Catalogue No.	Ware Type	Chronology	Context of Recovery	Elements	Coatings	Thickness	External Appearance
	ATHENIAN/ATTIC DECORATED OINOCHOAI FROM THE KYNOSARGES AND BSA COLLECTIONS							
161	K86	Oinochoe neck fr.	MGII	Grave	1		Thin	?
173	A298	Oinochoe	MGII-LGIa	Unknown	1	1	Thick	Lustrous
174	A341	N/L Oinochoe Broad	LGIa	Unknown	1	1	Thick	Matte
	ATHENIAN/ATTIC DECORATED PITCHERS FROM THE KYNOSARGES AND BSA COLLECTIONS							
162	K83	Pitcher	LGIIa	Grave	1		Thin	Matte
176	A306	Pitcher	LGIIa	Unknown	1		Thin	Matte
175	A305	Pitcher	LGIIa	Unknown	1		Thin	Matte
177	A303	Pitcher	LGIIa	Unknown	1		Thin	Matte
178	A304	Pitcher	LGIIa	Unknown	1		Thin	Matte
179	A361	Pitcher	LGIIb	Unknown	1		Thin	Matte

Chart 5.12: Chart of decorative/technological characteristics of 3 Athenian/Attic decorated *oinochoai* (all typologies) and 9 pitchers from the *Kynosarges* burials and the collections of the British School at Athens.

CHARTS OF CHAPTER 6

	Metrical Features of Drinking Vessels (Preserving Complete Profile) from the *Agora*							
Thesis No.	Inventory No.	Ware Type	Context	Chronology	Net Height (cm)	Rim Diameter (cm)	Base Diameter (cm)	Handle Attachment Height (cm)
		Skyphos						
125	P27944	Skyphos	non-BR	MGII	7.4	11.8	5.9	4.4
126	P32895	Skyphos	non-BR	MGII	7.2	12	5.5	4.5
129	P32891	Skyphos	non-BR	MGII	6.8	11.5	6.1	4
127	P27941	Skyphos	non-BR	MGII	8.8	13.2	7.1	5.3
124	P27942	Skyphos	non-BR	MGII	6.8	11.3	4.9	4
128	P27943	Skyphos	non-BR	MGII	7.5	12.5	5.5	4.5
149	P8230	Skyphos Wide	non-BR	MGII-LGIa	13.6	19.8	9	8.6
148	P8229	Skyphos Wide	non-BR	MGII-LGIa	10	15.7	7.4	6.9
150	P8225	Skyphos Wide Frs	non-BR	MGII-LGIa	10.9	15.3	7.7	N/A
151	P8221	Skyphos Wide	non-BR	MGII-LGIa	8.8	16.3	7	6
152	P8231	Skyphos Wide Fr.	non-BR	MGII-LGIa	8.5	16	6.7	N/A
133	P8224	Skyphos Frs	non-BR	MGII-LGIa	6.2	12	5	3.5
130	P8222	Skyphos	non-BR	MGII-LGIa	7.8	13.6	6.2	4.5
131	P8233	Skyphos Frs	non-BR	MGII-LGIa	7.7	13.7	7	4.8
132	P8223	Skyphos	non-BR	MGII-LGIa	7.3	12.5	6.7	4.5
135	P12112	Skyphos Fr.	non-BR	LGIb-LGIIa	6	13.5	6	N/A
134	P12111	Skyphos	non-BR	LGIb-LGIIa	7.1	13.4	5.6	5.2
136	P12109	Skyphos	non-BR	LGIb-LGIIa	7.5	11	4.7	4.5
138	P21799	Skyphos	non-BR	LGIb-LGIIa	6.3	11.6	5.8	3.6
137	P12110	Skyphos	non-BR	LGIb-LGIIa	6.5	11.4	5.2	3.5
139	P21807	Skyphos Fr.	non-BR	LGIb-LGIIa	9.8	16	7.5	6.4
140	P22431	Skyphos	non-BR	LGIIa-LGIIb	7.4	10	4.6	4.7
141	P22428	Skyphos	non-BR	LGIIb-EPA	6.6	9.1	4.8	4.3
142	P4615	Skyphos	BR	SG	6.9	11.2	4.4	4.2
143	P4659	Skyphos	non-BR	SG	5.8	8.7	3.8	3.6
		Kantharos						
122	P6420	Kantharos L/H	non-BR	MG	9.5	c.15	7.5	N/A
114	P7080	Kantharos Small H/L H/H	non-BR	MGII-LGIa	7.1	8.1 to 9.7	5	3.5
109	P15123	Kantharos H/L H/H	BR	LGIb	12.1	13.5 to 14.9	6.8	6.5
110	P4775	Kantharos H/L H/H	BR	LGIb-LGIIa	14.4	14.3 to 17.2	7.5	9
118	P17192	Kantharos ?	non-BR	LGIIa	10.8	12.4 to 16.2	7	N/A
115	P4961	Kantharos Small H/L H/H	BR	LGIIa	6.7	7.6 to 8.8	4	3.3
116	P4973	Kantharos Small H/L H/H	BR	LGIIa	6	7.8 to 9.2	4.4	3.2
117	P4976	Kantharos Small H/L H/H	non-BR	LGIIa	6.6	8 to 9.3	4.5	4.2
111	P4887	Kantharos H/L H/H	BR	LGIIb	11.8	13.0 to 15.0	6.4	7.2
113	P7476	Kantharos H/H	non-BR	SG	10.7	13.0 to 16.5	8.7	5
120	P7196	Kantharos Footed L/H	non-BR	SG	8	c.9.6	4	4.4

Chart 6.1: Metrical features of 25 *skyphoi* and 11 *kantharoi* with complete profiles from the Athenian *Agora* in chronological order. KEY: L/H (=low-handled), H/H (=high- handled), H/L (=high-lipped), BR (=burial context), N/A (=not applicable).

Surviving Metrical Features of Drinking Vessels (Incomplete or Fragmented) from the *Agora*							
Thesis No.	Inventory No.	Ware Type	Context	Chronology	Rim Diameter (cm)	Base Diameter (cm)	Handle Attachment Height (cm)
		Skyphos					
144	P27957	Skyphos Fr.	Non-BR	MGII	11		
154	P8228	Skyphos Wide Frs	Non-BR	MGII-LGIa	18.6		
153	P8226	Skyphos Wide Frs	Non-BR	MGII-LGIa	15.5		
146	P8234	Skyphos Frs	Non-BR	MGII-LGIa	13		
155	P8220	Skyphos Wide Frs	Non-BR	MGII-LGIa	16		
145	P8227	Skyphos Fr.	Non-BR	MGII-LGIa	15		
147	P5286	Skyphos Fr. Wide (Corinthianising)	Non-BR	LGIIb	16		
		Kantharos					
121	P19247	Kantharos Frs. Footed L/H	BR	EGI	c.13.5	c.5.3	
123	P27637	Kantharos L/H Frs.	BR	EGII-MGI	8		7.2
113	P6402	Kantharos H/L H/H Fr.	non-BR	MGII	c.13		
119	P1765	Kantharos H/L ?	non-BR	EPA	9.8 to 12.5	c.5.5	

Chart 6.2: Metrical features of fragmented *skyphoi* (7) and *kantharoi* (4) with incomplete profiles from the Athenian *Agora* in chronological order. KEY: L/H (=low-handled), H/H (=high-handled), H/L (=high-lipped), BR (=burial context), N/A (=not applicable).

Thesis No.	Inventory No.	Ware Type	Context	Chronology	Proportion of Handle Attachment Height to Net Height (%)	Proportion of Rim Diameter to Net Height (%)	Proportion of Base Diameter to Net Height (%)	Proportion of Base Diameter to Rim Diameter (%)
		Basic Proportions of Drinking Vessels (Preserving Complete Profile) from the *Agora*.						
		Skyphos						
125	P27944	Skyphos	non-BR	MGII	59.5	159.5	79.7	50.0
126	P32895	Skyphos	non-BR	MGII	62.5	166.7	76.4	45.8
129	P32891	Skyphos	non-BR	MGII	58.8	169.1	89.7	53.0
127	P27941	Skyphos	non-BR	MGII	60.2	150.0	80.7	53.8
124	P27942	Skyphos	non-BR	MGII	58.8	166.2	72.1	43.4
128	P27943	Skyphos	non-BR	MGII	60.0	166.7	73.3	44.0
149	P8230	Skyphos Wide	non-BR	MGII-LGIa	63.2	145.6	66.2	45.5
148	P8229	Skyphos Wide	non-BR	MGII-LGIa	69.0	157.0	74.0	47.1
150	P8225	Skyphos Wide Frs	non-BR	MGII-LGIa	N/A	140.4	70.6	50.3
151	P8221	Skyphos Wide	non-BR	MGII-LGIa	68.2	185.2	79.5	42.9
152	P8231	Skyphos Wide Fr.	non-BR	MGII-LGIa	N/A	188.2	78.8	41.9
133	P8224	Skyphos Frs	non-BR	MGII-LGIa	56.5	193.5	80.6	41.7
130	P8222	Skyphos	non-BR	MGII-LGIa	57.7	174.4	79.5	45.6
131	P8233	Skyphos Frs	non-BR	MGII-LGIa	62.3	177.9	90.9	51.1
132	P8223	Skyphos	non-BR	MGII-LGIa	61.6	171.2	91.8	53.6
135	P12112	Skyphos Fr.	non-BR	LGIb-LGIIa	N/A	225.0	100.0	44.4
134	P12111	Skyphos	non-BR	LGIb-LGIIa	73.2	188.7	78.9	41.8
136	P12109	Skyphos	non-BR	LGIb-LGIIa	60.0	146.7	62.7	42.7
138	P21799	Skyphos	non-BR	LGIb-LGIIa	57.1	184.1	92.1	50.0
137	P12110	Skyphos	non-BR	LGIb-LGIIa	53.8	175.4	80.0	45.6
139	P21807	Skyphos Fr.	non-BR	LGIb-LGIIa	65.3	163.3	76.5	46.9
140	P22431	Skyphos	non-BR	LGIIa-LGIIb	63.5	135.1	62.2	46.0
141	P22428	Skyphos	non-BR	LGIIb-EPA	65.2	137.9	72.7	52.7
142	P4615	Skyphos	BR	SG	60.9	162.3	63.8	39.3
143	P4659	Skyphos	non-BR	SG	62.1	150.0	65.5	43.7
		Kantharos						
122	P6420	Kantharos L/H	non-BR	MG	N/A	N/A	78.9	N/A
114	P7080	Kantharos Small H/L H/H	non-BR	MGII-LGIa	49.3	N/A	70.4	N/A
109	P15123	Kantharos H/L H/H	BR	LGIb	53.7	N/A	56.2	N/A
110	P4775	Kantharos H/L H/H	BR	LGIb-LGIIa	62.5	N/A	52.1	N/A
118	P17192	Kantharos ?	non-BR	LGIIa	N/A	N/A	64.8	N/A
115	P4961	Kantharos Small H/L H/H	BR	LGIIa	49.3	N/A	59.7	N/A
116	P4973	Kantharos Small H/L H/H	BR	LGIIa	53.3	N/A	73.3	N/A
117	P4976	Kantharos Small H/L H/H	non-BR	LGIIa	63.6	N/A	68.2	N/A
111	P4887	Kantharos H/L H/H	BR	LGIIb	61.0	N/A	54.2	N/A
113	P7476	Kantharos H/H	non-BR	SG	46.7	N/A	81.3	N/A
120	P7196	Kantharos Footed L/H	non-BR	SG	55.0	N/A	50.0	N/A

Chart 6.3: Basic proportions of 25 *skyphoi* and 11 *kantharoi* with complete profiles from the Athenian *Agora* in chronological order. KEY: L/H (=low-handled), H/H (=high-handled), H/L (=high-lipped), BR (=burial context), N/A (=not applicable).

Metrical Features of Drinking Vessels (Preserving Complete Profile) from *Kynosarges* and the BSA Museum								
Thesis No.	**Inventory No.**	**Ware Type**	**Context**	**Chronology**	**Net Height (cm)**	**Rim Diameter (cm)**	**Base Diameter (cm)**	**Handle Attachment Height (cm)**
		Skyphos						
168	K10	Skyphos Wide	BR	MGII	7	15.5	7	4.5
164	K88	Skyphos	BR	MGII-LGIa	6.5	12.5	6.5	4
183	A342	Skyphos Gadrooned	Unknown	LGIb-LGIIa	8.5	13.6	7.8	5.3
182	A343	Skyphos	Unknown	LGIIa	6	12	4.7	3
169	K2	Skyphos Wide	BR	LGIIa	8.1	15.5	6.1	4
165	K3	Skyphos	BR	LGIIb	6	11.7	4	3.8
166	K5	Skyphos	BR	LGIIb	6.5	9.7	4.2	4
167	K6	Skyphos	BR	LGIIb	8.7	13.2	5.4	5.9
		Kantharos						
163	K1	Kantharos H/L H/H	BR	MGII	11.7	15.0 to 15.7	7.6	7.8
181	A344	Kantharos H/H	non-BR	LGIIb	10.7	13.2 to 14.5	6.6	7
180	A123	Kantharos Small H/L H/H	non-BR	LGII	6.5	7.5 to 8.5	4.1	3.5

Chart 6.4: Metrical features of 8 *skyphoi* and 3 *kantharoi* with complete profile from the *Kynosarges* burials and the collections of the British School at Athens in chronological order. KEY: L/H (=low-handled), H/H (=high-handled), H/L (=high-lipped), BR (=burial context), N/A (=not applicable)

Basic Proportions of Drinking Vessels (Preserving Complete Profile) from *Kynosarges* and the BSA Museum								
Thesis No.	**Inventory No.**	**Ware Type**	**Context**	**Chronology**	**Proportion of Handle Attachment Height to Net Height (%)**	**Proportion of Rim Diameter to Net Height (%)**	**Proportion of Base Diameter to Net Height (%)**	**Proportion of Base Diameter to Rim Diameter (%)**
		Skyphos						
168	K10	Skyphos Wide	BR	MGII	64.3	221.4	100.0	45.2
164	K88	Skyphos	BR	MGII-LGIa	61.5	192.3	100.0	52.0
183	A342	Skyphos Gadrooned	non-BR	LGIb-LGIIa	62.4	160.0	91.8	57.4
182	A343	Skyphos	non-BR	LGIIa	50.0	200.0	78.3	39.2
169	K2	Skyphos Wide	BR	LGIIa	49.4	191.4	75.3	39.4
165	K3	Skyphos	non-BR	LGIIb	63.3	195.0	66.7	34.2
166	K5	Skyphos	BR	LGIIb	61.5	149.2	64.6	43.3
167	K6	Skyphos	BR	LGIIb	67.8	151.7	62.1	40.9
		Kantharos						
163	K1	Kantharos H/L H/H	BR	MGII	66.7	N/A	65.0	N/A
181	A344	Kantharos H/H	non-BR	LGIIb	65.4	N/A	61.7	N/A
180	A123	Kantharos Small H/L H/H	non-BR	LGII	53.8	N/A	63.1	N/A

Chart 6.5: Basic proportions of 8 *skyphoi* and 3 *kantharoi* with complete profiles from the *Kynosarges* burials and the collections of the British School at Athens in chronological order. KEY: L/H (=low-handled), H/H (=high-handled), H/L (=high-lipped), BR (=burial context), N/A (=not applicable).

		Metrical Features of *Skyphoi* (Preserving Complete Profile) from *Kerameikos*							
Thesis No.	Inventory No.	Ware Type	Chronology	*Kerameikos* Context	Real Net Height (cm)	Calculated Net Height (cm)	Calculated Rim Diameter (cm)	Calculated Base Diameter (cm)	Calculated Handle Attachment Height (cm)
275	413	Skyphos	EGII	Grave 14		5.8	11.3	5.8	3.4
276	247	Skyphos	EGII	Grave 75		6.2	14.6	7.1	3.1
277	2141	Skyphos	EGII-MGI	Grave 42		5.8	11.0	7.0	3.1
278	2142	Skyphos	EGII-MGI	Grave 42		5.7	11.4	6.6	2.9
337	2143	Skyphos Wide STR/H	EGII-MGI	Grave 42		6.0	17.6	12.0	3.2
338	2144	Skyphos Wide STR/H	EGII-MGI	Grave 42		5.4	17.8	12.9	2.6
281	261	Skyphos	MGI	Grave 20		6.3	10.6	5.6	3.6
279	886	Skyphos	MGI	Grave 13		5.9	13.7	7.6	2.8
280	887	Skyphos	MGI	Grave 13		6.9	14.9	8.0	3.6
339	888	Skyphos Wide STR/H	MGI	Grave 13		6.7	16.2	11.6	3.2
340	889	Skyphos Wide STR/H	MGI	Grave 13		5.8	16.5	12.8	3.1
282	2156	Skyphos	MGI	Grave 36		6.6	13.3	7.9	3.0
283	867	Skyphos	MGI	Grave 37		5.5	12.7	8.2	2.9
284	861	Skyphos	MGI-MGII	Grave 11	8.6		13.6	7.4	5.3
285	863	Skyphos	MGI-MGII	Grave 11	7.8		12.0	6.5	4.6
288	897	Skyphos	MGI-MGII	Grave 12	7.5		13.0	7.3	4.0
286	892	Skyphos	MGI-MGII	Grave 12		6.2	11.4	6.5	3.1
287	893	Skyphos	MGI-MGII	Grave 12		7.4	13.1	7.7	4.0
289	295	Skyphos	MGII	Grave 22		6.0	10.6	6.0	3.4
290	238	Skyphos	MGII	Grave 22		7.7	12.8	6.9	4.3
325	240	Skyphos Wide H/L	MGII	Grave 23		6.0	15.1	11.7	3.0
291	241	Skyphos	MGII	Grave 23		6.7	11.3	7.9	3.2
329	839	Skyphos Wide	MGII	Grave 82		5.8	15.4	9.3	3.5
330	840	Skyphos Wide	MGII	Grave 82		5.7	15.0	9.1	3.6
331	826	Skyphos Wide	MGII	Grave 86		5.3	16.2	8.3	2.8
332	827	Skyphos Wide	MGII	Grave 86		6.4	16.1	6.9	5.0
299	828	Skyphos	MGII	Grave 86		4.8	13.7	10.1	4.2
300	829	Skyphos	MGII	Grave 86		5.7	11.8	7.0	3.0
326	394	Skyphos Wide	MGII	Grave 35		6.1	17.0	9.9	3.4
327	395	Skyphos Wide	MGII	Grave 35		7.0	17.6	11.4	3.7
328	396	Skyphos Wide	MGII	Grave 35		6.5	16.8	10.2	4.3
292	286	Skyphos	MGII	Grave 29		5.2	8.8	5.0	2.8
293	278	Skyphos	MGII	Grave 30		6.7	11.5	6.4	3.5
294	387	Skyphos	MGII	Grave 34	7.3		11.3	6.4	4.0
295	391	Skyphos	MGII	Grave 34	8.4		13.3	7.3	4.9
296	388	Skyphos	MGII	Grave 35	7.2		11.6	7.2	3.9
297	256	Skyphos	MGII	Grave 69	6.9		12.2	6.6	3.5
298	1282	Skyphos	MGII	Grave 69	6.5		11.4	6.2	4.1
303	778	Skyphos	MGII-LGIa	Grave 89	5.6		14.3	10.6	2.8
333	780	Skyphos Wide	MGII-LGIa	Grave 89	7.5		15.0	7.5	4.4
304	781	Skyphos	MGII-LGIa	Grave 89	6.4		11.8	5.8	3.7
302	273	Skyphos	MGII-LGIa	Grave 31		5.5	8.8	4.8	3.3
301	879	Skyphos	MGII-LGIa	Grave 25		6.5	11.5	6.5	3.4
305	875	Skyphos	LGIa	Grave 9		8.3	10.9	5.3	4.7
306	367	Skyphos	LGIa	Grave 15		6.3	10.4	5.7	3.5
307	368	Skyphos	LGIa	Grave 15		5.8	10.6	5.8	3.3
341	1299	Skyphos Gadrooned	LGIa-LGIb	Grave 50		8.8	12.7	5.4	5.4
312	1300	Skyphos H/L	LGIa-LGIb	Grave 50		6.9	11.6	5.7	3.6
313	1301	Skyphos	LGIa-LGIb	Grave 50		4.0	7.0	3.8	2.2
305	325	Skyphos	LGIa-LGIb	Grave 32		7.3	13.4	6.1	4.6
309	326	Skyphos	LGIa-LGIb	Grave 32		6.8	11.6	5.4	4.2
310	327	Skyphos H/L	LGIa-LGIb	Grave 32		7.2	13.2	8.8	3.2
334	328	Skyphos Wide	LGIa-LGIb	Grave 32		6.0	15.3	7.2	3.4
311	330	Skyphos	LGIa-LGIb	Grave 32		6.7	10.7	4.6	3.7
342	1324	Skyphos Gadrooned	LGIb	Grave 48		9.1	13.3	5.7	6.9

343	1325	Skyphos Gadrooned	LGIb	Grave 48		9.6	13.4	5.7	6.1
314	376	Skyphos	LGIb	Grave 24		8.4	12.1	6.3	4.3
335	342	Skyphos Wide H/L	LGIb	Grave 71		10.5	17.3	11.7	5.1
316	343	Skyphos	LGIb	Grave 71		8.6	13.9	6.5	5.2
317	344	Skyphos	LGIb	Grave 71		9.1	14.3	6.5	5.5
315	876	Skyphos	LGIb	Grave 26	6.9		12.9	6.6	4.1
318	269	Skyphos H/L	LGIb-LGIIa	Grave 28		6.8	12.7	8.8	3.0
319	270	Skyphos H/L	LGIb-LGIIa	Grave 28		8.0	12.8	7.8	4.3
320	1319	Skyphos	LGIIa	Grave 51		6.9	14.9	5.0	3.8
336	818	Skyphos Wide	LGIIa	Grave 90	10.2		16.3	9.5	6.1
321	787	Skyphos	LGIIa	Grave 91	6.5		13.3	4.4	4.6
322	788	Skyphos	LGIIa	Grave 91	7.1		14.8	4.9	4.1
323	857	Skyphos	LGIIb	Grave 94	5.2		12.5	4.5	2.8
324	1322	Skyphos	LGIIb-EPA	Grave 51	5.5		9.6	4.4	4.6

Chart 6.6: Metrical features of 69 s*kyphoi* with complete profiles from the *Kerameikos* cemetery in chronological order. KEY: H/L (=high-lipped), BR (=burial context), N/A (=not applicable).

Metrical Features of *Kantharoi* (Preserving Complete Profile) from *Kerameikos*							
Inventory No.	**Ware Type**	**Chronology**	***Kerameikos* Context**	**Real Net Height (cm)**	**Calculated Rim Diameter (cm)**	**Calculated Base Diameter (cm)**	**Calculated Handle Attachment Height (cm)**
951	Kantharos Small L/H	EGI	Grave 3	6	N/A	4.7	1.3
936	Kantharos Small Footed L/H	EGI	Grave 3	6.2	N/A	3.2	3.5
943	Kantharos Small Footed L/H	EGI	Grave 3	7.2	N/A	4.2	4.2
929	Kantharos L/H	EGII	Grave 2	8	N/A	6.7	4.2
251	Kantharos L/H	EGII	Grave 74	8	N/A	6.2	3.7
246	Kantharos L/H	EGII	Grave 75	8.1	N/A	5.9	4.3
930	Kantharos Footed L/H	EGII	Grave 2	16.5	N/A	6.7	11.5
1251	Kantharos Footed L/H	EGII-MGI	Grave 43	10.7	N/A	5.7	6.1
237	Kantharos H/L H/H	MGII	Grave 23	9.4	N/A	6.3	5.7
239	Kantharos H/L H/H	MGII	Grave 23	9.4	N/A	6.1	6.1
285	Kantharos H/L H/H	MGII	Grave 29	9.5	N/A	7.6	5.7
390	Kantharos H/L H/H	MGII	Grave 34	10	N/A	8.1	5.8
400	Kantharos H/L H/H	MGII	Grave 35	10	N/A	6.4	5.6
258	Kantharos H/L H/H	MGII	Grave 69	11.5	N/A	6.8	5.4
1302	Kantharos Small H/L H/H	LGIa-LGIb	Grave 50	6.9	N/A	4.3	3.0
373	Kantharos H/L H/H	LGIb	Grave 24	11.6	N/A	7.7	5.7
364	Kantharos H/H	LGIb-LGIIa	Grave 21	10.7	N/A	6.6	5.0
268	Kantharos H/H	LGIb-LGIIa	Grave 28	10.5	N/A	6.3	6.3
817	Kantharos H/H	LGIIa	Grave 90	11.2	N/A	5.6	7.2
1340	Kantharos Small H/L H/H	LGIIa-LGIIb	Grave 49	7	N/A	4.9	4.1
1341	Kantharos Small H/L H/H	LGIIa-LGIIb	Grave 49	6.6	N/A	5.0	4.2
1345	Kantharos Small H/L H/H	LGIIa-LGIIb	Grave 49	5.5	N/A	3.9	2.4
320	Kantharos Small H/H	LGIIb	Grave 56	6	N/A	5.0	3.3
323	Kantharos Small H/H	LGIIb	Grave 57	5.8	N/A	4.1	3.3
324	Kantharos Small H/H	LGIIb	Grave 57	6	N/A	4.5	3.3
1229	Kantharos Small H/L H/H	SG	Grave 66	7	N/A	4.4	3.4

Chart 6.7: Metrical features of 26 *kantharoi* with complete profiles from the *Kerameikos* cemetery in chronological order. KEY: L/H (=low-handled), H/H (=high-handled), H/L (=high-lipped), BR (=burial context), N/A (=not applicable)

	Basic Proportions of *Skyphoi* (Preserving Complete Profile) from *Kerameikos*							
Thesis No.	**Inventory No.**	**Ware Type**	**Chronology**	***Kerameikos* Context**	**Calculated Proportion of Handle Attachment Height to Net Height (%)**	**Calculated Proportion of Rim Diameter to Net Height (%)**	**Calculated Proportion of Base Diameter to Net Height (%)**	**Calculated Proportion of Base Diameter to Rim Diameter (%)**
275	413	Skyphos	EGII	Grave 14	58.3	195.8	100.0	51.1
276	247	Skyphos	EGII	Grave 75	50.0	235.0	115.0	48.9
277	2141	Skyphos	EGII-MGI	Grave 42	54.2	191.7	120.8	63.0
278	2142	Skyphos	EGII-MGI	Grave 42	50.0	200.0	115.0	57.5
337	2143	Skyphos Wide STR/H	EGII-MGI	Grave 42	53.8	292.3	200.0	68.4
338	2144	Skyphos Wide STR/H	EGII-MGI	Grave 42	47.8	330.4	239.1	72.4
281	261	Skyphos	MGI	Grave 20	57.1	167.9	89.3	53.2
279	886	Skyphos	MGI	Grave 13	47.6	233.3	128.6	55.1
280	887	Skyphos	MGI	Grave 13	52.0	216.0	116.0	53.7
339	888	Skyphos Wide STR/H	MGI	Grave 13	47.8	243.5	173.9	71.4
340	889	Skyphos Wide STR/H	MGI	Grave 13	52.6	284.2	221.1	77.8
282	2156	Skyphos	MGI	Grave 36	45.5	200.0	118.2	59.1
283	867	Skyphos	MGI	Grave 37	52.4	228.6	147.6	64.6
284	861	Skyphos	MGI-MGII	Grave 11	62.1	158.6	86.2	54.3
285	863	Skyphos	MGI-MGII	Grave 11	58.3	154.2	83.3	54.1
288	897	Skyphos	MGI-MGII	Grave 12	52.9	173.5	97.1	55.9
286	892	Skyphos	MGI-MGII	Grave 12	50.0	183.3	104.2	56.8
287	893	Skyphos	MGI-MGII	Grave 12	54.5	177.3	104.5	59.0
289	295	Skyphos	MGII	Grave 22	57.1	176.2	100.0	56.8
290	238	Skyphos	MGII	Grave 22	55.2	165.5	89.7	54.2
325	240	Skyphos Wide H/L	MGII	Grave 23	50.0	253.1	196.9	77.8
291	241	Skyphos	MGII	Grave 23	48.3	169.0	117.2	69.4
329	839	Skyphos Wide	MGII	Grave 82	60.0	264.0	160.0	60.6
330	840	Skyphos Wide	MGII	Grave 82	63.6	263.6	159.1	60.3
331	826	Skyphos Wide	MGII	Grave 86	52.4	304.8	157.1	51.6
332	827	Skyphos Wide	MGII	Grave 86	78.6	250.0	107.1	42.9
299	828	Skyphos	MGII	Grave 86	88.5	284.6	211.5	74.3
300	829	Skyphos	MGII	Grave 86	52.6	205.3	121.1	59.0
326	394	Skyphos Wide	MGII	Grave 35	54.8	277.4	161.3	58.1
327	395	Skyphos Wide	MGII	Grave 35	52.9	250.0	161.8	64.7
328	396	Skyphos Wide	MGII	Grave 35	66.7	257.1	157.1	61.1
292	286	Skyphos	MGII	Grave 29	53.8	169.2	96.2	56.8
293	278	Skyphos	MGII	Grave 30	51.7	172.4	96.6	56.0
294	387	Skyphos	MGII	Grave 34	54.2	154.2	87.5	56.8
295	391	Skyphos	MGII	Grave 34	58.1	158.1	87.1	55.1
296	388	Skyphos	MGII	Grave 35	53.6	160.7	100.0	62.2
297	256	Skyphos	MGII	Grave 69	50.0	177.3	95.5	53.8
298	1282	Skyphos	MGII	Grave 69	62.5	175.0	95.8	54.8
303	778	Skyphos	MGII-LGIa	Grave 89	50.0	255.0	190.0	74.5
333	780	Skyphos Wide	MGII-LGIa	Grave 89	58.3	200.0	100.0	50.0
304	781	Skyphos	MGII-LGIa	Grave 89	57.1	183.9	91.1	49.5
302	273	Skyphos	MGII-LGIa	Grave 31	60.9	160.9	87.0	54.1
301	879	Skyphos	MGII-LGIa	Grave 25	52.0	176.0	100.0	56.8
305	875	Skyphos	LGIa	Grave 9	57.1	132.1	64.3	48.6
306	367	Skyphos	LGIa	Grave 15	55.0	165.0	90.0	54.5
307	368	Skyphos	LGIa	Grave 15	57.9	184.2	100.0	54.3
341	1299	Skyphos Gadrooned	LGIa-LGIb	Grave 50	62.1	144.8	62.1	42.9
312	1300	Skyphos H/L	LGIa-LGIb	Grave 50	51.5	166.7	81.8	49.1
313	1301	Skyphos	LGIa-LGIb	Grave 50	54.3	174.3	94.3	54.1
305	325	Skyphos	LGIa-LGIb	Grave 32	63.4	182.9	82.9	45.3
309	326	Skyphos	LGIa-LGIb	Grave 32	61.4	170.5	79.5	46.7
310	327	Skyphos H/L	LGIa-LGIb	Grave 32	45.0	185.0	122.5	66.2
334	328	Skyphos Wide	LGIa-LGIb	Grave 32	57.1	257.1	121.4	47.2
311	330	Skyphos	LGIa-LGIb	Grave 32	54.5	159.1	68.2	42.9
342	1324	Skyphos Gadrooned	LGIb	Grave 48	76.7	146.7	63.3	43.2

343	1325	Skyphos Gadrooned	LGIb	Grave 48	63.3	140.0	60.0	42.9
314	376	Skyphos	LGIb	Grave 24	51.1	144.4	75.6	52.3
335	342	Skyphos Wide H/L	LGIb	Grave 71	48.3	165.5	112.1	67.7
316	343	Skyphos	LGIb	Grave 71	60.7	160.7	75.0	46.7
317	344	Skyphos	LGIb	Grave 71	60.7	157.1	71.4	45.5
315	876	Skyphos	LGIb	Grave 26	59.1	186.4	95.5	51.2
318	269	Skyphos H/L	LGIb-LGIIa	Grave 28	45.0	187.5	130.0	69.3
319	270	Skyphos H/L	LGIb-LGIIa	Grave 28	53.1	159.4	96.9	60.8
320	1319	Skyphos	LGIIa	Grave 51	55.0	215.0	72.5	33.7
336	818	Skyphos Wide	LGIIa	Grave 90	60.0	160.0	93.3	58.3
321	787	Skyphos	LGIIa	Grave 91	71.1	205.3	68.4	33.3
322	788	Skyphos	LGIIa	Grave 91	57.9	207.9	68.4	32.9
323	857	Skyphos	LGIIb	Grave 94	54.1	240.5	86.5	36.0
324	1322	Skyphos	LGIIb-EPA	Grave 51	83.9	174.2	80.6	46.3

Chart 6.8: Basic proportions of 69 *skyphoi* with complete profiles from the *Kerameikos* cemetery in chronological order. KEY: H/L (=high-lipped), BR (=burial context), N/A (=not applicable).

	Basic Proportions of *Kantharoi* (Preserving Complete Profile) from *Kerameikos*							
Thesis No.	**Inventory No.**	**Ware Type**	**Chronology**	***Kerameikos* Context**	**Calculated Proportion of Handle Attachment Height to Net Height (%)**	**Calculated Proportion of Rim Diameter to Net Height (%)**	**Calculated Proportion of Base Diameter to Net Height (%)**	**Calculated Proportion of Base Diameter to Rim Diameter (%)**
267	951	Kantharos Small L/H	EGI	Grave 3	22.2	N/A	77.8	N/A
271	936	Kantharos Small Footed L/H	EGI	Grave 3	56.5	N/A	52.2	N/A
272	943	Kantharos Small Footed L/H	EGI	Grave 3	57.9	N/A	57.9	N/A
268	929	Kantharos L/H	EGII	Grave 2	52.4	N/A	83.3	N/A
270	251	Kantharos L/H	EGII	Grave 74	46.7	N/A	77.8	N/A
269	246	Kantharos L/H	EGII	Grave 75	52.5	N/A	72.5	N/A
273	930	Kantharos Footed L/H	EGII	Grave 2	69.6	N/A	40.5	N/A
274	1251	Kantharos Footed L/H	EGII-MGI	Grave 43	56.7	N/A	53.3	N/A
249	237	Kantharos H/L H/H	MGII	Grave 23	60.5	N/A	67.4	N/A
250	239	Kantharos H/L H/H	MGII	Grave 23	65.2	N/A	65.2	N/A
251	285	Kantharos H/L H/H	MGII	Grave 29	60.0	N/A	80.0	N/A
252	390	Kantharos H/L H/H	MGII	Grave 34	58.3	N/A	81.3	N/A
253	400	Kantharos H/L H/H	MGII	Grave 35	56.0	N/A	64.0	N/A
254	258	Kantharos H/L H/H	MGII	Grave 69	46.9	N/A	59.2	N/A
259	1302	Kantharos Small H/L H/H	LGIa-LGIb	Grave 50	43.8	N/A	62.5	N/A
255	373	Kantharos H/L H/H	LGIb	Grave 24	48.9	N/A	66.0	N/A
256	364	Kantharos H/H	LGIb-LGIIa	Grave 21	46.8	N/A	61.7	N/A
257	268	Kantharos H/H	LGIb-LGIIa	Grave 28	60.5	N/A	60.5	N/A
258	817	Kantharos H/H	LGIIa	Grave 90	64.6	N/A	50.0	N/A
260	1340	Kantharos Small H/L H/H	LGIIa-LGIIb	Grave 49	59.3	N/A	70.4	N/A
261	1341	Kantharos Small H/L H/H	LGIIa-LGIIb	Grave 49	64.0	N/A	76.0	N/A
262	1345	Kantharos Small H/L H/H	LGIIa-LGIIb	Grave 49	42.9	N/A	71.4	N/A
263	320	Kantharos Small H/H	LGIIb	Grave 56	55.6	N/A	83.3	N/A
264	323	Kantharos Small H/H	LGIIb	Grave 57	57.1	N/A	71.4	N/A
265	324	Kantharos Small H/H	LGIIb	Grave 57	55.0	N/A	75.0	N/A
266	1229	Kantharos Small H/L H/H	SG	Grave 66	48.6	N/A	62.9	N/A

Chart 6.9: Basic proportions of 26 *kantharoi* with complete profiles from the *Kerameikos* cemetery in chronological order. KEY: L/H (=low-handled), H/H (=high-handled), H/L (=high-lipped), BR (=burial context), N/A (=not applicable).

Thesis No.	Inventory No.	Ware Type	Chronology	Context	Real Base Diameter (cm)	Calculated Base Diameter (cm)	Difference of Base Diameter (cm)	Real Proportion of Base Diameter to Net Height (%)	Calculated Proportion of Base Diameter to Net Height (%)	Difference of Proportion of Base Diameter to Net Height (%)
275	413	Skyphos	EGII	Grave 14	6.7	5.8	0.9	103.1	100.0	3.1
280	887	Skyphos	MGI	Grave 13	8.3	8	0.3	122.1	116.0	6.1
288	897	Skyphos	MGI-MGII	Grave 12	7.1	7.3	-0.2	94.7	97.1	-2.4
314	376	Skyphos	LGIb	Grave 24	7.2	6.3	0.9	80.9	75.6	5.3
318	269	Skyphos H/L	LGIb-LGIIa	Grave 28	9.6	8.8	0.8	133.3	130.0	3.3

Chart 6.10: Accuracy test between real and calculated base measurements for 5 *Skyphoi* from the *Kerameikos* cemetery.

Thesis No.	Inventory No.	Ware Type	Chronology	Context	Real Rim Diameter (cm)	Calculated Rim Diameter (cm)	Difference of Rim Diameter (cm)	Real Proportion of Rim Diameter to Net Height (%)	Calculated Proportion of Rim Diameter to Net Height (%)	Difference of Proportion of Rim Diameter to Net Height (%)
275	413	Skyphos	EGII	Grave 14	11.3	11.3	0.0	195.8	195.8	0.0
280	887	Skyphos	MGI	Grave 13	15	14.9	-0.1	220.6	216.0	-4.6
288	897	Skyphos	MGI-MGII	Grave 12	12.7	13.0	0.3	169.3	173.5	4.2
314	376	Skyphos	LGIb	Grave 24	13	12.1	-0.9	146.1	144.4	-1.6
318	269	Skyphos H/L	LGIb-LGIIa	Grave 28	13.2	12.7	-0.5	183.3	187.5	4.2

Chart 6.11: Accuracy test between real and calculated rim measurements for 5 the *Skyphoi* from the *Kerameikos* cemetery.

	Metrical Features of *Skyphoi* (Preserving Complete Profile) from the British Museum							
Thesis No.	Inventory No.	Ware Type	Chronology	Origin	Real Net Height (cm)	Real Rim Diameter (cm)	Calculated Base Diameter (cm)	Calculated Handle Attachment Height (cm)
380	GR1977,1207.34	Skyphos	EGII	Probably Athens	7.6	15	6.8	4.0
381	GR1966,0610.1	Skyphos	MGI	Probably Athens	6.8	12	6.4	4.1
382	GR1842,0728.831	Skyphos	MGII	Athens	7.9	11.3	8.3	3.2
383	GR1977,1207.43	Skyphos	MGII-LGIa	Probably Athens	8.2	14.5	6.5	4.8
391	GR1977,1207.35	Skyphos Gadrooned	MGII-LGIa	Probably Athens	8.1	12.8	7.4	4.3
390	GR1977,1207.30	Skyphos Wide	LGIa	Probably Athens	11	15.5	5.9	5.6
384	GR1914,0407.1	Skyphos	LGIa	Attica	3.7	6.9	3.6	1.3
385	GR1927,0317.4	Skyphos	LGIa	Attica	7	10.4	5.7	3.6
386	GR1977,1207.33	Skyphos	LGIb	Probably Athens	7.4	10.5	6.0	3.9
387	GR1928,1018.1	Skyphos	LGIIa	Athens	8	14.5	10.4	2.9
388	GR1977,1207.38	Skyphos	LGIIb	Probably Athens	6.5	12.5	8.9	3.3
389	GR1977,1207.39	Skyphos	LGIIb	Probably Athens	6.4	9.7	5.0	2.2

Chart 6.12: Metrical features of 12 *skyphoi* with complete profiles from the British Museum in chronological order. KEY: H/L (=high-lipped), N/A (=not applicable).

	Basic Proportions of *Skyphoi* (Preserving Complete Profile) from the British Museum							
Thesis No.	Inventory No.	Ware Type	Chronology	*Origin*	Calculated Proportion of Handle Attachment Height to Net Height (%)	Real Proportion of Rim Diameter to Net Height (%)	Calculated Proportion of Base Diameter to Net Height (%)	Calculated Proportion of Base Diameter to Rim Diameter (%)
380	GR1977,1207.34	Skyphos	EGII	Probably Athens	52.2	197.4	89.1	45.2
381	GR1966,0610.1	Skyphos	MGI	Probably Athens	60.6	176.5	93.9	53.2
382	GR1842,0728.831	Skyphos	MGII	Athens	40.5	143.0	105.4	73.7
383	GR1977,1207.43	Skyphos	MGII-LGIa	Probably Athens	58.8	176.8	79.4	44.9
391	GR1977,1207.35	Skyphos Gadrooned	MGII-LGIa	Probably Athens	52.8	158.0	91.7	58.0
390	GR1977,1207.30	Skyphos Wide	LGIa	Probably Athens	51.2	140.9	53.5	38.0
384	GR1914,0407.1	Skyphos	LGIa	Attica	34.5	186.5	96.6	51.8
385	GR1927,0317.4	Skyphos	LGIa	Attica	51.4	148.6	81.1	54.6
386	GR1977,1207.33	Skyphos	LGIb	Probably Athens	52.6	141.9	81.6	57.5
387	GR1928,1018.1	Skyphos	LGIIa	Athens	36.4	181.3	130.3	71.9
388	GR1977,1207.38	Skyphos	LGIIb	Probably Athens	50.0	192.3	137.5	71.5
389	GR1977,1207.39	Skyphos	LGIIb	Probably Athens	35.1	151.6	78.4	51.7

Chart 6.13: Basic proportions of 12 *skyphoi* with complete profiles from the British Museum in chronological order. KEY: H/L (=high-lipped), N/A (=not applicable).

Thesis No.	Inventory No.	Ware Type	Date	Origin	Real Rim Diameter (cm)	Calculated Rim Diameter (cm)	Difference of Rim Diameter (cm)	Real Proportion of Rim Diameter to Net Height (%)	Calculated Proportion of Rim Diameter to Net Height (%)	Difference of Proportion of Rim Diameter to Net Height (%)
380	GR1977,1207.34	Skyphos	EGII	Probably Athens	15	15.4	-0.4	197.4	202.2	-4.8
381	GR1966,0610.1	Skyphos	MGI	Probably Athens	12	12.0	0.0	176.5	175.8	0.7
382	GR1842,0728.831	Skyphos	MGII	Athens	11.3	12.0	-0.7	143.0	151.4	-8.3
383	GR1977,1207.43	Skyphos	MGII-LGIa	Probably Athens	14.5	15.0	-0.5	176.8	182.4	-5.5
391	GR1977,1207.35	Skyphos Gadrooned	MGII-LGIa	Probably Athens	12.8	13.5	-0.7	158.0	166.7	-8.6
390	GR1977,1207.30	Skyphos Wide	LGIa	Probably Athens	15.5	15.6	-0.1	140.9	141.9	-1.0
384	GR1914,0407.1	Skyphos	LGIa	Attica	6.9	7.0	-0.1	186.5	189.7	-3.2
385	GR1927,0317.4	Skyphos	LGIa	Attica	10.4	10.2	0.2	148.6	146.0	2.6
386	GR1977,1207.33	Skyphos	LGIb	Probably Athens	10.5	10.7	-0.2	141.9	144.7	-2.9
387	GR1928,1018.1	Skyphos	LGIIa	Athens	14.5	15.3	-0.8	181.3	190.9	-9.7
388	GR1977,1207.38	Skyphos	LGIIb	Probably Athens	12.5	12.2	0.3	192.3	187.5	4.8
389	GR1977,1207.39	Skyphos	LGIIb	Probably Athens	9.7	10.0	-0.3	151.6	156.8	-5.2

Chart 6.14: Accuracy test between real and calculated measurements for 12 *skyphoi* from the British Museum.

		CHART OF FABRIC DESCRIPTIONS				
Thesis No.	**Inventory No.**	**Ware Type**	**Context**	**Chronology**	**Munsell Colour**	**Fabric Type**
		Skyphoi				
144	P27957	Skyphos Fr.	non-BR	MGII	5YR 7/4	1
126	P32895	Skyphos	non-BR	MGII	5YR 6/6	2
129	P32891	Skyphos	non-BR	MGII	5YR 7/4	1
125	P27944	Skyphos	non-BR	MGII	5YR 7/3	1
127	P27941	Skyphos	non-BR	MGII	5YR 6/4	1
124	P27942	Skyphos	non-BR	MGII	10YR 6/6	1
133	P8224	Skyphos Frs	non-BR	MGII-LGIa	5YR 7/4	1
139	P21807	Skyphos Fr.	non-BR	LGIb-LGIIa	5YR 6/4	1
135	P12112	Skyphos Fr.	non-BR	LGIb-LGIIa	5YR 6/6	1
134	P12111	Skyphos	non-BR	LGIb-LGIIa	5YR 7/4	1
140	P22431	Skyphos	non-BR	LGIIa-LGIb	5YR 8/4	2
147	P5286	Skyphos Fr. Corinthianising	non-BR	LGIIb	5YR 7/4	1
		Kantharoi				
123	P27637	Kantharos L/H Frs.	BR	EGII-MGI	5YR 7/3	1
113	P6402	Kantharos H/L H/H Fr.	non-BR	MGII	5YR 7/8	1
110	P4775	Kantharos H/L H/H	BR	LGIb	5YR 7/3	1
109	P15123	Kantharos H/L H/H	BR	LGIb	5YR 6/4	1
115	P4961	Kantharos Small H/L H/H	BR	LGIIa	5YR 7/6	1
116	P4973	Kantharos Small H/L H/H	BR	LGIIa	2.5YR 6/6	1
117	P4976	Kantharos Small H/L H/H	non-BR	LGIIa	5YR 7/3	1
120	P7196	Kantharos Foothed L/H	non-BR	SG	5YR 7/3	1
112	P7476	Kantharos H/H	non-BR	SG	2.5 YR 6/6	1

Chart 6.15: Fabric descriptions of Athenian 9 *kantharoi* and 12 *skyphoi* from the *Agora*.

CHART OF DECORATIVE/ TECHNOLOGICAL CHARACTERISTICS								
Artefact information					Colour Groups		Slip or Coating Quality	
Thesis No.	Inventory No.	Ware Type	Chronology	Context of Recovery	Elements	Coatings	Thickness	External Appearance
121	P19247	Kantharos Frs. Footed L/H	EGI	Grave		1	Thick	?
123	P27637	Kantharos L/H Frs.	EGII-MGI	Burial/Pyre	1	1	Thick	?
122	P6420	Kantharos L/H	MG	Well		1	Thick	?
163	K1	Kantharos H/L H/H	MGII	Grave	1	1	Thick	Lustrous
113	P6402	Kantharos H/L H/H Fr.	MGII	Well	1	1	Thick	Lustrous
114	P7080	Kantharos Small H/L H/H	MGII-LGIa	Well	1	1	Thick	Matte
109	P15123	Kantharos H/L H/H	LGIb	Grave	1	1	Thick	Matte
110	P4775	Kantharos H/L H/H	LGIb-LGIIa	Grave	1	1	Thick	Matte
115	P4961	Kantharos Small H/L H/H	LGIIa	Grave	1	1	Thick	Matte
118	P17192	Kantharos ?	LGIIa	Pit	1	1	Thick	?
116	P4973	Kantharos Small H/L H/H	LGIIa	Grave	1	1	Thick	Matte
117	P4976	Kantharos Small H/L H/H	LGIIa	Grave	1	1	Thick	Matte
111	P4887	Kantharos H/L H/H	LGIIb	Grave	1	1	Thick	Matte
181	A344	Kantharos H/H	LGIIb	Other	1	1	Thick	Matte
180	A123	Kantharos Small H/L H/H	LGII	Other	1	1	Thick	Matte
112	P7476	Kantharos H/H	SG	Pit and Well	1		Thin	Matte
120	P7196	Kantharos Footed L/H	SG	Well			Thin	Matte
119	P1765	Kantharos H/L ?	EPA	Outside House	1		Thin	Matte

Chart 6.16: Chart of decorative/technological characteristics of 18 Athenian/Attic *kantharoi* (all sub-classes) from the *Agora*, the *Kynosarges* burials and the collections of the British School at Athens.

CHART OF DECORATIVE/ TECHNOLOGICAL CHARACTERISTICS								
Artefact information					Colour Groups		Slip or Coating Quality	
Thesis No.	Inventory No.	Ware Type	Chronology	Context of Recovery	Elements	Coatings	Thickness	External Appearance
125	P27944	Skyphos	MGII	Well	1	1	Thick	?
129	P32891	Skyphos	MGII	Well	1	1	Thick	Lustrous
144	P27957	Skyphos Fr.	MGII	Well	1	1	Thick	Lustrous
126	P32895	Skyphos	MGII	Well	1	1	Thick	Lustrous
127	P27941	Skyphos	MGII	Well	1	1	Thick	?
124	P27942	Skyphos	MGII	Well	2	2	Thick	Matte
128	P27943	Skyphos	MGII	Well	1	1	Thick	Lustrous
168	K10	Skyphos Wide	MGII	Grave	1	1	Thick	Lustrous
164	K88	Skyphos	MGII-LGIa	Grave	1	1	Thick	Lustrous
130	P8228	Skyphos Frs	MGII-LGIa	Well	1	1	Thick	Lustrous
149	P8230	Skyphos Wide	MGII-LGIa	Well		1	Thick	Lustrous
148	P8229	Skyphos Wide	MGII-LGIa	Well	1	1	Thick	?
150	P8225	Skyphos Wide Frs	MGII-LGIa	Well		1 & 2	Thick	Lustrous
151	P8221	Skyphos Wide	MGII-LGIa	Well	1	1	Thick	Lustrous
152	P8231	Skyphos Wide Frs	MGII-LGIa	Well	2	2	Thick	Matte
133	P8224	Skyphos Frs	MGII-LGIa	Well	2	2	Thick	Matte
130	P8222	Skyphos	MGII-LGIa	Well	2	1	Thick	Matte
154	P8226	Skyphos Frs	MGII-LGIa	Well	1	1	Thick	Matte
131	P8233	Skyphos Frs	MGII-LGIa	Well	1	1	Thick	Matte
132	P8223	Skyphos	MGII-LGIa	Well	2	1	Thick	Matte
146	P8234	Skyphos	MGII-LGIa	Well		1	Thick	Matte
155	P8220	Skyphos Frs	MGII-LGIa	Well	1	1	Thick	Lustrous
145	P8227	Skyphos Fr.	MGII-LGIa	Well	1	1	Thick	?
135	P12112	Skyphos Fr.	LGIb-LGIIa	Well	1	1	Thick	?
134	P12111	Skyphos	LGIb-LGIIa	Well	1	1	Thick	Matte
136	P12109	Skyphos	LGIb-LGIIa	Well	1	1	Thick	Matte
138	P21799	Skyphos	LGIb-LGIIa	Well	1	1	Thick	Matte
137	P12110	Skyphos	LGIb-LGIIa	Well	2	2	Thick	Matte
139	P21807	Skyphos Fr.	LGIb-LGIIa	Well	1	1	Thick	?
183	A342	Skyphos Gadrooned	LGIb-LGIIa	Other	1	1	Thick	Matte
140	P22431	Skyphos	LGIIa-LGIIb	Well	1	1	Thick	Matte
182	A343	Skyphos	LGIIa	Other	1	1	Thick	Matte
169	K2	Skyphos Wide	LGIIa	Grave	1	1	Thick	Matte
147	P5286	Skyphos Fr. (Corinthianising)	LGIIb	Sand Fill	2	2	Thick	Matte
165	K3	Skyphos	LGIIb	Grave	1	1	Thick	Matte
166	K5	Skyphos	LGIIb	Grave	1	1	Thick	Matte
167	K6	Skyphos	LGIIb	Grave	1	1	Thick	Matte
141	P22428	Skyphos	LGIIb-EPA	Well	1	1	Thick	?
142	P4615	Skyphos	SG	Grave	1	1	Thick	?
143	P4659	Skyphos	SG	Fill		2	Thick	Matte

Chart 6.17: Chart of decorative/technological characteristics of Athenian/Attic *skyphoi* (all sub-classes) from the *Agora*, the *Kynosarges* burials and the collections of the British School at Athens.

CONCORDANCE TABLES FOR CERAMIC ARTEFACTS

CONCORDANCE BETWEEN THESIS NUMBERS AND ARTEFACT INVENTORY NUMBERS

Thesis No.	Inventory No.	Vessel Type
1	Agora P 6400	Amphora N-H
2	Agora P 3747	Amphora N-H
3	Agora P 7141	Amphora N-H
4	Agora P 5422	Amphora N-H (with lid)
5	Agora P 12105	Amphora N-H
6	Agora P 32887	Amphora N-H
7	Agora P 16990	Amphora N-H
8	Agora P 4768	Amphora N-H
9	Agora P 17080	Amphora N-H Fragment
10	Agora P 27953	Amphora N-H Fragment
11	Agora P 8248	Amphora N-H
12	Agora P 21707	Amphora N-H Fragment
13	Agora P 7280	Amphora N-H Fragment
14	Agora P 23795	Amphora N-H Fragment
15	Agora P 13767	Amphora N-H
16	Agora P 4886	Amphora N-H Fragment
17	Agora P 22439	Amphora N-H Fragment
18	Agora P 23888	Amphora N-H
19	Agora P 8382	Amphora N-H Fragment
20	Agora P 7491	Amphora N-H Fragment
21	Agora P 7492	Amphora N-H Fragment
22	Agora P 1706	Amphora N-H Fragment
23	Agora P 1708	Amphora N-H Fragments
24	Agora P 6410	Amphora Banded
25	Agora P 6423	Amphora Banded
26	Agora P 21578	Amphora Banded
27	Agora P 4613	Amphora Banded
28	Agora P 26242	Amphora Banded
29	Agora P 23660	Amphora Banded
30	Agora P 27937	Amphora Banded N/L
31	Agora P 17197	Amphora Banded N/L
32	Agora P 17198	Amphora Banded N/L
33	Agora P 23656	Amphora Banded N/L
34	Agora P 23669	Amphora Banded N/L
35	Agora P 23658	Amphora Banded N/L
36	Agora P 6997	Amphora Banded
37	Agora P 6411	Amphora Banded
38	Agora P 27938	Amphora Banded
39	Agora P 27939	Amphora Banded

40	Agora P 12434	Amphora Banded
41	Agora P 4978	Amphora Banded
42	Agora P 17199	Amphora Banded Fragment
43	Agora P 22435	Amphora N-H Fragment, Dipylon
44	Agora P 19228	Amphora S-H
45	Agora P 24842	Amphora B-H Fragments
46	Agora P 6413	Amphora (?) Fragments
47	Agora P 15838	Amphora (?) Fragment
48	Agora P 5025	Amphora (?) Fragments
49	Agora P 5499	Amphora Fragments
50	Agora P 18412	Amphora (?) Fragment
51	Agora P 23420	Amphora (?) Fragment
52	Agora P 1712	Amphora (?) Fragment
53	Agora P 1704	Amphora (?) Fragments
54	Agora P 26727	Hydria
55	Agora P 4980	Hydria
56	Agora P 24840	Hydria Fragment
57	Agora P 8215	Hydria Fragment
58	Agora P 12124	Hydria
59	Agora P 17208	Hydria Fragment
60	Agora P 23674	Hydria
61	Agora P 4614	Hydria
62	Agora P 18616	Oinochoe
63	Agora P 18618	Oinochoe
64	Agora P 18622	Oinochoe
65	Agora P 6164	Oinochoe
66	Agora P 6203	Oinochoe
67	Agora P 6205	Oinochoe
68	Agora P 6409	Oinochoe
69	Agora P 552	Oinochoe
70	Agora P 553	Oinochoe
71	Agora P 3874	Oinochoe
72	Agora P 18365	Oinochoe
73	Agora P 27948	Oinochoe
74	Agora P 6401	Oinochoe
75	Agora P 17194	Oinochoe
76	Agora P 12104	Oinochoe
77	Agora P 12433	Oinochoe
78	Agora P 12431	Oinochoe
79	Agora P 4772	Oinochoe
80	Agora P 23649	Oinochoe
81	Agora P 23673	Oinochoe
82	Agora P 3687	Oinochoe
83	Agora P 27951	Oinochoe Neck Fragment

84	Agora P 27950	Oinochoe
85	Agora P 27952	Oinochoe Fragments
86	Agora P 2402	Oinochoe Fragments
87	Agora P 15127	Oinochoe
88	Agora P 10224	Oinochoe
89	Agora P 12432	Oinochoe
90	Agora P 26827	Oinochoe Fragment
91	Agora P 4923	Oinochoe Neck Fragment
92	Agora P 19842	Oinochoe
93	Agora P 7482	Oinochoe Neck Fragment
94	Agora P 25631	Oinochoe Giant
95	Agora P 23675	Oinochoe Giant
96	Agora P 24844	Oinochoe Giant
97	Agora P 12108	Oinochoe N/L
98	Agora P 12115	Oinochoe N/L
99	Agora P 12120	Oinochoe N/L
100	Agora P 22427	Oinochoe N/L
101	Agora P 23654	Oinochoe N/L
102	Agora P 23655	Oinochoe N/L
103	Agora P 23657	Oinochoe N/L
104	Agora P 20729	Oinochoe N/L
105	Agora P 26813	Oinochoe N/L Fragment
106	Agora P 17193	Oinochoe N/L
107	Agora P 21579	Oinochoe Broad N/L
108	Agora P 21580	Oinochoe Broad N/L
109	Agora P 15123	Kantharos H/L H/H
110	Agora P 4775	Kantharos H/L H/H
111	Agora P 4887	Kantharos H/L H/H
112	Agora P 7476	Kantharos H/H
113	Agora P 6402	Kantharos H/L H/H
114	Agora P 7080	Kantharos Small H/L H/H
115	Agora P 4961	Kantharos Small H/L H/H
116	Agora P 4973	Kantharos Small H/L H/H
117	Agora P 4976	Kantharos Small H/L H/H
118	Agora P 17192	Kantharos Fragment (?)
119	Agora P 1765	Kantharos ? H/L
120	Agora P 7196	Kantharos Footed L/H
121	Agora P 19247	Kantharos Fragments Footed L/H
122	Agora P 6420	Kantharos L/H Fragment
123	Agora P 27637	Kantharos L/H Fragments
124	Agora P 27942	Skyphos
125	Agora P 27944	Skyphos
126	Agora P 32895	Skyphos
127	Agora P 27941	Skyphos

128	Agora P 27943	Skyphos
129	Agora P 32891	Skyphos
130	Agora P 8222	Skyphos
131	Agora P 8233	Skyphos Fragments
132	Agora P 8223	Skyphos
133	Agora P 8224	Skyphos
134	Agora P 12111	Skyphos
135	Agora P 12112	Skyphos
136	Agora P 12109	Skyphos
137	Agora P 12110	Skyphos
138	Agora P 21799	Skyphos
139	Agora P 21807	Skyphos Fragment
140	Agora P 22431	Skyphos
141	Agora P 22428	Skyphos
142	Agora P 4615	Skyphos
143	Agora P 4659	Skyphos
144	Agora P 27957	Skyphos
145	Agora P 8227	Skyphos
146	Agora P 8234	Skyphos Fragments
147	Agora P 5286	Skyphos Fragment (Corinthianising)
148	Agora P 8229	Skyphos Wide
149	Agora P 8230	Skyphos Wide
150	Agora P 8225	Skyphos Wide Fragments
151	Agora P 8221	Skyphos Wide
152	Agora P 8231	Skyphos Wide Fragments
153	Agora P 8226	Skyphos Wide Fragments
154	Agora P 8228	Skyphos Wide Fragments
155	Agora P 8220	Skyphos Wide Fragments
156	Kynosarges K84	Amphora N-H Fragment
157	Kynosarges K30	Amphora Fragment
158	Kynosarges K31	Amphora Fragment
159	Kynosarges K15	Amphora ? Fragment
160	Kynosarges K16	Amphora Fragment
161	Kynosarges K86	Oinochoe Neck Fragment
162	Kynosarges K83	Pitcher
163	Kynosarges K1	Kantharos H/L H/H
164	Kynosarges K88	Skyphos
165	Kynosarges K3	Skyphos
166	Kynosarges K5	Skyphos
167	Kynosarges K6	Skyphos
168	Kynosarges K10	Skyphos Wide
169	Kynosarges K2	Skyphos Wide
170	BSA Collections A517	Amphora ? Fragment

171	BSA Collections A518	Amphora ? Fragment
172	BSA Collections A204	Amphora Fragment
173	BSA Collections A298	Oinochoe
174	BSA Collections A341	Oinochoe Broad
175	BSA Collections A305	Pitcher
176	BSA Collections A306	Pitcher
177	BSA Collections A303	Pitcher
178	BSA Collections A304	Pitcher
179	BSA Collections A361	Pitcher
180	BSA Collections A123	Kantharos Small H/L H/H
181	BSA Collections A344	Kantharos H/H
182	BSA Collections A343	Skyphos
183	BSA Collections A342	Skyphos Gadrooned
184	Kerameikos 2132	Amphora N-H
185	Kerameikos 925	Amphora N-H
186	Kerameikos 926	Amphora N-H
187	Kerameikos 2136	Amphora N-H
188	Kerameikos 254	Amphora N-H
189	Kerameikos 253	Amphora N-H
190	Kerameikos 2140	Amphora N-H
191	Kerameikos 1249	Amphora N-H
192	Kerameikos 884	Amphora N-H
193	Kerameikos 2155	Amphora N-H
194	Kerameikos 866	Amphora N-H
195	Kerameikos 859	Amphora N-H
196	Kerameikos 291	Amphora N-H
197	Kerameikos 236	Amphora N-H
198	Kerameikos 242	Amphora N-H
199	Kerameikos 277	Amphora N-H
200	Kerameikos 255	Amphora N-H
201	Kerameikos 272	Amphora N-H
202	Kerameikos 1306	Amphora N-H
203	Kerameikos 377	Amphora N-H
204	Kerameikos 346	Amphora N-H
205	Kerameikos 385	Amphora N-H
206	Kerameikos 267	Amphora N-H
207	Kerameikos 337	Amphora N-H
208	Kerameikos 656	Amphora N-H
209	Kerameikos n.n.	Amphora N-H
210	Kerameikos 850	Amphora N-H
211	Kerameikos 1298	Amphora N-H SOS
212	Kerameikos 412	Amphora S-H
213	Kerameikos 234	Amphora S-H
214	Kerameikos 890	Amphora S-H

215	Kerameikos 284	Amphora S-H
216	Kerameikos 825	Amphora S-H
217	Kerameikos 2146	Amphora B-H
218	Kerameikos 1315	Amphora N-H Banded
219	Kerameikos 1250	Amphora N-H Banded N/L
220	Kerameikos 894	Amphora N-H Banded N/L
221	Kerameikos 296	Amphora N-H Banded N/L
222	Kerameikos 289	Amphora N-H Banded N/L
223	Kerameikos 783	Hydria
224	Kerameikos 784	Hydria
225	Kerameikos 928	Oinochoe
226	Kerameikos 927	Oinochoe
227	Kerameikos 2139	Oinochoe
228	Kerameikos 2148	Oinochoe
229	Kerameikos 2149	Oinochoe
230	Kerameikos 2145	Oinochoe
231	Kerameikos 1253	Oinochoe
232	Kerameikos 862	Oinochoe
233	Kerameikos 298	Oinochoe
234	Kerameikos 300	Oinochoe
235	Kerameikos 379	Oinochoe
236	Kerameikos 397	Oinochoe
237	Kerameikos 880	Oinochoe
238	Kerameikos 274	Oinochoe
239	Kerameikos 1327	Oinochoe
240	Kerameikos 341	Oinochoe
241	Kerameikos 814	Oinochoe
242	Kerameikos 369	Oinochoe
243	Kerameikos 874	Broad N/L Oinochoe
244	Kerameikos 1141	Oinochoe Lekythos
245	Kerameikos 819	Pitcher
246	Kerameikos 821	Pitcher
247	Kerameikos 393	Pitcher
248	Kerameikos 399	Pitcher
249	Kerameikos 237	Kantharos H/L H/H
250	Kerameikos 239	Kantharos H/L H/H
251	Kerameikos 285	Kantharos H/L H/H
252	Kerameikos 390	Kantharos H/L H/H
253	Kerameikos 400	Kantharos H/L H/H
254	Kerameikos 258	Kantharos H/L H/H
255	Kerameikos 373	Kantharos H/L H/H
256	Kerameikos 364	Kantharos H/H
257	Kerameikos 268	Kantharos H/H
258	Kerameikos 817	Kantharos H/H

259	Kerameikos 1302	Kantharos Small H/L H/H
260	Kerameikos 1340	Kantharos Small H/L H/H
261	Kerameikos 1341	Kantharos Small H/L H/H
262	Kerameikos 1345	Kantharos Small H/L H/H
263	Kerameikos 320	Kantharos Small H/H
264	Kerameikos 323	Kantharos Small H/H
265	Kerameikos 324	Kantharos Small H/H
266	Kerameikos 1229	Kantharos Small H/L H/H
267	Kerameikos 251	Kantharos L/H
268	Kerameikos 929	Kantharos L/H
269	Kerameikos 246	Kantharos L/H
270	Kerameikos 951	Kantharos Footed L/H
271	Kerameikos 936	Kantharos Footed L/H
272	Kerameikos 943	Kantharos Footed L/H
273	Kerameikos 930	Kantharos Footed L/H
274	Kerameikos 1251	Kantharos Footed L/H
275	Kerameikos 413	Skyphos
276	Kerameikos 247	Skyphos
277	Kerameikos 2141	Skyphos
278	Kerameikos 2142	Skyphos
279	Kerameikos 886	Skyphos
280	Kerameikos 887	Skyphos
281	Kerameikos 261	Skyphos
282	Kerameikos 2156	Skyphos
283	Kerameikos 867	Skyphos
284	Kerameikos 861	Skyphos
285	Kerameikos 863	Skyphos
286	Kerameikos 892	Skyphos
287	Kerameikos 893	Skyphos
288	Kerameikos 897	Skyphos
289	Kerameikos 295	Skyphos
290	Kerameikos 238	Skyphos
291	Kerameikos 241	Skyphos
292	Kerameikos 286	Skyphos
293	Kerameikos 278	Skyphos
294	Kerameikos 387	Skyphos
295	Kerameikos 391	Skyphos
296	Kerameikos 388	Skyphos
297	Kerameikos 256	Skyphos
298	Kerameikos 1282	Skyphos
299	Kerameikos 828	Skyphos
300	Kerameikos 829	Skyphos
301	Kerameikos 879	Skyphos
302	Kerameikos 273	Skyphos

303	Kerameikos 778	Skyphos
304	Kerameikos 781	Skyphos
305	Kerameikos 875	Skyphos
306	Kerameikos 367	Skyphos
307	Kerameikos 368	Skyphos
308	Kerameikos 325	Skyphos
309	Kerameikos 326	Skyphos
310	Kerameikos 327	Skyphos
311	Kerameikos 330	Skyphos
312	Kerameikos 1300	Skyphos
313	Kerameikos 1301	Skyphos
314	Kerameikos 376	Skyphos
315	Kerameikos 876	Skyphos
316	Kerameikos 343	Skyphos
317	Kerameikos 344	Skyphos
318	Kerameikos 269	Skyphos
319	Kerameikos 270	Skyphos
320	Kerameikos 1319	Skyphos
321	Kerameikos 787	Skyphos
322	Kerameikos 788	Skyphos
323	Kerameikos 857	Skyphos
324	Kerameikos 1322	Skyphos
325	Kerameikos 240	Skyphos wide
326	Kerameikos 394	Skyphos wide
327	Kerameikos 395	Skyphos wide
328	Kerameikos 396	Skyphos wide
329	Kerameikos 839	Skyphos wide
330	Kerameikos 840	Skyphos wide
331	Kerameikos 826	Skyphos wide
332	Kerameikos 827	Skyphos wide
333	Kerameikos 780	Skyphos wide
334	Kerameikos 328	Skyphos wide
335	Kerameikos 342	Skyphos wide
336	Kerameikos 818	Skyphos wide
337	Kerameikos 2143	Skyphos wide STR/H
338	Kerameikos 2144	Skyphos wide STR/H
339	Kerameikos 888	Skyphos wide STR/H
340	Kerameikos 889	Skyphos wide STR/H
341	Kerameikos 1299	Skyphos Gadrooned
342	Kerameikos 1324	Skyphos Gadrooned
343	Kerameikos 1325	Skyphos Gadrooned
344	BM GR1978,0701.8	Amphora N-H
345	BM GR1978,0701.9	Amphora N-H
346	BM GR1977,1207.1	Amphora N-H

347	BM GR2000,0524.1	Amphora N-H
348	BM GR1977,1211.2	Amphora N-H
349	BM GR1977,1207.5	Amphora N-H
350	BM GR1977,1207.2	Amphora N-H
351	BM GR1977,1207.49	Amphora N-H
352	BM GR1977,1207.3	Amphora N-H
353	BM GR1914,0413.1	Amphora N-H
354	BM GR1977,1202.1	Amphora N-H
355	BM GR1927,0411.1	Amphora N-H
356	BM GR1978,0701.7	Amphora B-H
357	BM GR1950,0228.1	Oinochoe
358	BM GR1950,0228.2	Oinochoe
359	BM GR1977,1207.50	Oinochoe
360	BM GR1977,1207.11	Oinochoe
361	BM GR1977,1207.12	Oinochoe
362	BM GR1977,1207.13	Oinochoe
363	BM GR1920,1014.4	Oinochoe
364	BM GR1877,1207.12	Oinochoe
365	BM GR1868,0110.768	Oinochoe Lekythos
366	BM GR1977,1207.8	Oinochoe giant
367	BM GR1977,1207.9	Oinochoe giant
368	BM GR1878,0812.8	Pitcher
369	BM GR1877,1207.10	Pitcher
370	BM GR1977,1207.10	Pitcher
371	BM GR1977,1211.3	Pitcher
372	BM GR1913,1113.1	Pitcher
373	BM GR1916,0108.2	Pitcher
374	BM GR1912,0522.1	Pitcher
375	BM GR1905,1028.1	Pitcher
376	BM GR1842,0728.826	Pitcher
377	BM GR1977,1211.4	Pitcher (with short neck)
378	BM GR1977,1207.14	Pitcher (with short neck)
379	BM GR1912,0718.1	Pitcher (with short neck)
380	BM GR1977,1207.34	Skyphos
381	BM GR1966,0610.1	Skyphos
382	BM GR1842,0728.831	Skyphos
383	BM GR1977,1207.43	Skyphos
384	BM GR1914,0407.1	Skyphos
385	BM GR1927,0317.4	Skyphos
386	BM GR1977,1207.33	Skyphos
387	BM GR1928,1018.1	Skyphos
388	BM GR1977,1207.38	Skyphos
389	BM GR1977,1207.39	Skyphos
390	BM GR1977,1207.30	Skyphos wide

391	BM GR1977,1207.35	Skyphos gadrooned

CONCORDANCE BETWEEN ARTEFACT INVENTORY NUMBERS AND THESIS NUMBERS

Inventory No.	Thesis No.	Vessel Type
Agora P 552	69	Oinochoe
Agora P 553	70	Oinochoe
Agora P 1704	53	Amphora (?) Fragments
Agora P 1706	22	Amphora N-H Fragment
Agora P 1708	23	Amphora N-H Fragments
Agora P 1712	52	Amphora (?) Fragment
Agora P 1765	119	Kantharos ? H/L
Agora P 2402	86	Oinochoe Fragments
Agora P 3687	82	Oinochoe
Agora P 3747	2	Amphora N-H
Agora P 3874	71	Oinochoe
Agora P 4613	27	Amphora Banded
Agora P 4614	61	Hydria
Agora P 4615	142	Skyphos
Agora P 4659	143	Skyphos
Agora P 4768	8	Amphora N-H
Agora P 4772	79	Oinochoe
Agora P 4775	110	Kantharos H/L H/H
Agora P 4886	16	Amphora N-H Fragment
Agora P 4887	111	Kantharos H/L H/H
Agora P 4923	91	Oinochoe Neck Fragment
Agora P 4961	115	Kantharos Small H/L H/H
Agora P 4973	116	Kantharos Small H/L H/H
Agora P 4976	117	Kantharos Small H/L H/H
Agora P 4978	41	Amphora Banded
Agora P 4980	55	Hydria
Agora P 5025	48	Amphora (?) Fragments
Agora P 5286	147	Skyphos Fragment (Corinthianising)
Agora P 5422	4	Amphora N-H (with lid)
Agora P 5499	49	Amphora Fragments
Agora P 6164	65	Oinochoe
Agora P 6203	66	Oinochoe
Agora P 6205	67	Oinochoe

Agora P 6400	1	Amphora N-H
Agora P 6401	74	Oinochoe
Agora P 6402	113	Kantharos H/L H/H
Agora P 6409	68	Oinochoe
Agora P 6410	24	Amphora Banded
Agora P 6411	37	Amphora Banded
Agora P 6413	46	Amphora (?) Fragments
Agora P 6420	122	Kantharos L/H Fragment
Agora P 6423	25	Amphora Banded
Agora P 6997	36	Amphora Banded
Agora P 7080	114	Kantharos Small H/L H/H
Agora P 7141	3	Amphora N-H
Agora P 7196	120	Kantharos Footed L/H
Agora P 7280	13	Amphora N-H Fragment
Agora P 7476	112	Kantharos H/H
Agora P 7482	93	Oinochoe Neck Fragment
Agora P 7491	20	Amphora N-H Fragment
Agora P 7492	21	Amphora N-H Fragment
Agora P 8215	57	Hydria Fragment
Agora P 8220	155	Skyphos Wide Fragments
Agora P 8221	151	Skyphos Wide
Agora P 8222	130	Skyphos
Agora P 8223	132	Skyphos
Agora P 8224	133	Skyphos
Agora P 8225	150	Skyphos Wide Fragments
Agora P 8226	153	Skyphos Wide Fragments
Agora P 8227	145	Skyphos
Agora P 8228	154	Skyphos Wide Fragments
Agora P 8229	148	Skyphos Wide
Agora P 8230	149	Skyphos Wide
Agora P 8231	152	Skyphos Wide Fragments
Agora P 8233	131	Skyphos Fragments
Agora P 8234	146	Skyphos Fragments
Agora P 8248	11	Amphora N-H
Agora P 8382	19	Amphora N-H Fragment
Agora P 10224	88	Oinochoe
Agora P 12104	76	Oinochoe
Agora P 12105	5	Amphora N-H
Agora P 12108	97	Oinochoe N/L
Agora P 12109	136	Skyphos
Agora P 12110	137	Skyphos
Agora P 12111	134	Skyphos
Agora P 12112	135	Skyphos
Agora P 12115	98	Oinochoe N/L

Agora P 12120	99	Oinochoe N/L
Agora P 12124	58	Hydria
Agora P 12431	78	Oinochoe
Agora P 12432	89	Oinochoe
Agora P 12433	77	Oinochoe
Agora P 12434	40	Amphora Banded
Agora P 13767	15	Amphora N-H
Agora P 15123	109	Kantharos H/L H/H
Agora P 15127	87	Oinochoe
Agora P 15838	47	Amphora (?) Fragment
Agora P 16990	7	Amphora N-H
Agora P 17080	9	Amphora N-H Fragment
Agora P 17192	118	Kantharos Fragment (?)
Agora P 17193	106	Oinochoe N/L
Agora P 17194	75	Oinochoe
Agora P 17197	31	Amphora Banded N/L
Agora P 17198	32	Amphora Banded N/L
Agora P 17199	42	Amphora Banded Fragment
Agora P 17208	59	Hydria Fragment
Agora P 18365	72	Oinochoe
Agora P 18412	50	Amphora (?) Fragment
Agora P 18616	62	Oinochoe
Agora P 18618	63	Oinochoe
Agora P 18622	64	Oinochoe
Agora P 19228	44	Amphora S-H
Agora P 19247	121	Kantharos Fragments Footed L/H
Agora P 19842	92	Oinochoe
Agora P 20729	104	Oinochoe N/L
Agora P 21578	26	Amphora Banded
Agora P 21579	107	Oinochoe Broad N/L
Agora P 21580	108	Oinochoe Broad N/L
Agora P 21707	12	Amphora N-H Fragment
Agora P 21799	138	Skyphos
Agora P 21807	139	Skyphos Fragment
Agora P 22427	100	Oinochoe N/L
Agora P 22428	141	Skyphos
Agora P 22431	140	Skyphos
Agora P 22435	43	Amphora N-H Fragment, Dipylon
Agora P 22439	17	Amphora N-H Fragment
Agora P 23420	51	Amphora (?) Fragment
Agora P 23649	80	Oinochoe
Agora P 23654	101	Oinochoe N/L
Agora P 23655	102	Oinochoe N/L
Agora P 23656	33	Amphora Banded N/L

Agora P 23657	103	Oinochoe N/L
Agora P 23658	35	Amphora Banded N/L
Agora P 23660	29	Amphora Banded
Agora P 23669	34	Amphora Banded N/L
Agora P 23673	81	Oinochoe
Agora P 23674	60	Hydria
Agora P 23675	95	Oinochoe Giant
Agora P 23795	14	Amphora N-H Fragment
Agora P 23888	18	Amphora N-H
Agora P 24840	56	Hydria Fragment
Agora P 24842	45	Amphora B-H Fragments
Agora P 24844	96	Oinochoe Giant
Agora P 25631	94	Oinochoe Giant
Agora P 26242	28	Amphora Banded
Agora P 26727	54	Hydria
Agora P 26813	105	Oinochoe N/L Fragment
Agora P 26827	90	Oinochoe Fragment
Agora P 27637	123	Kantharos L/H Fragments
Agora P 27937	30	Amphora Banded N/L
Agora P 27938	38	Amphora Banded
Agora P 27939	39	Amphora Banded
Agora P 27941	127	Skyphos
Agora P 27942	124	Skyphos
Agora P 27943	128	Skyphos
Agora P 27944	125	Skyphos
Agora P 27948	73	Oinochoe
Agora P 27950	84	Oinochoe
Agora P 27951	83	Oinochoe Neck Fragment
Agora P 27952	85	Oinochoe Fragments
Agora P 27953	10	Amphora N-H Fragment
Agora P 27957	144	Skyphos
Agora P 32887	6	Amphora N-H
Agora P 32891	129	Skyphos
Agora P 32895	126	Skyphos
BM GR1842,0728.826	376	Pitcher
BM GR1842,0728.831	382	Skyphos
BM GR1868,0110.768	365	Oinochoe Lekythos
BM GR1877,1207.10	369	Pitcher
BM GR1877,1207.12	364	Oinochoe
BM GR1878,0812.8	368	Pitcher
BM GR1905,1028.1	375	Pitcher
BM GR1912,0522.1	374	Pitcher
BM GR1912,0718.1	379	Pitcher (with short neck)
BM GR1913,1113.1	372	Pitcher

BM GR1914,0407.1	384	Skyphos
BM GR1914,0413.1	353	Amphora N-H
BM GR1916,0108.2	373	Pitcher
BM GR1920,1014.4	363	Oinochoe
BM GR1927,0317.4	385	Skyphos
BM GR1927,0411.1	355	Amphora N-H
BM GR1928,1018.1	387	Skyphos
BM GR1950,0228.1	357	Oinochoe
BM GR1950,0228.2	358	Oinochoe
BM GR1966,0610.1	381	Skyphos
BM GR1977,1202.1	354	Amphora N-H
BM GR1977,1207.1	346	Amphora N-H
BM GR1977,1207.10	370	Pitcher
BM GR1977,1207.11	360	Oinochoe
BM GR1977,1207.12	361	Oinochoe
BM GR1977,1207.13	362	Oinochoe
BM GR1977,1207.14	378	Pitcher (with short neck)
BM GR1977,1207.2	350	Amphora N-H
BM GR1977,1207.3	352	Amphora N-H
BM GR1977,1207.30	390	Skyphos wide
BM GR1977,1207.33	386	Skyphos
BM GR1977,1207.34	380	Skyphos
BM GR1977,1207.35	391	Skyphos gadrooned
BM GR1977,1207.38	388	Skyphos
BM GR1977,1207.39	389	Skyphos
BM GR1977,1207.43	383	Skyphos
BM GR1977,1207.49	351	Amphora N-H
BM GR1977,1207.5	349	Amphora N-H
BM GR1977,1207.50	359	Oinochoe
BM GR1977,1207.8	366	Oinochoe giant
BM GR1977,1207.9	367	Oinochoe giant
BM GR1977,1211.2	348	Amphora N-H
BM GR1977,1211.3	371	Pitcher
BM GR1977,1211.4	377	Pitcher (with short neck)
BM GR1978,0701.7	356	Amphora B-H
BM GR1978,0701.8	344	Amphora N-H
BM GR1978,0701.9	345	Amphora N-H
BM GR2000,0524.1	347	Amphora N-H
BSA Collections A123	180	Kantharos Small H/L H/H
BSA Collections A204	172	Amphora Fragment
BSA Collections A298	173	Oinochoe
BSA Collections A303	177	Pitcher
BSA Collections A304	178	Pitcher
BSA Collections A305	175	Pitcher

BSA Collections A306	176	Pitcher
BSA Collections A341	174	Oinochoe Broad
BSA Collections A342	183	Skyphos Gadrooned
BSA Collections A343	182	Skyphos
BSA Collections A344	181	Kantharos H/H
BSA Collections A361	179	Pitcher
BSA Collections A517	170	Amphora ? Fragment
BSA Collections A518	171	Amphora ? Fragment
Kerameikos n.n.	209	Amphora N-H
Kerameikos 234	213	Amphora S-H
Kerameikos 236	197	Amphora N-H
Kerameikos 237	249	Kantharos H/L H/H
Kerameikos 238	290	Skyphos
Kerameikos 239	250	Kantharos H/L H/H
Kerameikos 240	325	Skyphos wide
Kerameikos 241	291	Skyphos
Kerameikos 242	198	Amphora N-H
Kerameikos 246	269	Kantharos L/H
Kerameikos 247	276	Skyphos
Kerameikos 251	267	Kantharos L/H
Kerameikos 253	189	Amphora N-H
Kerameikos 254	188	Amphora N-H
Kerameikos 255	200	Amphora N-H
Kerameikos 256	297	Skyphos
Kerameikos 258	254	Kantharos H/L H/H
Kerameikos 261	281	Skyphos
Kerameikos 267	206	Amphora N-H
Kerameikos 268	257	Kantharos H/H
Kerameikos 269	318	Skyphos
Kerameikos 270	319	Skyphos
Kerameikos 272	201	Amphora N-H
Kerameikos 273	302	Skyphos
Kerameikos 274	238	Oinochoe
Kerameikos 277	199	Amphora N-H
Kerameikos 278	293	Skyphos
Kerameikos 284	215	Amphora S-H
Kerameikos 285	251	Kantharos H/L H/H
Kerameikos 286	292	Skyphos
Kerameikos 289	222	Amphora N-H Banded N/L
Kerameikos 291	196	Amphora N-H
Kerameikos 295	289	Skyphos
Kerameikos 296	221	Amphora N-H Banded N/L
Kerameikos 298	233	Oinochoe
Kerameikos 300	234	Oinochoe

Kerameikos 320	263	Kantharos Small H/H
Kerameikos 323	264	Kantharos Small H/H
Kerameikos 324	265	Kantharos Small H/H
Kerameikos 325	308	Skyphos
Kerameikos 326	309	Skyphos
Kerameikos 327	310	Skyphos
Kerameikos 328	334	Skyphos wide
Kerameikos 330	311	Skyphos
Kerameikos 337	207	Amphora N-H
Kerameikos 341	240	Oinochoe
Kerameikos 342	335	Skyphos wide
Kerameikos 343	316	Skyphos
Kerameikos 344	317	Skyphos
Kerameikos 346	204	Amphora N-H
Kerameikos 364	256	Kantharos H/H
Kerameikos 367	306	Skyphos
Kerameikos 368	307	Skyphos
Kerameikos 369	242	Oinochoe
Kerameikos 373	255	Kantharos H/L H/H
Kerameikos 376	314	Skyphos
Kerameikos 377	203	Amphora N-H
Kerameikos 379	235	Oinochoe
Kerameikos 385	205	Amphora N-H
Kerameikos 387	294	Skyphos
Kerameikos 388	296	Skyphos
Kerameikos 390	252	Kantharos H/L H/H
Kerameikos 391	295	Skyphos
Kerameikos 393	247	Pitcher
Kerameikos 394	326	Skyphos wide
Kerameikos 395	327	Skyphos wide
Kerameikos 396	328	Skyphos wide
Kerameikos 397	236	Oinochoe
Kerameikos 399	248	Pitcher
Kerameikos 400	253	Kantharos H/L H/H
Kerameikos 412	212	Amphora S-H
Kerameikos 413	275	Skyphos
Kerameikos 656	208	Amphora N-H
Kerameikos 778	303	Skyphos
Kerameikos 780	333	Skyphos wide
Kerameikos 781	304	Skyphos
Kerameikos 783	223	Hydria
Kerameikos 784	224	Hydria
Kerameikos 787	321	Skyphos
Kerameikos 788	322	Skyphos

Kerameikos 814	241	Oinochoe
Kerameikos 817	258	Kantharos H/H
Kerameikos 818	336	Skyphos wide
Kerameikos 819	245	Pitcher
Kerameikos 821	246	Pitcher
Kerameikos 825	216	Amphora S-H
Kerameikos 826	331	Skyphos wide
Kerameikos 827	332	Skyphos wide
Kerameikos 828	299	Skyphos
Kerameikos 829	300	Skyphos
Kerameikos 839	329	Skyphos wide
Kerameikos 840	330	Skyphos wide
Kerameikos 850	210	Amphora N-H
Kerameikos 857	323	Skyphos
Kerameikos 859	195	Amphora N-H
Kerameikos 861	284	Skyphos
Kerameikos 862	232	Oinochoe
Kerameikos 863	285	Skyphos
Kerameikos 866	194	Amphora N-H
Kerameikos 867	283	Skyphos
Kerameikos 874	243	Broad N/L Oinochoe
Kerameikos 875	305	Skyphos
Kerameikos 876	315	Skyphos
Kerameikos 879	301	Skyphos
Kerameikos 880	237	Oinochoe
Kerameikos 884	192	Amphora N-H
Kerameikos 886	279	Skyphos
Kerameikos 887	280	Skyphos
Kerameikos 888	339	Skyphos wide STR/H
Kerameikos 889	340	Skyphos wide STR/H
Kerameikos 890	214	Amphora S-H
Kerameikos 892	286	Skyphos
Kerameikos 893	287	Skyphos
Kerameikos 894	220	Amphora N-H Banded N/L
Kerameikos 897	288	Skyphos
Kerameikos 925	185	Amphora N-H
Kerameikos 926	186	Amphora N-H
Kerameikos 927	226	Oinochoe
Kerameikos 928	225	Oinochoe
Kerameikos 929	268	Kantharos L/H
Kerameikos 930	273	Kantharos Footed L/H
Kerameikos 936	271	Kantharos Footed L/H
Kerameikos 943	272	Kantharos Footed L/H
Kerameikos 951	270	Kantharos Footed L/H

Kerameikos 1141	244	Oinochoe Lekythos
Kerameikos 1229	266	Kantharos Small H/L H/H
Kerameikos 1249	191	Amphora N-H
Kerameikos 1250	219	Amphora N-H Banded N/L
Kerameikos 1251	274	Kantharos Footed L/H
Kerameikos 1253	231	Oinochoe
Kerameikos 1282	298	Skyphos
Kerameikos 1298	211	Amphora N-H SOS
Kerameikos 1299	341	Skyphos Gadrooned
Kerameikos 1300	312	Skyphos
Kerameikos 1301	313	Skyphos
Kerameikos 1302	259	Kantharos Small H/L H/H
Kerameikos 1306	202	Amphora N-H
Kerameikos 1315	218	Amphora N-H Banded
Kerameikos 1319	320	Skyphos
Kerameikos 1322	324	Skyphos
Kerameikos 1324	342	Skyphos Gadrooned
Kerameikos 1325	343	Skyphos Gadrooned
Kerameikos 1327	239	Oinochoe
Kerameikos 1340	260	Kantharos Small H/L H/H
Kerameikos 1341	261	Kantharos Small H/L H/H
Kerameikos 1345	262	Kantharos Small H/L H/H
Kerameikos 2132	184	Amphora N-H
Kerameikos 2136	187	Amphora N-H
Kerameikos 2139	227	Oinochoe
Kerameikos 2140	190	Amphora N-H
Kerameikos 2141	277	Skyphos
Kerameikos 2142	278	Skyphos
Kerameikos 2143	337	Skyphos wide STR/H
Kerameikos 2144	338	Skyphos wide STR/H
Kerameikos 2145	230	Oinochoe
Kerameikos 2146	217	Amphora B-H
Kerameikos 2148	228	Oinochoe
Kerameikos 2149	229	Oinochoe
Kerameikos 2155	193	Amphora N-H
Kerameikos 2156	282	Skyphos
Kynosarges K1	163	Kantharos H/L H/H
Kynosarges K2	169	Skyphos Wide
Kynosarges K3	165	Skyphos
Kynosarges K5	166	Skyphos
Kynosarges K6	167	Skyphos
Kynosarges K10	168	Skyphos Wide
Kynosarges K15	159	Amphora ? Fragment
Kynosarges K16	160	Amphora Fragment

Kynosarges K30	157	Amphora Fragment
Kynosarges K31	158	Amphora Fragment
Kynosarges K83	162	Pitcher
Kynosarges K84	156	Amphora N-H Fragment
Kynosarges K86	161	Oinochoe Neck Fragment
Kynosarges K88	164	Skyphos

APPENDICES

APPENDIX 1: ARTEFACT CATALOGUE

THE ATHENIAN AGORA

ELABORATELY DECORATED NECK-HANDLED AMPHORAE							
(Vessels with complete profiles):							
Photograph	**Thesis No.**	**Inventory No.**	**Vessel Type**	**Chronology**	**Context**	**Condition**	**Publications**
[redacted]	1	Agora P 6400	Amphora N-H	MGI ?	Well L6:2	Mended, partly restored	Marwitz 1959, 95; Blegen 1952, 282
[redacted]	2	Agora P 3747	Amphora N-H	MGI?	Well H15:1	Parts missing	Blegen 1952, 282; Marwitz 1959, 95; illustration after Papadopoulos 2007, 106, fig.105
[redacted]	3	Agora P 7141	Amphora N-H	MGII-LGIa	Well D12:3	Almost complete, small parts missing	Prhotograph after Brann 1961a, 103, n.I1, pl.13
[redacted]	4	Agora P 5422	Amphora N-H (with lid)	LGIa	Grave20, G12:24	Complete	Young 1939, 46, n.XI2, fig.32; Marwitz 1959, 99; photograph after Brann 1962, 31, pl.1, n.11; Miles 1998, 109
[redacted]	5	Agora P 12105	Amphora N-H	LGIb-LGIIa	Well S18:1	Partly restored, complete	Brann 1961a, 117, n.L1, pl.13; photograph after Brann 1962, 31, pl.1, n.9; Miles 1998, 111
[redacted]	6	Agora P 32887	Amphora N-H	LGIIa	Grave I13:5 (?)	Mended, parts missing	Photograph after Camp 1999, 263, no.10, fig.11
[redacted]	7	Agora P 16990	Amphora N-H	LGIIa	Grave 4, B20:5	Many fragments missing, restored	Young 1951, 83, pl.35e; photograph after Brann 1962, 30, pl.1, n.2
[redacted]	8	Agora P 4768	Amphora N-H	SG-EPA	Grave 9, G12:10	Complete, restored	Photograph after Young 1939, 29, n.VI1, fig.16

ELABORATELY DECORATED NECK-HANDLED AMPHORAE (Incomplete or fragmented vessels):							
Photograph	**Thesis No.**	**Inventory No.**	**Vessel Type**	**Chronology**	**Context**	**Condition**	**Publications**
[redacted]	9	Agora P 17080	Amphora N-H Fragment	EGII-MGI	Grave R20:1	Neck & shoulder fragment	Thompson 1947, 19; Smithson 1968, 85 under 2
[redacted]	10	Agora P 27953	Amphora N-H Fragment	MGII	Well J 13:1	Neck and shoulder	Camp 1999, 262, n.10
[redacted]	11	Agora P 8248	Amphora N-H	MGII-LGIa	Well D12:3	Restored in plaster	Photograph after Brann 1961a, 103, n.I2, pl.13
[redacted]	12	Agora P 21707	Amphora N-H Fragment	LGIa	Well P7:3	Neck fragment	Photograph after Brann 1961a, 115, n.K1, pl.14; Brann 1961b, 323, under F1; Brann 1962, 31, pl.1, n.5
[redacted]	13	Agora P 7280	Amphora N-H Fragment	LGIb	Pit & well D11:5	Neck and shoulder	Shear 1936b, 193, fig.8; photograph after Young 1939, 181, n.C136, fig.131; Brann 1962, 67, pl.18, n.320; Papadopoulos 2007, 120-121, fig.116b
[redacted]	14	Agora P 23795	Amphora N-H Fragment	LGIb-LGIIa	Well O12:1	Lower neck & shoulder	Photograph after Brann 1961b, 323, n.F1, pls.66, 90
[redacted]	15	Agora P 13767	Amphora N-H	LGIIa	Well V24:2	Restored, some missing	Photograph after Brann 1962, 31, pl.1, n.3
[redacted]	16	Agora P 4886	Amphora N-H Fragment	LGIIa	Grave12, G12:13	Neck fragment	Young 1939, 73-74, n.XV1, fig.48; photograph after Brann 1962, 69, pl.19, n.334; Coldstream 1968, 66-7
[redacted]	17	Agora P 22439	Amphora N-H Fragment	LGIIa-LGIIb	Well N11:5	Neck with handles	Photograph after Brann 1961a, 126, n.M2, pl.13; Brann 1962, 67, pl.18, n.322; Camp 1998, 15, fig.19
[redacted]	18	Agora P 23888	Amphora N-H	LGIIb-EPA	Well N11:6	One handle & rim missing	Photograph after Brann 1961a, 143, n.R1, pl.13; Brann 1962, 31, pl.1, n.10; Miles 1998, 135
[redacted]	19	Agora P 8382	Amphora N-H Fragment	LGIIb-EPA	Pit D11:5	Neck and handle fragment	Photograph after Young 1939, 183, n.C140, fig.133

[redacted]	20	Agora P 7491	Amphora N-H Fragment	SG	Pit & well D11:5	Neck & shoulder	Photograph after Young 1939, 182-3, n.C138, fig.132; Marwitz 1959, 98
	21	Agora P 7492	Amphora N-H Fragment	SG	Pit & well D11:5	Lower vessel, restored	Photograph after Young 1939, 182-3, n.C139, fig.132; Marwitz 1959, 98
	22	Agora P 1706	Amphora N-H Fragment	PA	Area H17:4	Rim and handle attachment	Photograpgh after Burr 1933, 570-1, n.129, figs.29-30
	23	Agora P 1708	Amphora N-H Fragments	PA	Area H17:4	Two handle fragments	Photograph after Burr 1933, 571, n.131, fig.29

BANDED NECK-HANDLED AMPHORAE (Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	24	Agora P 6410	Amphora Banded	MG	Well L6:2	Restored, some missing	Photograph after Papadopoulos & Smithson 2002, 169-70, fig.15 f
	25	Agora P 6423	Amphora Banded	MG	Well L6:2	Partly restored	Blegen 1952, 282; Brann 1962, 32, under 15; photograph after Papadopoulos 1994, 441,n.A7, fig.3, pl.109c-e; Papadopoulos 1998, 111
	26	Agora P 21578	Amphora Banded	LGIa	Well P7:3	Intact	Brann 1961a, 115-116, n.K2, pl.13; Brann 1962, 34, pl.3, n.29; photograph after Papadopoulos & Smithson 2002, 162, fig.17 a
	27	Agora P 4613	Amphora Banded	LGIIb	Grave 4, G12:4	Some missing	Photograph after Young 1939, 25-6, n.IV1, fig.12
	28	Agora P 26242	Amphora Banded	LGIIb-EPA	Well Q8:9	Mended, some missing	Brann 1962, 34, pl.3, n.34; Miles 1998, 161; photograph after Papadopoulos & Smithson 2002, 172, fig.17e

[redacted]	29	Agora P 23660	Amphora Banded	LGIIb-EPA	Well Q8:9	Almost complete	Brann 1961a, 128, n.N5

NECK-LESS (N/L) BANDED NECK-HANDLED AMPHORAE (Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	30	Agora P 27937	Amphora Banded N/L	MGII	Well J 13:1	Restored	Camp (1999) pg.262, n.10
	31	Agora P 17197	Amphora Banded N/L	LGIIa	Well or pit M11:1	Restored	Photograph after Brann 1961a, 131, n.O3, pl.13
	32	Agora P 17198	Amphora Banded N/L	LGIIa	Well or pit M11:1	Missing fragments, restored	Photograph after Brann 1961a, 131, n.O4, pl.133, pl.13
	33	Agora P 23656	Amphora Banded N/L	LGIIb-EPA	Well Q8:9	Intact, worn	Photograpgh after Brann 1961a, 128, n.N1, pl.13
	34	Agora P 23669	Amphora Banded N/L	LGIIb-EPA	Well Q8:9	Intact	Photograph after Brann 1961a, 128, n.N3, pl.13
	35	Agora P 23658	Amphora Banded N/L	LGIIb-EPA	Well Q8:9	Some missing	Photograph after Brann 1961a, 128, n.N2, pl.13

BANDED NECK-HANDLED AMPHORAE (Incomplete or fragmented vessels):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	36	Agora P 6997	Amphora Banded	LPG	Grave 17, B10:1	Some missing, restored	Desborough 1952, 9; Smithson 1961, 152; illustration after Papadopoulos & Smithson 2002, 171, fig.16 a
	37	Agora P 6411	Amphora Banded	MG	Well L6:2	Upper part missing	Photograph after Papadopoulos & Smithson 2002, 169-70, fig.15e
	38	Agora P 27938	Amphora Banded	MGII	Well J 13:1	Mended, some missing	Camp 1999, 262, n.10; photograph after Papadopoulos & Smithson 2002, 169-70, fig.15g

[redacted]	39	Agora P 27939	Amphora Banded	MGII-LGIa	Well J 13:1	Restored in plaster	Camp 1999, 262, n.10; photograph after Papadopoulos & Smithson 2002, 169-70, fig.15h
	40	Agora P 12434	Amphora Banded	LGIb-LGIIa	Well L18:2	Neck, shoulder, one handle	Brann 1962, 32, pl.2, n.15; Brann 1961b, 323, under F1; photograph after Papadopoulos 1994, 441-3, A8, fig.3, pl.110a-b
	41	Agora P 4978	Amphora Banded	LGIIa	Grave13, G12:13	Upper part missing	Photograph after Young 1939, 111, n.B6, fig.78
	42	Agora P 17199	Amphora Banded Fragment	LGIIa	Well or pit M11:1	Partly restored neck	Brann 1961a, 131, n.O5

ELABORATELY DECORATED DIPYLON-STYLE MONUMENTAL NECK-HANDLED AMPHORAE (Incomplete or fragmented vessels):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	43	Agora P 22435	Amphora N-H Fragment, Dipylon Style	LGIIa-LGIIb	Well N11:3	Neck and handle fragment	Thompson 1953, 39, pl.18a; photograph after Brann 1961a, 125-6, n.M1, pl.14; Brann 1962, 65, pl.17, n.303; Coldsteram 1968, 22; Papadopoulos 2003, 112

ELABORATELY DECORATED SHOULDER-HANDLED AMPHORAE (Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	44	Agora P 19228	Amphora S-H	EGI	Grave D16:2	Mended, chips missing	Photograph after Young 1949, 289, n.1, pl.67-8; Desborough 1952, 37, 39, 54, 138, pl.15; Marwitz 1959, 73, 101; Smithson 1961, 157, under n.4; Coldsteram 1968, pl.1a

ELABORATELY DECORATED BELLY-HANDLED AMPHORAE (Incomplete or fragmented vessels):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	45	Agora P 24842	Amphora B-H Fragments	MGI-MGII	Well N12:2	Fragments	Photograph after Brann 1962, 64, pl.17, n.296

ELABORATELY DECORATED AMPHORAE OF UNCERTAIN TYPOLOGY (?)
(Incomplete or fragmented vessels):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	46	Agora P 6413	Amphora (?) Fragments	MG	Well L6:2	Foot (misfire)	Photograph after Papadopoulos 2003, 103-4, n.83, fig.2.43; 2. Monaco 2000, 174, n.A.VII,1
	47	Agora P 15838	Amphora (?) Fragment	LGIIa	Grave B21:10	Lower body fragment	Photograph after Young 1951, 83, pl.35c
	48	Agora P 5025	Amphora (?) Fragments	LGIIa-LGIIb	Mixed Fill F-G12:2	Mended & restored	Young 1939, 115, n.B21, fig.82; photograph after Brann 1962, 64, pl.17, n.298
	49	Agora P 5499	Amphora Fragments	LGIIb	Grave 20, fill G12:24	Mended wall fragments	Photograph after Young 1939, 49-52, n.XI7, fig.33-5; 2. Coldstream 1968, 59
	50	Agora P 18412	Amphora (?) Fragment	LGIIb-EPA	Grave A, B19:4	Mended, no base or rim	Photograph after Young 1951, 72, pl.35b; Brann 1962, 31, under 10
	51	Agora P 23420	Amphora (?) Fragment	LGIIb-EPA	Well R8:2	Neck fragment	Photograph after Brann 1961b, 346, n.G1, pl.66
	52	Agora P 1712	Amphora (?) Fragment	PA	Area H17:4	Rim fragment	Photograph after Burr 1933, 576, n.138, figs.33-4
	53	Agora P 1704	Amphora (?) Fragments	PA	Area H17:4	Two fragments, rim and upper neck	Photograph after Burr 1933, 570-1, n.127, figs.29-30

DECORATED HYRDIAE
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	54	Agora P 26727	Hydria	LG	Well U19:5	Mended, some missing	Miles 1998, 179
	55	Agora P 4980	Hydria	LGIIa	Grave 15 G12:6	Mended, complete	Young 1939, 42-3, n.X1, fig.27; Marwitz 1959, 93; photograph after Brann 1962, 35, pl.3, n.37, Papadopoulos & Smithson 2002, 168

DECORATED HYRDIAE							
(Incomplete or fragmented vessels):							
Photograph	**Thesis No.**	**Inventory No.**	**Vessel Type**	**Chronology**	**Context**	**Condition**	**Publications**
[redacted]	56	Agora P 24840	Hydria Fragment	MGII	Well N11:3	Shoulder Fragment	Brann 1961a, 114, n.J1
[redacted]	57	Agora P 8215	Hydria Fragment	MGII-LGIa	Well D12:3	Neck & shoulder, restored	Photograph after Brann 1961a, 104, n.I4, pl.14
[redacted]	58	Agora P 12124	Hydria	LGIb-LGIIa	Well S18:1	Neck restored	Photograph after Brann 1961a, 118-9, n.L8, pl.14; Brann 1962, 35, pl.3, n.39
[redacted]	59	Agora P 17208	Hydria Fragment	LGIIa	Well or pit M11:1	Shoulder fragment restored	Brann 1961a, 131, n.O6
[redacted]	60	Agora P 23674	Hydria	LGIIb-EPA	Well Q8:9	Neck missing	Photograph after Brann 1961a, 128-9, n.N6, pl.14
[redacted]	61	Agora P 4614	Hydria	SG	Grave 5, G12:5	Upper part missing	Young 1939, 27-8, n.V1, fig.14; photograph after Papadopoulos & Smithson 2002, 167, fig.12
STANDARD TREFOIL OINOCHOAI							
(Vessels with complete profiles):							
Photograph	**Thesis No.**	**Inventory No.**	**Vessel Type**	**Chronology**	**Context**	**Condition**	**Publications**
[redacted]	62	Agora P 18616	Oinochoe	EGII	Well C18:6	Part missing	Coldstream 1968, 267
[redacted]	63	Agora P 18618	Oinochoe	EGII	Well C18:6	Rim partly restored	Blegen 1952, 284
[redacted]	64	Agora P 18622	Oinochoe	EGII	Well C18:6	Partly restored	Blegen 1952, 285
[redacted]	65	Agora P 6164	Oinochoe	MGI	Well L6:2	Almost complete	Shear 1935, 443, fig.5; Shear 1936a, 32, fig.31; Blegen 1952, 284; photograph after Papadopoulos 1998, 111, pl.16c
[redacted]	66	Agora P 6203	Oinochoe	MGI	Well L6:2	Almost complete	Blegen 1952, 284
[redacted]	67	Agora P 6205	Oinochoe	MGI	Well L6:2	Some missing	Blegen 1952, 284
[redacted]	68	Agora P 6409	Oinochoe	MGI	Well L6:2	Partly restored	Blegen 1952, 284; Smithson 1968, 86 under 3

[redacted]	69	Agora P 552	Oinochoe	MGI	Burial I18:3	Complete	Shear 1933, 26; photograph after Smithson 1974, 362, n.I 18:3-1, pl.78a1; Papadopoulos 2007, 112-3, fig.111a
	70	Agora P 553	Oinochoe	MGI	Burial I18:3	Mended, most restored	Photograph after Smithson 1974, 363, n.I 18:3-5, pl.78d5
	71	Agora P 3874	Oinochoe	MGI	Well H15:1	Mended, some missing	Blegen 1952, 284
	72	Agora P 18365	Oinochoe	MGII	Well C18:9	Mended, almost complete	Coldstream 1968, 22
	73	Agora P 27948	Oinochoe	MGII	Well J13:1	Almost complete	Camp 1999, 262, n.10
	74	Agora P 6401	Oinochoe	MGII	Well L6:2	Partly restored	Brann 1962, 31, under n.6
	75	Agora P 17194	Oinochoe	LGIb-LGIIa	Pit M11:1	Partly restored	Photograph after Brann 1961a, 131-2, n.O7, pl.15; Brann 1962, 61-2, pl.16, n.270
	76	Agora P 12104	Oinochoe	LGIb-LGIIa	Well S18:1	Complete, partly restored	Shear 1939, 219, 227, fig.21; Marwitz 1959, 87; photograph after Brann 1961a, 119, n.L10, pl.14; Brann 1962, 35-6, pl.4, n.43; Papadopoulos 2007, 112-3, fig.111d
	77	Agora P 12433	Oinochoe	LGIb-LGIIa	Well L18:2	Partly restored in plaster	Photograph after Brann 1962, 36,pl.4, n.49; Miles 1998, 115
	78	Agora P 12431	Oinochoe	LGIb-LGIIa	Well L18:2	Restored in plaster, preserving complete profile	Photograph after Brann 1962, 36, pl.4, n.48
	79	Agora P 4772	Oinochoe	LGIb-LGIIa	Grave G12:8	Almost intact	Young 1939, 69-97, n.XX7, fig.67; photograph after Brann 1962, 36, pl.4, n.45
	80	Agora P 23649	Oinochoe	LGIIb-EPA	Well Q8:9	Part missing	Photograph after Brann 1961a, 129, n.N7, pl.15
	81	Agora P 23673	Oinochoe	LGIIb-EPA	Well Q8:9	Mended, some missing	Photograph after Brann 1961a, 129, n.N8, pl.15

STANDARD TREFOIL OINOCHOAI
(Incomplete or fragmented vessels):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	82	Agora P 3687	Oinochoe	EGI	Well K12:2	Upper part missing	Photograph after Papadopoulos & Ruscillo 2002, 191, fig.4; Papadopoulos 2003, 100
	83	Agora P 27951	Oinochoe Neck Fragment	MGII	Well J13:1	Neck & shoulder fragment	Camp 1999, 262, n.10
	84	Agora P 27950	Oinochoe	MGII	Well J13:1	Much restored in plaster	Camp 1999, 262, n.10
	85	Agora P 27952	Oinochoe Fragments	MGII	Well J13:1	Two fragments from the shoulder / neck & base areas	Camp 1999, 262, n.10
	86	Agora P 2402	Oinochoe Fragments	MGII-LGIa	Pit C, H8-10	Six joining neck fragments	Photograph after Brann 1962, 72, pl.21, n.365
	87	Agora P 15127	Oinochoe	LGIb	Grave 3, E19:3	Neck & handle restored	Shear 1940, 271, fig.7; photograph after Brann 1960, 406-7, n.2., pl.89
	88	Agora P 10224	Oinochoe	LGIb-LGIIa	Well T19:3	Mended fragments, base restored	Photograph after Brann 1962, 37, pl.4, n.55; Miles 1998, 110
	89	Agora P 12432	Oinochoe	LGIb-LGIIa	Well L18:2	Upper part restored	Photograph after Brann 1962, pl.4, n.47
	90	Agora P 26827	Oinochoe Fragment	LGIIa-LGIIb	Well S20:1	Mended, some missing	Miles 1998, 109
	91	Agora P 4923	Oinochoe Neck Fragment	LGIIa-LGIIb	Surface fill N10:1	Neck and bit of shoulder	Brann 1962, 72, n.363
	92	Agora P 19842	Oinochoe	LGIIa-LGIIb	Well B18:6	Rim missing	Photograph after Brann 1962, 40, pl.5, n.79
	93	Agora P 7482	Oinochoe Neck Fragment	LGIIa-LGIIb	Pit & well D11:5	Neck & shoulder fragment	Photograph after Young 1939, 174, n.C113, fig.125; Marwitz 1959, 86, 92

GIANT TREFOIL OINOCHOAI
(Incomplete or fragmented vessels):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	94	Agora P 25631	Oinochoe Giant	LGIb-LGIIa	Well J15:4	Most missing	Photograph after Brann 1962, 35, pl.4, n.42
[redacted]	95	Agora P 23675	Oinochoe Giant	LGIIb-EPA	Well Q8:9	Upper part missing	Brann 1961a, 129, n.N10
[redacted]	96	Agora P 24844	Oinochoe Giant	LGIIb-EPA	Well N11:4	Neck & handle missing	Photograph afterBrann 1961a, 141-142, n.Q3, pl.15

NECK-LESS (N/L) TREFOIL OINOCHOAI
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	97	Agora P 12108	Oinochoe N/L	LGIb-LGIIa	Well S18:1	Almost complete	Photograph after Brann 1961a, 119, n.L14, pl.16; Brann 1961b, 350 under G8
[redacted]	98	Agora P 12115	Oinochoe N/L	LGIb-LGIIa	Well S18:1	Upper part restored	Photograph after Brann 1961a, 119, n.L13, pl.16
[redacted]	99	Agora P 12120	Oinochoe N/L	LGIb-LGIIa	Well S18:1	Partly restored	Photograph after Brann 1961a, 119, n.L12, pl.15
[redacted]	100	Agora P 22427	Oinochoe N/L	LGIIb	Well N11:6	Almost complete	Photograph after Brann 1961a, 144, n.R5, pl.15; Coldstream 1968, 59
[redacted]	101	Agora P 23654	Oinochoe N/L	LGIIb-EPA	Well Q8:9	Almost intact	Photograph after Brann 1961a, 129, n.N11, pl.16; Brann 1962, 72, pl.21, n.360; Coldstream 1968, pl.11e; Treziny 1979, pl.1
[redacted]	102	Agora P 23655	Oinochoe N/L	LGIIb-EPA	Well Q8:9	Almost intact	Photograph after Brann 1961a, 129-30, n.N12, pl.15; Brann 1962, 40, pl.21, n.84=359; Coldstream 1968, 78
[redacted]	103	Agora P 23657	Oinochoe N/L	LGIIb-EPA	Well Q8:9	Complete	Photograph after Brann 1961a, 130, n.N13, pl.16
[redacted]	104	Agora P 20729	Oinochoe N/L	LGIIb-SG	Well R10:5	Mended, partly restored	Photograph after Brann 1962, 40, pl.5, n.82

NECK-LESS (N/L) TREFOIL OINOCHOAI
(Incomplete or fragmented vessels):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	105	Agora P 26813	Oinochoe N/L Fragment	LGIIa-LGIIb	Well S20:1	Neck & upper body	Miles 1998, 109
[redacted]	106	Agora P 17193	Oinochoe N/L	LGIIb-EPA	Pit M11:1	Base restored	Photograph after Brann 1961a, 132, n.O8, pl.16

BROAD NECK-LESS (N/L) TREFOIL OINOCHOAI
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	107	Agora P 21579	Oinochoe Broad N/L	LGIa	Well P7:3	Small restoration	Photograph after Brann 1961a, 116, n.K3, pl.15; Brann 1961b, 350 under G8; Brann 1962, 40, pl.5, n.80

BROAD NECK-LESS (N/L) TREFOIL OINOCHOAI
(Incomplete or fragmented vessels):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	108	Agora P 21580	Oinochoe Broad N/L	LGIa	Well P7:3	Lower part missing	Photograph after Brann 1961a, 116, n.K4, pl.15

TYPICAL KANTHAROI WITH HIGH HANDLES (H/H)
– including those with high lips (H/L)
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	109	Agora P 15123	Kantharos H/L H/H	LGIb	Grave 3, E19:3	Mended, complete	Shear 1940, 271, fig.7; photograph after Brann 1960, 405-6, n.405, pl.89/5
[redacted]	110	Agora P 4775	Kantharos H/L H/H	LGIb-LGIIa	Grave G12:8	Complete	Young 1939, 96, n.XX4, fig.67; photograph after Brann 1962, 52, pl.10, n.171; Papadopoulos 2007, 116-7, fig113a
[redacted]	111	Agora P 4887	Kantharos H/L H/H	LGIIb	Grave 12, G12:13	Complete	Young 1939, 74-5, n.XV2, fig.48; photograph after Brann 1962, 52, pl.10, n.170
[redacted]	112	Agora P 7476	Kantharos H/H	SG	Pit and well D11:5	Mended, restored, complete profile	Photograph after Young 1939, 159, n.C64, fig.112

TYPICAL KANTHAROI WITH HIGH HANDLES (H/H)
– including those with high lips (H/L)
(Incomplete or fragmented vessels):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	113	Agora P 6402	Kantharos H/L H/H	MGII	Well L6:2	About half preserved	Photograph after Brann 1962, 52, pl.10, n.169; Smithson 1968, 86 under 3

SMALL KANTHAROI WITH HIGH HANDLES (H/H)
– including those with high lips (H/L)
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	114	Agora P 7080	Kantharos Small H/L H/H	MGII-LGIa	Well D12:3	Partly restored	Photograph after Brann 1961a, 111, n.I50, pl.20; Brann 1962, 52, pl.10, n.175
	115	Agora P 4961	Kantharos Small H/L H/H	LGIIa	Grave 12, G12:14	Mended, complete	Young 1939, 38-9, n.IX9, fig.24; protograph after Brann 1962, 52, pl.10, n.172
	116	Agora P 4973	Kantharos Small H/L H/H	LGIIa	Grave 13, G12:14	Intact	Photograph after Young 1939, 38-9, n.IX8, fig.24
	117	Agora P 4976	Kantharos Small H/L H/H	LGIIa	Grave 13, G12:14	Intact	Photograph after Young 1939, 40, n.IX10 and pg.38, fig.24

KANTHAROI OF UNCERTAIN TYPOLOGY (?)
(Incomplete or fragmented vessels):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	118	Agora P 17192	Kantharos Fragment (?)	LGIIa	Pit or well M11:1	Mended, handles restored	Photograph after Brann 1961a, 134, n.O28, pl.20
	119	Agora P 1765	Kantharos ? H/L	EPA	Fill H17:4	Mended, restored	Photograph after Burr 1933, 590, n.205, fig.57; Cook 1934-5, 216

FOOTED KANTHAROI WITH LOW HANDLES (L/H)
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	120	Agora P 7196	Kantharos Footed L/H	PA	Well D11:5	Restored	Young 1939, 162, n.C69, fig.111; photograph after Brann 1962, 49, pl.9, n.152

FOOTED KANTHAROI WITH LOW HANDLES (L/H)
(Incomplete or fragmented vessels):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	121	Agora P 19247	Kantharos Fragments Footed L/H	EGI	Grave D16:2	Fragments, restored	Photograph after Young 1949, 296, n.20, pl.67:20, 69:20; Desborough 1952, 54, 103, 104; Blegen 1952, 283; Marwitz 1959, 76

KANTHAROI WITH LOW HANDLES (L/H)							
(Vessels with complete profiles):							
Photograph	**Thesis No.**	**Inventory No.**	**Vessel Type**	**Chronology**	**Context**	**Condition**	**Publications**
[redacted]	122	Agora P 6420	Kantharos L/H Fragment	MG	Well L6:2	Half, mended, restored	Blegen 1952, 284
KANTHAROI WITH LOW HANDLES (L/H)							
(Incomplete or fragmented vessels):							
Photograph	**Thesis No.**	**Inventory No.**	**Vessel Type**	**Chronology**	**Context**	**Condition**	**Publications**
[redacted]	123	Agora P 27637	Kantharos L/H Fragments	EGII-EGI	Cremation H16:6	Three fragments, rim & handle	Photograph after Smithson 1968, 97, n.24, pl.22
TYPICAL SHALLOW SKYPHOI							
(Vessels with complete profiles):							
Photograph	**Thesis No.**	**Inventory No.**	**Vessel Type**	**Chronology**	**Context**	**Condition**	**Publications**
[redacted]	124	Agora P 27942	Skyphos	MGII	Well J13:1	Mended, some missing	Camp 1999, 262, n.10
	125	Agora P 27944	Skyphos	MGII	Well J13:1	Mended, some missing	Camp 1999, 262, n.10
	126	Agora P 32895	Skyphos	MGII	Well J13:1	Mended, parts missing	Photograph after Camp 1999, 262, no.8, fig.10
	127	Agora P 27941	Skyphos	MGII	Well J13:1	Complete, mended	Camp 1999, 262, n.10
	128	Agora P 27943	Skyphos	MGII	Well J13:1	Mended, small restoration	Camp 1999, 262, n.10
	129	Agora P 32891	Skyphos	MGII	Well J13:1	Mended, parts missing	Photograph after Camp 1999, 262, no.9, fig.10
	130	Agora P 8222	Skyphos	MGII-LGIa	Well D12:3	Mended, restored	Photograph after Brann 1961a, 109, n.I33, pl.19
	131	Agora P 8233	Skyphos Fragments	MGII-LGIa	Well D12:3	Profile fragments, vessel restored	Photograph after Brann 1961a, 109, n.I32, pl.19
	132	Agora P 8223	Skyphos	MGII-LGIa	Well D12:3	Half vessel, restored	Photograph after Brann 1961a, 109, n.I35, pl.19
	133	Agora P 8224	Skyphos	MGII-LGIa	Well D12:3	Most restored	Photograph after Brann 1961a, 110, n.I40, pl.19
	134	Agora P 12111	Skyphos	LGIb-LGIIa	Well S18:1	Half vessel	Brann 1961a, 122, n.L30
	135	Agora P 12112	Skyphos	LGIb-LGIIa	Well S18:1	Profile fragment, no handles	Photograph after Brann 1961a, 122, n.L28, pl.20
	136	Agora P 12109	Skyphos	LGIb-LGIIa	Well S18:1	Half, restored	Photograph after Brann 1961a, 121, n.L26, pl.19

[redacted]	137	Agora P 12110	Skyphos	LGIb-LGIIa	Well S18:1	Half, restored	Photograph after 1. Brann 1961a, 121-2, n.L27, pl.19; Brann 1962, 48-9, pl.8, n.144
	138	Agora P 21799	Skyphos	LGIb-LGIIa	Well P14:2	Complete, partly restored	Photograph after Brann 1962, 47, pl.8, n.127; Miles 1998, 113
	139	Agora P 21807	Skyphos Fragment	LGIb-LGIIa	Well P14:2	Profile fragment	Photograph afterBrann 1962, 47, pl.8, n.126; Miles 1998, 116
	140	Agora P 22431	Skyphos	LGIIa-LGIIb	Well N11:5	Mended, almost complete	Photograph after Brann 1961a, 127, n.M9, pl.19; Papadopoulos 2003, 121-2, n.101, fig.2.58
	141	Agora P 22428	Skyphos	LGIIb-EPA	Well N11:6	Mended, some missing	Brann 1961a, 144, n.R11; Papadopoulos 2003, 188
	142	Agora P 4615	Skyphos	SG	Grave 5, G12:5	Complete, worn	Photograph after Young 1939, 28, n.V3, fig.15
	143	Agora P 4659	Skyphos	SG	Road Fill F-G 12:1	Mended, one handle and chips missing	Photograph after Young 1939, 123-4, n.B53, fig.88

TYPICAL SHALLOW SKYPHOI
(Incomplete or fragmented vessels):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	144	Agora P 27957	Skyphos	MGII	Well J13:1	Rim & wall with half handle	Camp 1999, 262, n.10
	145	Agora P 8227	Skyphos	MGII-LGIa	Well D12:3	Rim fragments, vessel restored	Photograph after Brann 1961a, 108, n.I28, pl.19
	146	Agora P 8234	Skyphos Fragments	MGII-LGIa	Well D12:3	Rim & walls, vessel restored	Brann 1961a, 111, n.I48

CORINTHIANISING SKYPHOI
(Incomplete or fragmented vessels):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	147	Agora P 5286	Skyphos Fragment (Corinthianising)	LGIIb	Test cut F-G12:1	Pieces mended, no handle	Young 1939, 138, n.B85, fig.91; photograph after Brann 1962, 70, pl.21, n.343; Brokaw 1963, 66 and pl.29; Coldstream 1968, 60

WIDE SHALLOW SKYPHOI
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	148	Agora P 8229	Skyphos Wide	MGII-LGIa	Well D12:3	Partly restored	Brann 1961a, 109, n.I30
	149	Agora P 8230	Skyphos Wide	MGII-LGIa	Well D12:3	Most restored	Brann 1961a, 109, n.I31

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	150	Agora P 8225	Skyphos Wide Fragments	MGII-LGIa	Well D12:3	Profile fragment, no handles, vessel restored	Photograph after Brann 1961a, 108, n.I29, pl.19
[redacted]	151	Agora P 8221	Skyphos Wide	MGII-LGIa	Well D12:3	Partly restored	Photograph after Brann 1961a, 109, n.I36, pl.19
[redacted]	152	Agora P 8231	Skyphos Wide Fragments	MGII-LGIa	Well D12:3	Most vessel restored, no handles	Photograph after Brann 1961a, 109, n.I38, pl.19

WIDE SHALLOW SKYPHOI
(Incomplete or fragmented vessels):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	153	Agora P 8226	Skyphos Wide Fragments	MGII-LGIa	Well D12:3	Rim & handle fragment, vessel restored	Photograph after Brann 1961a, 110, n.I39, pl.19
[redacted]	154	Agora P 8228	Skyphos Wide Fragments	MGII-LGIa	Well D12:3	Most fragments joining, vessel restored	Photograph after Brann 1961a, 108, n.I27, pl.19
[redacted]	155	Agora P 8220	Skyphos Wide Fragments	MGII-LGIa	Well D12:3	Half vessel, restored	Photograph after Brann 1961a, 108, n.I26, pl.19

THE KYNOSARGES BURIALS

ELABORATELY DECORATED NECK-HANDLED AMPHORAE
(Incomplete or fragmented vessels):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	156	Kynosarges K84	Amphora N-H Fragment	MGII	Kynosarges Grave ?	Neck & upper part fragment	Photograph after Coldstream 2003, 339, pl.44

ELABORATELY DECORATED AMPHORAE OF UNCERTAIN TYPOLOGY (?)
(Incomplete or fragmented vessels):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	157	Kynosarges K30	Amphora Fragment	LGIIa	Kynosarges Grave ?	Neck Fragment	Photograph after Coldstream 2003, 337-8, pl.43
[redacted]	158	Kynosarges K31	Amphora Fragment	LGIIb	Kynosarges Grave ?	Wall fragment	Photograph after Coldstream 2003, 338, pl.43
[redacted]	159	Kynosarges K15	Amphora ? Fragment	EPA	Kynosarges Grave ?	Neck fragment	Photograph after Coldstream 2003, 335, pl.42
[redacted]	160	Kynosarges K16	Amphora Fragment	EPA	Kynosarges Grave ?	Rim and neck fragment	Photograph after Coldstream 2003, 337, pl.42, fig.1

STANDARD TREFOIL OINOCHOAI
(Incomplete or fragmented vessels):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	161	Kynosarges K86	Oinochoe Neck Fragment	MGII	Kynosarges Grave ?	Neck fragment	Photograph after Coldstream 2003, 339, pl.44

PITCHERS
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	162	Kynosarges K83	Pitcher	LGIIa	Kynosarges Grave ?	Mended and restored	Photograph after Coldstream 2003, 338, pl.45, fig.1

TYPICAL KANTHAROI WITH HIGH HANDLES (H/H)
– including those with high lips (H/L)
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	163	Kynosarges K1	Kantharos H/L H/H	MGII	Kynosarges Grave ?	Complete, partly restored	Publication after Coldstream 2003, 334, pl.40

TYPICAL SHALLOW SKYPHOI
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	164	Kynosarges K88	Skyphos	MGII-LGIa	Kynosarges Grave ?	Complete, partly restored	Photograph after Coldstream 2003, 339, pl.44, fig.1
	165	Kynosarges K3	Skyphos	LGIIb	Kynosarges Grave ?	Complete, mended	Photograph after Coldstream 2003, 334, pl.40
	166	Kynosarges K5	Skyphos	LGIIb	Kynosarges Grave ?	Intact	Photograph after Coldstream 2003, 334, pl.40
	167	Kynosarges K6	Skyphos	LGIIb	Kynosarges Grave ?	Mended, complete	Photograph after Coldstream 2003, 334, pl.40

WIDE SHALLOW SKYPHOI
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	168	Kynosarges K10	Skyphos Wide	MGII	Kynosarges Grave ?	Complete, partly restored	Photograph after Coldstream 2003, 335, pl.41
	169	Kynosarges K2	Skyphos Wide	LGIIa	Kynosarges Grave ?	Complete	Photograph after Coldstream 2003, 334, pl.40

THE GEOMETRIC COLLECTIONS OF THE BRITISH SCHOOL AT ATHENS

ELABORATELY DECORATED AMPHORAE OF UNCERTAIN TYPOLOGY (?)
(Incomplete or fragmented vessels):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	170	BSA Collections A517	Amphora ? Fragment	LGIIa	Athens- Unknown context	Neck fragment	Photograph after Coldstream 2003, 345-6, pl.53
	171	BSA Collections A518	Amphora ? Fragment	LGIIa	Athens- Unknown context	Neck fragment	Photograph after Coldstream 2003, 346, pl.53, fig.2

ELABORATELY DECORATED NECK-HANDLED AMPHORAE
(Incomplete or fragmented vessels):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	172	BSA Collections A204	Amphora Fragment	MGII-LGIa	Attica- Unknown context	Neck fragment	Photograph after Coldstream 2003, 343, pl.48

STANDARD TREFOIL OINOCHOAI
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	173	BSA Collections A298	Oinochoe	MGII-LGIa	Attica- Unknown context	Intact	Photograph after Coldstream 2003, 343, pl.49

BROAD TREFOIL OINOCHOAI
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	174	BSA Collections A341	Oinochoe Broad	LGIa	Attica- Unknown context	Intact	Photograph after Coldstream 2003, 344-5, pl.52

PITCHERS
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	175	BSA Collections A305	Pitcher	LGIIa	Athens- Unknown context	Intact	Photograph after Coldstream 2003, 344, pl.51

[redacted]	176	BSA Collections A306	Pitcher	LGIIa	Athens-Unknown context	Mended, small restoration	Photograph after Coldstream 2003, 344, pl.51
	177	BSA Collections A303	Pitcher	LGIIa	Athens-Unknown context	Complete	Photograph after Coldstream 2003, 343-4, pl.50
	178	BSA Collections A304	Pitcher	LGIIa	Athens-Unknown context	Complete	Photograph after Coldstream 2003, 344, pl.50
	179	BSA Collections A361	Pitcher	LGIIb	Attica-Unknown context	Mended and restored	Photograph after Coldstream 2003, 345, pl.53

SMALL KANTHAROI WITH HIGH HANDLES (H/H)
- including those with high lips (H/L)
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	180	BSA Collections A123	Kantharos Small H/L H/H	LGII	Attica-Unknown context	Intact	Photograph after Coldstream 2003, 343, pl.47

KANTHAROI WITH HIGH HANDLES (H/H)
– including those with high lips (H/L)
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	181	BSA Collections A344	Kantharos H/H	LGIIb	Attica-Unknown context	Some missing including one handle, restored	Photograph after Coldstream 2003, 345, pl.52

TYPICAL SHALLOW SKYPHOI
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	182	BSA Collections A343	Skyphos	LGIIa	Attica-Unknown context	Complete, mended	Photograph after Coldstream 2003, 345, pl.52

GARDROONED SHALLOW SKYPHOI
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	183	BSA Collections A342	Skyphos Gardooned	LGIb-LGIIa	Attica-Unknown context	Complete, mended	Photograph after Coldstream 2003, 345, pl.52

THE KERAMEIKOS CEMETERY

ELABORATELY DECORATED NECK-HANDLED AMPHORAE (Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	184	Kerameikos 2132	Amphora N-H	EGI	Grave 1	Complete, mended	Photograph after Kübler 1954, 210, pl.25, 150
[redacted]	185	Kerameikos 925	Amphora N-H	EGII	Grave 2	Complete, mended	Photograph after Kübler 1954, 211, pl.27, 150
[redacted]	186	Kerameikos 926	Amphora N-H	EGII	Grave 2	Complete, mended	Photograph after Kübler 1954, 211, pl.25
[redacted]	187	Kerameikos 2136	Amphora N-H	EGII	Grave 38	Complete, mended	Photograph after Kübler 1954, 234, pl.27, 150
[redacted]	188	Kerameikos 254	Amphora N-H	EGII	Grave 74	Complete, mended	Photograph after Kübler 1954, 260, pl.26, 150
[redacted]	189	Kerameikos 253	Amphora N-H	EGII	Grave 74	Complete, mended	Photograph after Kübler 1954, 261, pl.25
[redacted]	190	Kerameikos 2140	Amphora N-H	EGII-MGI	Grave 42	Complete, mended	Photograph after Kübler 1954, 237, pl.28, 151
[redacted]	191	Kerameikos 1249	Amphora N-H	EGII-MGI	Grave 43	Complete, mended	Photograph after Kübler 1954, p.238, pl.28, 151
[redacted]	192	Kerameikos 884	Amphora N-H	MGI	Grave 13	Complete, mended	Photograph after Kübler 1954, 218, pl.29, 153

[redacted]	193	Kerameikos 2155	Amphora N-H	MGI	Grave 36	Complete, mended	Photograph after Kübler 1954, 233, pl.29
[redacted]	194	Kerameikos 866	Amphora N-H	MGI	Grave 37	Complete, mended	Photograph after Kübler 1954, 233, pl.29
[redacted]	195	Kerameikos 859	Amphora N-H	MGI-MGII	Grave 11	Complete, partly restored	Photograph after Kübler 1954, 216, pl.30, 151
[redacted]	196	Kerameikos 291	Amphora N-H	MGII	Grave 22	Complete, partly restored	Photograph after Kübler 1954, 223, pl.32, 153
[redacted]	197	Kerameikos 236	Amphora N-H	MGII	Grave 23	Complete, mended	Photograph after Kübler 1954, 224, pl.30
[redacted]	198	Kerameikos 242	Amphora N-H	MGII	Grave 23	Complete, mended	Photograph after Kübler 1954, 224, pl.30
[redacted]	199	Kerameikos 277	Amphora N-H	MGII	Grave 30	Complete, mended	Photograph after Kübler 1954, 229, pl.31
[redacted]	200	Kerameikos 255	Amphora N-H	MGII	Grave 69	Complete, partly restored	Photograph after Kübler 1954, 257, pl.31, 151
[redacted]	201	Kerameikos 272	Amphora N-H	MGII-LGIa	Grave 31	Complete, mended	Photograph after Kübler 1954, 109, 230, pl.31
[redacted]	202	Kerameikos 1306	Amphora N-H	LGIa-LGIb	Grave 50	Complete, mended	Photograph after Kübler 1954, 244, pl.110, 141

[redacted]	203	Kerameikos 377	Amphora N-H	LGIb	Grave 24	Complete, mended	Photograph after Kübler 1954, 225, pl.33, 153
	204	Kerameikos 346	Amphora N-H	LGIb	Grave 71	Complete, mended	Photograph after Kübler 1954, 258, pl.34
	205	Kerameikos 385	Amphora N-H	LGIb-LGIIa	Grave 72	Complete	Photograph after Kübler 1954, 259, pl.35, 140
	206	Kerameikos 267	Amphora N-H	LGIb-LGIIa	Grave 28	Complete, mended	Photograph after Kübler 1954, 228, pl.33
	207	Kerameikos 337	Amphora N-H	LGIIa-LGIIb	Grave 59	Complete, mended	Photograph after Kübler 1954, 253, pl.38, 153
	208	Kerameikos 656	Amphora N-H	LGIIa-LGIIb	Grave 97	Complete, mended	Photograph after Kübler 1954, 270, pl.37, 141
	209	Kerameikos n.n.	Amphora N-H	LGIIb	Grave 52	Complete profile, restored	Photograph after Kübler 1954, 247, pl.38
	210	Kerameikos 850	Amphora N-H	LGIIb	Grave 85	Almost complete, mended	Photograph after Kübler 1954, 264, pl.37, 141, 153

ELABORATELY DECORATED NECK-HANDLED SOS AMPHORAE
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	211	Kerameikos 1298	Amphora N-H SOS	SG	Grave 64	Mended, partly restored	Photograph after Kübler 1954, 254, pl.38

ELABORATELY DECORATED SHOULDER-HANDLED AMPHORAE
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	212	Kerameikos 412	Amphora S-H	EGII	Grave 14	Mended, partly restored	Photograph after Kübler 1954, 220, pl.42
	213	Kerameikos 234	Amphora S-H	MGI	Grave 76	Complete, mended	Photograph after Kübler 1954, 262, pl.44
	214	Kerameikos 890	Amphora S-H	MGI-MGII	Grave 12	Complete, mended	Photograph after Kübler 1954, 217, pl.44, 109, 151
	215	Kerameikos 284	Amphora S-H	MGII	Grave 29	Complete	Photograph after Kübler 1954, 228, pl.45
	216	Kerameikos 825	Amphora S-H	MGII	Grave 86	Complete	Photograph after Kübler 1954, 265, pl.45, 151

ELABORATELY DECORATED BELLY-HANDLED AMPHORAE
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	217	Kerameikos 2146	Amphora B-H	EGII-MGI	Grave 41	Complete, mended	Photograph after Kübler 1954, 235, pl.46

BANDED NECK-HANDLED AMPHORAE
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	218	Kerameikos 1315	Amphora N-H Banded	LGIIb-EPA	Grave 51	Almost complete, mended	Photograph after Kübler 1954, 246, pl.41

NECK-LESS (N/L) BANDED NECK-HANDLED AMPHORAE
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	219	Kerameikos 1250	Amphora N-H Banded N/L	EGII-MGI	Grave 43	Complete, mended	Photograph after Kübler 1954, 238, pl.41
	220	Kerameikos 894	Amphora N-H Banded N/L	MGI-MGII	Grave 12	Complete, mended	Photograph after Kübler 1954, 217, pl.41
	221	Kerameikos 296	Amphora N-H Banded N/L	MGII	Grave 22	Complete	Photograph after Kübler 1954, 223, pl.41
	222	Kerameikos 289	Amphora N-H Banded N/L	MGII	Grave 29	Complete	Photograph after Kübler 1954, 229, pl.41

ELABORATELY DECORATED HYDRIAE
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	223	Kerameikos 783	Hydria	MGII-LGIa	Grave 89	Complete, mended	Photograph after Kübler 1954, 267, pl.50
	224	Kerameikos 784	Hydria	MGII-LGIa	Grave 89	Complete, mended	Photograph after Kübler 1954, 267, pl.50

STANDARD TREFOIL OINOCHOAI
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	225	Kerameikos 928	Oinochoe	EGII	Grave 2	Complete, mended	Photograph after Kübler 1954, 211, pl.70, 150
	226	Kerameikos 927	Oinochoe	EGII	Grave 2	Complete, mended	Photograph after Kübler 1954, 212, pl.71

[redacted]	227	Kerameikos 2139	Oinochoe	EGII	Grave 38	Complete	Photograph after Kübler 1954, 234, pl.71, 150
	228	Kerameikos 2148	Oinochoe	EGII-MGI	Grave 41	Complete, mended	Photograph after Kübler 1954, 235, pl.72
	229	Kerameikos 2149	Oinochoe	EGII-MGI	Grave 41	Complete, mended	Photograph after Kübler 1954, 235, pl.72, 109
	230	Kerameikos 2145	Oinochoe	EGII-MGI	Grave 42	Complete, mended	Photograph after Kübler 1954, 237, pl.73, 152
	231	Kerameikos 1253	Oinochoe	EGII-MGI	Grave 43	Complete	Photograph after Kübler 1954, 238, pl.74
	232	Kerameikos 862	Oinochoe	MGI-MGII	Grave 11	Complete, mended	Photograph after Kübler 1954, 216, pl.73
	233	Kerameikos 298	Oinochoe	MGII	Grave 22	Complete, mended	Photograph after Kübler 1954, 224, pl.75
	234	Kerameikos 300	Oinochoe	MGII	Grave 22	Mended, partly restored	Photograph after Kübler 1954, 224, pl.73
	235	Kerameikos 379	Oinochoe	MGII	Grave 23	Mended, partly restored	Photograph after Kübler 1954, 225, pl.73, 152
	236	Kerameikos 397	Oinochoe	MGII	Grave 35	Complete, mended	Photograph after Kübler 1954, 233, pl.75
	237	Kerameikos 880	Oinochoe	MGII-LGIa	Grave 25	Mended, partly restored	Photograph after Kübler 1954, 226, pl.74

[redacted]	238	Kerameikos 274	Oinochoe	MGII-LGIa	Grave 31	Complete	Photograph after Kübler 1954, 230, pl.76
	239	Kerameikos 1327	Oinochoe	LGIb	Grave 48	Complete	Photograph after Kübler 1954, 242, pl.76
	240	Kerameikos 341	Oinochoe	LGIb	Grave 71	Complete	Photograph after Kübler 1954, 258, pl.75
	241	Kerameikos 814	Oinochoe	LGIIa	Grave 90	Complete	Photograph after Kübler 1954, 268, pl.78, 152
	242	Kerameikos 369	Oinochoe	LGIIb	Grave 57	Partly restored	Photograph after Kübler 1954, 250-1, pl.78

BROAD NECK-LESS (N/L) TREFOIL OINOCHOAI (Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	243	Kerameikos 874	Broad N/L Oinochoe	LGIa	Grave 9	Complete, mended	Photograph after Kübler 1954, 215, pl.82

TREFOIL OINOCHOAI LEKYTHOI (Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	244	Kerameikos 1141	Oinochoe Lekythos	MGI	Grave 13	Partly restored	Photograph after Kübler 1954, 219, pl.83

PITCHERS (Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	245	Kerameikos 819	Pitcher	LGIIa	Grave 79	Complete, mended	Photograph after Kübler 1954, 263, pl.116, 152

[redacted]	246	Kerameikos 821	Pitcher	LGIIa	Grave 93	Complete, mended	Photograph after Kübler 1954, 269, pl.116
	247	Kerameikos 393	Pitcher	LGIIa-LGIIb	Grave 33	Mended, partly restored	Photograph after Kübler 1954, 231, pl.115
	248	Kerameikos 399	Pitcher	LGIIb	Grave 16	Mended, partly restored	Photograph after Kübler 1954, 220-1, pl.114

TYPICAL KANTHAROI WITH HIGH HANDLES (H/H)
– including those with high lips (H/L)
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	249	Kerameikos 237	Kantharos H/L H/H	MGII	Grave 23	Complete	Photograph after Kübler 1954, 225, pl.85
	250	Kerameikos 239	Kantharos H/L H/H	MGII	Grave 23	Complete, mended	Photograph after Kübler 1954, 225, pl.85
	251	Kerameikos 285	Kantharos H/L H/H	MGII	Grave 29	Complete, chips missing	Photograph after Kübler 1954, 232, pl.86
	252	Kerameikos 390	Kantharos H/L H/H	MGII	Grave 34	Complete	Photograph after Kübler 1954, 232, pl.86
	253	Kerameikos 400	Kantharos H/L H/H	MGII	Grave 35	Complete	Photograph after Kübler 1954, 233, pl.86
	254	Kerameikos 258	Kantharos H/L H/H	MGII	Grave 69	Complete	Photograph after Kübler 1954, 257, pl.85, 152
	255	Kerameikos 373	Kantharos H/L H/H	LGIb	Grave 24	Complete, mended	Photograph after Kübler 1954, 226, pl.86
	256	Kerameikos 364	Kantharos H/H	LGIb-LGIIa	Grave 21	Complete	Photograph after Kübler 1954, 222, pl.87
	257	Kerameikos 268	Kantharos H/H	LGIb-LGIIa	Grave 28	Complete	Photograph after Kübler 1954, 228, pl.87
	258	Kerameikos 817	Kantharos H/H	LGIIa	Grave 90	Complete, mended	Photograph after Kübler 1954, 268, pl.87

SMALL KANTHAROI WITH HIGH HANDLES (H/H)
– including those with high lips (H/L)
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	259	Kerameikos 1302	Kantharos Small H/L H/H	LGIa-LGIb	Grave 50	Complete	Photograph after Kübler 1954, 244, pl.88
	260	Kerameikos 1340	Kantharos Small H/L H/H	LGIIa-LGIIb	Grave 49	Complete	Photograph after Kübler 1954, 242, pl.88
	261	Kerameikos 1341	Kantharos Small H/L H/H	LGIIa-LGIIb	Grave 49	Complete, mended	Photograph after Kübler 1954, 242, pl.88
	262	Kerameikos 1345	Kantharos Small H/L H/H	LGIIa-LGIIb	Grave 49	Complete, mended, chip on rim	Photograph after Kübler 1954, 242, pl.88
	263	Kerameikos 320	Kantharos Small H/H	LGIIb	Grave 56	Intact	Photograph after Kübler 1954, 250, pl.88
	264	Kerameikos 323	Kantharos Small H/H	LGIIb	Grave 57	Complete, mended	Photograph after Kübler 1954, 250, pl.88
	265	Kerameikos 324	Kantharos Small H/H	LGIIb	Grave 57	Complete, mended	Photograph after Kübler 1954, 250, pl.88
	266	Kerameikos 1229	Kantharos Small H/L H/H	SG	Grave 66	Mended, partly restored	Photograph after Kübler 1954, 255, pl.88

KANTHAROI WITH LOW HANDLES (L/H)
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	267	Kerameikos 251	Kantharos L/H	EGII	Grave 74	Intact	Photograph after Kübler 1954, 261, pl.84
	268	Kerameikos 929	Kantharos L/H	EGII	Grave 2	Complete, mended	Photograph after Kübler 1954, 211, pl.84
	269	Kerameikos 246	Kantharos L/H	EGII	Grave 75	Complete, mended	Photograph after Kübler 1954, 261, pl.84

FOOTED (both high and low footed) KANTHAROI WITH LOW HANDLES (L/H)
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	270	Kerameikos 951	Kantharos Footed L/H	EGI	Grave 3	Complete	Photograph after Kübler 1954, 212, pl.15/n.9
	271	Kerameikos 936	Kantharos Footed L/H	EGI	Grave 3	Complete	Photograph after Kübler 1954, 212, pl.15/n.2
	272	Kerameikos 943	Kantharos Footed L/H	EGI	Grave 3	Complete	Photograph after Kübler 1954, 212, pl.15/n.8
	273	Kerameikos 930	Kantharos Footed L/H	EGII	Grave 2	Mended, partly restored	Photograph Kübler 1954, 211, pl.84
	274	Kerameikos 1251	Kantharos Footed L/H	EGII-MGI	Grave 43	Complete	Photograph after Kübler 1954, 238, pl.99

TYPICAL SHALLOW SKYPHOI
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	275	Kerameikos 413	Skyphos	EGII	Grave 14	Complete, partly restored	Photograph after Kübler 1954, 220, pl.89
[redacted]	276	Kerameikos 247	Skyphos	EGII	Grave 75	Complete, mended	Photograph after Kübler 1954, 262, pl.89
[redacted]	277	Kerameikos 2141	Skyphos	EGII-MGI	Grave 42	Complete, mended	Photograph after Kübler 1954, 237, pl.92
[redacted]	278	Kerameikos 2142	Skyphos	EGII-MGI	Grave 42	Complete, mended	Photograph after Kübler 1954, 237, pl.90
[redacted]	279	Kerameikos 886	Skyphos	MGI	Grave 13	Intact	Photograph after Kübler 1954, 218, pl.89
[redacted]	280	Kerameikos 887	Skyphos	MGI	Grave 13	Intact	Photograph after Kübler 1954, 218, pl.89
[redacted]	281	Kerameikos 261	Skyphos	MGI	Grave 20	Complete, mended	Photograph after Kübler 1954, 221, pl.92
[redacted]	282	Kerameikos 2156	Skyphos	MGI	Grave 36	Complete, mended	Photograph after Kübler 1954, 233, pl.89
[redacted]	283	Kerameikos 867	Skyphos	MGI	Grave 37	Complete, chips missing	Photograph after Kübler 1954, 233, pl.89
[redacted]	284	Kerameikos 861	Skyphos	MGI-MGII	Grave 11	Complete, mended	Photograph after Kübler 1954, 216, pl.95
[redacted]	285	Kerameikos 863	Skyphos	MGI-MGII	Grave 11	Complete, mended	Photograph after Kübler 1954, 216, pl.93
[redacted]	286	Kerameikos 892	Skyphos	MGI-MGII	Grave 12	Complete, mended	Photograph after Kübler 1954, 217, pl.89
[redacted]	287	Kerameikos 893	Skyphos	MGI-MGII	Grave 12	Complete	Photograph after Kübler 1954, 217, pl.90
[redacted]	288	Kerameikos 897	Skyphos	MGI-MGII	Grave 12	Complete, partly restored	Photograph after Kübler 1954, 217, pl.96
[redacted]	289	Kerameikos 295	Skyphos	MGII	Grave 22	Complete	Photograph after Kübler 1954, 223, pl.91
[redacted]	290	Kerameikos 238	Skyphos	MGII	Grave 22	Intact	Photograph after Kübler 1954, 225, pl.92
[redacted]	291	Kerameikos 241	Skyphos	MGII	Grave 23	Complete	Photograph Kübler 1954, 225, pl.92
[redacted]	292	Kerameikos 286	Skyphos	MGII	Grave 29	Complete, chips missing	Photograph after Kübler 1954, 228-9, pl.92
[redacted]	293	Kerameikos 278	Skyphos	MGII	Grave 30	Complete, mended	Photograph after Kübler 1954, 229, pl.90
[redacted]	294	Kerameikos 387	Skyphos	MGII	Grave 34	Complete, mended	Photograph after Kübler 1954, 232, pl.92
[redacted]	295	Kerameikos 391	Skyphos	MGII	Grave 34	Complete, mended	Photograph after Kübler 1954, 232, pl.90

[redacted]	296	Kerameikos 388	Skyphos	MGII	Grave 35	Complete	Photograph after Kübler 1954, 232, pl.92
[redacted]	297	Kerameikos 256	Skyphos	MGII	Grave 69	Complete, mended	Photograph after Kübler 1954, 257, pl.91
[redacted]	298	Kerameikos 1282	Skyphos	MGII	Grave 69	Complete, chips missing	Photograph after Kübler 1954, 257, pl.90
[redacted]	299	Kerameikos 828	Skyphos	MGII	Grave 86	Complete	Photograph after Kübler 1954, 265, pl.94
[redacted]	300	Kerameikos 829	Skyphos	MGII	Grave 86	Intact	Photograph after Kübler 1954, 265, pl.91
[redacted]	301	Kerameikos 879	Skyphos	MGII	Grave 25	Complete, mended	Photograph after Kübler 1954, 226, pl.89
[redacted]	302	Kerameikos 273	Skyphos	MGII-LGIa	Grave 31	Complete, chips missing	Photograph after Kübler 1954, 230, pl.92
[redacted]	303	Kerameikos 778	Skyphos	MGII-LGIa	Grave 89	Complete	Photograph after Kübler 1954, 267, pl.91
[redacted]	304	Kerameikos 781	Skyphos	MGII-LGIa	Grave 89	Complete, mended	Photograph after Kübler 1954, 267, pl.100
[redacted]	305	Kerameikos 875	Skyphos	LGIa	Grave 9	Complete	Photograph after Kübler 1954, 215, pl.93
[redacted]	306	Kerameikos 367	Skyphos	LGIa	Grave 15	Complete, mended	Photograph after Kübler 1954, 220, pl.91
[redacted]	307	Kerameikos 368	Skyphos	LGIa	Grave 15	Complete, partly restored	Photograph after Kübler 1954, 220, pl.91
[redacted]	308	Kerameikos 325	Skyphos	LGIa-LGIb	Grave 32	Complete, mended	Photograph after Kübler 1954, 231, pl.97
[redacted]	309	Kerameikos 326	Skyphos	LGIa-LGIb	Grave 32	Complete, mended	Photograph after Kübler 1954, 231, pl.97
[redacted]	310	Kerameikos 327	Skyphos	LGIa-LGIb	Grave 32	Complete, chips missing	Photograph after Kübler 1954, 231, pl.97
[redacted]	311	Kerameikos 330	Skyphos	LGIa-LGIb	Grave 32	Complete, mended	Photogaph after Kübler 1954, 231, pl.91
[redacted]	312	Kerameikos 1300	Skyphos	LGIa-LGIb	Grave 50	Intact	Photograph after Kübler 1954, 244, pl.96
[redacted]	313	Kerameikos 1301	Skyphos	LGIa-LGIb	Grave 50	Intact	Photograph after Kübler 1954, 244, pl.97
[redacted]	314	Kerameikos 376	Skyphos	LGIb	Grave 24	Complete, mended	Photograph after Kübler 1954, 226, pl.97
[redacted]	315	Kerameikos 876	Skyphos	LGIb	Grave 26	Complete	Photograph after Kübler 1954, 227, pl.93
[redacted]	316	Kerameikos 343	Skyphos	LGIb	Grave 71	Complete, mended	Photograph after Kübler 1954, 258, pl.99
[redacted]	317	Kerameikos 344	Skyphos	LGIb	Grave 71	Intact	Photograph after Kübler 1954, 258, pl.99

[redacted]	318	Kerameikos 269	Skyphos	LGIb-LGIIa	Grave 28	Complete, mended	Photograph after Kübler 1954, 228, pl.94
[redacted]	319	Kerameikos 270	Skyphos	LGIb-LGIIa	Grave 28	Complete, mended	Photograph after Kübler 1954, 228, pl.99
[redacted]	320	Kerameikos 1319	Skyphos	LGIIa	Grave 51	Complete, mended	Photograph after Kübler 1954, 246, pl.130
[redacted]	321	Kerameikos 787	Skyphos	LGIIa	Grave 91	Complete, mended	Photograph after Kübler 1954, 269, pl.129
[redacted]	322	Kerameikos 788	Skyphos	LGIIa	Grave 91	Complete, partly restored	Photograph after Kübler 1954, 269, pl.129
[redacted]	323	Kerameikos 857	Skyphos	LGIIb	Grave 94	Intact	Photograph after Kübler 1954, 269, pl.131
[redacted]	324	Kerameikos 1322	Skyphos	LGIIb-EPA	Grave 51	Complete	Photograph after Kübler 1954, 247, pl.100

WIDE SHALLOW SKYPHOI
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	325	Kerameikos 240	Skyphos wide	MGII	Grave 23	Complete, mended	Photograph after Kübler 1954, 225, pl.94
[redacted]	326	Kerameikos 394	Skyphos wide	MGII	Grave 35	Complete	Photograph after Kübler 1954, 232, pl.96
[redacted]	327	Kerameikos 395	Skyphos wide	MGII	Grave 35	Complete	Photograph after Kübler 1954, 232, pl.96
[redacted]	328	Kerameikos 396	Skyphos wide	MGII	Grave 35	Complete	Photograph after Kübler 1954, 232-3, pl.95
[redacted]	329	Kerameikos 839	Skyphos wide	MGII	Grave 82	Intact	Photograph after Kübler 1954, 264, pl.90
[redacted]	330	Kerameikos 840	Skyphos wide	MGII	Grave 82	Intact	Photograph after Kübler 1954, 264, pl.90
[redacted]	331	Kerameikos 826	Skyphos wide	MGII	Grave 86	Complete, chip on rim	Photograph after Kübler 1954, 265, pl.94
[redacted]	332	Kerameikos 827	Skyphos wide	MGII	Grave 86	Intact	Photograph after Kübler 1954, 265, pl.94
[redacted]	333	Kerameikos 780	Skyphos wide	MGII-LGIa	Grave 89	Complete, mended	Photograph after Kübler 1954, 267, pl.95
[redacted]	334	Kerameikos 328	Skyphos wide	LGIa-LGIb	Grave 32	Complete, mended	Photograph after Kübler 1954, 231, pl.97
[redacted]	335	Kerameikos 342	Skyphos wide	LGIb	Grave 71	Complete	Photograph after Kübler 1954, 258, pl.96
[redacted]	336	Kerameikos 818	Skyphos wide	LGIIa	Grave 90	Complete	Photograph after Kübler 1954, 268, pl.99

WIDE SHALLOW SKYPHOI WITH STIRRUP HANDLES (STR/H)
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	337	Kerameikos 2143	Skyphos wide STR/H	EGII-MGI	Grave 42	Complete, mended	Photograph after Kübler 1954, 237, pl.93
	338	Kerameikos 2144	Skyphos wide STR/H	EGII-MGI	Grave 42	Complete, mended	Photograph after Kübler 1954, 237, pl.93
	339	Kerameikos 888	Skyphos wide STR/H	MGI	Grave 13	Intact	Photograph after Kübler 1954, p.219, pl.93
	340	Kerameikos 889	Skyphos wide STR/H	MGI	Grave 13	Complete	Photograph after Kübler 1954, 219, pl.93

GADROONED SKYPHOI
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	341	Kerameikos 1299	Skyphos Gadrooned	LGIa-LGIb	Grave 50	Complete, mended	Photograph after Kübler 1954, 244, pl.99
	342	Kerameikos 1324	Skyphos Gadrooned	LGIb	Grave 48	Complete, mended	Photograph after Kübler 1954, 242, pl.99
	343	Kerameikos 1325	Skyphos Gadrooned	LGIb	Grave 48	Complete, mended	Photograph after Kübler 1954, 242, pl.99

THE GEOMETRIC COLLECTIONS OF THE BRITISH MUSEUM

ELABORATELY DECORATED NECK-HANDLED AMPHORAE
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	344	British Museum Collections GR1978,0701.8	Amphora N-H	MPG-LPG	Probably Athens/ Unknown context	Complete	Photograph after Coldstream 2010, 12, pl.1
	345	British Museum Collections GR1978,0701.9	Amphora N-H	MPG-LPG	Probably Athens/ Unknown context	Complete	Photograph after Coldstream 2010, 12, pl.1
	346	British Museum Collections GR1977,1207.1	Amphora N-H	MGI	Probably Athens/ Unknown context	Complete	Photograph after Coldstream 2010, 12, pl.1

[redacted]	347	British Museum Collections GR2000,0524.1	Amphora N-H	MGI	Probably Athens/ Unknown context	Complete, mended	Photograph after Coldstream 2010, 12, pl.2
[redacted]	348	British Museum Collections GR1977,1211.2	Amphora N-H	MGI	Probably Athens/ Unknown context	Complete	Photograph after Coldstream 2010, 12-13, pl.2
[redacted]	349	British Museum Collections GR1977,1207.5	Amphora N-H	MGII	Probably Athens/ Unknown context	Almost complete	Photograph after Coldstream 2010, 13, pl.3
[redacted]	350	British Museum Collections GR1977,1207.2	Amphora N-H	MGII	Probably Athens/ Unknown context	Complete, partly restored	Photograph after Coldstream 2010, 13, pl.4
[redacted]	351	British Museum Collections GR1977,1207.49	Amphora N-H	MGII-LGIa	Probably Athens/ Unknown context	Complete	Photograph after Coldstream 2010, 14-15, pl.6
[redacted]	352	British Museum Collections GR1977,1207.3	Amphora N-H	LGIb	Probably Athens/ Unknown	Almost complete	Photograph after Coldstream 2010, 14, pl.6
[redacted]	353	British Museum Collections GR1914,0413.1	Amphora N-H	LGIIa	Attica/ Unknown context	Complete, mended	Photograph after Coldstream 2010, 15, pl.7, fig.2
[redacted]	354	British Museum Collections GR1977,1202.1	Amphora N-H	LGIIa	Probably Athens/ Unknown context	Complete	Photograph after Coldstream 2010, 14-15, pl.6
[redacted]	355	British Museum Collections GR1927,0411.1	Amphora N-H	LGIIb	Attica/ Unknown context	Almost complete, mended	Photograph after Coldstream 2010, 15, pl.8, 9, fig.3, 4

ELABORATELY DECORATED BELLY-HANDLED AMPHORAE
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	356	British Museum Collections GR1978,0701.7	Amphora B-H	LPG	Probably Athens/ Unknown context	Complete	Photograph after Coldstream 2010, 15-16, pl.10

STANDARD TREFOIL OINOCHOAI
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	357	British Museum Collections GR1950,0228.1	Oinochoe	LPG	Probably Athens/ Unknown context	Complete	Photograph after Coldstream 2010, 16, pl.11
	358	British Museum Collections GR1950,0228.2	Oinochoe	EGI	Probably Athens/ Unknown context	Complete	Photograph after Coldstream 2010, 16, pl.11
	359	British Museum Collections GR1977,1207.50	Oinochoe	MGI-MGII	Probably Athens/ Unknown context	Complete	Photograph after Coldstream 2010, 16, pl.11, fig.5
	360	British Museum Collections GR1977,1207.11	Oinochoe	MGII	Probably Athens/ Unknown context	Complete	Photograph after Coldstream 2010, 17, pl.12
	361	British Museum Collections GR1977,1207.12	Oinochoe	MGII	Probably Athens/ Unknown context	Complete, worn	Photograph after Coldstream 2010, 17, pl.13
	362	British Museum Collections GR1977,1207.13	Oinochoe	LGIIa	Probably Athens/ Unknown context	Complete	Photograph after Coldstream 2010, 17, pl.14, 15
	363	British Museum Collections GR1920,1014.4	Oinochoe	LGIIa	Attica/ Unknown context	Complete	Photograph after Coldstream 2010, 17-18, pl.15
	364	British Museum Collections GR1877,1207.12	Oinochoe	LGIIa	Attica/ Unknown context	Complete	Photograph after Coldstream 2010, 18, pl.16

TREFOIL OINOCHOAI LEKYTHOI
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	365	British Museum Collections GR1868,0110.768	Oinochoe Lekythos	MGI	Attica/ Unknown context	Complete	Photograph after Coldstream 2010, 26, pl.36

GIANT TREFOIL OINOCHOAI
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	366	British Museum Collections GR1977,1207.8	Oinochoe giant	LGIIa	Probably Athens/ Unknown context	Complete, partly restored	Photograph after Coldstream 2010, 18, pl.16, 17
[redacted]	367	British Museum Collections GR1977,1207.9	Oinochoe giant	LGIIa	Probably Athens/ Unknown context	Complete, handle restored	Photograph after Coldstream 2010, 18-19, pl.18

PITCHERS
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	368	British Museum Collections GR1878,0812.8	Pitcher	LGIa	Attica/ Unknown context	Complete	Photograph after Coldstream 2010, 19, pl.19
[redacted]	369	British Museum Collections GR1877,1207.10	Pitcher	LGIb	Possibly Phaleron/ Unknown	Complete	Photograph after Coldstream 2010, 20, pl.20, 21
[redacted]	370	British Museum Collections GR1977,1207.10	Pitcher	LGIb	Probably Athens/ Unknown context	Complete	Photograph after Coldstream 2010, 20, pl.21
[redacted]	371	British Museum Collections GR1977,1211.3	Pitcher	LGIIa	Probably Athens/ Unknown context	Complete	Photograph after Coldstream 2010, 21, pl.24
[redacted]	372	British Museum Collections GR1913,1113.1	Pitcher	LGIIb	Attica/ Unknown context	Complete, mended	Photopraph after Coldstream 2010, 21, pl.24, 2

[redacted]	373	British Museum Collections GR1916,0108.2	Pitcher	LGIIb	Attica/ Unknown context	Complete, mended	Photograph after Coldstream 2010, 22, pl.26, 27
	374	British Museum Collections GR1912,0522.1	Pitcher	LGIIb	Attica/ Unknown context	Complete	Photograph after Coldstream 2010, 22-3, pl.28, 29
	375	British Museum Collections GR1905,1028.1	Pitcher	LGIIb	Attica/ Unknown context	Complete	Photograph after Coldstream 2010, 23, pl.30
	376	British Museum Collections GR1842,0728.826	Pitcher	LGIIb	Attica/ Unknown context	Complete	Photograph after Coldstream 2010, 23, pl.31

PITCHERS WITH SHORT NECKS
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	377	British Museum Collections GR1977,1211.4	Pitcher (with short neck)	LGIb	Probably Athens/ Unknown context	Part of lip missing	Photograph after Coldstream 2010, 20, pl.22
	378	British Museum Collections GR1977,1207.14	Pitcher (with short neck)	LGIb	Probably Athens/ Unknown context	Complete	Photograph after Coldstream 2010, 20-1, pl.22, 23
	379	British Museum Collections GR1912,0718.1	Pitcher (with short neck)	LGIIa	Probably Athens/ Unknown context	Complete	Photograph after Coldstream 2010, 21, pl.23

TYPICAL SHALLOW SKYPHOI
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	380	British Museum Collections GR1977,1207.34	Skyphos	EGII	Probably Athens/ Unknown context	Complete	Photograph after Coldstream 2010, 31, pl.45
	381	British Museum Collections GR1966,0610.1	Skyphos	MGI	Probably Athens/ Unknown context	Complete, worn	Photograph after Coldstream 2010, 32, pl.46

[redacted]	382	British Museum Collections GR1842,0728.83 1	Skyphos	MGII	Athens/ Unknown context	Intact	Photograph after Coldstream 2010, 32, pl.46
[redacted]	383	British Museum Collections GR1977,1207.43	Skyphos	MGII-LGIa	Probably Athens/ Unknown context	Complete, handle missing	Photograph after Coldstream 2010, 32, pl.46
[redacted]	384	British Museum Collections GR1914,0407.1	Skyphos	LGIa	Attica/ Unknown context	Intact	Photograph after Coldstream 2010, 33, pl.47
[redacted]	385	British Museum Collections GR1927,0317.4	Skyphos	LGIa	Attica/ Unknown context	Mended, restored	Photograph after Coldstream 2010, 33, pl.47
[redacted]	386	British Museum Collections GR1977,1207.33	Skyphos	LGIb	Probably Athens/ Unknown context	Complete, mended	Photograph after Coldstream 2010, 33, pl.47
[redacted]	387	British Museum Collections GR1928,1018.1	Skyphos	LGIIa	Athens/ Unknown context	Complete, mended	Photograph after Coldstream 2010, 34, pl.49
[redacted]	388	British Museum Collections GR1977,1207.38	Skyphos	LGIIb	Probably Athens/ Unknown context	Intact	Photograph after Coldstream 2010, 35, pl.50
[redacted]	389	British Museum Collections GR1977,1207.39	Skyphos	LGIIb	Probably Athens/ Unknown context	Intact	Photograph after Coldstream 2010, 35, pl.50

WIDE SHALLOW SKYPHOI
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	390	British Museum Collections GR1977,1207.30	Skyphos wide	LGIa	Probably Athens/ Unknown context	Complete, mended	Photograph after Coldstream 2010, 33, pl.47

GADROONED SHALLOW SKYPHOI
(Vessels with complete profiles):

Photograph	Thesis No.	Inventory No.	Vessel Type	Chronology	Context	Condition	Publications
[redacted]	391	British Museum Collections GR1977,1207.35	Skyphos gadrooned	MGII-LGIa	Probably Athens/ Unknown context	Complete, mended	Photograph after Coldstream 2010, 32, pl.46

APPENDIX 2: TABLES OF OXIDE CONCENTRATIONS AFTER SCANNING ELECTRON MICROSCOPY

TABLES OF OXIDE CONCENTRATIONS FOR SAMPLE PASTES

All results are given in oxide compound (%)

EARLY PROTOATTIC PERIOD

AS 1813 (Amphora)

Spectrum	*Na*	*Mg*	*Al*	*Si*	*K*	*Ca*	*Ti*	*Cr*	*Mn*	*Fe*	*Ni*
Spectrum 1	0.9	4.8	16.1	57.3	3.1	8.7	0.8	0.1	0.1	8.1	0
Spectrum 2	1.3	4.6	16.8	54.6	3.8	9.3	1	0.2	0.1	8.4	0
Spectrum 3	0.8	4.1	13.3	51.3	3	6.5	0.7	0.1	0.2	19.7	0.3
Spectrum 4	0.7	4.8	16.4	56.8	3.4	8.7	0.7	0.1	0.2	8.3	0
Mean	0.9	4.6	15.7	55	3.3	8.3	0.8	0.1	0.2	11.1	0.1
Std. deviation	0.3	0.3	1.6	2.7	0.3	1.2	0.2	0.1	0	5.7	0.2

AS 1821 (krater or dinos)

Spectrum	*Na*	*Mg*	*Al*	*Si*	*K*	*Ca*	*Ti*	*Cr*	*Mn*	*Fe*	*Ni*
Spectrum 1	0.5	5.1	18.1	53.1	3.4	10.0	0.9	0.1	0.1	8.6	0.1
Spectrum 2	0.2	5.5	15.9	55.4	3.0	9.7	0.8	0.3	0.1	9	0.1
Spectrum 3	0.3	5.3	15.7	54.7	2.9	9.7	1.0	0.2	0.5	9.6	0.1
Spectrum 4	0.4	5.5	16.6	52.9	3.1	10.3	1.0	0.1	0.1	9.8	0.1
Mean	0.4	5.3	16.6	54.0	3.1	9.9	0.9	0.2	0.2	9.2	0.1
Std. deviation	0.1	0.2	1.1	1.2	0.2	0.3	0.1	0.1	0.2	0.6	0

AS 1819 (kotyle or skyphos)

Spectrum	*Na*	*Mg*	*Al*	*Si*	*K*	*Ca*	*Ti*	*Cr*	*Mn*	*Fe*	*Ni*
Spectrum 1	0.3	4.8	16.5	58.3	3.7	6.1	0.9	0.2	0.1	8.9	0
Spectrum 2	0.7	6.0	18.6	48.6	3.6	7.7	1.0	0	0.2	13.6	0.2
Spectrum 3	0.2	5.5	16.2	56.0	3.2	8.2	1.3	0.5	0.1	8.9	0
Spectrum 4	0.6	5.9	17.8	50.2	3.5	8.3	1.0	0	0.2	12.6	0
Mean	0.4	5.5	17.3	53.3	3.5	7.6	1.1	0.2	0.2	11	0.1
Std. deviation	0.2	0.5	1.1	4.6	0.2	1	0.1	0.2	0	2.5	0.1

LATE GEOMETRIC PERIOD

AS1814 (Amphora)

Spectrum	*Na*	*Mg*	*Al*	*Si*	*K*	*Ca*	*Ti*	*Cr*	*Mn*	*Fe*	*Ni*
Spectrum 1	0.6	5.5	17.8	53.3	3.3	9.2	0.9	0.2	0.1	8.9	0.1
Spectrum 2	0.7	5.3	17.4	52.8	3.0	10.0	0.8	0.2	0.3	9.3	0.1
Spectrum 3	0.5	5.2	17.5	53.9	3.2	9.7	0.8	0.1	0.1	8.8	0.1
Spectrum 4	0.7	5.0	16.0	58.0	3.1	8.2	0.9	0.1	0.3	7.9	-0.1
Mean	0.6	5.3	17.2	54.5	3.2	9.3	0.9	0.1	0.2	8.7	0
Std. deviation	0.1	0.2	0.8	2.3	0.1	0.8	0.1	0	0.1	0.6	0.1

AS1816 (Early SOS amphora)

Spectrum	*Na*	*Mg*	*Al*	*Si*	*K*	*Ca*	*Ti*	Cr	*Mn*	*Fe*	*Ni*
Spectrum 1	0.2	4.5	16.7	58.8	3.6	6.4	1.0	-0.04	0.23	8.77	-0.16
Spectrum 2	0.5	4.5	17.8	55.8	4.1	6.5	1.4	0.13	0.12	9.01	0.15
Spectrum 3	0.2	4.7	17.4	54.5	3.9	7.4	1.2	0.13	0.09	10.54	0
Spectrum 4	0.7	4.5	16.8	55.6	3.6	7.2	1.2	0.13	0.11	10.25	-0.01
Mean	0.4	4.6	17.2	56.2	3.8	6.9	1.2	0.09	0.14	9.64	-0.01
Std. deviation	0.2	0.1	0.5	1.8	0.3	0.5	0.2	0.1	0.1	0.9	0.1

AS1818 (krater)

Spectrum	*Na*	*Mg*	*Al*	*Si*	*K*	*Ca*	*Ti*	*Cr*	*Mn*	*Fe*	*Ni*
Spectrum 1	0.6	5.4	16.3	53.4	2.9	11.0	1.2	0.1	0	9.2	0
Spectrum 2	0.5	5.6	16.2	54.4	2.4	10.2	1.5	0.1	0	9	0.1
Spectrum 3	0.4	5.4	15.8	54.9	2.7	10.7	1.0	0	0.2	8.9	0.1
Spectrum 4	0.7	5.8	17.8	51.2	3.5	10.5	1.0	0.2	0.1	9.2	0
Mean	0.5	5.5	16.5	53.5	2.9	10.6	1.2	0.1	0.1	9.1	0
Std. deviation	0.1	0.2	0.9	1.6	0.4	0.3	0.2	0.1	0.1	0.1	0.1

AS1817 (oinochoe)

Spectrum	*Na*	*Mg*	*Al*	*Si*	*K*	*Ca*	*Ti*	*Cr*	*Mn*	*Fe*	*Ni*
Spectrum 1	0.3	4.8	17.7	55.2	3.9	5.9	1.2	0	0.1	11	-0.1
Spectrum 3	0.3	4.1	16.2	62.0	3.4	4.8	0.8	-0.1	0.1	8.3	0.1
Spectrum 4	0.3	4.5	16.3	58.4	3.7	5.0	1.3	0.2	0.1	10.2	0.1
Spectrum 5	0.5	4.9	17.3	57.3	3.8	5.4	1.0	0.1	0.1	9.5	0
Mean	0.4	4.6	16.9	58.2	3.7	5.3	1.0	0.1	0.1	9.8	0
Std. deviation	0.1	0.4	0.8	2.8	0.2	0.5	0.2	0.1	0	1.1	0.1

AS1815 (cup)

Spectrum	*Na*	*Mg*	*Al*	*Si*	*K*	*Ca*	*Ti*	*Cr*	Mn	*Fe*	*Ni*
Spectrum 1	0.6	4.6	16.2	50.8	3.3	10.8	1.1	0.1	0.1	12.2	0.2
Spectrum 2	0.3	4.6	15.3	53.7	2.6	10.9	0.8	0.2	0.1	11.5	0.1
Spectrum 3	0.7	4.5	15.7	52.4	3.0	10.0	1.3	0.2	0.2	12.1	0
Spectrum 4	0.6	4.5	15.9	57.0	2.7	8.7	1.2	0.2	0	9.1	0
Mean	0.6	4.6	15.8	53.5	2.9	10.1	1.1	0.2	0.1	11.2	0.1
Std. deviation	0.2	0.1	0.4	2.6	0.3	1	0.2	0	0.1	1.4	0.1

MIDDLE GEOMETRIC PERIOD

AS1825 (amphora)

Spectrum	*Na*	*Mg*	*Al*	*Si*	*K*	*Ca*	*Ti*	*Cr*	*Mn*	*Fe*	*Ni*
Spectrum 1	1.1	5.4	15.6	50.5	2.4	12.4	0.9	0.1	0.2	11.5	0
Spectrum 2	0.7	4.6	14.6	53.1	2.7	12.2	1.2	0.3	0.1	10.6	-0.1
Spectrum 3	1.0	5.7	16.6	46.5	2.1	14.0	1.5	0.1	0.1	12.3	0.1
Spectrum 4	1.2	5.3	15.1	49.4	2.3	14.2	0.7	0.1	0.1	11.5	0.1
Mean	1.0	5.2	15.5	49.9	2.4	13.2	1.1	0.1	0.1	11.5	0
Std. deviation	0.2	0.5	0.8	2.7	0.2	1	0.4	0.1	0	0.7	0.1

AS1823 (krater or Skyphos)

Spectrum	*Na*	*Mg*	*Al*	*Si*	*K*	*Ca*	*Ti*	*Cr*	*Mn*	*Fe*	*Ni*
Spectrum 1	0.3	5.7	18.1	54.7	3.8	5.4	0.8	0.3	0.2	10.5	0.1
Spectrum 2	0.3	5.3	16.8	56.2	3.7	5.7	0.8	-0.1	0.2	10.9	0.1
Spectrum 3	0.2	6.3	18.6	51.9	3.9	6.5	0.9	0.2	0.1	11.3	0.2
Spectrum 4	0.3	6.8	18.5	52.0	3.9	5.5	0.8	0.2	0.1	11.8	0.1
Mean	0.3	6.0	18.0	53.7	3.8	5.8	0.8	0.1	0.2	11.1	0.1
Std. deviation	0.1	0.6	0.8	2.1	0.1	0.5	0.1	0.1	0.1	0.6	0

AS1822 (Oinochoe)

Spectrum	*Na*	*Mg*	*Al*	*Si*	*K*	*Ca*	*Ti*	*Cr*	*Mn*	*Fe*	*Ni*
Spectrum 1	0.6	4.8	16.6	56.5	3.3	8.6	0.7	0.1	0.2	8.6	0.1
Spectrum 2	0.9	4.3	17.0	54.3	4.1	9.0	1.0	0.0	0.2	9.2	0.1
Spectrum 3	0.7	4.6	15.4	59.2	3.2	8.4	0.9	0.1	0.1	7.4	0.1
Spectrum 4	0.7	5.0	17.2	55.4	3.7	8.8	0.8	0.2	0.1	8.2	0.1
Mean	0.7	4.7	16.5	56.4	3.6	8.7	0.9	0.1	0.1	8.4	0.1
Std. deviation	0.1	0.3	0.8	2.1	0.4	0.3	0.1	0.1	0.1	0.8	0.0

AS1824 (cup)

Spectrum	*Na*	*Mg*	*Al*	*Si*	*K*	*Ca*	*Ti*	*Cr*	*Mn*	*Fe*	*Ni*	
Spectrum 1	0.6	4.9	17.1	56.8	3.2	7.4	0.9	0.2	0.1	8.8	0.1	
Spectrum 2	0.4	5.0	16.1	57.7	3.3	7.7	0.9	0	0.1	8.8	0	
Spectrum 3	0.5	4.9	15.9	56.9	3.2	8.0	1.1	0.1	0.2	9.3	0	
Spectrum 4	0.5	5.4	16.7	54.9	3.1	8.2	1.0	0	0.2	9.8	0.1	
Mean	0.5	5.0	16.5	56.6	3.2	7.8	1.0	0.1	0.1	9.1	0.1	
Std. deviation	0.1	0.2	0.6	1.2	0.1	0.4	0.1	0.1	0.1	0.5	0	

EARLY GEOMETRIC PERIOD

AS1828 (cup)

Spectrum	*Na*	*Mg*	*Al*	*Si*	*K*	*Ca*	*Ti*	*Cr*	*Mn*	*Fe*	*Ni*	
Spectrum 1	0.8	4.2	14.5	56.9	3.1	11.5	0.8	0.1	0.2	7.8	0	
Spectrum 2	0.7	4.8	14.9	52.3	3.0	14.5	0.8	0.3	0.1	8.5	0.1	
Spectrum 3	0.7	4.6	14.9	54.9	3.2	11.9	0.8	0.1	0.1	8.6	0.1	
Spectrum 4	1.0	4.2	14.9	56.4	2.8	11.3	1.3	0.1	0.2	7.7	0.1	
Mean	0.8	4.5	14.8	55.1	3.0	12.3	0.9	0.1	0.1	8.2	0.1	
Std. deviation	0.2	0.3	0.2	2.1	0.2	1.5	0.2	0.1	0.1	0.5	0	

AS1829 (Neck-handled amphora)

Spectrum	*Na*	*Mg*	*Al*	*Si*	*K*	*Ca*	*Ti*	*Cr*	*Mn*	*Fe*	*Ni*	
Spectrum 1	0.9	5.3	16.6	54.8	3.4	7.8	1.2	0.1	0.1	9.5	0.1	
Spectrum 2	1.0	5.4	16.6	54.4	3.1	8.4	0.9	0.2	0.1	10	0.1	
Spectrum 3	1.2	5.6	16.9	56.1	3.0	7.2	1.0	0.1	0.2	8.6	0.1	
Spectrum 4	1.1	5.9	16.2	57.1	3.1	7.1	1.1	0.2	0	8.2	0.1	
Mean	1.1	5.6	16.6	55.6	3.2	7.6	1.1	0.1	0.1	9.1	0.1	
Std. deviation	0.1	0.3	0.3	1.2	0.2	0.6	0.1	0.1	0.1	0.9	0	

AS1826 (oinochoe)

Spectrum	*Na*	*Mg*	*Al*	*Si*	*K*	*Ca*	*Ti*	*Cr*	*Mn*	*Fe*	*Ni*
Spectrum 1	0.9	5.1	16.4	56.9	3.4	7.0	1.0	0.2	0.1	8.8	0.2
Spectrum 2	0.9	5.3	17.1	56.1	3.4	7.4	0.8	0.1	0.2	8.5	0.2
Spectrum 3	0.9	5.7	16.4	56.6	3.9	5.8	0.9	0.1	0.1	9.3	0.1
Spectrum 4	1.4	5.2	17.4	55.1	3.3	6.9	0.9	0.1	0.3	9.4	0.1
Mean	1.0	5.3	16.8	56.2	3.5	6.8	0.9	0.2	0.2	9	0.1
Std. deviation	0.2	0.3	0.5	0.8	0.3	0.6	0.1	0.1	0.1	0.4	0

AS1827 (Skyphos?)

Spectrum	*Na*	*Mg*	*Al*	*Si*	*K*	*Ca*	*Ti*	*Cr*	*Mn*	*Fe*	*Ni*
Spectrum 1	0.7	5.5	15.6	53.8	2.9	9.8	1.0	0.2	0.1	10.3	0.1
Spectrum 2	0.7	5.6	15.6	54.5	2.9	9.2	1.0	0.2	0.1	9.9	0.2
Spectrum 3	1.3	6.1	17.2	51.2	3.1	9.2	1.4	0	0.2	10	0.3
Spectrum 4	1.0	6.2	16.9	52.6	2.8	9.5	1.0	0.1	-0.1	9.9	0
Mean	1.0	5.9	16.3	53.0	2.9	9.4	1.1	0.1	0.1	10.1	0.1
Std. deviation	0.3	0.3	0.8	1.4	0.1	0.3	0.2	0.1	0.1	0.2	0.1

TABLES OF OXIDE CONCENTRATIONS FOR SAMPLE SLIPS/COATINGS

All results are given in oxide compound (%)

AS1821 (Protoattic krater or dinos)

Spectrum	*Na*	*Mg*	*Al*	*Si*	*K*	*Ca*	*Ti*	*Cr*	*Mn*	*Fe*	*Ni*
Spectrum 1	0.7	6.3	17.8	52.7	1.1	10.3	0.9	0.1	0.1	10.1	0
Spectrum 2	1.3	6.3	15.6	47.3	1.6	8.1	3.8	0.1	0.2	15.6	0.1
Spectrum 3	0.8	6.8	17.2	50.4	0.9	12.2	0.9	0.2	0.1	10.4	0.1
Spectrum 4	0.4	5.3	10.1	46.3	1.4	4.6	0.9	0.3	0.3	30.3	0.2
Mean	0.8	6.2	15.2	49.2	1.3	8.8	1.6	0.2	0.2	16.6	0.1
Std. deviation	0.4	0.6	3.5	2.9	0.3	3.2	1.4	0.1	0.1	9.5	0.1

AS1818 (Late Geometric krater)

Spectrum	*Na*	*Mg*	*Al*	*Si*	*K*	*Ca*	*Ti*	*Cr*	*Mn*	*Fe*	*Ni*
Spectrum 1	1.1	2.6	26.7	44.5	9.8	1.6	0.8	0.1	0.2	12.9	-0.1
Spectrum 2	1	2.4	27	44.7	9.8	1.4	0.6	0	0.2	12.9	0
Spectrum 3	1.4	2.7	26.2	45	9.4	1.3	0.5	0.2	0.1	13.2	0
Spectrum 4	1	3.4	25.7	44.3	9.3	1.3	0.5	0	0.2	14.3	0.1
Mean	1.1	2.8	26.4	44.6	9.5	1.4	0.6	0.1	0.2	13.3	0
Std. deviation	0.2	0.5	0.6	0.3	0.3	0.1	0.2	0.1	0.1	0.6	0.1

AS1824 (Middle Geometric cup)

Spectrum	*Na*	*Mg*	*Al*	*Si*	*K*	*Ca*	*Ti*	*Cr*	*Mn*	*Fe*	*Ni*
Spectrum 1	0.3	2.1	29.4	46.7	4.7	0.3	0.6	0.1	0.1	15.7	0
Spectrum 2	0.1	2.0	29.9	47.9	4.6	0.4	0.6	0.1	0.1	14.2	0.1
Spectrum 3	0.4	2.1	30.0	46.8	5.2	0.7	0.7	0.2	0	13.9	0
Spectrum 4	0.2	2.2	29.8	47.7	4.7	0.3	0.7	0	0.1	14.3	0
Mean	0.3	2.1	29.8	47.3	4.8	0.4	0.6	0.1	0.1	14.5	0
Std. deviation	0.1	0.1	0.3	0.6	0.3	0.2	0.1	0.1	0	0.8	0.1

AS1828 (Early Geometric cup)

Spectrum	*Na*	*Mg*	*Al*	*Si*	*K*	*Ca*	*Ti*	*Cr*	*Mn*	*Fe*	*Ni*
Spectrum 1	0.9	2.7	26.0	49.8	4.6	3.2	0.5	0.1	0	12.1	0.1
Spectrum 2	0.7	2.3	30.7	45.4	6.2	0.6	0.4	0	0.1	13.5	0.1
Spectrum 3	0.8	2.2	29.2	47.1	6.3	0.5	0.4	0	0.1	13.2	0.2
Spectrum 4	0.8	2.3	28.6	45.9	6.4	0.7	0.5	0	0.2	14.7	0.1
Mean	0.8	2.4	28.7	47.0	5.9	1.3	0.4	0	0.1	13.4	0.1
Std. deviation	0.1	0.2	2	2	0.9	1.3	0	0	0.1	1.1	0.1

AS1829 (Early Geommetric neck-handled amphora)

Spectrum	*Na*	*Mg*	*Al*	*Si*	*K*	*Ca*	*Ti*	*Cr*	*Mn*	*Fe*	*Ni*
Spectrum 1	0.6	1.9	30.3	44.9	7.0	0.3	0.4	0	0.1	14.5	0.1
Spectrum 2	0.6	2.0	30.3	44.5	7.2	0.4	0.4	-0.1	0.2	14.5	0
Spectrum 3	0.6	2.2	29.8	44.6	6.8	0.4	0.3	0.1	0.1	15	0.1
Spectrum 4	0.6	1.9	29.8	44.1	7.7	0.4	0.5	0.1	0.1	14.9	0
Mean	0.6	2.0	30.1	44.5	7.1	0.4	0.4	0	0.1	14.7	0
Std. deviation	0	0.1	0.3	0.3	0.4	0.1	0.1	0.1	0	0.3	0

AS1826 (Early Geometric oinochoe)

Spectrum	*Na*	*Mg*	*Al*	*Si*	*K*	*Ca*	*Ti*	*Cr*	*Mn*	*Fe*	*Ni*
Spectrum 1	2.1	2.1	27.8	43.9	8.2	0.5	0.6	0	0.1	14.7	0
Spectrum 2	2	2.2	28.1	44.1	8.5	0.5	0.6	0.1	0.1	13.9	0
Spectrum 3	1.9	1.8	27.9	44.8	8.9	0.6	0.5	0	0.2	13.5	0
Spectrum 4	2.2	2	27.7	43.7	8.6	0.5	0.4	0	0.2	14.4	0.2
Mean	2	2	27.9	44.1	8.5	0.5	0.5	0	0.2	14.1	0.1
Std. deviation	0.1	0.1	0.2	0.5	0.3	0	0.1	0	0.1	0.5	0.1