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Ceramics, Clays, and the Technological Landscape of Urban Sikyon:

(2nd century BC - 7th century AD)

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This thesis is submitted in fulfilment of the requirements for the degree of Doctor of Philosophy.

Trinity College Dublin

2013

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FOR MY PARENTS

Laurence and Christine Trainor

Without the freedom, opportunity, support and encouragement you provided, this work would not have been possible.

“We throw clay to shape a pot,
But the utility of the clay pot is a function
…of the nothingness inside it.”

- Tao Te Ching: Chapter 11
trans. R. Ames & D. Hall (2003)

Summary

This thesis presents the results of the author's study of the ceramic fabrics of Hellenistic, Roman and Early Byzantine Sikyon. The overarching aim of this work is to explore some of the issues that a combined programme of ceramic fabric and typological analyses can tackle on an urban archaeological survey.

This thesis begins by explaining what we know with certainty, that the presence of kiln-wasters indicates that a local ceramics industry once existed on the plateau of Sikyon, and forms an interpretative matrix outward from that point. The reason for such a format is rooted in simple necessity; The Sikyon Survey Project was a single site survey and therefore a standard listing of sites simply does not apply. The vast majority of pottery found at Sikyon appears in a single fabric family which means that a detailed listing and breakdown of fabric families and wares would be completely impractical. Finally a detailed typological catalogue of the ceramics recovered during the survey would be enormous and outside the scope of the present investigation, which aims to present a general picture of an industry through the interpretation of surface ceramics.

The Introduction places Sikyon within its geographical, geological, and historical context. Chapters 1 and 2 introduce the aims and the main questions addressed in this thesis. They also place the research questions within their broader intellectual context. Chapter 1 discusses the development of modern survey in the Aegean area and highlights some geographically and methodologically similar surveys. The main aims and methodology of the Sikyon Survey Project are then discussed. Chapter 2 outlines the techniques, development and incorporation of ceramic fabric analysis into the archaeology of the Aegean area and then outlines how it was utilized on the Sikyon Survey Project. The chapter ends with an overview of key ceramic publications essential for building our interpretative framework.

With the scholarly, historical and geological context for the investigation established, Chapter 3 marks the beginning of the material discussion, and focuses on ceramic production, addressing how it was established that Sikyon was home to an ancient ceramics industry. This chapter outlines the production process of ceramics, with emphasis on clay sourcing and processing, and the formation and firing of ceramics. While the discussion focuses on the production of ceramics in general, it also incorporates some modern ethnographic examples based on the author's discussions with a potter on the island of Aegina who still employs traditional sourcing and construction techniques in the production of his ceramic wares. A section on firing errors introduces the material collected from Sikyon, as the first certain evidence of a ceramics industry at the site came from the discovery of several concentrations of a class of heat-damaged ceramics known as kiln-wasters. These concentrations are mapped and the finds from all the squares which yielded evidence of possible production are discussed in order to attempt to differentiate kiln-wasters from vessels with use-related heat damage. The rest of the chapter examines the types, dates and functions of vessel shapes known from the kiln-wasters. All of these shapes appear in the same fabric family, which is then characterized. The fabric of the kiln-wasters and non-kiln wasters is then compared with a series of sampled and fired clays from around the plateau.

Chapter 4 builds upon the patterns established in the previous chapter and assesses the extent, character and chronological range of the Sikyonian ceramics industry. After this, the other categories of fabrics recorded on the survey are discussed, with an eye to exploring what appears to be an important gap in Sikyonian ceramic production, namely Late Roman production. A discussion of Late Roman ceramic types follows, which ends with an examination of the fabric of these vessels. After this, two other areas in which ceramic fabric analysis proved to be a useful tool are outlined: architectural fabrics and imported amphoras.

Chapter 5 is a synthesis chapter which ties together many of the observations and statistics discussed in the previous chapters. Initially, the character and scope of the industry are addressed. A discussion of the variations in the local Sikyonian fabric family follows, and production-related issues such as firing differentials across vessel categories and over time are charted. A comparison of Sikyonian and Corinthian ceramic fabrics follows, which highlights some of the differences in these closely-related ceramic fabrics. At this stage two unexpected patterns in the Sikyonian ceramic assemblage are addressed: the scarcity of drinking vessels, and the apparent lack of Late Roman era ceramic production. Chapter 5 ends with a discussion of consumption patterns on the plateau for ceramics over time, which explores spatial delineation within the city, the location of possible kilns on the Southern Plateau, and the nature of commerce at Sikyon which may have driven the ceramics industry.

The concluding section of this thesis draws together all the issues addressed in the previous chapters and presents an interpretation of the industrial and technological landscape of the Sikyon Plateau during Hellenistic, Roman and Early Byzantine times. The issues of differentiation from Corinthian pottery, possible trade patterns, and the potential of ceramic fabric analysis (CFA hereafter) as a tool for chronological distinction are discussed. Each methodology employed is assessed and the role of CFA on the Sikyon Survey Project is discussed in detail. The final section of this thesis discusses the potential impact of this study, both as a methodological guideline for approaching ceramics on urban survey and as a reference work for scholars studying ceramics in the broader region.

Acknowledgements

There are many people without whom this thesis would not have been completed and I wish to offer my sincere thanks to them all.

Dr. Christine Morris, my supervisor, whose advice, patience and support were absolutely vital throughout this long, and occasionally winding, road.

I am extremely grateful to my examiners, Professor Catherine Morgan and Professor Brian McGing, for their valuable advice, suggestions and guidance.

My family, Laurence and Christine, Cormac, Heather, Nuala, Dearbhla, Ross and Gavin.

Jo Day, you have lived with this thesis for over a year now, you have been an endless source of warmth, encouragement, and curiosity! Without your constructive criticism, proofreading, patience and understanding this thesis would certainly be a shadow of what it now this. Thank you.

To my dear friends in Greece (mostly!) who made my time living there such a pleasure, and opened my mind in many new directions:

Caoimhín Ó Coigligh, Myrto Georgakapoulou, Heinrich Hall, Matthew Haysom, Michael Iliakis, Amanda Kelly, Thomas Loughlin, Maria Mili, Myrto Mitsopoulou, Joanne Murphy, Denitsa Nenova, Robert Pitt, Hüseyin Öztürk, Roula Sarri, Yannis and Pantelis Tzavellas, and Chavdar Tzochev.

Nigel and Geraldine Rees, Rosemary and Penny Day, William and Rebecca Megarry, Mê-Linh Le, John Dillon, Fran O'Rourke, Barbara O'Connell-Zotou, Hazel Dodge, Jon Coulson, Georg Ladstätter, John Hayes, Dimitris Grigoropoulos, Bernie Kavanagh, Anne Foley and Richard Hope Simpson. The Irish Institute of Hellenic Studies at Athens. The Trinity College Department of Classics, and especially Winifred Ryan and Vivienne O' Rafferty. The British School at Athens. Amalia Kakissis, Penny Wilson Zarganis, Sandra Pepelasis and Philippa Currie. Areti Pentedeka and Zoe Zgouleta. Ben Gourley and Susan-Marie Cronkite-Price for introducing me to field archaeology and complementing this with many discussions over the last 12 years. A special thanks goes to Daniel Stewart for patient discussion and very helpful advice during a crucial time in this research. The former Ambassador of Ireland to Greece, His Excellency Antóin Mac Unfraidh, and the current Ambassador His Excellency Charles Sheehan.

The Hellenic Ministry of Culture, especially Konstantinos Kissas and the 37th Ephorate of Prehistoric and Classical Antiquities, Dimitris Athanasoulis and the 25th Ephorate of Byzantine Antiquities. Dina Myttaki and Christos Damatopoulos, for their support, kindness, professionalism and their unwavering dedication to the site of Sikyon. The Demos of Kiato. Ruth Sidall, Paul Reynolds, Gerald Finkielsztejn, the Israeli Antiquities Authority, Walter Gauss, Chris Hayward, Mark Lawall and Nektarios Garis. Kathleen Slane, Heather Graybehl, Mark Hammond, Guy Sanders and Iulia Herbst-Tzonou from the ASCCA excavations at Corinth for discussion and advice on the Sikyon ceramics. Leticia Rodriguez and Joey Lilywhite for assistance with sorting the ceramic fabrics from Sikyon.

A 'thank you' to Jennifer Moody and to Evangelia Kiriatzi is simply insufficient to cover their roles in this research. Jennifer's advice, critical eye, and encouragement during my fieldwork at Sikyon and again when I decided to develop this topic was beyond generous and was absolutely crucial. Evangelia introduced me to and taught me about microscopic analysis of ceramic fabrics, to clay sampling, test firing, sampling strategies, to Nektarios Garis, and many other aspects at the heart of this investigation. Evangelia was there from the fieldwork component of this thesis (before it became a thesis) to the final writing phase. Without either of you I would certainly not presently be typing the acknowledgements of my thesis.

Financial aid for this project was gratefully received from a number of sources: The Centre for Mediterranean and Near Eastern Studies, Trinity College Dublin, The Irish Institute of Hellenic Studies at Athens, Dolores McCall, The British School at Athens Fitch Laboratory Bursary Committee, and from Yannis Lolos on behalf of the Sikyon Survey Project.

I am extremely grateful to Jo Day, Elli Tzavella, Heather Graybehl and Evangelia Kiriatzi for proofreading parts of this thesis and for providing constructive criticism and specialized advice. Any remaining mistakes are surely my own.

Lastly to my friends, my teachers and my colleagues at Sikyon- it is certain that none of this would have been possible without your advice, lessons, encouragement and many, many discussions: Yannis Lolos, Peter Stone, Matthew Maher, and finally Elli Tzavella.

Chronology

The historical periods outlined in this thesis are:

Hellenistic Period - Late 4th century BC- mid 1st century BC

Early Hellenistic - Late 4th century-3rd century BC

Middle Hellenistic - 1st half of the 2nd century BC

Late Hellenistic - 2nd half of the 2nd century BC- mid 1st century BC[1]

Roman period -1st century BC – 5th century AD

Early Roman- 1st century BC-2nd century AD

Middle Roman - 2nd century AD-4th century AD

Late Roman - 4th century AD -5th century AD

Early Byzantine period- 6th century AD 7th century AD

[1] Late Hellenistic and Early Roman refer to historical periods. These historical periods are simply used for convenience and to align with convention and do not necessarily reflect in the ceramic record for reasons discussed throughout this thesis.

Glossary

Many of the forms discussed in this thesis span several historical periods and the names of these forms often vary names according to period, and even according to where the relevant material is published. As this thesis spans the Hellenistic, Roman and Early Byzantine periods it is necessary to present some standardized nomenclature as relates to vessel forms in order to maintain consistency across probable functional categories.

Stew Pot – Deep cooking pot. Includes the Hellenistic *chytra*.

Casserole- Shallower cooking pot. Includes the Hellenistic *lopas*.

Jug- Pouring vessel for water, wine or other liquids. Includes the Hellenistic *pitcher*.

Krater- Large deep coarseware vessel for mixing and other utilitarian functions. Within the scope of the present investigation kraters might best thought of as coarse deep bowl-like vessels, as opposed to, say, a Classical Attic krater used for wine-mixing.

Basin- Large wide coarseware bowl or ceramic tub. Includes the Hellenistic *lekane*.

Amphoras- The amphora in this thesis are all of the transport variety of amphora unless otherwise specified.

Kiln-Waster- Ceramics (generally malformed) which have been damaged during the firing process.

Marl Clay- Yellow/White calcareous clay which is extremely common along the north coast of the Peloponnese.

Terra Rossa Type Clay – Red to brown iron-rich clay which appears in layers close to the surface on and around the Sikyon plateau.

List of Tables

List of Figures

Intro

Chapter 1

Chapter 3

Chapter 4

Chapter 5

Table of Contents

Introduction:

The Ceramics Industry of Ancient Sikyon

Chapter 2:

Setting the Stage: Ceramic Fabrics and Shapes

Chapter 3:

Establishing 'Local':

Heat-Damaged Ceramics, Vessel Types and Sikyonian Clays

Chapter 4: Exploring The Sikyonian Ceramics Industry

Conclusions

Bibliography

Tables

Figures

Introduction:

Agrum nobilissimae fertilitatis
(*Livy* 27.31.1)

Introduction

I.1 – Aim

During the surface survey of the ancient city of Sikyon, large concentrations of ceramic kiln-wasters were recovered. These wasters, the by-products of ceramic production, presented solid evidence for the presence of an ancient ceramics industry at the site. This thesis takes a unique interdisciplinary approach, involving archaeology, ancient history, and ceramic fabric analysis to explore the ceramics industry at Sikyon and place it within wider historical interpretations.

I.2 – A Problem Related to Archaeological Survey

In the most general terms, archaeological survey refers to the location and exploration of material culture on the ground surface. This type of investigation is most often conducted by systematically walking in a defined area and recording archaeological remains within it. If we think of an archaeological excavation as a microscope, a tool designed to examine a small amount of space in enormous detail, perhaps archaeological survey might be thought of more like a telescope, a tool by which we might view a subject within its broader context. Bearing this in mind we can understand that excavation and survey, while often complementary, are fundamentally equipped to tackle rather different sets of questions. The most interesting survey results are those which present a picture of an entire landscape of interconnected systems, so by design, therefore, most modern surveys tend to be diachronic in scope and multi-disciplinary in approach. The Sikyon Survey Project was no exception.

As on archaeological excavations, the major chronological benchmark for surveys in the Mediterranean region is ceramic material, specifically pottery. The most accurately datable class of ceramic types are finewares, for example, Archaic and Classical Attic

Black or Red figure vessels, Hellenistic mould-made bowls, Roman era Italian sigillata vessels, or glazed Byzantine plates. These represent luxury items that were created with a particular aesthetic in mind, were been widely distributed, and their decorative schema would have changed frequently, making them quite indicative of a specific period. Even to a non-specialist, fineware such as a sherd of Attic Black Figure pottery, a fragment of an African Red Slip plate, or a green-glazed bowl fragment can be easily identified and would provide at least some sort of chronological connection to the later Archaic, Late Roman or Late Byzantine-Ottoman periods respectively. A problem emerges, however, when we consider that 70-90% of ceramic material recovered during archaeological surveys in Greece is coarseware pottery such as cooking pots, basins, and storage or transport jars, and not fineware (Riley 1984: 59). The reason for this imbalance is likely rooted in how we identify ceramics; finewares are often interpreted through their surface decoration, which often does not survive the processes of post-depositional movements which push sherds to the surface, or of surface erosion. A piece of fine ceramic without paint, slip or glaze on its surface could be extremely difficult to identify. Coarsewares, on the other hand, are usually undecorated, and although as a result they provide less nuanced chronological information, they tend to be more identifiable on surface surveys. At any rate, basing the chronology or an interpretation of a site or an area on 10-30% of the material runs a very real risk of presenting a seriously skewed interpretation. For an example of this type of bias we might imagine surveying a modern house and trying to understand it through the fine china and crystal contained inside, all the while ignoring the work-a-day mugs, bowls, plates, bottles, glasses, buckets, even the oven and the fridge. The methodological pitfalls associated with constructing an interpretation from such a small fraction of a ceramic assemblage are apparent.

The risk of producing such an interpretive skew can be quite easily off-set when studying pottery from archaeological excavations through referencing comparative stratigraphic contexts. For example, if a particular type of coarse pottery occurs frequently in the same strata with articulated kantharos feet then the excavator might reasonably associate that type of coarse pottery with a later Classical or earlier Hellenistic date as would be consistent with such a form of kantharos (Edwards 1975:

83-4). On archaeological survey, however, as the material comes from the surface which obviously has no stratigraphic context, it is all too tempting to fall back on the small scraps of finewares as reasonably safe chronological and functional indicators in a survey area. Understanding a survey area in this way, however, can only ever provide a general glimpse of what may have been happening at a site or within an area at a given time. It does not allow for a nuanced interpretation of a site or surface assemblage and had, until comparatively recently, led to survey being viewed as a type of archaeological foreplay, useful simply for helping delineate an area for excavation.

I.3- A Known Solution

Ceramic Fabric Analysis (CFA herein), refers to the study of the composition of the clay mix used in pottery. While CFA is an umbrella term for a range of techniques, the most useful for archaeological survey has proven to be a combined approach which incorporates the systematic macroscopic analysis of ceramics and thin section petrography. Such an approach has proven to be fast, cost effective, and most importantly, a very accurate method of sorting and analysing a ceramic assemblage.

Incorporating a programme of CFA into a survey methodology enhances the potential of a ceramic dataset immensely, as fineware, as well as coarseware, and even non-shape diagnostic pottery can all yield some information. As well as this, it also allows archaeologists to tackle the statistical imbalance of only examining fineware pottery, ca.10-30% of their data. Through the systematic analysis of the composition of generally small ceramic fragments collected during a survey which might likely be otherwise overlooked, CFA can also enable scholars to study aspects of pottery production, clay sourcing and even international trade patterns.

I.4 -Material

As noted above, this thesis presents the results of the study and interpretation of the ceramic fabrics at Sikyon. Sikyon was a relatively large polis located in the northeast Peloponnese. In 303 BC the city was moved by Demetrios Poliorketes from a coastal location to a 250 ha. plateau 4km southwest of the modern town of Kiato, on the south shore of the Corinthian Gulf (Diod. Sic. 20.102.2-4; Paus. 2.7.1; Plut. *Demetr*. 25.2; Strabo 8.383). Sikyon appears to have remained on this plateau until Late Roman/Early Byzantine times (ca. 4^{th}-6^{th} century AD), when some disruption in the settlement appears to have occurred.

The Sikyon plateau was the subject of one of the largest intensive urban surveys in the Mediterranean region, The Sikyon Survey Project (2004-2008).[1] In excess of 739,313 sherds were collected and it is unsurprising that ceramics represent by far the vast majority of artefacts studied during the course of the survey. Over 90,000 of these sherds have been separated according to their fabric, counted, weighed and their distributions mapped. Approximately 2,000 other sherds were examined using a hyper-intensive macroscopic methodology and a representative sample of major fabric types was examined using thin-section petrography. This material was drawn from Total Collection Squares, indexed shape diagnostic sherds, non-diagnostic amphora fragments, and finally some randomly sampled material from the plateau. As a result, it is possible to present a reasonably clear and statistically accurate picture of the long-term production and importation of ceramic types, as well as their distributions, on the Sikyon plateau.

I.5- Introduction to Sikyon

While the present thesis is a ceramics-based investigation, it is necessary to begin by introducing some background context. As the chief data-source for this thesis is the Sikyon Survey Project it is imperative that the survey, its methodology, and aims be discussed. Geography, topography, geology and the relevant history of Sikyon must also be mentioned at this stage as each of these factors played a role in shaping the questions that the Sikyon survey, and indeed the present thesis, address. The most immediate ramifications of this study will be for future archaeological investigations at Sikyon and in the northeast Peloponnese, and it is vital that some of the major relevant historical issues in the area are highlighted prior to introducing the ceramic material.

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[1]For the official website of the Sikyon Survey Project see: http://extras.ha.uth.gr/sikyon/

Sikyon was a wealthy city located on the Corinthian Gulf, with a long and distinguished artistic tradition in the areas of sculpture, painting and metalworking. The polis is perhaps best-known with reference to the Orthagorid dynasty of tyrants, who ruled it from approximately 650 BC until approximately 550 BC (Griffin 1982: 43-7). Of these, Kleisthenes is the most well-known, largely due to his leading role in the First Sacred War, the story of the courtship of his daughter, Agariste, and finally as the grandfather of his namesake the Athenian democratic reformer (Herod. 6.126-30). It was under Orthagorid rule that the original Sikyonian treasuries at Delphi and Olympia were built. Sikyon is the only polis to have treasuries at both sanctuaries, which may attest to its eminent status throughout Southern Greece during the Archaic period.

Internally, perhaps the most significant event to impact on the city, as regards the current study, occurred in the Early Hellenistic period. In 303 BC, under the command of the Macedonian general Demetrius Poliorketes, the city of Sikyon was sacked and then moved from a coastal location on the Corinthian Gulf to a fortified plateau 4km southwest of the modern coastline. This move was apparently made in the interest of creating a more defensible settlement (Diod. Sic. 20.102.2-4; Paus. 2.7.1; Plut. *Demetr.* 25.2; Strabo 8.383). It is, however, also worth bearing in mind that a series of earthquakes in the region are dated to around 303 BC and the movement of the city may have had something to do with repercussions from these (Lolos 2011: 30; Papaphotiou 2002:181-2, 196-7).

Sikyon once again made historical headlines during the Hellenistic period under the leadership of the Sikyonian statesman/general Aratos. He was the main leader of the Achaian League during its most successful period, when it led a series of campaigns against both Macedonian incursions and tyrannical rule in the Peloponnese ca. 245-222 BC (Griffin 1982: 80-6; Skalet 1928: 83-9). While initially successful, however, these campaigns ultimately resulted in Sikyon, and the rest of the Achaian League, submitting to Macedonian rule. Finally, Sikyon is known for its role as a regional centre after the Roman destruction of Corinth in 146 BC, when the city was granted control of the Pan-Hellenic games at Isthmia.

I.6- Geography and Territory of Sikyon and the Sikyonia (Fig I.1; I.2)

The term *Sikyon* could refer to several things: the urban centre of Sikyon, the plateau (*ἄστυ*); the surrounding territory of Sikyonia (*χώρα*); both the urban centre *and* its hinterland (*πόλις*). As regards the current investigation, the term Sikyon, unless otherwise specified refers to the urban centre, or the plateau.

The Sikyonian plateau is located in the northeast Peloponnese, approximately 17km northwest of Ancient Corinth and 4km southwest of the modern coastal town of Kiato. The plateau, which served as the urban centre of ancient Sikyon during the Hellenistic and Roman periods, is a roughly triangular, limestone feature with more-or-less sheer sides and an area of ca.250ha. It is bordered by the Helisson River to the north and the Asopos River to the south. Situated on a roughly northeast/southwest axis, the plateau is a well-watered, fertile agricultural zone, and would have been naturally highly defensible and thus an attractive candidate for settlement (Winter 1971:3-47).

In ancient times, Sikyon appears to have occupied a position of reasonable geopolitical importance. It had a harbour which was at times of significant strategic importance, especially during the Sikyonian-Spartan alliance (Griffin 1982: 59-69). The Sikyonia was also located at the junction of two important land routes: The first and more obvious of these was the road which ran across the north coast of the Peloponnese, from Corinth to Patras. The second route was certainly more significant in shaping the history of Sikyon: this was the main road which connected the coast of the Corinthian Gulf south to Arcadia, and ultimately to Lakonia.

Sikyonian territory was naturally bounded on the north by the Gulf of Corinth; on the east by the Nemea River (Livy 33.15; Strabo 8.382); on the west by the Sythas River (Paus. 2.12.2; 7.27.12); and finally, on the south by the territories of Phlius and Stymphalos.[2] While the exact location of the Sythas River is not certainly known, it is

[2]An interesting side note to this issue relates to the Pitsas cult cave (famous as the find spot of the Pitsas Panels, the only known remaining examples of Archaic panel painting). In the displays exhibiting finds

most likely the river which flows through modern Xylokastro (Lolling 1888:162; Lolos 2011: 14-5; Skallet 1928: 26-7). The total area of the Sikyonia has most recently, and convincingly, been estimated at 372 km^2 (Lolos 2011:27-8) (**Fig 1.3**).

Besides the main urban centre of Sikyon, the polis had several smaller demes and outlying settlements, including: Titane; Ephyra; Salleis; Plataea; and at one stage also, Donussa, a town to the west between Aegira and Pellene. The most significant of these was Titane, the location of a significant cult of Asklepios (Paus. 2.11.3,6; 2.27.1; 7.23.8). In addition to this, the site was also heavily fortified and occupied a hilltop position approximately 11 km south (as-the-crow-flies) from the Sikyonian plateau, and appears to represent a southern border between Sikyonia and Phliasia (Skalet 1928: 27; Lolos 2011: 23-4).

I.7- Topography and Geomorphology of the Sikyonia (Fig I.4)

The northeast coast of the Peloponnese, including the territory of Sikyon, can most easily be understood as a series of step-formations as it ascends southward from the Gulf of Corinth in a series of natural headers and risers culminating in the northern Arcadian and Achaian mountain ranges. This whole system is a result of tectonic activity beneath the Gulf of Corinth. The gulf itself is a graben which has developed over the last 5-10 million years (Doutsos and Piper 1990; Higgins and Higgins 1996: 42; Jackson et al. 1981: 377-97; Vita-Finzi and King 1985: 379-407). The settling of this graben has been uneven and much more subsidence has occurred on the south shore than on the north (Higgs 1988:155-65). A series of parallel fault lines along the southern shore, changes in sea level, and late Pleistocene and Holocene glacial cycles have created a series of large marine terraces along the northern coast of the Peloponnese (Hayward 2003; Higgins and Higgins 1996: 42; Keraudren and Sorel 1987; von Freyberg 1973). Within each terrace, there exist smaller faults, roughly perpendicular to the shoreline,

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from the cave and the National Archaeological Museum in Athens and at the Archaeological Museum of Sikyon the cave is referred to as being *Sikyonian*, however, it lies 43 km to the west of the Sikyon plateau, and 10.3 km past the generally-accepted location of the end of Sikyonian territory, the Sythas River. It is possible that the sanctuary was either Aigeirettan, or Pellinian, or possibly Sikyonian for only a brief time during the Archaic period, possibly in the reign of Kleisthenes after his destruction of Pellini.

along which erosion has occurred and has caused the creation of a series of island-like plateaux along the south shore of the gulf (Lolos et al. Forthcoming). The Sikyon plateau is one such feature.

Related to the evolution of the gulf graben is an uneven uplift of the northern half of the Peloponnese since antiquity (Lolos 2011: 29; Mariolakos and Stiros 1987: 225-8; Pritchet 1965: 12-3; Stiros 1988: 199-213; Vita-Finzi 1978: 55). This process has occurred through a series of violent earthquakes and has led to the north coast of the Peloponnese rising, especially at the middle, while the south coast of Phokis and Boeotia is pushed down as a result. The central part of the north Peloponnesian coast area near the site of Aigeira (west of Sikyon) appears to have experienced the greatest effects of this process and marine Pleistocene strata can be found at 1800 masl in this locality (Lolos 2011: 29-30; Mariolakos and Stiros 1987: 227; Papageorgiou et al. 1993: 279). Indeed, at the harbour of Aigeira (Mavra Litharia), marine conglomerates which contain sherds of ancient pottery have been found 2m above the water (Lolos 2011: 29-30; Mariolakos and Stiros 1987: 227; Stiros et al. 1996: 256). The *terminus post quem* for the formation of these conglomerates was therefore the use-period of the harbour, or perhaps slightly later, meaning that within the last two to three thousand years the coastline here has risen 2m. By contrast, the uplift at the Corinthian harbour of Lechaion (east of Sikyon) appears to be significantly less, at 1m (Papageorgiou et al. 1993: 275-81; Papageorgiou and Stiros 1996: 211-4; Papaphotiou 2002: 280-304; Stiros et al. 1996: 251-63). Based on these different levels of uplift, Lolos puts the effects on Sikyon at ca.1.50m in the past ca. 2,000 years. A water level which was 1.50m higher than it is today would have had significant shrinking effect on the Sikyonian plain. Lolos discusses what appears to be the northeast section of the breakwater of the ancient Sikyonian harbour in Kiato, which suggests that the ancient coastline of Sikyon would have been 150m inland from the present coastline (Lolos 2011: 31, 284-6).

I.8- Geology of the Sikyonia

The lowest geology beneath Sikyonia, as with most of the modern *nomos* of Corinthia and the eastern Argolid, consists of rocks of the Sub-Pelagonian zone, a band that was once part of an old continental margin (Higgins and Higgins 1996: 40).[3] The main units represented in the coastal region are thick, pale/white Pliocene marls which are overlain by thin Pleistocene transgressive clastic and carbonate units. Further from the coast the higher ground is composed of lower to middle Mesozoic crystalline limestones, and shales. The combination of regional uplift of the northern Peloponnese and glacially-related sea level changes during the last 500 ka has produced a series of marine terraces (Keraudren and Sorel 1987).

A walk or a drive around the base of the plateau will reveal much of its geology, which is very similar, if not identical to the rest of the northeast coast of the Peloponnese. It is surrounded by enormous white cliffs which have been formed mostly from the Pliocene marls. The Pleistocene sequences on each of the marine terraces uncomfortably overly the marls. These sediments are composed in general of basal conglomerates and coarse sands, with grain size becoming finer upwards in the succession and the amount of carbonate increasing such that the upper Pleistocene units tend to be clastic-rich calcarenites and finally relatively pure calcarenites, the latter of more restricted occurrence (Hayward 2003; Lolos et al. forthcoming; Keraudren and Sorell 1987; von Freyberg 1973).

The Sikyon plateau consists of two geologically separate levels. The small, roughly triangular Upper Plateau (UP herein) represents a portion of the 238ka marine terrace (Keraudren and Sorell 1987) and stands at 210-270masl (Lolos et al. forthcoming). The UP is located at the west end of the Sikyon plateau, and can be delineated from the lower parts most easily by tracing the rise in terrain from the ancient theatre and above the gymnasium. The flatter, very roughly rectangular Lower Plateau (LP herein) accounts for the majority of the surface area of the Sikyon plateau. LP represents a length of the 216ka marine terrace, and stands at 160-170masl (Fig I.5) (Lolos et al. forthcoming).

[3] The geological and geomorphological survey and analysis for the Sikyon Survey Project were conducted by Dr. C. Hayward and it is from the preliminary results of his research that the following data originate. I am most grateful to Hayward for advising and generously sharing his notes for the current section.

A large scarp to the east of the plateau separates the LP from the 120ka marine terrace which represents the ground level below the plateau. This east side is the least sheer of all the sides of the plateau and is where the main ancient access roads are located. The whole formation tends to rise to the west with the western parts of Upper Plateau and Lower Plateau representing the highest points of each formation. Beginning at its western edge and moving toward the northeast, the Helisson River forms one edge of the plateau, while the Asopos River forms the southwest-southeast edge (Lolos et al. forthcoming).

Marls are thickest on the north side of the plateau. While the majority of clay beds on and around the plateau investigated by the author are whitish marl, the range in colours of pottery produced at Sikyon suggests that red *terra rossa* type clays may have been added to the potting clay mix. The latter tend to exist in deposits close to the surface, and may leach into the marls slightly. Such deposits are visible in places on the plateau, but hardly in amounts suitable for large-scale pottery production. Within the greater territory of the Sikyonia large terra rossa clay deposits do exist and are visible all along the road above the village of Souli, and around the northwest face of Mt. Vesiza to the south of the city.

I.9- Crops

The quote from Livy which opens this chapter refers to the coastal plain shared by Corinth and Sikyon which was ravaged by P. Sulpicius during his campaigns against the Macedonians during the First Macedonian War (Livy 27.31.1-4; 27.33.3). As today, the plain was heavily farmed in antiquity, with vines and olives being major crops, while today the main crops are vines, apricots and olives.[4] Both upland Sikyonia and the plain had good access to water due to the frequent presence of perennial springs and a series of torrential rivers which descend from the mountains to the south. The plateau itself is

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[4] The Sikyon-Corinth plain is so heavily farmed that residents in many of the villages, including Ancient Sikyonand Ancient Corinth are unable to consume the local water due to pesticide contamination in the water table.

extremely well irrigated both by ground water and by a system of ancient cisterns and drains (as observed during the Sikyon Survey Project). The LP is extremely fertile and has extensive vine and apricot cultivation. The UP is not as heavily farmed but nonetheless also has some vines and olive cultivation on it.

I.10- Historical Context of Sikyon

*"τὴν δὲ τοῦ Αἰγιαλέως ἐν τῷ πεδίῳ πόλιν Δημήτριος καθελὼν ὁ Ἀντιγόνου τῇ πάλαι ποτὲ ἀκροπόλει προσῴκισε τὴν νῦν πόλιν." (*Paus. *2.7.1)*

Built by Aegialeus on the plain the city was destroyed by Demetrius son of Antigonous, who built the new city close to the old akropolis.

The earliest certain signs of human activity on the Sikyon plateau are represented in the form of several sherds of Neolithic Urfirnis pottery of Middle Neolithic period date, ca. 5750-5250 BC (Lavezzi 2003: 66).[5] These came from the same area, a flat-topped knoll which juts out to the south-southeast of the plateau, as all the rest of the prehistoric pottery recovered during the survey, as well as most of the late-post Medieval finewares, which appear to be connected to a medieval fortress a Sikyon, then known as *Basilicata* (Hazard 1975: 257). Phelps suggests that the northeast Peloponnese as an area of significant Early Neolithic activity, including ceramic finds at Phlius and Tarsina (which are both part of the same Asopos system as Sikyon, and both have very similar settlement conditions) and also at Akrata and Corinth (Phelps 2004:30). Periods for which little or no certain archaeological evidence has been identified at Sikyon include: The Early Iron Age; Archaic Period; Early and most of the Classical Period and Middle Byzantine. One of the most surprising results from the Sikyon survey was the near total lack of identifiable material from the Archaic period, the time for which Sikyon is undoubtedly best known.

[5] I specify 'Neolithic Urfirnis' so as to avoid any confusion with the EH II finewares discovered by Blegen at Korakou and also at Eutresis, which he also dubbed *urfirnis* (from the German meaning 'First Varnish' here taken to mean 'First Glaze')

The majority of the archaeological evidence from the survey, from previous excavations, and from visible surface remains at Sikyon belongs to the Hellenistic and Roman periods. While the Sikyon Survey Project was diachronic by design, the nature of the evidence dictated that the main focus was going to be centred on these two periods. Furthermore, the plateau had already been partially examined as part of a regional extensive survey by Lolos which had allowed the Sikyon Survey Project to begin with a focused set of questions. Prior to discussing the survey, its aims and methodologies, it is important to provide a very general historical overview of Sikyon and to frame some of the main historical questions the survey sought to address.

The first certain reference to Sikyon occurs in the *Iliad*, where it is mentioned in the Catalogue of Ships as being under the command of Agamemnon along with several other northeastern Peloponnesian towns (*Iliad*: 2.572).[6] We know very little else, however, about pre- and proto-historic Sikyon.

Undoubtedly Sikyon is best known for Orthagorid tyranny in the Archaic period.[7] The Orthagorid family ruled the city for a century, and under Kleisthenes the city became one of the most powerful in the Greek world.[8] As nothing relating to Archaic Sikyon

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[6] Pausanias and Strabo both note that *Aigialeis* was the original name for Sikyon (Paus. 2.5.6; 2.6.5; Strabo 8.382). With this in mind, the earliest possible mentions of the state of Sikyon may appear in Linear B tablets from Thebes (Th Of 25; Th Of 35) and Pylos (Py 91- Fn. 50.4; Fn. 79.15) as a-ki-a-ri-ja.Vermeule connected this name with Aigialia (Vermeule 1987: 135). Some of the names of heroic figures from later Sikyonian Kings Lists also appear as proper names in these tablets (Euseb. *Chron* I; Paus. 2.5.6-6.7).

[7] Off the Sikyonian plateau, recently uncovered Mycenaean and EIA burials during the course of road and railway extensions around Kiato attest to the serious potential for future research in this area. These add to Mycenaean burials which were uncovered by the Archaeological Service near the village of Moulki. Also, during our 2010 research season the archaeologists from the Archaeological Service (*AZ*) brought us to a site they were working on, just off the plateau which yielded the first significant signs of an Archaic cemetery in the area. (See Morgan et al. 2012: 44) .

[8] Although a fascinating subject Kleisthenes and the Orthagorid tyranny at Sikyon is not strictly within the scope of the present investigation which focuses on the fortified plateau of Sikyon between Hellenistic and Byzantine times. For further reading on the Orthagorid tyranny see: **Ancient and Medieval Sources**- Aischin. 3.107-112; Anaxand. *Del. FGH*404; Arist. *Pol.* 1315b; Diod. 7.24; Frontain *Stret.* 3.7.6; Herod 1.6-7; 5.67-8; 6.126-30; Homer *Il.* 2.572; Nik Dam, *FGH* 90 f.61.1-2; P. *Oxy.* 1241 col. 3; 1365; Paus 2.8.1; 6.19.1-4; 8.26.2-3, 10.7.6; 10.18.5; 10.37.6; Pliny *NH* 36.9-10; Plut. *Mor.* 401 D; 553 a,b 859 b; Polyain. 3; *Schol. Aischin.* 2.77; *Schol vet. Pind. Nem.* 9; Steph. Byz. s.v. Ἀἴγειρα". **Modern Sources**- Andrews 1956; Cavaignac 1919: *REG 32:* 64; Griffin 1982: 40, 42, 43-7; 50-53; 57-59; McGlew (1993); Rudolph 1971; Skalet 1928: 53-8; 95; 146-7; Soucek 1997.

was found during the survey, however, the real history of the city as concerns the present investigation begins in the fourth century BC.

During the fourth century BC Sikyon was a secondary power, having been allied with Sparta in the fifth century, and with Thebes in the early fourth. By the later fourth century, however, Sikyon had aligned itself with Macedon (under Philip II and Alexander) and a garrison had been placed in the city (Skalet 1928: 77). In 323 BC this Macedonian garrison was temporarily driven out of by a leader named Euphron II and the polis seems to have experienced a brief democracy (Diod. 18.11.2; Paus 1.25.4; Griffin 1982: 76). After the death of Alexander, Sikyon and Corinth fell under the control of Antipater until his death, when both cities were then fought over by Kassander and Polyperchon (Diod. 19.35.1, 53.1, 54.3, 62.1-2 and 63; Griffin 1982: 77). Kassander won out but eventually handed Sikyon and Corinth to Ptolemy, who stationed garrisons at both places (Diod. 20.37.1-2; Polyain, 8.58).

In 303 BC, the most significant event for the history of Sikyon occurred (at least the most significant event as relates to the Sikyon Survey Project); Demetrios I of Macedon, or Demetrios Poliorketes, captured Sikyon in a surprise attack, which led the Ptolemy-allied garrison on the Sikyon acropolis to surrender. Shortly after its capture Demetrios secured the city, by moving it up onto the acropolis, and destroying part of the old town perhaps so as to avoid people moving back in. It is most likely that the city/plateau was also fortified around this time. Sikyon was the only city, aside from his palatial home of Demetrias in Thessaly, which Demetrios founded (Paus. 2.7; Plut *Dem.* 25.3; Strabo. 8.382; Diod. 20.102.2-4; Griffin 1982: 78; Skallet 1928: 82-3). Immediately after its re-foundation, Sikyon was renamed Demetrias, although the name does not appear to have remained in use for longer than a few months (*SEG XLI* 50; Camp 2003: 273-5; Lolos 2011: 72). Demetrios' mistress Lamia became a patron of the arts at Sikyon and commissioned the building of an art gallery (Athen. 13.577c). A treaty inscription found during the excavations at the Athenian Agora records an agreement between Sikyon and Athens and makes mention of the Sikyonian demos which may imply that in the years immediately following Demetrios' re-foundation, Sikyon was at least to some degree democratic (*IG* xi.4, no. 704; Griffin 1982:79). Once again little is known about either the internal or the external policies of Sikyon for the years that followed Demetrios' re-foundation of Sikyon in 303 BC.

Sikyon's most famous citizen, Aratos, son of a former tyrant named Kleinias, seized power in a bloodless coup in 251 BC, when he was 20 years old (Walbank 1933: 31-4).[9] One of the first things he did after seizing power was to recall all those who had been exiled over the previous ca. 50 years, during a succession of tyrannical rulers. While this was a way of healing old wounds, and bringing back prominent Sikyonians, it also led to internal problems. Upon their return, the exiled Sikyonian nobles demanded the return of their confiscated lands and property, or compensation. Initially Antigonos gave 15 talents toward this (Plut. *Arat.* 11.2). Thereafter, Ptolemy II, the Macedonian king of Egypt, then gave 40 talents toward this, then 100 talents over several years. Additionally, he then provided Aratos with a personal wage of six talents per year (Cic. *De Off.* 2.23.81; Plut. *Arat.* 9-12; Griffin 1982: 78-81; Skalet 1928: 685; Walbank 1933: 37, 40, 99). Shortly after seizing power, Aratos brought Sikyon into the Achaian League as a means of securing both internal and external security (Plut. *Arat.* 9.5-6; Polyb. 2.43; Griffin 1982: 81; Skalet 1928: 85). Upon the entry of Sikyon into the league in 251/250 BC, Aratos was elected *strategos*, an office he continued to hold every second year (as often as was permitted), until his death (Plut. *Arat.* 11-45; Griffin 1982: 82; Walbank 1933: 37-9).

The central aim of the Achaian League was to oppose Macedonian rule in the Peloponnese and indeed in the second term of Aratos' leadership, the league captured Acrocorinth, the primary Macedonian stronghold in the Peloponnese (Polyb. 2.43.3-5). The Macedonians' position in the Peloponnese was immeasurably weakened without their main stronghold and for a time they withdrew from the area. During the Macedonian withdrawal the Achaian League turned their attention to ridding the peninsula of another problem, tyrannies. The League first attacked the tyrant of Argos, Aristomachos, who repelled the attack. At a later date, the league mounted an attack on

[9] While he does mention that Aratos was 20 at the time of his rise, Walbank also raises a cautionary note about this suggesting that Aratos may have been older during his capture of Sikyon (1933: 175).

Aristomachos' successor, Aristippos, who was eventually killed in battle. Another tyrant, Lydiades of Megalopolis, fearing a similar attack, voluntarily brought his polis into the league. Following the former example, Aristippos' successor, Aristomachos (II) of Argos, also brought his polis into the League (Plut. *Arat.* 25; 30; 35; Griffin 1982: 82; Walbank 1933: 57-69).

The anti-Macedonian policy of the Achaian League, and then the later anti-tyrant policies which appear to have been championed by Aratos are interesting. During Aratos' preparations for his initial coup at Sikyon, he was based in Argos and was supported by the elder tyrant, Aristomachos, a very close ally of Antigonos, the Macedonian king, who had his troops stationed on Acrocorinth (Plut. *Arat.* 5). Furthermore, Ptolemy's intervention in solving the social unrest at Sikyon after the return of the exiles makes things appear to be part of a larger rivalry between Ptolemy and Antigonos for influence in the region (Walbank 1933: 34, 40). These actions must call into question some aspects of our interpretation of Aratos. Plutarch's perhaps biased biography of Aratos is our main source for the general's life. Plutarch's main sources for his biography were autobiographical memoirs left by Aratos, who Plutarch states was an ancestor of his (Plut. *Arat.* 1.1). The view we have of Aratos, therefore, is quite a glossy and uncritical one. He appears to have been somewhat of an opportunist able to take advantage of situations quite quickly, taking help from tyrants and Macedonians as he needed it, but otherwise siding with the Achaian League and leading them in attacks against those who formally aided him.

The downfall of Aratos is connected to Sikyon's occasional ally Sparta, and began with the Spartan King Kleomenes III adopting an aggressive expansionist policy in the Peloponnese which alarmed the Achaian League. Aratos' chief rival for leadership of the league was the former tyrant of Megalopolis, Lydiades. As Lydiades' polis lay close to Sparta, he was forced to respond to Kleomenes but Aratos was not keen to help. Nonetheless, the Achaian League under the leadership of Lydiades, fought Kleomenes and during a battle the former was killed. After this initial victory over the Achaian League Kleomenes then sought to further expand his power in the Peloponnese, which led to many smaller battles between the Spartans and the league. Kleomenes eventually persuaded many poleis to leave the league and to join an alliance with Sparta (Walbank 1933: 70-9). Argos and Corinth both joined the Spartans and we are told by Plutarch that Kleomenes even found allies within Sikyon. Eventually the Spartans laid siege to Sikyon for three months, during which time Kleomenes offered Aratos a pension of 12 talents per year if he surrendered, twice what Ptolemy paid him annually at that time (Walbank 1933: 99). Out of desperation, Aratos convinced the Achaian League that if they were to defeat the Spartans, they needed to seek help from their old enemies, the Macedonians (Plut. *Arat*. 35-44; Walbank 1933: 89-100).

Antigonos Doson, the Macedonian king, agreed to help the Achaian League on condition that they relinquished control of Acrocorinth (Walbank 1933: 100). The Achaian League agreed to this stipulation, and then the Achaian/Macedonian army marched on Kleomenes, finally defeating him in the Battle of Sellasia in 222 BC (Walbank 1933: 110-1). After the defeat of Kleomenes and the Spartans, Antigonos Doson returned to Macedonia, the Achaian League returned to its former state, and those poleis which had previously sided with Kleomenes, although harshly treated, were readmitted into the league. Antigonos Doson was impressed with Aratos and sent his son Philip (Philip V) to live with him and the other Peloponnesian/Achaian League states, in order to build ties with them (Walbank 1933: 112-3). For many years Aratos was the closest advisor to the young Philip, but they eventually fell out with one another as Philip grew continually more aggressive towards states in the Peloponnese, especially Messene (Plut. *Arat*. 45-47; Walbank 1933: 156). Eventually their relationship deteriorated completely. In 213 BC at the age of 58 Aratos succumbed to lung disease in his house at Aigio, believing that Philip had him poisoned (Walbank 1933: 157). Aratos was buried at Sikyon, as opposed to the League's headquarters at Aigion, and a hero-cult grew around him (Plut. *Arat*. 51-53). Aratos' son, Aratos II, began to follow in his father's military footsteps, but died young. Again poisoning by Philip V is cited as the cause (Plut. *Arat*. 54; Walbank 1933: 157).

After the death of Aratos, Sikyon remained a place for meetings of the Achaian League and occasionally served as a military headquarters for the Achaian League, but was otherwise no longer a place of particular importance (Livy 27.31.1-3; Griffin 1982: 86). The Romans found the Achaian League a useful entity for their anti-Macedon ambitions. They met at Sikyon in 198 BC for discussions with the League (Livy 32.19.5). In the same year Flamininus and Attalos of Pergamon met at Sikyon, and Attalos gave Sikyon money and corn; he had previously given the polis money to help pay off a large debt and the Sikyonians then erected a large golden statue of him (*IG* iv 426 (poss); Livy 32.39.3-4, 40.18-19; Polyb.18 16.14; Griffin 1982: 86).

The Achaian League eventually sided with Rome and became more aggressive against the Macedonians, who still retained their base at Corinth. During this time Sikyon became a front in the battles between Rome and Macedon and its land was badly ravaged as a result. From this point onwards the history of Sikyon becomes even spottier. Indeed, what we know of the history of Roman Sikyon is extremely scant. In 168/7 BC Aemilius Paulus, touring Greece following his victory over Perseus, visited Sikyon and was impressed by its fortifications (Livy 44 6.3, 8.8; Polyb. 30.10.4). In 156 BC The Roman Senate asked Sikyon to arbitrate a dispute between Oropos and Athens (Paus. 7.4-5; Griffin 1982: 87). In 146 BC the Romans destroyed Corinth, which initially seemed to benefit the Sikyonians, as they were granted control of Corinthian interests including agricultural lands and the Isthmian games (Paus. 2.2.2; Strabo 8.387; Griffin 1982: 87). In the 1st century BC Sulla visited Sikyon and dedicated a statue of himself to Mars in the Agora, which has been found (Prakt. 1938: 121; Griffin 1982: 89.). Cicero tells us of Verres' visit to Sikyon, during which he demanded money from a magistrate, who refused and was then beaten up very badly. Cicero also mentioned Verres taking art from Achaia, and while he does not specify from where, Sikyon seems like a likely source (Cic. *Verr.* 2.1,17.44-45). In 61 BC and 59 BC, Cicero's friend Atticus wrote to him complaining of debts which Sikyon owed him and would not repay (Cic. *Ad. Att.* 1.13.1; 2.13.2; 2.21.6; Griffin 1982: 89) and in 56 BC Sikyon had to sell its civic art collection to pay off debts (Pliny 35.127). In 40 BC Marcus Antonius' wife died at Sikyon (Appian. *BC*, 5.55.230, 249; Cass. Dio. 48.28.2; Plut. *Ant.* 30.3). During the mid 2nd century AD, Pausanias mentions seeing the after-effects of earthquake damage on the buildings at Sikyon. This earthquake seems to have occurred in 142-144 AD a time when Sikyon was quite poor (Paus. 2.7.1; Lolos 2001: 30; Papaphotiou 2002: 181-2, 196-7.). The upper level of the Gymnasium of Kleinias was rebuilt in the 3rd century AD (Prakt. 1936: 89) and the former Bouleuterion was turned into a bath-house at this time; indeed we know of three other Late Roman baths at Sikyon (Prakt. 1958: 188). In Late Roman or Early Byzantine times the population may have shifted back toward the coast. The discovery of a large Christian basilica built in the fifth century in Kiato seems to further support this supposition (*BCH* 1.1926:177; Prakt. 1933: 81-90; Prakt.1938: 120f; Prakt. 1954: 219-31). During the 4th-5th centuries two churches were built, one in the Agora over the archaic temple and another near Ag. Triada near the current entrance to the modern village (ArchDelt 10 1926: 47. Prakt Nos. 16-7). As is evident from the history of Sikyon, a reasonable amount of detail is known of the polis under the rule of the Orthagorids, and under Aratos. Beyond these, however, details become spotty, and especially as regards Roman Sikyon, in order to fill in some of these blanks it is necessary to turn to the archaeological record.

Chapter 1-
The Intellectual Landscape: Survey, Ceramics and Analysis

1.1- Introduction

The Sikyon Survey Project revealed that during Hellenistic and Roman times, the city of Sikyon was home to a significant ceramics industry. This investigation presents a picture of that industry, of how, why and where the ceramics at Sikyon were produced and consumed, and the international trade patterns that may have impacted upon this industry. It is unusual to be able to ask such in-depth questions of survey ceramics, but this has been possible at Sikyon as a result of the high data resolution at the site, which itself builds upon generations of typological and fabric analysis of ceramics in the broader region. This chapter discusses the scholarly context, within which the Sikyon Survey Project grew, the aims of the survey and the methodology.

1.2- Development of Archaeological Survey and the Birth of Modern Survey

Archaeological survey initially grew out of a process used by archaeologists to look for sites to excavate, and it is easy to see why – one of the basic principles upon which early survey was based was that walls and/or concentrations of broken pottery found on the surface are indicative of archaeological material below the soil. More recently the term *archaeological survey* has come to be an umbrella term which refers more generally to the non-intrusive investigation of an archaeological feature or landscape.

There are many different ways to *survey* a site or a feature these include, field-walking, geophysical prospection, literature survey, or the developing field of digital-based surveying. The terms *survey* and *archaeological survey* in this thesis, however, refer specifically to field-walking the process of systematically walking over the surface of a feature or a landscape and recording what material remains are encountered. The concept of field-walking as a method of studying a landscape or a past society, as opposed to simply locating an archaeological site, developed in the early to mid- 20th century in the southwest United States (Trigger 1989). The idea of a broad thematic study of an area caught on quickly in the Aegean and resulted in the development of a trend of extensive surveys.

The general aim of an extensive survey is to explore a broad area, either systematically or through a focussed thematic approach. For example, a notable scholar of the extensive survey movement who took a thematic approach is Richard Hope Simpson, who published prolifically on Mycenaean sites in Greece and Asia Minor (Hope Simpson 1957, 1958, 1965; Stewart 2007: 21; Trigger 1989: 186-205; Waterhouse and Hope Simpson 1960, 1961). The overarching aim of Hope Simpson's research was to identify as many Mycenaean period sites as possible based on a combination of published evidence and field investigation. This work was to present a picture of Mycenaean activity in Greece. The work of Hood, Warren and Cadogan on Crete was of a similar vein (Hood 1967; Hood et al.1964; 1965; 1966). In a series of publications the authors documented their travels around parts of Crete looking for Minoan remains. While Hope Simpson, Hood, Warren and Cadogan were primarily interested in specific periods, sites of earlier and later date, where recognizable, were also noted in these studies. The hundreds of sites identified and mapped by Hope Simpson and the dozens by Hood, Warren and Cadogan still serve as very important basis for surveys and topographic studies today. As survey has developed, however, it has generally moved away from the primarily synchronic and unsystematic approaches taken by these scholars, in favour of more holistic and diachronic interpretations of clearly delineated landscapes.

The bridge between broad extensive surveys and modern survey is the University of Minnesota Messenia Expedition (UMME hereafter) which was published in 1972. This project was a study of the province, or *nomos,* of Messenia in the southwest Peloponnese and grew out of research by William McDonald and Hope Simpson on prehistoric habitation of Messenia as mentioned in the Pylos Linear B tablets (McDonald and Hope Simpson 1961; McDonald and Rapp 1972; Stewart 2007: 152; Watrous 1974: 86; Winther-Jacobsen 2010: 16-7). UMME differed from earlier surveys in that it utilized a multi-disciplinary approach which was designed to treat the landscape as a unit which formed the basis of the study, as opposed to having a more thematic basis, such as for example, Mycenaean Messenia. Its research program included a truly groundbreaking approach to ceramics as well as studies on topography, architecture, soil, flora, fauna, metallurgy, geochemistry, geophysics, and the incorporation of evidence from prehistoric Linear B tablets as well as Classical and post-Classical written records (McDonald and Rapp 1972: 64-117). While the primary aim of the project was to explore the Mycenaean "Kingdom of Pylos", it did maintain a somewhat diachronic scope, and the holistic methodology was truly a study of the landscape as a unit in the Braudelian mould, and not just of the archaeological remains within it (Braudel 1996). The questions asked by the UMME investigators changed the course of survey archaeology in the Aegean (McDonald and Rapp 1972:8).[10] In the years since the publication of UMME surveys have become more intensive, more systematic and more deliberately diachronic in their approaches, while retaining the UMME multidisciplinary and landscape-based approach. Most notable of these are the Southern Argolid Exploration Project, the Northern Keos Survey, and the Cambridge-Bradford Archaeological Survey/Boeotia Survey (Bintliff and Snodgrass 1985 and 1988; Bintliff et al. 2007; Cherry et al. 1991; Jameson et al. 1994). Survey has, in recent decades, become a much slower, more interpretative and methodical creature.

In general it is very difficult to compare the results of one survey with another. For example, an excavated Hellenistic stoa in the Athenian Agora could be compared with an excavated Hellenistic stoa at Corinth on various levels. Size, positioning, architectural style, associated finds and data resolution based on recording and excavation techniques would all be valid points of contrast and comparison. At the end of a discussion on these points some valid conclusions could be drawn about Hellenistic architecture, monumental buildings in Greek cities, or even about excavation conditions. Conversely, as surveys are so heavily influenced by size, location, budget, collection strategy, permissions, and a range of other factors, it is extremely difficult to compare results in

[10]For precedents outside Greece McDonald mentions: The Oaxaca Valley Project, K. Flannery; Virú Valley Project, G. Willey; The Soviet Project in lower Anu Darya and Syr Darya, S. Tolstov; The Tehuacan Project, R. MacNeish; The San Lorenzo Project, D. Coe; The Cases Grand Project, C. DiPeso; The Glen Canyon Project, J. Jennings.

anything but the broadest manner. For example, it would be completely invalid to say that the urban Sikyon Survey Project is better or worse than, say, Lolos' extensive regional survey of the Sikyonia, as both surveys were so different in aim, methodology and scope. We might compare the proportions of Late Roman pottery found on the Sikyon Survey Project to those found on the Eastern Korinthia Archaeological Survey (EKAS hereafter). Even in this case, however, if the Sikyon Survey Project yielded X% of Late Roman pottery from the total finds, and EKAS Y% of the total finds, it would quickly transform into a methodological discussion about collection techniques, survey aims, landscape suitability, data visibility, storage capabilities, etc. Methodology very much dominates scholarly discussion around archaeological survey as it is the main point of comparison between projects. Additionally, scholars have been utilizing this debate to explore the range of issues which can and cannot be addressed though this technique, and where the practical limits of investigations should lie (Alcock and Cherry 2004).

Is it preferable, for example, to have a survey that runs for several generations and thoroughly explores a landscape in extreme detail, or to have one which answers a few clearly defined questions and is published in a timely fashion? As the majority of material encountered on most surveys in Greece is ceramic, is it better to collect a lot of material knowing that it may not necessarily add significantly to the interpretation or a site, or is it better simply to record find densities in the field and collect a few datable pieces? It may be preferable to incorporate as wide a range of specialists as possible onto a project to ask as wide a range of questions as possible. Not every project will have the budget and amount of time necessary to accommodate a range of specialists, however, and therefore a balance must be sought between the level of detail desired from a study and cost/expediency of publication. While enormous variety exists in approaches to survey, there are several universal questions that almost always need to be addressed prior to beginning a project: determining a survey area; the aims of the survey; establishing a methodology; establishing how will finds be recorded and/or collected; and, in the Aegean area specifically, ceramics will almost certainly account for the majority of finds, so how will these be approached and studied?

The following section explores these questions with reference to some surveys which are either geographically or methodologically comparable to the Sikyon Survey Project. These surveys are: the Asea Valley Project, the Berbati-Limnes Project, John Bintliff's Boeotia Surveys, Eastern Korinthia Aarchaeological Sirvey, the Knossos Urban Landscapes Project, the Kythera Island Project, the Laconia Survey, the Land of Sikyon extensive survey, the Methana Survey, the Nemea Valley Archaeological Project, the Phlius Survey, the Pylos Regional Archaeological Project and, the Sphakia Survey.

1.3- Aims, Methodologies and Collection Strategies of Selected Surveys (Fig 1.1)

The purpose of this section is to examine 13 surveys which are either in close geographic proximity to Sikyon, or have methodological similarities in order to establish the types of questions being asked of comparative survey data and the approaches employed to enable these lines of inquiry.

1) *The Asea Valley Project*

Name:	Asea Valley Project
Dates:	1994-96
Aim:	Diachronic, multi-disciplinary study of the valley of Asea
Survey Area:	40.2km^2 (ext), 18.7km^2 (int)
Sampling Technique:	Grab samples
Ceramics Collected:	Fineware (coarseware sample)
Condition:	Diagnostic ceramics only
Ceramic Fabrics:	Observations on fabrics noted
Count:	200 (Archaic to Hellenistic)

A comparatively recent survey in the Peloponnese, this was directed by Forsén and Forsén between 1994 and 1996 (Forsén and Forsén 2003). The survey was a mixed extensive/intensive survey and covered an area of 40.2km^2, with 18.7km^2 being intensively surveyed. The project was designed to be a diachronic study of the valley of Asea from the time it was initially settled until the early Modern period and was a multi-disciplinary project which included archaeology, history, and geology (Forsén and Forsén 2003: 13; 17-20).

Ceramic collection on the Asea Valley Project was done using grab samples, which were mostly a representative collection of diagnostic pottery. So-called grab samples are a very common method of collection on archaeological surveys and involve archaeologists collecting what they deem to be a representative sample of artefacts from a predefined area. Diagnostic coarsewares were sampled, while non-diagnostic pottery was ignored (Forsén and Forsén 2003: 15). The methodology for studying ceramics recovered from the Asea Valley Project appears to vary slightly according to each period and each specialist studying it. On the whole a program of macroscopic ceramic fabric analysis was carried out on the catalogued pottery and the work done on the Prehistoric and Roman pottery is comprehensive. The listed method of ceramic fabric analysis for the 200 sherds which form the Archaic, Classical and Hellenistic ceramic dataset, however, is problematic. The discussed fabric groupings appear to be based primarily on colour and secondarily on inclusions, thus overlooking nearly all the known scholarship on ceramic fabrics (Forsén and Forsén 2003: 203-7). As a result, differentiating local and imported vessels will surely be a difficult task, so while date and form may be identified, no issues of economy or production could be approached through these data.

2) *Berbati-Limnes Archaeological Survey-*

Name:	Berbati-Limnes Archaeological Survey
Dates:	1988-89
Aim:	Diachronic, systematic study of Berbati and Limnes
Survey Area:	61km^2 (ext), 25km^2 (int)
Sampling Technique:	Grab sample- tract based
Ceramics Collected:	Fineware (coarseware sample)
Condition:	Diagnostic ceramics only
Ceramic Fabrics:	Macroscopic and microscopic fabric analysis
Count:	9,324 Sherds Collected

Directed by Wells and Runnels between 1988 and 1989 this was an integrated extensive/intensive survey in the central Argolid, which is in relatively close proximity to Sikyon (Wells and Runnels 1996). The aim of the Berbati-Limnes Project was 'to carry out a systematic survey of the Berbati Valley and the Limnes uplands in order to try to determine the date and extent of human activity in the area throughout time' (Wells and Runnels 1996: 15). More specifically it was to determine the interrelationship of landscape and site distribution, land-use patterns, and monument preservation locally while also putting the survey area into a broader regional perspective (Wells and Runnels 1996: 15). The survey covered an area of 61km^2 of which 25km^2 was surveyed intensively (Wells and Runnels 1996: 15).

Ceramics were collected by site using a system of tract-based grab sampling. As sites were identified they were classified as a single unit and collection was thus carried out. This approach meant that each site could be interpreted as a contained unit, as opposed to being a series of high find concentrations within a tract system. Abandoning the tract system for sites, however, would certainly have resulted in lower data resolution, as spatial delineation within a site would therefore become impossible. The collection of ceramics was based on functional and stylistic categories and was modelled on the methodology employed by Runnels on the earlier Southern Argolid Exploration Project (Jameson et al. 1994).[11] The collection and study methodology called for the collection of diagnostic pottery only, although this included diagnostic coarseware as well as finewares. Non-diagnostic pottery was included in the in-field pottery counts which totalled 70,403 while 9,324 sherds, 13.24% of the total, were studied. The initial publication mentions that macroscopic ceramic fabric analysis was carried out on catalogued sherds with particular attention paid to the colour of fabrics, while macroscopic descriptions of inclusions were also included in some cases (Wells and Runnels 1996: 18). In addition to this initial fabric study, an extensive programme of ceramic fabric analysis was undertaken by Whitbread and Ponting to study the use of

[11] The Southern Argolid Exploration Project an excellent survey project designed shortly after the publication of UMME. I have, however, omitted it as The Berbati-Limnes Project, NVAP and EKAS all represent more modern surveys in the general area.

clays in the Berbati valley and its relation to ceramic production there over time (Whitbread et al. 2007). This excellent study involved macroscopic, microscopic and plasma atomic emission spectronomy analysis of 303 sherds which ranged in date from Neolithic to early Modern (ca. 19th century AD). Diagnostic sherds from vessels were broadly divided into the following categories: drinking, open, closed, storage, transport, cooking, building, tile, and kiln (Whitbread et al. 2007: 183). Compositional patterns were then established both within each category and across time, and similarities and differences were established and mapped. Whitbread's article highlights some of the potential benefits that a program of systematic ceramic fabric analysis can offer to survey, but it also serves as an excellent bridge between the remains of human activity and the natural resources within the study area.

3) *Cambridge-Bradford Archaeological Survey/Boeotia Survey/Leiden-Ljubljana Ancient Cities of Boeotia Project-*

Name:	Cambridge-Bradford Archaeological Survey
Dates:	1978-80
Aim:	Diachronic study of human settlement and land use in parts of Boeotia
Survey Area:	$50km^2$
Sampling Technique:	Total collection and grab samples
Ceramics Collected:	Finewares and coarsewares
Condition:	Diagnostic ceramics only
Ceramic Fabrics:	Unclear- observations on fabrics noted
Count:	827 sherds collected

From a methodological perspective, one of the most significant surveys in the Aegean has been the Cambridge-Bradford Archaeological Survey/Boeotia Survey (1978-1991) which has also given birth to the Leiden-Ljubljana Ancient Cities of Boeotia Project (2000-present). This has been an ongoing series of related projects for over 30 years and was started by Bintliff and Snodgrass (Bintliff and Snodgrass 1985; 1988). These have since continued under the direction of John Bintliff, and in its latest incarnation in collaboration with Slapšak (Bintliff et al. 2000, 2001).

Based on the 1985 publication of the Cambridge-Bradford Archaeological Survey, the total area covered by the project was 50km^2. The Boeotia Survey website describes the project most succinctly as 'an exercise in Landscape Archaeology aiming to reconstruct the history of human settlement and land use in one of the most important historical regions of prehistoric, ancient and medieval Greece using surface mapping of pottery sherds and architectural debris.'[12] The survey was a mixture of extensive and intensive survey and focussed on rural areas as well as several known urban sites: Thespiae, Haliartos and Hyettos, and a town at Askra. The methodologies of the latter were the basis of the methodology of the Sikyon Survey Project (Y. Lolos. Pers. Comm. June 2010). The Cambridge-Bradford Archaeological Survey/Boeotia Survey was originally designed based on the UMME survey, but was aimed at producing a much more focussed and intensive study (Bintliff and Snodgrass 1985: 135-6). While various methodologies have been used during the course of the survey, often in the scholarly interest of testing their effectiveness, the collection strategy generally relied on a combination of grab samples and selective total collection areas. In the first two seasons, 1979 and 1980, 11,597 sherds were recorded; 8,824 of these were deemed 'rubbish' while 827 were kept as 'feature sherds' (Bintliff and Snodgrass 1985: 127-36; esp. 'Table 1' 133). Coarse pottery was collected and although non-diagnostic pottery was not, it was counted in-field for statistical purposes. While details about ceramic fabrics were noted, the specific method or methods of ceramic fabric analysis from the early seasons are unclear but appear to have incorporated macroscopic fabric analysis to some degree (Bintliff and Snodgrass 1985: 132, 139). Final publications from these projects are pending, which can make side-by-side comparison with other projects a difficult proposition. Nonetheless a very significant body of literature has been produced from all three projects.

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[12] See: http://www.narcis.nl/research/RecordID/OND1302842

4) The *Eastern Korinthia Archaeological Survey* (EKAS hereafter)-

Name:	Eastern Korinthia Archaeological Survey
Dates:	1997-2002
Aim:	Diachronic study of local, regional and supra-regional interactions and how these developed and changed at diverse spatial and temporal scales.
Survey Area:	350km^2
Sampling Technique:	ChronoType Sample
Ceramics Collected:	Finewares and coarsewares
Condition:	Diagnostic ceramics only
Ceramic Fabrics:	Unclear
Count:	4402 sherds collected

This project was conducted from 1997 to 2002 and was directed by Tartaron, Gregory, and Pullen (Pettegrew 2006; Tartaron et al. 2006). EKAS was a regional survey which focussed on exploring the interplay of local, regional and supra-regional interactions and how these developed and changed at diverse spatial and temporal scales (Tartaron et al. 2006: 456). It was also designed in the hope that the survey results would help contextualize known sites through the discovery and study of new sites and off-site material (Tartaron et al. 2006: 456). EKAS was an ambitious project which covered an enormous area, ca. 350km^2 and integrated both extensive and intensive methods.

As EKAS was a mixed intensive and extensive survey, the project employed a three-fold collection and walking strategy based on what was found in each area. The broadest of these modes was the extensive discovery mode, followed by the intensive discovery mode, and finally the most focussed, site investigation mode. Extensive discovery units were walked systematically and unsystematically usually by three people who recorded and collected finds in a similar fashion to the more intensive sections. The more intensive walking was done in *discovery units*. In these, walkers would be spaced at 10m intervals and would count all ceramic finds that were larger than a thumbnail and tile finds within 2m on either side of their path. All lithics and non-ceramics were collected, while tiles and finds unique to each walking path were collected (Tartaron et al. 2007: 474-5). In other words, a walker would collect everything initially, but would not collect repeating examples of ceramics, so if 20 ceramic types were found in a discovery unit, only one of each type would be collected. This strategy is known as the ChronoType system.

The ChronoType system is a strategy for the collection and recording of survey ceramics and was developed on the Sydney Cyprus Survey Project. Former participants of that project continue this methodology with their work on the Troodos Archaeological and Environmental Survey Project; The Australian Paliochora-Kythera Survey; and the presently discussed EKAS. The system was designed to strike a balance between total collection of all artefacts, and the collection of only diagnostic ceramics: it is faster than the former and more thorough than the latter (Tartaron et al. 2007: 478). It calls for the collection of unique ceramic types within each discovery unit by each walker. These are then classified in the field into general categories such as fine or coarse, then by rough period such as Prehistoric or Historic, and then, if possible, more finely as, Greek, Roman, etc., until eventually all of the information possible is filled in about each sherd (Tartaron et al. 2007: 476-83). Only one example of each diagnostic ceramic type was collected and studied, with the aim of minimizing storage space and not collecting 'redundant' data (Tartaron et al. 2007: 478)

The ChronoType system is controversial and has been criticised for relying far too heavily on field-walkers being able to identify and classify unwashed pottery in the field, which must be considered a risk inherent in this system (*pro* Meyer in Given and Knapp 2003: 14-16: *contra* Lolos et al. 2007: 271). In standard archaeological practise after recording the counts and weights, ceramics are cleaned, and it is only after cleaning that sherds are studied, as it is often at this stage that the decoration and full profile of sherds can be understood. Studying and classifying sherds in the field will lead to problems with identification and to incorrect understanding of distributions of shapes and fabrics within a survey area. On a non-collection survey such as EKAS, however, it did enable the team to piece together an accurate picture of their survey area expediently whilst being unable to collect most material. In some ways this may not be an ideal methodology, however, given the aims and restrictions of EKAS, the ChronoType system does appear to have worked reasonably well. Some coarsewares were studied, however non-diagnostic pottery was not. The methodology section notes that ceramic fabric analysis was carried out, but which techniques were used and on what amount and type of ceramics remains unclear (Tartaron et al. 2007: 483). Based on the collection strategy, however, in-field macroscopic grouping seems most likely.

5) *Knossos Urban Landscape Project* (KULP hereafter) –

Name:	Knossos Urban Landscape Project
Dates:	2005-08
Aim:	Survey intensively and systematically the Knossos valley
Survey Area:	840ha
Sampling Technique:	Total Collection
Ceramics Collected:	Finewares and coarsewares
Condition:	All ceramics
Ceramic Fabrics:	Unclear- macroscopic and microscopic fabric analysis appears most likely
Count:	Unclear- 420,000 sherds collected in first season.

Although still very much in progress, KULP certainly warrants mention here as it will undoubtedly be an extremely important survey when completed. It also compares well to both the Sikyon Survey Project and Kythera Island Project in terms of the size of its dataset and its hyper-intensive methodology (Whitelaw et al. 2007). The project, initially directed by Bennet, Grammatikaki, Vasilakis and Whitelaw has been designed to 'survey intensively and systematically the Knossos valley, documenting the material record of occupation from initial Neolithic colonisation down to the early 20th century' (Whitley et al. 2005: 107). Collection seasons for the project were 2005-2008, with study seasons occurring annually and ongoing at the time of writing. KULP is a hyper-intensive urban survey which focuses on an 840ha area (8.4 km^2) based on 21,000 20m x 20m tracts (Morgan et al. 2008-9: 94).

Artefacts were collected on a 20m X 20m grid system with total collection areas of $10m^2$ within each ($400m^2$) square. This resulted in a theoretical 2.5% sample of the total material. The approximate amount of pottery collected which will be studied is enormous, with 420,000 sherds or 4.2 tonnes during the first season alone. Coarseware and non-diagnostic pottery were both collected (Morgan et al. 2009-10: 183). Details of the nature of ceramic fabric analysis undertaken on this material at present are unclear, however, based on the hyper-intensive collection strategy it seems likely that a programme similar to those at Sphakia, Sikyon and on Kythera will be applied.

6) *The Kythera Island Project-*

Name:	Kythera Island Project
Dates:	1998-2001
Aim:	To explore the dynamics of insular cultures, economies, environments, and ecologies on Kythera through time
Survey Area:	$100km^2$
Sampling Technique:	Total collection and systematic diagnostic samples
Ceramics Collected:	Finewares and coarsewares
Condition:	Diagnostic ceramics only
Ceramic Fabrics:	Macroscopic and microscopic fabric analysis
Count:	200,000+ sherds collected

The Kythera Island Project is a survey directed by Cyprian Broodbank and Evangelia Kiriatzi, and had collection seasons between 1998 and 2001, with study seasons year season since then (Broodbank 1999; Kiriatzi 2003; 'Kythera Island Project Webpages'). The Kythera Island Project (KIP hereafter) is a multi-disciplinary, integrated intensive/extensive survey which covered a $100km^2$ area on the island of Kythera. The aim of the project is "to explore the dynamics of insular cultures, economies, environments, and ecologies on Kythera through time, from the deep past until the present" (Broodbank 1999: 191). Although on-going, KIP is important to mention as the methodology employed will likely become a new benchmark for regional survey. It also provides a very good comparison for the Sikyon Survey Project in terms of the size of the dataset, the collection strategy, and the ceramics methodology.

The collection strategy employed on KIP included picking up pottery, lithics and metal finds. Collection was a combination of grab samples, total collection, and the collection of feature sherds. The pottery collected and studied during KIP numbers in the "hundreds of thousands" (E. Kiriatzi Pers Comm. Feb 2011). Coarsewares were collected, while non diagnostic pottery was recorded in the field but not collected. KIP used an integrated approach with macroscopic and microscopic fabric analysis combined. Using no more than a 10X hand lens, the bulk of the pottery was analysed and classified based on surface and core colour, colour of re-fired samples, as well as frequency, sorting, size, roundness and types of aplastic inclusions, and percentage of voids in the clay matrix. The patterns seen in the pottery then formed the basis for targeted microscopic analysis of thin sections (E. Kiriatzi Pers. Comm. April 2011).

7) *The Laconia Survey-*

Name:	Laconia Survey
Dates:	1983-88
Aim:	Clarifying settlement changes in north-central Laconia between the late prehistoric periods and the foundations of the modern Greek state in the early nineteenth century.
Survey Area:	$70km^2$
Sampling Technique:	Grab sample- site based
Ceramics Collected:	Finewares and coarsewares
Condition:	Diagnostic ceramics and non-diagnostics samples
Ceramic Fabrics:	Macroscopic fabric analysis
Count:	Unclear

The Laconia Survey was a regional study of an area in the vicinity of modern Sparti was conducted between 1983 and 1988 (Cavanagh et al. 2002; Stewart 2007: 83; Winthers-Jacobsen: 2010: 13-16). This project is currently considered to be the 'gold standard' of survey publications (Stewart 2007: 83): not only is it very thorough and very clear, but the inclusion of all the raw data used in the interpretations was a unique development which added a layer of transparency hitherto unseen on a survey publication. The project aimed at clarifying settlement changes in north-central Laconia between the late prehistoric periods and the foundations of the modern Greek state in the early nineteenth century; in particular, it addressed the relationships between the traditional heartland (the Evrotas valley, or Sparta plain) and the neighbouring rural landscapes, both in the plain and in the neighbouring hills (Cavanagh et al. 2002: 1). It was therefore by design diachronic and also had intensive and extensive elements, covering an area of 70km^2.

The collection strategy for ceramics on the Laconia Survey is very similar to that of the Methana Survey (see below). Identified sites were sampled and selections of the most diagnostic artefacts were bagged for later analysis. Potsherds, tile fragments and stone tools were counted separately, coarsewares were collected but only for representative sampling purposes. Most interpretations, therefore, were based upon fineware pottery. Non-typologically diagnostic pottery was not collected, but counts and locations of non-diagnostic finewares were recorded in the field. Although limited by their collection strategy, the Laconia Survey did implement a programme of ceramic fabric analysis which consisted mostly of macroscopic classification of all indexed sherds, noting colours, inclusion types and hardness. The level of ceramic fabric analysis implemented on the Laconia Survey appears to vary slightly according to how each individual ceramics specialist incorporated it (Cavanagh et al. 2002: 43-5).

8) *The Methana Survey-*

Name:	Methana Survey
Dates:	1982, 84-87
Aim:	To undertake as complete a diachronic survey as possible of the defined area of Methana
Survey Area:	10.5km^2
Sampling Technique:	Grab sample- site based
Ceramics Collected:	Finewares and coarsewares
Condition:	Diagnostic ceramics only
Ceramic Fabrics:	Observations on fabrics noted
Count:	5-6000 sherds collected

The Methana Survey has been praised for the thoroughness of its research design, its methodology, the transparency of the published data and its interpretations (Stewart 2007: 94, Winther-Jacobsen 2010: 8-13). The survey focused on Methana, a volcanic island off the east coast of the Argolid which is connected to the mainland by a narrow causeway (Mee and Forbes 1997). The project was initiated in 1982, then continued in 1984-1987 under the direction of Mee and Forbes, who hoped to 'undertake as complete a diachronic survey as possible of the defined area of Methana' (Mee and Forbes 2007: 34). The survey was a combined extensive/intensive survey, and covered a total area of 10.5km^2.

The ceramics methodology employed at Methana varied slightly according to find density: in areas with high find concentrations collection of material was highly intensive, while in areas with lower find densities collection was more superficial. Due to the size of the area explored during the survey, a total collection/study of all the encountered ceramics was 'out of the question' (Mee and Forbes 1997: 35). Therefore, as the likely extent of a site was established based on concentrations of artefacts on the surface and where possible, architecture, a representative sample preferably of diagnostic ceramics was taken in a grab sample. Feature sherds and lithics were the most common artefacts in the grab samples from Methana. Feature sherds can be defined as sherds of ceramics which are of potentially typologically diagnostic value, such as rims, bases, handles or sherds which exhibit some type of decoration.

Large sites encountered on the Methana Survey were subdivided along natural features, and collections within these were conducted along grid patterns. Sampling units consisted of $10m^2$ areas and were spaced at intervals of 50m, within these grab sampling was practised. While typologically diagnostic fineware was favoured for collection, some coarsewares were also sampled (Mee and Forbes 1997: 35). The total amount of ceramics collected during the Methana Survey was 5-6000 pieces (Mee and Forbes 1997: 283-343). Basic ceramic fabric analysis was carried out on the sampled pottery for classification purposes; however, as most of the collected pottery would have been fineware this would not necessarily be the most useful method of analysis. Finewares are often so finely levigated that their fabrics cannot always be reliably studied macroscopically, and can even prove difficult to interpret by microscopic means (Farnsworth 1970: 10; Whitbread et al. 2007: 181).

9) *The Nemea Valley Archaeological Project* (NVAP hereafter)-

Name:	Nemea Valley Archaeology Project
Dates:	1984-9
Aim:	To document and explain changes in patterns of settlement and land use at all times in and around the Nemea Valley
Survey Area:	$80km^2$
Sampling Technique:	Systematic collection by tract and POSI
Ceramics Collected:	Finewares and coarsewares
Condition:	Diagnostic ceramics only
Ceramic Fabrics:	Unclear
Count:	Unclear

NVAP was conducted between 1984 and 1989 and material study is on going at the time of writing (Pullen et al. 2010; Wright et al. 1990). The primary goal of the survey is 'to document and explain changes in patterns of settlement and land use at all times in the past within a small region approximately 80km^2 in southern Greece, centred on the Nemea Valley' (Wright et al. 1990: 583). The project is particularly noteworthy for several reasons, including its holistic integration of geomorphology, anthropology and archaeology. Along with the exploration of "long durée processes relating to the topography and geomorphology in the valley, the project also addressed moyenne durée issues relating to the relationship between the major prehistoric site of Tsoungiza and its hinterland, and also explored issues relating to modern land use by means of a dedicated programme of anthropological research" (Wright et al. 1990: 584).

While the final publication on NVAP is currently in progress, and we cannot thus say anything about its overall conclusions, we can say a few things about the project's collection strategy and ceramics methodology based on published articles and NVAP Vol. I (Pullen et al. 2010; Wright et al.1990). The NVAP survey area was divided up into a system of tracts of varying size based on natural divisions, crop usage, or visibility. No tract was more than 2ha in size, and in all, 4800 tracts were surveyed (Wright et al. 1990: 604). All finds were counted by clicker for each 100m pass, then all potentially diagnostic material of all forms was collected, with plain body sherds being excluded. It remains to be seen if and how ceramic fabric analysis will be approached. Preliminarily, fabrics have been differentiated macroscopically based on work from the excavations at Nemea and to a lesser extent, at Phlius (Wright et al. 1990: 646).

10) The *Phlius Survey* –

Name:	Phlius Survey
Dates:	1986
Aim:	To demonstrate how urban survey can contribute the study of long-term change throughout a whole region.
Survey Area:	120ha
Sampling Technique:	Grab sample- tract and problem based
Ceramics Collected:	Unclear
Condition:	Diagnostic ceramics only
Ceramic Fabrics:	Unclear
Count:	7,000+

The nearest urban survey to Sikyon and focussed on the ancient polis of Phlius on the Asopos River, in the Nemean Valley (Alcock 1991). The Phlius Survey was conducted by Alcock in 1986 as part of the Nemea Valley Project. The aim of the Phlius survey was to demonstrate how urban survey can contribute to the study of long-term change throughout a whole region and to compare diachronic activity in the town and countryside (Alcock 1991: 424). The survey was intensive and focussed exclusively on the urban area of the polis; 337 tracts were covered within an area of 120ha (Alcock 1991: 440).

Ceramics were collected through a combination of $10m^2$ total collection units, tract samples and field grabs of potentially diagnostic pottery, as well as tile and stone. 7000+ sherds of pottery were collected and studied (Alcock 1991: 442-3). It is unclear if coarseware was collected, although based on the NVAP and PRAP methodologies it seems likely that it was. Non-typologically diagnostic pottery was not collected intentionally, and it remains unclear if ceramic fabric analysis was utilized on this project (Alcock 1991: 443). A final report on the Phlius Survey remains to be published, so at present not all the details of this project are clear. It is nonetheless vital to mention this project, both because of its geographical proximity to Sikyon and its role as a pioneering urban survey. Furthermore, many of the finds from Phlius are similar also in time frame to those from Sikyon.

11) *The Pylos Regional Archaeological Project* (PRAP hereafter)-

Name:	Pylos Regional Archaeological Project
Dates:	1991-94
Aim:	To set the excavations at the Palace of Nestor into a regional context, as well as to establish the pattern of human settlement over time and to explore diachronic changes in geomorphology and land use
Survey Area:	$40km^2$
Sampling Technique:	Systematic collection by tract and POSI
Ceramics Collected:	Finewares and coarsewares
Condition:	Diagnostic ceramics only
Ceramic Fabrics:	Macroscopic fabric analysis
Count:	8,220 sherds of historic date

The central aim of PRAP was to set the excavations at the Palace of Nestor into a regional context, as well as to establish the pattern of human settlement over time and to explore diachronic changes in geomorphology and land use (Alcock et al. 2005; Bennet et al. 2000; Davis et al. 1997). The survey was conducted between 1991 and 1994 and focussed on a $40km^2$ area in southwest Messenia. Although final publication on this project is pending, several publications detail the preliminary results of PRAP and and all the relevant data are online, thus it is possible to make some observations on the project.[13]

Data collection was conducted along existing field boundaries. Walkers were spaced at 15m intervals. Walkers would record all visible artefacts of any category in 100m long paths, but only diagnostic finds were kept. An area with particularly high concentrations of finds was dubbed a 'Place of Special Interest' (POSI), to avoid stating that an artefact scatter certainly represented a site. Each POSI was gridded in 10x10m or

[13] http://classics.uc.edu/prap/

20x20 squares so as to allow intensive and systematic recording and collection within these areas, providing a high resolution picture of the PRAP data.

The majority of ceramics collected during PRAP were finewares, but coarse ceramics were also sampled. 8220 sherds from historic times were collected during the survey (Alcock at al. 2005: 167). Macroscopic fabric analysis was carried out on a sample of the collected pottery which enabled PRAP to establish some of the major local and non-local fabrics noted on the survey as well as to build upon and expand those ceramic fabrics identified during UMME (Alcock 2005: 196-7).

12) *The Sphakia Survey-*

Name:	Sphakia Survey
Dates:	1986-90
Aim:	To investigate all human interaction with the landscape of Sphakia
Survey Area:	472km^2
Sampling Technique:	Total collection
Ceramics Collected:	Finewares and coarsewares
Condition:	All ceramics
Ceramic Fabrics:	Macroscopic and microscopic fabric analysis employed
Count:	13,000 Sherds of historic date

The project which most clearly and strongly stated the case for the integration of systematic CFA into archaeological survey is the Sphakia Survey (Nixon et al. 1988; Moody et al. 2003; The Sphakia Survey: Internet Edition). Directed by Jennifer Moody and Lucia Nixon, this was an integrated extensive/intensive survey in southwest Crete which covered an area of 472km^2 (Moody et al. 2003: 44). An initial phase of the survey was conducted in 1986 while the main collection seasons took place between 1987-1990 with study seasons in 1989, 1993-1999 (The Sphakia Survey Internet Edition). The Sphakia Survey was also the first project of its type to fully publish its database on the internet, a medium which allows for the cost effective publication of more data and detail than would be practical on paper (Sphakia Survey: Internet Edition; Moody et al. 2003: 103-4). The aim of the survey was to investigate all human interaction with the landscape of Sphakia, and as such this approach was truly diachronic (Sphakia Survey Internet Edition).

The Sphakia Survey used a complex and hyper-intensive collection strategy for their pottery. This involved highly intensive sampling in the coastal plains which would have always provided the best land for settlements, with non-random samples taken (10%) from *madhares*, a mountainous region within the survey area. On a first walking pass, all pottery was noted and dated if possible. On a second pass, every 100 paces the crew stopped and recorded the number of sherds (if any) within a circle of one meter radius, these were recorded and dated if possible. 'Unusual or particularly diagnostic objects were collected, as well as at least one example of each ceramic fabric represented' (Nixon et al. 1988). Notes on soils and vegetation were also recorded. During the course of the survey just over 13,000 sherds were collected and studied, which included both coarsewares and non-diagnostic pottery as well as finewares and diagnostic pottery. All collected pottery was studied for its fabric. The programme of ceramic fabric analysis employed on the Sphakia Survey was based on the methodology outlined in Moody's doctoral thesis (Moody 1987: 165-86), and was generally done systematically and macroscopically. The condition, shape, size, texture, manufacture, colour, hardness, and inclusions of each sherd were recorded on a special form (Nixon et al. 1988). The results from these investigations were tested and supported microscopically. Through this approach to their ceramics the specialists on the Sphakia survey were able to outline major fabric groups by period, to identify a considerable amount of ceramic material which might otherwise not be identifiable, and finally through the concept of *fabric suites* it became possible to assign dates to some sites based on the presence of single-period ceramic fabrics. While the final publication of the Sphakia Survey is still in progress, the publication of the ceramic fabrics from this project has proven to be of landmark importance to survey archaeologists looking to interpret coarsewares from a site (Moody et al. 2003).

13) *Land of Sikyon* (Extensive Survey of the Sikyonia)-

Name:	Land of Sikyon
Dates:	1996-98
Aim:	To investigate the history of Sikyonian land, moving beyond its civic and temporal boundaries, to cover its countryside from antiquity to the Ottoman era.
Survey Area:	360km^2
Sampling Technique:	Non-collection
Ceramics Collected:	Non-collection
Condition:	All ceramics- studied in-field
Ceramic Fabrics:	Observations on fabrics noted
Count:	N/A

It was out of Lolos' extensive survey of the Sikyonia that the intensive urban-focused Sikyon Survey Project grew. The aim of the extensive survey was "to investigate the history of Sikyonian land, moving beyond its civic and temporal boundaries, to cover its countryside from antiquity to the Ottoman era." (Lolos 2011: 1) This survey was a historical, environmental and archaeological study of the area of the ancient Sikyonia and was, for the most part, conducted by Lolos himself. The project covered an area of 360km^2 and was a non-collection extensive regional survey which took place between 1996 and 1998. Most of the pottery was studied in the field by Lolos. Due to their very different aims, Land of Sikyon and the Sikyon Survey Project are not particularly methodologically comparable. It is important, however, for the present thesis to acknowledge that this survey laid the foundation for many of the central questions relating to the Sikyon Survey Project.

1.4- Sikyon Survey Project

The Sikyonian plateau presents an unusual set of circumstances which lend themselves particularly well to survey. Firstly the geologically defined area is also the same area as the fortified polis-site of Sikyon. Also, most of the area of the ancient city has never been built over, resulting in a clear survey environment. Owing to its close proximity with

Corinth, and the extremely high quality publications from that site, a wealth of published local archaeological comparanda was readily available. Finally, the plateau had been the subject of several excavation campaigns beginning in the late 19th century by the American School of Classical Studies at Athens, and then throughout the 20th century by the Archaeological Society of Athens. These excavations focus on the agora area, the theatre, and the gymnasium of Klinias at the centre of the ancient city.[14] More recently the 37th Ephorate of Prehistoric and Classical Antiquities and the 25th Ephorate of Byzantine Antiquities have overseen a series of building-related rescue excavations on and around the base of the plateau, which will surely shed light on aspects of Hellenistic and Roman Sikyon. For the most part, however, the city of Sikyon had only been extensively surveyed by Lolos prior to the intensive systematic investigations of the Sikyon Survey Project (SSP hereafter).

There were six primary areas of research carried out as part of the SSP: archaeology, geophysics, geomorphology, anthropology, history, and ecology. The primary focus of the present investigation, however, is on the archaeological aspect of the SSP although references to the geomorphological investigations are also made throughout.

The overarching aims of the survey were to study the natural conditions of the plateau, as well as to trace human activity within that survey universe from earliest times to the present day. The SSP was designed to explore these through a series of more specific questions (Lolos et al. 2007: 273-4):

1) The exploration of the chronological phases and *foci* of the settlement.
2) Earliest phases and extent of the settlement.
3) The use of the plateau during the Archaic and Classical periods.
4) The fate of the Hellenistic and Roman city during the Late Roman and Byzantine periods.

[14] For references to these excavations see: Fossum, A. 1905; Krystall-Votsi, K. 1984, 1988, 1991a and 1991b; Orlandos A. 1934-1969; Pharaklas N. 1971 and Philadelphos A 1926.

5) The history of the plateau during Frankish times (the *Castellania* of *Vasilika* from 13th and 14th century documents).
6) Extent and nature of habitation during the Ottoman period.
7) The layout and development of the city during Hellenistic and Roman times.
8) The development of the settlement.
9) Functional divisions within the Roman and Hellenistic city.
10) Shape and extent of the agora area.
11) Density of habitation throughout the lifespan of the settlement.
12) Did the Sikyonia as a whole experience nucleation and decentralization?
13) Did Sikyon develop into a major ceramic production centre after the sack of Corinth in 146 BC?
14) How did Sikyon interact with other cities and regions of the Hellenistic and Roman world?

While the survey was diachronic by design, the vast majority of finds related to the post-303 BC Hellenistic and Roman city thus comprises the main results of the archaeological aspect of the survey. During Hellenistic and Early Roman times Sikyon appears to have been a thriving city. Literary references hint at it, and the results of our survey appear to reinforce the point. While this in itself might not be a surprising revelation, it has wider regional ramifications. Most of the archaeological chronologies used for studying sites in the Peloponnese have been derived from research at Corinth. Corinth, however, was destroyed in 146 BC by the Romans under the command of the general Lucius Mummius. While the totality of this destruction is currently a subject of some debate, it has long been an accepted idea that it was not a complete destruction (James 2010). Most publications of pottery from Corinth, and indeed often at other sites in the Peloponnese, are forced to cite 146 BC as a *terminus ante quem* for Hellenistic pottery, while 44 BC, the date of the re-foundation of Corinth, often serves as the *terminus post quem* for Early Roman pottery. As a result, ceramic chronologies for an extremely important historical transitional period remain blurry. The rich and typologically similar ceramic dataset from Sikyon is well placed to make a significant contribution towards the interpretation of this difficult period.

1.5- Sikyon Survey Project Methodology[15]

As previously noted, the Sikyon plateau is a geologically delineated ca. 250 ha area, which presented a clearly-defined case study for an urban survey. It was not possible to survey all of the 250 ha; the built-up area around the village of Ancient Sikyon was necessarily excluded from the survey, as was the fenced archaeological site of the agora of Sikyon, which has been the subject of several excavations and of geophysical prospection. After these exclusions a surveyable area of ca. 180 ha remained (Fig. 1.2).[16] The 180 ha were then divided into three large sub-areas to create a more manageable survey area. The first of these areas was a ca. 56 ha zone, dubbed the 'Upper Plateau' (UP hereafter). This represented the highest section of the site and is delineated from the lower areas by a geomorphological feature (the edge of the 238Ka terrace previously mentioned) which runs above the *cavea* of the ancient theatre. The remainder of the plateau was a large area with no obvious geomorphological divisions. In the interest of practicality, however, this remaining zone was divided into two parts, separated roughly in the middle by the main modern service road of the Sikyon plateau. The two areas created from our artificial division have been dubbed the 'North Plateau' (NP hereafter) and the 'South Plateau' (SP hereafter) and were 67 ha and 61 ha respectively (Fig. 1.3).

With the establishment of the three major areas of survey, further subdivisions were required in order to increase control on data collection and mapping, and to ensure high-resolution data. A system of *tracts* was devised to serve as such a control. These tracts were based on existing field boundaries on the Sikyon plateau in the hope that it might be possible to account for different data results based on different patterns of land-use.[17] One problem with tracts based on field boundaries, however, is that such subdivisions are not necessarily uniform. In order to reconcile variability in size and shape of tracts, further sub-units, called squares, of 20m x 20m were created (Fig. 1.4).

[15] For a lengthier discussion of the methodology see Lolos et al. 2007.

[16] The village of Archaia Sikyona was the subject of the spolia survey. The area of the agora was excluded as it was the subject of numerous excavations as well as an intensive programme of geophysical prospection.

[17] For a basic example, fields which have been regularly ploughed within an area will tend to yield higher pottery counts than unploughed fields.

An example of the nomenclature of a data unit would look something like 'NP 76.02': data was recorded firstly by plateau 'NP', then by tract '76', and finally by square '02'.

No system of categorizing a landscape will be absolutely applicable, and our system at Sikyon is no exception, with several zones failing to fit into these tract and square divisions. Two cases especially stand out as exceptions: 1) occasionally areas existed which fell within a tract but did not fit into the square system. In these cases, units were given their own *square* numbers, but were not necessarily squares themselves; rather they were of necessary shape and size to fit the edges of the tract; 2) some special units based on features which transcended the tract and square system had to be outlined. The most noteworthy example relates to a large irrigation channel which was cut near the agora area. Due to its location, this channel yielded very high densities of finds (especially Late Roman pottery), however it ran through several tracts, and pottery distributions from this feature could not be reliably mapped as a result. The feature was therefore given its own tract designation, named 'SP76 East Irrigation Channel'.

While selected individual collection units, or squares, were explored by topographical and geophysical survey teams, the majority of the plateau was explored by two teams of field-walkers. Each team was composed of one experienced team supervisor, and five student volunteers. The field-walkers walked each square at intervals of four meters. The walkers made two passes over each square: the first one was to count tiles and pottery using hand-held counters, while during the second pass typologically diagnostic 'feature' sherds as well as non-ceramic finds were collected for study. Total counts and weights of the artefacts were made at the end of every square, as were notes on the square, with particular attention paid to any factors which may aid or impede visibility, which was graded on a scale of 1-5. Every fifth square in a tract was designated as a 'total collection' square (TC hereafter) square, in which *all* finds were collected. While no uniform system of designating the spacing of TC squares was employed, they were generally designed to be roughly equidistant, so as to avoid clusters of them in any one area. In these squares, walkers would make the two usual passes, but on the second pass *all* ceramic material (except tiles) and other small finds would be collected, then counted and weighed in the field and brought back to the apotheke for further study. In particularly high density areas (such as around the Agora), total collection was not always practical, due to extremely high pottery counts (some in excess of 6,000 sherds/square). In such instances a strategy of cross-sampling was employed. In these cases walkers would collect everything along two lines which intersected at the centre of the square, would count and weigh the material in the field, and would bring it back to the apotheke for further study (Lolos et al. 2007: 279).[18] Finally, the locations of non-ceramic archaeological finds of significance were plotted within each square, recorded and were then removed if possible. Non-movable finds, such as architecture or wells, were cleaned and recorded with a 'sub-m GPS either as individual points or as line features' (Lolos et al. 2007: 279). In the five seasons of intensive surface explorations conducted between 2004 and 2008, a total of 2,839 (20 x 20 m) squares, totalling 114 hectares was covered.

[18] The pottery collected from the Total Collection and Cross-Section squares makes up the majority of the data studied for their ceramic fabrics.

Chapter 2:

Setting the Stage: Ceramic Fabrics and Shapes

"At the beginning of our work in Sphakia, students and colleagues would stare at the coarse, battered, but still distinctive sherds we had collected, and ask us what they were, and when they were used. We would stare at the ground, shuffle our feet, wave our hands vaguely, and say, 'Well, the pottery seems to be prehistoric, and the site they have come from might be a small farm, but it is hard to say for sure.' Or we might even have to say, 'I don't know'."

(Moody et al. 2003: 37-8)

2.1- Ceramic Fabric Analysis Overview and Main Techniques

Archaeological ceramics are most often studied using a typological approach which focuses on changes in shape and decoration of vessels to elucidate functions and dates. Ceramic fabric analysis (CFA) refers to the systematic examination and study of the clay matrix and the temper (where applicable) of ceramic objects such as pottery, clay figurines, clay plaques, tiles, and bricks. This mode of analysis falls under the broad banner of ceramic characterization studies, an area of research concerned with the compositional and constructional properties of ceramics (Rice 1987: 309-30). While studying the fabrics of ceramics represents a different analytical approach to the typological one, in order for the results of fabric analysis to mean anything or to be tied into any worthwhile narrative, it is essential that they are combined with typological analysis.

Most modern archaeological projects employ some type of CFA on their ceramic datasets. Through studying the ingredients of a vessel's clay it becomes possible to address questions relating to how a piece of ceramic was formed and fired; technological choices made by the potter; mechanical performance characteristics of a vessel; the possible provenance of the constituent elements of the vessel, trade, and, in some cases is even be used to address some chronological issues (Moody et al. 2003: 53-4; Rice 1987 317-8; Shepard 1936: 389). Many techniques for analysing ceramic fabrics exist, and while no one technique or approach is necessarily better than another, some will be more suited to a particular dataset or to a particular set of questions that researchers wish to ask of a body of material than others. The three major families of techniques for conducting ceramic fabric analysis are: Elemental; Microscopic (MICFA); Macroscopic (MACFA).

1) Elemental Analysis

The first group of techniques is known as elemental analysis. Although none of these were carried out on the material from Sikyon and are therefore not directly relevant to this thesis, the central principal of each technique ought to be briefly reviewed as elemental analysis represents a very important and growing family of techniques for CFA (Hilditch 2008: 105-7; Jones 1986: 15-55).[19] Below are listed seven of the more common techniques used in elemental analysis, all focus on the identification of the elemental composition of ceramics:

i) *Neutron Activation Analysis (*NAA*)*:

Through this technique atomic nuclei within a prepared sample are transformed into unstable radioactive isotopes resulting from the bombardment of the sample with slow neutrons. Gamma rays are emitted from the sample as its isotopes decay into stable isotopic forms. Individual elements within the sample can then be characterized based on the nature of the gamma rays which are emitted during this process (Abscal et al. 1974: 81-99; De Soete et al. 1972; Jones 1986: 16-7; Kruger 1971; Perlman and Asaro 1969: 21-52; Pollard et al. 1996).

ii) *X-Ray Fluorescence* (XRF):

A sample is irradiated using a primary radiation source which causes the displacement of electrons from the inner orbits of the sample's atoms. During this process, the energy levels of the inner electron are filled by electrons from the outer orbits of the atoms. This process causes energy to be released in the form of florescence x-rays. X-rays with characteristic energy wavelengths are emitted in this process which enables researchers

[19] Elemental analysis of ceramics is very often referred to as *chemical* analysis, which in most cases is accurate. As some techniques also employ nuclear methods for analysis, however, the term *elemental* is perhaps a more accurate term to use when discussing this category of techniques as a whole.

to identify individual elements (Bertin 2006; Jenkins 2008; Jones 1986: 17; Van Grieken and Markowicz 2002).

iii) *Optical Emission Spectroscopy (OES):*

In this technique a sample is placed between two electrodes, which send a charge through it. As the constituent atoms within the sample become excited, they release energy in the form of light. A spectrograph with a quartz prism then dispenses the light into different wavelengths which are characteristic of specific types of atoms (Doménech-Carbó et al. 2009; Hedges and McLelllan 1976: 203-7; Jones 1986: 17; Richards and Hartley 1960: 194-6).

iv) *X-Ray Defraction* (XRD):

A polycrystalline or powdered solid sample is bombarded with x-rays. As the x-rays pass through the sample it scatters. The nature of these scatters can be compared to charts of referenced dispersal scatters which can help reveal the crystallographic structure and elemental composition of a sample (Materials Research Laboratory, UC Santa Barbara).

v) *Atomic Absorption Spectrometry* (AAS):

This involves the atomic absorption of light within a sample. Using a hollow cathode lamp which discharges a given element, the light which is emitted from this lamp is passed through a flame into which a solution containing the sample is then sprayed. The amount of light absorbed will be proportional to the concentration levels of the element (Jones, R. 1986: 17-21; Welz and Sperling 1999).

vi) *Inductively Coupled Plasma Mass Spectrometry* (ICP-MS):

Within high temperature argon plasma, samples are decomposed into neutral elements. These are then analysed based on their mass-to-charge ratios (Jarvis et al. 1992; Worley and Kvech 2000).

vii) *Energy Dispersive X-Ray* (EDS):

Energy Dispersive X-Ray Spectroscopy (EDS or EDX) is a technique of chemical microanalysis and is used in conjunction with a scanning electron microscope (SEM). The EDS technique detects x-rays which are emitted from a sample during bombardment by electrons. These x-rays can characterize the elemental composition of the analysed sample. Features as small as 1μm or less can be analysed (Materials Evaluation and Engineering, Inc. 2009).

The various techniques for elemental analysis generally represent the most accurate types of compositional analysis of pottery. Although techniques vary significantly in their effectiveness, XRF and NAA remain the most utilized in archaeological research due to their accuracy, speed and availability. No elemental techniques, however, were used in the analysis of the ceramics collected during the Sikyon Survey Project. Elemental analyses are highly specialised, relatively time-consuming and comparatively expensive processes and as such we were hesitant to engage in this type of analysis without having very specific research questions which could be addressed through these techniques.

2) Microscopic Fabric Analysis

The initial aim of this author's project was to try to distinguish local pottery from non-local pottery, especially Sikyonian pottery from Corinthian pottery. How the enormous ceramic dataset from the Sikyon Survey Project might best be utilized was also a concern, and we decided that ceramic fabric analysis would enable us to interpret more of our data than we otherwise might through exclusively studying typologically diagnostic sherds. We also hoped that it might be possible to identify clay sources and to study semi-typologically diagnostic amphora fragments by fabric. The basis for these investigations was petrographic analysis of ceramics and clays using Thin Section (TS hereafter) petrography. TS petrography was the only form of MICFA undertaken on material recovered from the Sikyon Survey Project and was used in the first instance to check macroscopically established fabric groups and families as identified by the author. At a later stage it was used more extensively during investigations to trace the provenance of ancient Sikyonian clays and to study the fabrics of some imported amphoras.

As a technique TS petrography strikes an excellent balance between cost-effectiveness, relative speed, and accuracy in the identification of minerals within ceramic fabrics. Preparation of a single TS slide costs the Fitch Laboratory in the British School at Athens 15 euro. On average, projects require between 150-400 slides to be made and examined (E. Kiriatzi Pers. Comm. April 2011). Therefore the cost of sample preparation will range from 2,250-6,000 euro. In Greece an official permit is required for ceramics to be thin-sectioned it can take from two to three months to over a year for the permit to be processed, as petrography is a semi-destructive analytical technique.

Preliminary MICFA for the Sikyon material was carried out in the Fitch Laboratory by Kiriatzi, while a later more detailed analysis was carried out by the author. Initially the author, along with Kiriatzi, Lolos and Tzavella sampled a range of river sediments close to Sikyon, along with clays from beds on and around the site, as well as taking samples of pottery collected during the Sikyon Survey. These samples of ancient Sikyonian pottery were chosen based on preliminary fabric groups as identified macroscopically by the author. Two samples were taken from each selected piece of ancient pottery. One sample of each was fired in a test kiln in oxidizing conditions to 1,050^{0}C, so as to allow for the analysis and uniform comparison of evenly fired pottery. After the sample was fired, it and the piece which was not re-fired, were impregnated with a low birefringence epoxy resin, attached to a glass slide, and then ground down to a thickness of 30μm (0.03mm). The slides were then examined under a polarizing microscope at 40x and 100x magnifications. A similar approach was taken for the sampled clays discussed in Chapter 3. The samples viewed under the microscope were examined for microstructure (e.g. voids, orientation of inclusions), groundmass, colour and optical activity in cross-polarized light and the types, sizes and frequency of inclusions and other concentration features. This analytical process sheds light on three main areas of interest: 1) the general geological composition of a vessel, which is compared against sampled local geology 2) clay preparation methods 3) firing practices.

TS petrography was especially useful for studying clay sourcing and as a check for the initial macroscopic analysis.

3) Macroscopic Fabric Analysis

Although MICFA is significantly less expensive than those techniques used for elemental analysis, it is nonetheless a process that can cost a considerable amount of time and money, and a sampling strategy must therefore be carefully considered. 121 ceramic thin sections were prepared from ancient Sikyonian pottery and analysed, which took several months and cost slightly over 1,800 euro. These 121 sherds represent only a tiny proportion (0.003%) of the 700,000+ sherds collected during the course of the survey. MICFA study of a statistically viable proportion of all the sherds studied during the Sikyon Survey Project was therefore not practical or necessary. The majority of CFA conducted during the Sikyon Survey was done macroscopically. Although MACFA has been practised for over a century on pottery, it was really the work of Jennifer Moody that saw it applied in a focused and systematic way to archaeological survey (Kiriatzi 2003: 124; Hilditch 2008: 104).

MACFA involves the systematic examination of ceramic fabrics without the aid of prepared microscopic samples. In other words, empirical observations about the clay matrix of ceramics form its basis. While this might sound like a rather basic form of analysis, it is an extremely effective method. As with all other modes of CFA, its usefulness lies in both the sampling strategies implemented and also in the questions asked of the data. Methodologies for MACFA, therefore, can vary significantly by project, and can even vary within the same project.

MACFA was carried out in two different phases during the course of the Sikyon Survey Project. The first was designed to establish the range of fabric types and families that we had at Sikyon, to separate pottery into fabric categories and to quantify potentially local and non-local forms. The second phase was much more detailed and was designed to address issues including clay sourcing, technological choice, provenance studies and vessel mechanics. Only the basic approaches will be mentioned here as the various MACFA methodologies used on the Sikyon Survey Project are discussed in detail in Chapters 3 and 4. The approach relied heavily on the examination of as many sherds as was practical to study. Variables such as: surface and core colour; inclusion colour, size and sorting; hardness of the fabric; and the nature of breaks in the ceramic were all considered for each sherd. The MACFA investigations at Sikyon were conducted with no magnification, with 10x and 20x jeweller's loupes, and finally with a 40x handheld microscope. A Munsell Soil Colour Chart (Munsell Soil Colour Company 2000) was used for colour references in order to minimize terminological relativism and a Mohs Scale of Mineral Hardness for testing hardness. Sorting, size and density of aplastic inclusions in the fabrics were studied with reference to Wentworth Grain Size Charts (Wentworth 1922), the soil charts included in the Munsell Soil Colour Charts, and a ruler. Other tools occasionally used included pliers for creating fresh breaks in the ceramic where required, a knife for testing hardness, a digital weighing scale, and dilute hydrochloric acid used to test for the presence of calcareous grits.[20] MACFA has proven both extremely useful and accurate in differentiating fabric groups and families at Sikyon. It was low cost, accurate and fast which made it an attractive method for studying a large amount of material, while being able to address statistical issues that MICFA was not practically capable of addressing. Together with MICFA to help ensure its accuracy, and with typological analysis to help with the chronology and functional interpretation of the material, MACFA proved to be an extremely useful and practical approach to the very large dataset at Sikyon.

2.2- Ceramic Fabric Analysis in the Aegean as Relates to the Sikyon Survey Project

Ceramic fabric analysis has been carried out on Aegean ceramics in various forms since the nineteenth century (Dawkins and Droop 1910-11; Evans 1921; Hilditch 2008: 103; Hogarth et al. 1899; Mackenzie et al. 1899). Indeed MACFA played a major role in the construction of ceramic typologies in the Aegean area during the early and mid-20th century (Evans 1921; Furumark 1950; Harland 1924; Hilditch 2008: 103; Tsountas

[20] Thanks must go to J. Moody and E. Kiriatzi who patiently listened and suggested these approaches over a series of conversations.

1908). For the majority of the 20th century, however, ceramic fabrics were paid comparatively little scholarly attention, with both the shape and decoration of fineware pottery occupying prominent roles in the majority of investigations which involve archaeological ceramics.

The story of the establishment of systematic ceramic fabric analysis in the Aegean actually begins in the American southwest with the research of Anna Shepard. The 1936 publication of Shepard's study of the ceramics from Pecos, New Mexico outlined her methodology for the characterization study of pottery. This work relied heavily on ceramic fabric analysis to determine the origins of the pottery she studied and was a defining influence on the two scholars who introduced this type of research to the eastern Mediterranean: Wayne Felts (1942: 243) and Frederick Matson (1937: 325-7). The publication of Shepard's seminal work 'Ceramics for the Archaeologist' called for fabric analysis (although not yet specifically named) to be a standard part of studying pottery assemblages.

Modern systematic ceramic fabric analysis began in the Aegean around 1940 with the petrographic analysis of ceramics by Felts and Matson (Felts: 1942; Matson: 1942). While petrographic analysis had been practiced for some time in Greece on the marble of Classical sculptures and their source quarries (Lepsius: 1890), it had not been applied to the analysis of ceramics. Coincidently both scholars published the results of their respective studies in 1942, Felts from his research at Troy and Matson from Antioch (obviously outside the Aegean). While Felts, a geologist, did not continue working in archaeology within the Aegean after publishing his results, Matson did.

The story of the development of ceramic fabric analysis in the Aegean once again takes us back to the previously discussed University of Minnesota of Messenia Expedition, which as well as setting the standard for archaeological survey in its day also utilized a highly innovative approach to the ceramics collected during the project. (McDonald and Rapp 1972: 200-24). This was conducted by Matson and built upon his previous work in the Amuq Valley, Turkey (Braidwood and Braidwood 1960: 31-35, 42;

Matson: 1945). Matson was interested in the production of roof tiles, bricks and pottery as the best ceramic survivals from their survey data. He studied the shapes and decoration of some 5,000 ceramics macroscopically using a 3x hand lens and, where needed, a 60x microscope. After these initial fabric examinations, Matson then sampled 12 pieces for TS petrographic analysis, through which he hoped to address issues relating to the method of manufacture; degree of firing; surface texture, and the paste texture of the sampled ceramics (Matson 1972: 201; Winther-Jacobsen 2010: 16). Matson's ground-breaking research for UMME also included ethnographic comparisons, clay sourcing experiments, test firings, the introduction of both the Munsell Soil Colour charts and the Wentworth Grain Size chart (McDonald and Rapp 1972: 200-24). Not only did Matson pioneer new ways of looking at ceramics but he also demonstrated that through this type of research it was possible to address broader sets of issues relating to ancient economy, manufacturing, trade and technology.

With the publication of the UMME, the benefits of Matson's methodology became clear. Aegean prehistoric archaeologists were quickest to take up an interest in this type of research, especially the microscopic aspect, perhaps as a result of Matson's own prehistoric focus (Betancourt et al. 1979; Einfalt 1979; Meyer and Betancourt 1981; Noll 1979; Riley 1981, 1983, 1984; Williams 1979). Scholars of the Late Antique period picked up on the benefits of CFA too and began to include it in their research relatively soon after, possibly as a result of the diachronic work of Riley (1979, 1979b, 1981, 1983, 1984), while Classical archaeology lagged, and indeed in many ways continues to lag, in this area. The latter does not appear to be the result of a lack of interest in the science, rather scholars of Classical archaeology tend to be less concerned with issues of trade, economy, production and technological control than scholars of prehistoric, or Late Antique and Medieval archaeology (Moody 2003: 40, f.12). Recent innovative publications, most notably 'The Athenian Agora XXXIII: the Hellenistic Coarsewares', however, present the clear benefits of incorporating ceramic fabric analysis into the study of antique ceramics and will surely set a new standard for the types of questions asked of ceramics by Classical archaeologists (Rotroff 2006).

One area of ceramics research which has a comparatively long history of integrating ceramic fabric analysis and typological analysis is the field of amphora studies. Amphoras were the primary means of shipping oils, wine and foodstuffs in the ancient and post-antique Mediterranean. As a result of their prominent role in commerce, city-states standardized amphora production in the interest of imposing standard taxes and duties on their contents. As a result of their standardized production and their close association with trade, the ceramic fabrics of amphoras have been the subject of considerable investigations as their compositions could well hint at the origins of their clay. A good example of this type of integration is the research of David Peacock. Peacock carried out extensive and very detailed integrated microscopic studies on Roman amphoras, beginning in 1968. His work has led to several landmark publications in the area, including the recent, and perhaps most relevant for the present study "Roman Amphorae: a digital resource".[21] This is an online database with typological descriptions, technical drawings, associated bibliographies, and often images of microscopic and macroscopic views of ceramic fabrics in a searchable format. Peacock's research paved the way for subsequent scholarly research on amphora fabrics. As concerns Classical archaeology in Greece, however, a former student of Peacock, Ian Whitbread, perhaps brought ceramic petrology and ceramic fabric analysis to the attention of Classical archaeologists more than anyone else to date (Whitbread: 1995).

Whitbread's most influential work his 1995 'Greek Transport Amphorae: A Petrological and Archaeological Study' focussed on several classes of Archaic to Late Classical period transport amphoras. As well as researching the known history of production areas of the major amphora types he studied, Whitbread also undertook detailed studies of stamps and the shapes of these vessels as well as a program of extensive geological sampling around each possible production site. His main case study was amphora production in Corinth and he built upon the earlier archaeological science work of Marie Farnsworth (1964; 1970) and Richard Jones (1984; 1986) at the site. Whitbread addressed both the analytical framework of petrography and incorporated

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[21] Keay and Peacock 2005- *Roman Amphorae: a digital resource.* See: http://ads.ahds.ac.uk/catalogue/archive/amphora_ahrb_2005/index.cfm

techniques from soil micro-morphology, while framing his discussions firmly within greater historical narratives concerning issues of economy, trade and amphora production, making it accessible to ceramic fabric specialists and non-specialists alike.[22] The highly successful reception of Whitbread's work is rooted not only in his exemplary scholarship, but also in his ability to ask questions of the data which are particularly relevant and accessible to ancient historians, archaeologists, and students of petrology alike. Whitbread's work at Corinth is frequently referenced throughout this thesis, as are several more recent studies which have grown out of his research at the site including the work of Joyner on Byzantine and Frankish cooking vessels from Corinth (2007) and most recently Graybehl (2010) which focussed on Late Roman cooking vessels at the same site.

While TS petrography became an increasingly accepted and valued technique for analysing aspects of ceramics, systematic macroscopic analysis of ceramic fabrics did not gain such broad acceptance as quickly. Macroscopic analysis was generally always part of any sort of ceramic fabric analysis, but was mostly employed as part of a sampling technique as opposed to an analytical technique in itself.

Moody devised a methodology which called for the systematic collection and study of all pottery, coarse and fine, typologically diagnostic and non-typologically diagnostic alike (Moody 1987). She devised a system for ceramic fabric analysis which allowed all sherds to be studied to some degree. This system was also accessible to non-specialists as it did not involve highly-specialized laboratory equipment and was extremely economical, while also being quick enough to deal with large amounts of ceramic material. Most importantly, as proved through the results of the Sphakia Survey, Moody's approach was a highly accurate method for classifying and studying the ceramic fabrics from the survey (Moody et al. 2003). Echoing the work of Sheppard, Moody called for ceramic fabric analysis to be a fully integrated aspect of archaeological

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[22] Four centres dedicated to scientific analysis of archaeological material deserve much of the credit for promoting this strand of scholarship: The Marc and Ismene Fitch Laboratory in the British School at Athens, the Demokritos Laboratory in Athens, the Weiner Laboratory at the American School of Classical Studies at Athens, and finally the F. Matson Laboratory in the INSTAP Study Center in East Crete.

investigation as a means of addressing the enormous proportions of non-typologically diagnostic coarsewares found on archaeological surveys in Greece. She called for the systematic investigation of a broad sample of ceramics to be done macroscopically, using nothing more high-powered than a 30x hand-held microscope. Each sherd was to be examined using a standardized set of criteria which focused on its physical properties such as: surface and core colour; hardness; texture; break-type; as well as the colour, size, shape and frequency of non-plastic inclusions in the fabric biscuit. Moody's methodology called for the study of thousands of sherds, indeed the success of her research design is very much complemented by the statistical data it can generate, and thus this programme of study needs to be carried out extensively on a large amount of pottery (Moody: Pers. Comm. October 2010).

Through the systematic and detailed study of the fabric of each sampled sherd, Moody was able to group her ceramics into individual fabrics and fabric families. The distribution of each fabric and fabric family was mapped, and where possible dates and typological details mapped by vessel type and by date range, which was based on shape-diagnostic material. The attractiveness of this approach is threefold; it is fast, inexpensive and accurate, and thus enables investigators to examine large amounts of material which would otherwise likely be ignored, or at best simply counted and weighed, which has led to its widespread incorporation on archaeological survey. While it is possible to explore ceramic fabrics more accurately and in more detail using microscopic means such as thin-section analysis, the speed and cost of Moody’s methodology make it possible to examine large amounts of collected material which is not practical microscopically. For example, Matson was able to examine 308 sherds from the Amuq Valley. From the UMME, 12 sherds were selected for microscopic analysis after preliminary fabric sorting with a hand lens (Matson 1945; McDonald and Rapp 1972: 205; Petersen 2009: 5). Modern projects which incorporate microscopic ceramic fabric analysis usually sample between 150 and 400 sherds.

Moody sought to develop a methodology which would be accessible in practice and interpretation to non-specialists in ceramic petrology but her approach does require a fairly in-depth knowledge of geology and/or mineralogy. A ceramic fabric is essentially a combination of a clay matrix and aplastic minerals or other similar material. Identifying the latter, however, is not always possible, as particles range in size from several centimetres to truly microscopic. Petrography specialists argue that overlooking the smallest inclusions within a clay matrix can mean potentially misunderstanding the origin or production site of a piece (Peterson 2009: 2). This criticism has not necessarily been an issue in Moody's own research as she has a strong familiarity with geology, and indeed microscopic studies of her work, notably from Sphakia, have supported her identifications. In other situations, however, where a ceramicist is not so familiar with ceramic fabric analysis, this could potentially represent a problem. The most common solution to this problem, and one used by Moody herself, is to incorporate an integrated system of microscopic analysis to aid with questions related to provenance and to calibrate the results of macroscopic analysis, while using the latter to study the majority of an assemblage (Kiriatzi 2003: 124). Since the publication of the Sphakia Survey, most surveys include references to this work in their ceramic methodologies. Few, however, are as detailed as Moody in their research, with many making note of ceramic fabrics, but not actually integrating this data into their typological results.

2.3- Ceramic Typology and Chronology

At its core the present study is an investigation of the ceramic fabrics of Sikyon. Contextualizing ceramic fabrics and attaching them to meaningful narratives, however, relies heavily upon the integration of typological analysis as well as known historical events. It is through typological analysis that dates and chronological and functional interpretations are possible. In other words, if we only examined the fabric of a vessel and some local clay, we could interpret the composition and firing of that vessel as well as possibly understanding where the clay used in it was sourced. Through analysis and interpretation of the shape it might also become possible to attach a probable date of production and a possible intended function, so we might be able to say that we have a Late Hellenistic stew pot for example. The typological analysis of the relevant Hellenistic, Roman and Byzantine ceramics on the Sikyon Survey Project was undertaken by Peter Stone (University of Cincinnati) and Elissavet Tzavella

(Birmingham University) respectively, and Roman finewares, although not discussed at length in this thesis, were studied by Matthew Maher (University of Winnipeg), while the amphoras were studied by the author along with Stone and Tzavella. The typological analysis discussed in this thesis is rooted in these studies, and has been amended in places by the author.

The typological interpretations of the ceramics at Sikyon are reliant on relevant published detailed studies in the broader geographical area, of which there are many. Some of the more relevant works for this investigation are mentioned here as this will help place the interpretations of this study in context. Sikyon's close proximity to Corinth, Isthmia, Argos and Athens, and the wealth of published ceramic comparanda from these sites, have made it possible to interpret a significant amount of the ceramics from the survey. The main chronological divisions which appear in this study have been listed by broad period, such as Early Roman or Middle Roman. This has been done in the interest of caution; for example a vessel which appears in Corinth around the first quarter of the 2nd century BC does not necessarily have exactly the same time frame at Sikyon. While it is likely that these will be close in date, it seemed safer to provide a general chronological indicator for the Sikyon material for now in the hope that dates and chronologies will be refined through excavations at the site.

The chronological and functional interpretations upon which this thesis relies primarily come from a range of sites in southern Greece. The first and most relevant to Sikyon is obviously Corinth. The publications from Corinth which are frequently cited in the present work in rough thematic chronological order are I. Whitbread's *Greek Transport Amphoras* (1995), G. Roger Edwards' *Corinthian Hellenistic Pottery* (1975), E. Pemberton's *The Sanctuary of Demeter and Kore - The Greek Pottery* (1989), K. Slane's *The Sanctuary of Demeter and Kore - The Roman Pottery and Lamps* (1990), O. Broneer's *'Teracotta Lamps'* (1930) and K. Slane and G. Sander's 'Corinth: Late Roman Horizons' (2003).

Although a ground breaking study in its day, some of the chronologies presented in Edward's *Corinthian Hellenistic Pottery* have been called into question (e.g. by Rudolph 1977: 247) and it is largely accepted that an update to this important work is needed. The recently completed dissertation of Sarah James (2010) aims to address some of the chronological issues noted in the work of Edwards, however, at the time of writing, it was not possible to access this much-anticipated work. Instead within the pages of this study, more emphasis is placed on the chronologies and interpretations of Anderson-Stojanovic and Reese (1993), and Anderson-Stojanovic (1996) from the Rachi settlement at nearby Isthmia, which provides a good guide for the ca. 150 years prior to 210 BC. Bald Romano helps fill in part of the later Hellenistic period in the area through her study of a Corinthian deposit which dated to Middle-Late Hellenistic times (1994).

The Roman period in the area is generally well-covered by the outstanding and extensive work of Slane.[23] Additionally, publications by Abadie-Reynal (2007) at Argos was well as Pickersgill and Roberts at Sparta (2003) served as extremely helpful reference works.

Another very important site to this study is the Athenian Agora. Although not as geographically close as Corinth the enormous amounts of material and excellent standard of publication from the Agora provided an important extra dimension to the Corinth publications, and in the case of the post 146 BC – Hellenistic period, the Agora was the most important reference work. The work of Susan Rotroff (1982, 1997, esp. 2006) provided invaluable parallels for Hellenistic ceramics found at Sikyon, and indeed also does an excellent job of integrating ceramic fabric studies and typological analysis, especially with reference to unguentaria (2006: 137-60). Vogeikoff-Brogan's work on Late Hellenistic pottery from Athens was also useful (2000). Robinson's study of Roman ceramics from the Agora was an important reference work for this thesis and helped fill in some of the spottier Early Roman period at Corinth (1959). John Hayes' (2008) study of the finewares of the Agora is an exemplary work and although not often cited in the

[23] Whom the author would like to thank for much advice and extremely valuable insight on a broad range of ceramics related issues and encouragement during the years of the Sikyon Survey Project.

present thesis, hopefully foreshadows great things for his forthcoming study of the Roman plain wares from the Agora. Hayes' seminal *Late Roman Pottery* (1972) was important for referencing later material, while his works on both Cyprus (2003) and Knossos (1983) also provided very useful comparanda for Hellenistic and earlier Roman material. Callaghan's research at Knossos proved helpful as well with the interpretations of some of the Hellenistic and Roman ceramics from Sikyon (in Sackett et al.1992).

Moving further afield, Riley's publication of the pottery from Berenice (Benghazi) proved to be an extremely useful work, especially as relates to Middle and Later Roman amphoras (1979). Finally as previously mentioned in relation to the fabrics, the work of Whitbread (1995), that of Peacock and Williams (1986) and the University of Southampton hosted "Roman Amphoras - A Digital Resource" by Keay and Williams (2005) were invaluable references in the interpretations of the amphoras from Sikyon.[24]

2.4- Ceramics Methodology with an Emphasis on Ceramic Fabric Analysis (Overview) –

As with many other survey projects, and other types of diachronic studies, several methodologies for examining ceramics were employed on the SSP. Even the ceramic fabric analysis (CFA) was conducted through three different methodologies, and each one of these will be addressed in more detail in the relevant chapter. The present section on methodologies provides a general overview of the process for studying the pottery collected during the SSP, of the main aims of this study, and of the interface between ceramic analysis and the survey.

Unsurprisingly, ceramics represent by far the vast majority of collected artefacts from the survey, with in over 739,313 sherds collected. Due to the enormous amount of collected pottery, as well as a desire for the most accurate interpretation of the data, the total ceramic assemblage was divided up and studied by a variety of specialists. At the end of every day the collected artefacts were taken to the apotheke for processing. The pottery was kept in separate bags for each square, while other special finds were bagged

[24] http://ads.ahds.ac.uk/catalogue/collections/blurbs/463.cfm

individually within each square-bag. Ceramic finds were washed in water by the field-walkers in the evening under the supervision of the pottery specialists. Once washed to a suitable standard the pottery was left to dry, separated by square, on boards or on concrete for 2-3 days for practical reasons.[25] The dried pottery was then analysed by the relevant specialists. Typologically diagnostic ceramics from non-TC or cross-section squares were examined by Elissavet Tzavella and Peter Stone who studied Classical/Hellenistic and Roman/Byzantine/Ottoman shapes respectively. Diagnostic material outside these periods was extremely rare, and where it found this was set aside for study by Julia Herbst-Tzonou (prehistoric), Matthew Maher (Roman fineware). Ceramics from TC and cross-section squares underwent initial CFA and were separated by fabric with each fabric family being classified, counted and weighed by the author before going to the shape specialists for typological study. During the processing of the ceramics, indexed reference trays were created to display particularly indicative shapes (by Stone and Tzavella) and fabrics (by the author). These trays served as simple reference collections to aid the ceramic specialists, but were also for the benefit of non-specialists who wanted to identify a particular shape or fabric for consistency of nomenclature and terminology.

The general aims of studying the pottery from the Sikyon survey were to delineate areas of the plateau based on functional usage, to study the range and dates of human occupation, to look at the changing nature of the settlement on the plateau, and finally to look at industry and trade at Sikyon. By integrating an intensive programme of CFA with the typological studies it was hoped that it would be possible both to study local pottery production in more detail than would otherwise be possible, and also to make better use of the complete ceramic assemblage recovered from Sikyon. The author was responsible for classifying, counting and weighing ca. 90,000 sherds and mapping their distributions. In addition to this a small but representative sample of major fabric-types was examined using thin-section petrography. The fabrics of approximately 2,000

[25] I acknowledge the potential benefits of leaving pottery to dry for longer periods, but in a 4-week season we did not have the time to let it dry for 6-8 weeks as seems ideal for quantification. For more on this see: Slane 2003: 324.

other sherds were examined by the author using a hyper-intensive systematic macroscopic methodology. The material that was subjected to CFA was drawn from TC squares, indexed shape diagnostic sherds, non-diagnostic amphora fragments, and finally some randomly sampled pieces from various areas on the Sikyon plateau to help ensure statistical accuracy.

There were three key areas of research being explored through ceramic fabric analysis (CFA) at Sikyon:

1) The establishment of local and non-local Sikyonian ceramic fabrics. Of particular importance to this aspect was to attempt to differentiate local fabrics from those produced in the greater geological region, at Corinth and to a lesser extent, at Stymphalos and Phlius.
2) The exploration of pottery production at Sikyon from Hellenistic times to the Early Byzantine period. Through an intensive integrated programme of MACFA and MICFA on locally produced amphoras, cookwares and kraters some temporal fluctuations in the composition and firing of the main local fabric family have become apparent. The potential technological and chronological ramifications of this remain the subject of on-going research.
3) The study of imported amphoras through CFA. Due to their durable construction and wide distribution, amphoras tend to have high survival rates on archaeological surveys in the Mediterranean region. The majority of amphora fragments found at Sikyon were not necessarily typologically diagnostic, especially in the case of handles. Due to their broad range in fabrics, however, and a number of high quality publications which place strong emphasis on amphora fabrics specifically, CFA can help shed light on some of these vessels' origin of manufacture.

Chapter 3:
Establishing 'Local': Heat-Damaged Ceramics, Vessel Types and Sikyonian Clays

'ΕΝ ΤΩ ΠΙΘΩ ΤΗΝ ΚΕΡΑΜΕΙΑΝ ΕΠΙ ΧΕΙΡΕΙΝ ΜΑΝΘΑΝΕΙΝ'
(Gorgias 513E/Christakis 2005:44)

Introduction

Ceramics from Sikyon and Corinth can be extremely difficult to distinguish from one another. Corinth is one of the largest and most thoroughly published archaeological sites in Greece, whilst Sikyon had until recently only been explored in a piecemeal fashion through a series of largely unrelated excavations. Many of the surface finds recorded during the Sikyon Survey Project have parallels in material excavated from stratified contexts at Corinth. For the most part, these similarities in the material culture of both Sikyon and Corinth have been of incalculable benefit to the Sikyon Survey Project as it has enabled researchers on the project to gain much higher chronological and functional resolution on the collected ceramics than would be possible on surveys in less well-explored regions. A downside to this similarity, however, arose when exploring the possibility of ceramic production having taken place at Sikyon, as the first step in this involved attempting to look beyond some of this similarity in order to differentiate pottery from both Sikyon and Corinth.

Differentiation of ceramics from both Sikyon and Corinth is hardly a new problem. Friis Johansen's *Sikyoniske Vaser: En arkæologisk Undersøgelse* (1919), or as the title translates, *Sikyonian Vases: an Archaeological Survey*, was the first attempt to publish Sikyonian pottery. Johansen intended to produce a typology of Geometric and Early Archaic pottery, a lot of which was found in Delphi, and some at the Heraion of Perachora. He hypothesized that much of this pottery had come from Sikyon, which was by no means illogical as he noted that it differed slightly from what had until that point been understood as Corinthian. During Archaic times, Sikyon had been a famous artistic centre, which was also heavily involved in politics at Delphi, and in the Corinthian Gulf in general where a lot of this pottery was found. Friis Johansen's theory, therefore, was that the highly decorated, Corinthian-looking vessels largely found at Delphi and

Peracora (both of which are closer to Sikyon than to Corinth) were of Sikyonian origin (Fig 3.1). Humfry Payne's 1931 publication, *Necrocorinthia,* and his subsequent excavations at Perachora, along with more recent work at both Isthmia and Corinth, however, appear to have proven a Corinthian origin for these classes of pottery (Dunbabin 1962:3).

The case of Friis-Johansen's *Sikyonian* pottery serves as a good introduction to a crucial challenge faced during the Sikyon Survey Project, namely the identification of local Sikyonian pottery. The importance of being able to identify local pottery cannot be overstated on an archaeological survey. The ability to identify local pottery can help enable archaeologists to interpret the nature and scale of a local ceramics industry as well as to hypothesize about the size and nature of related industries and economy within a survey area (Moore 2001; Zifferero 2005: 60-8). Additionally, the types and quantities of vessels produced within a specific area could potentially shed light on other economically important industries which may have required specific vessel-types, such as large-scale perfume production that would have required the production of oil flasks to transport the product to markets. Conversely, a lack of certain locally-produced ceramic types may also suggest that a site was importing certain goods at certain periods, for example dried fruits during Early Roman times from the Campania region (Callender 1965; Panella 2002; Zevi 1966). From a chronological perspective, understanding a site's ceramics industry is also very important for the establishment of relative ceramic chronologies at that site and within a broader region. An aim specific to the ongoing research at Sikyon is to understand more about the material culture of the Late Hellenistic-Early Roman transition, a period which is not well represented in the archaeological record at Corinth.

During the 2005 season of the Sikyon Survey Project some malformed, very hard, rough, greenish sherds were collected (Fig 3.2). These sherds were the remains of heat-damaged vessels, and were to prove among the most useful of all the ceramics collected during the survey. These sherds came from vessels that were either damaged by heat during the firing process, or by other exposure to extreme temperatures, such as a fire.[26] Vessels such as cooking pots can also fall into the heat-damaged category due to their function, although the comparatively low temperature of cooking fires would have been unlikely to alter the structure of a ceramic beyond darkening its exterior. As pertains to the present investigation, the term "heat-damaged" refers to those sherds which exhibit the effects of heat-exposure, from cooking pots with highly burnt surfaces, at one end of the spectrum, to kiln-wasters in which the ceramics sintered during production, at the other. Kiln-wasters are by-products of ceramic production formed accidentally during firing. They serve no function and would likely have been immediately discarded. As a result, kiln-wasters were rarely if ever found far from ceramic production workshops, and provide very strong evidence for pottery production within a given area (Homann-Wedeking 1950: 165; Young 1937: 138). Differentiating kiln-wasters, which would indicate ceramic production, from other heat-damaged ceramics, which may indicate functions as common as cooking, was a challenge at Sikyon, one which was carried out through a combination of examination of associated finds, and obvious morphological deformities which would have made a vessel unusable.

One area in the SP (South Plateau) exhibited particularly high concentrations of heat-damaged pottery. Due to the density of these concentrations the area was interpreted as a possible location of a kiln, several kilns, or at the very least, an ancient industrial dumping zone. We did not know, however, during which period, or periods, this/these possible kiln(s)/dumping zone may have been in use. Furthermore, it was unclear which types of vessels these kiln-wasters might represent or for that matter if they represented a range of vessel-types, or just one specific vessel-type. Nor was it clear whether changes in production could be seen over time. As the possible kilns were located inside the city walls, what might we deduce about the technological landscape of Sikyon: was the clay also sourced from within the walls or were ceramics simply being produced near to their market? Also, while the presence of heat-damaged vessels at a site most likely indicates a

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[26] As can be seen in the heat damaged cups from the Palace of Nestor in the Pylos Archaeological Museum.

local ceramics industry, it was necessary to compare the composition of these ceramics with local clay types microscopically, to further explore this possibility.

The main aims of the current chapter are to outline how it was established that ceramics were being produced at Sikyon, what types of ceramics these were, and to understand the chronology of this industry. Finally, building upon these details, a preliminary characterization of the ceramic fabrics of the Sikyonian pottery could be compared with the composition and physical properties of several sampled local clays in order both to test the hypothesis of local production, but also to test for possible ancient clay sources.

Part 1- Ceramics Production

3.1.1 – *Ceramics Production*

Prior to beginning an investigation of ceramic production at Sikyon, it essential to discuss some points about the manufacturing process of ceramics in general. Terms and definitions relating to the production process appear with some frequency and these ought to be discussed and standardized within the scope of the present investigation. Furthermore, by discussing the complete production process, it will clarify which steps we can, and cannot, expect to trace at Sikyon.

At its most basic, ceramic is formed when clay mineral and water are mixed and heated to a temperature above 250-300^{0}C (Rice 1987:87). Further description becomes significantly more complicated as so many variations exist at virtually every stage of production. The four essential phases of creating ceramics, however, are as follows: 1) Clay selection 2) Clay preparation 3) Vessel formation 4) Firing (Rye 1981: 3).[27] These four phases and the *chaîne opèratoire* they represent form the outline of the current section.

[27] I have omitted any mention of decoration at this stage as the vast majority of those ceramics recovered during the Sikyon Survey Project which compose the data for this thesis were undecorated or their decoration did not survive intact.

3.1.2 *Clay Preparation*

Once suitable clay has been sourced, cleaning is usually required in order that large organic and mineral inclusions and any other impurities are extracted prior to the sample being immersed in water. The immersion process is known as levigation, which is a method for further cleaning and removing impurities in a clay. Once sufficiently cleaned through sieving and/or levigation, clay should be kneaded or *wedged* on a porous surface to draw out excess moisture, to help smooth out any especially hard sections in the clay and to eliminate as many air bubbles as possible, which can cause firing irregularities (Rice 1987: 119). Cleaning of clays can vary depending on the amount of impurities present. For example, Nektarios Garis, one of the few Greek potters still practising traditional clay extraction and firing methods, sources the potting clay he uses to make Aeginetan water jugs from a deposit near Mesargos on Aegina, precisely because it is very fine and does not require levigation (see Gauss and Kiriatzi 2011: 74-8) (Fig 3.3).[28]

At this stage mineral temper may be added in order to boost certain desired properties of a clay. For example, quartz might be added as a temper to increase heat resistance in a vessel (Kilikoglou et al. 1998: 273-4), or shell to boost the shock resistance (Rice 1987: 407; Rye 1981: 33-6). Other added tempers which can be found in pottery in the Aegean include chert, mudstone, sand, organic matter such as grass, grog (ground-up ceramic vessels), and mica (Kilikoglou et al. 1998; Petersen 2009:10). Adding a temper would often involve the smashing and/or grinding of the desired additive, and adding it to the wet clay matrix, and is almost always done prior to forming. An exception to this is vessels that might require a particularly coarse surface, such as mortaria or grinders. In these cases temper was added to a surface after forming as only a specific part of the vessel would need to be rough (Pemberton 1989: 185 no.639). Indeed when looking for a possible temper in a ceramic thin section, a researcher will often pay particular attention to the presence of angular inclusions, as these could suggest that a

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[28] The author was introduced to Nektarios Garis by E. Kiriatzi, who studied his pottery production methods and analysed clay from the Ag. Thomas bed as well as vessels made from it. For the results of this study see Kiriatzi and Gauss 2011.

mineral had been artificially broken or ground and added to the clay (Reedy 2008: 131, 151; Rice 1987 409-11; Rye 1981: 31-2, 37; Shepard 1956: 117).

3.1.3- *Vessel Formation and Drying*

Once clay has been suitably prepared it is ready to be formed into a vessel shape. Forming can be achieved through a number of techniques; in the Aegean area the most common are by hand, by wheel, and by mould.

Handmade vessels are generally formed in one of two ways, either by a potter sculpting a single lump of clay by pinching and drawing it up into a rough desired shape or through forming coils. The latter involves making a series of small spirals from a clay sample and forming them into rings. These rings are then stacked on top of one another and then are pressed and smoothed together by the potter (Rice 1987: 125; Rye 1981: 62, 67-9). This manufacturing technique can generally be spotted quite easily by looking for circular firing irregularities in the section of a broken vessel (Rye 1981: 67-9). Handmade techniques represent the oldest and most basic methods for forming ceramic vessels.

The wheel is the most well-known and common forming technique used for making pottery. Potter's wheels were first used in the Chalcolithic period in the Levant and the Middle Bronze Age (Middle Minoan 1B- ca. 1900BC) in the Aegean (Laneri 2011: 69; Vitelli 1993: 143-6; 96-7). The core principal of this technique is to place a lump of prepared clay at the centre of a horizontal wheel which is then turned quickly, either by the potter's foot or by an assistant, or in modern times by a motor. The centrifugal force of the wheel turning causes the clay to spread out slightly horizontally, which allows a potter with some water on her/his hands to raise the sides of the clay and push it down at the centre to hollow it, thus forming it into a vessel shape. Creating vessels on a wheel is on the whole a much faster process than creating them by hand, and also results in the production of more stable and more standardized vessel shapes.

A less common technique, but nonetheless an important one for the time-frame of the present investigation is moulding. As the name suggests, clay was formed into a desired shape by being pressed into a ceramic mould, prior to being taken out, dried and fired. During Hellenistic times this technique rose to the fore when it used to make the so-called Megarian or mould-made bowls, which replaced the earlier kantharos as the primary fineware drinking vessels of the time (Rotroff 1982:1). Several ceramic moulds for this type of bowl were recovered during the course of the Sikyon Survey Project and are not uncommon finds on Hellenistic sites within the broader region (as observed by the author at Stymphalos and Aigeira).

Regardless of the forming process, once shaped, a vessel has to be very thoroughly dried before firing. Complete drying is absolutely crucial and can take days, weeks or even months. Incomplete drying will most likely lead to uneven firing, cracking, or even to structural collapse during the firing process (Rice 1987: 67) (Fig. 3.4).

3.1.4- *Firing*

The most difficult stage in the process of creating ceramics is undoubtedly the process which turns formed *green* clay vessels into ceramic vessels: firing (N. Garis Pers. Comm. April 2012). Uneven or inconsistent firing will result in a ceramic product buckling, warping, sinking, or even exploding, in other words these will become kiln-wasters. In order to understand the reasons for this, it is important to think of firing not exclusively as a method of hardening clay, but also as a process of removing the plasticity from a clay/water mixture. As previously discussed, the properties of the mixture allow it to be formed to a desired shape. While unfired, or *green*, the shape of a vessel can still be manipulated or at least altered to some degree. Even after a long period of drying, an unbaked shape can still be quite easily broken down by hand. After firing, however, all plastic properties of a clay mixture are eliminated and further shaping of a vessel cannot take place (Rice 1987:80).

Air-drying a *green* vessel removes some of the water, especially from closer to the surface of a piece. Formed clay, however, does not start to become ceramic until it is exposed to heat in the 250°C-300°C range. It is at this temperature range that the structure of the clay mineral begins to transform, as the remains of the water in the clay/water mixture evaporate from the surface of the compound. The evaporation of these hydroxyls within the central layers of the clay continues at temperatures in the broad 300^0C-800^0C range. This is a crucial stage of the firing process, and heat must be increased very gradually and constantly so as to allow even evaporation. Should evaporation not occur evenly, a vessel would most likely lose structural integrity and develop cracks or even breaks, as water in the matrix evaporates. A vessel also shrinks accordingly during this process (Grim 1968: 314,369; Rice 1987: 87-8, 90-1).

Within the 200^0C-600^0C temperature range carbon, including organic matter, within the clay/water mix begins to oxidise as carbon monoxide and carbon dioxide. As with hydroxyls, carbon on the surface of a vessel oxidises first beginning at ca. 200^0C, and as the temperature increases, carbon within the structure rises to the surface at around ca. 400^0C-500^0C before complete oxidization at 600^0C-750^0C. Should the carbon within a vessel not oxidise completely, either as a result of a lower firing temperature, or a short firing time, it would most likely result in the piece having a dark grey-black core, or a dark grey-black surface depending on the level of oxidization which had taken place (Fig 3.5) (Rice 1987: 88).

In order for temperatures higher than 600^0C-750^0C to be achieved, a kiln must have a flow of oxygen in its atmosphere, thus requiring ventilation in the heat chamber. In the 500^0C-870^0C range some mineral types such as carbonates, sulphides and sulphates also begin to vaporize. Of particular relevance to Sikyonian pottery is that calcites begin to volatilize at the top end of this range (Rice 1987: 88).

As will be shown, Sikyonian and regional clays tend to be calcareous, and are rich in calcium carbonate ($CaCO_3$) (Hayward 2003: 16-7; Higgins and Higgins 1996: 40; Tataris et al. 1970; Whitbread 2003: 2). In the 650^0C-850^oC range calcium carbonate becomes volatile and transforms into lime (CaO). At these temperatures, lime is hygroscopic, meaning that it will absorb water vapour from the atmosphere and will form quicklime, a process which causes it to rapidly increase in size. The increase in size of these carbonates within a hardened, non-plastic, clay matrix can lead to spalling, cracking and possibly even disintegrating. If calcium particles are particularly fine within a clay then the hygroscopic lime will not likely lead to a structural problem, as this issue generally only occurs when calcium particles are particularly large. Three possible solutions to prevent spalling or cracking of a vessel due to carbonates are a) *docking*- soaking the fired vessel, while still hot, in water, b) firing the vessel in a reducing atmosphere below 700°C, and avoiding the calcium carbonate becoming hygroscopic, or c) firing a vessel above 1,000°C as at these temperatures the calcium becomes part of a liquid during sintering and/or vitrification (Butterworth 1956; Maniatis et al.1983; Rice 1987: 98; Rye 1976).

In the 800°C-1,050°C temperature range the processes of oxidization and dehydroxylation complete and the structure of ceramic breaks down. This process represents a firing phase known as *sintering* during which new silicates, or high-temperature minerals, begin to form. Sintering represents an early stage in the process of clay changing into glass, a process known as *vitrification*.

Between 1,050°C-1,275°C in kaolin-clays (those used for making porcelain) an alteration product known as *spinel* transforms into *mullite*, which forms as a network of microscopic columnar crystals or needles resulting in a very strong groundmass and a very hard vessel surface (Fig 3.6). Something very similar can be observed in some of the Sikyonian heat-damaged pottery. Based on the sedimentary nature of Sikyonian geology the presence of the kaolin alteration product that is mullite would be unlikely. Rather, a similar mineral which occurs naturally as a metamorphic mineral, melilite can form in sedimentary geologies such as we have around Sikyon when exposed to such high temperatures (MacKenzie and Guilford 1980: 12, 28; Martinon-Torres et al. 2006: 437-8 and Melluso et al. 2003. 1287-99; R. Siddall and E. Kiriatzi Pers. Comm. March 2012). Although melilite and mullite have similar appearances and properties, the dark core of the melilite needles allow for differentiation in this case. At even higher temperatures, in the 1275°C-1460°C range, minerals which occur in nature as metamorphic minerals such as cristobalite begin to form (Rice 1987: 87-8, 90-1 and 97-8).

Until the development of more advanced kiln technology in later Roman times, ancient ceramics were generally fired in the temperature range of 750-850^{o}C, or possibly up to 900-1000^{0}C (Moore 2001: 88-9). From later prehistory onward, ceramics in the Aegean were generally fired in either up-draft or down-draft kilns. Both kiln-types were composed of a firing chamber, or a series of firing chambers, a fuel box, a chimney, and a sealable hatch through which to let in controlled amounts of oxygen during firing. In Classical times pottery was frequently fired in up-draft kilns (Hasaki 2002; Homann-Wedeking 1950: 166-9; Noble 1988: 151), and the fuel would have been loaded into a firebox in the bottom of the kiln while vessels would have been stacked above. Sometimes vessels and the firebox were separated by a perforated floor, but often the fuel and the vessels were simply fired in the same chamber. In these kilns heat would have gone straight up, directly onto the vessels. In down-draft kilns (Shaw et al. 2001), vessels would be stacked in a chamber or chambers while fuel would have been loaded in a side chamber. Heat from the burning fuel would then be channelled to the side and downward and would heat the vessels from above. Up-draft kilns are obviously the simpler type, and would have been cheaper and easier to construct; however maintaining a constant and even distribution of heat was easier in down-draft kilns as ceramics were not exposed directly to heat (Fig 3.7) (Rice 1987: 160-1).

As previously mentioned, the two most important aspects of firing pottery are a) ensuring that the ceramics are thoroughly dried prior to firing, and b) ensuring a slow, steady build-up of heat which can be maintained steadily for a significant period. Twelve hours is a reasonable time to allow a kiln to reach a maximum temperature of 900^{o}C (Cardew 1969: 167; Rice 1887: 86). Although not necessarily universally applicable, it is worth noting that Nektarios Garis is so concerned with these two factors that he only fires his pottery once a year, in late October or early November when the olive-wood, olive-brush and pine-wood mix used for fuel are likely to be at their driest. Firing usually takes place over an afternoon, an evening, and through the night. Indeed the preparation involved in making pottery in this way is considerable, and even masters at it are prone to occasional mistakes (N. Garis. Pers. Comm. April 2012). When mistakes do occur they vary in severity - in a good case a vessel may take on an unexpected colour or may warp slightly, while in worse cases vessels can sag, collapse, or even explode. Such highly heat-damaged ceramics are known as kiln-wasters and are almost certainly non-functional. While kiln-wasters are examples of heat-damaged ceramics, not all heat-damaged ceramics can be considered kiln-wasters (Fig. 3.8). The presence of heat-damaged vessels in an assemblage does not necessarily indicate pottery production in an immediate area. At Sikyon it was not unusual to find occasional fragments of heat-damaged rough, very hard vessels, or others with strange colours amidst typical functional assemblages, especially amongst cooking vessels which would by nature of their function have been exposed to heat with some regularity.

In order to trace out a zone or zones of possible pottery production on the Sikyon plateau, however, it was necessary to attempt to differentiate those vessels which were heat-damaged due to function, such as cooking vessels, from those that were heat-damaged due to firing, such as kiln-wasters. In those straightforward cases where a piece of ceramic had obvious morphological irregularities, the author designated this as a kiln-waster (Fig 3.9). In the vast majority of cases, however, fairly nondescript parts of vessels were found; for example, a body sherd, which made it difficult to tell if a piece was from a kiln-waster or if it had to be more broadly categorised as a heat-damaged sherd. In cases such as these, the author attempted to distinguish both categories based on associated finds. The underlying assumption here was that a single heat-damaged sherd may not be indicative of ceramic production in a given area, whereas a concentration of heat-damaged sherds would warrant extra investigation.

Kiln-spacers, the ceramic braces used to stack green vessels in kilns prior to firing, represent another indicator of ceramic production. Spacers, like kiln-wasters are rarely, if ever, found far from dumps either within, or in close proximity to, ceramic production areas (Young 1937: 138; Homann-Wedeking 1950: 165). No kiln-spacers, however, were identified during the Sikyon Survey Project.

Part 2- Distributions

3.2.1 – *Ceramic Kiln-Waster and Heat-damaged Vessel Distributions*

1,341 examples of heat-damaged sherds were recorded and studied from Total Collection and Cross-Section Collection squares by the author. The following statistics were taken from these squares, as diagnostic and non-diagnostic pottery alike was collected and recorded.

Of the 1,341 recorded heat-damaged sherds from Total Collection and Cross-Section Collection squares, 38 came from the NP, 101 from the UP, and 1,202 from the SP (Table 3.1). Those squares with heat-damaged sherds yielded a total sherd count of 31,735 with a total weight of 191.32kg, giving an average weight of 6g per sherd. From these totals, the heat-damaged sherds weighed 25.46kg, averaging 18.98g each.

Area	Count	% of Total
North Plateau	38	2.83%
South Plateau	1,202	89.63%
Upper Plateau	101	7.53%
Total	1,341	100%

Table 3.1-

Heat-Damaged Sherd Counts and Percentage of Total by Plateau

Despite significant fluctuations in concentration densities, average sherd weight and average heat-damaged sherd weight remained fairly consistent across all three zones of the Sikyon plateau (NP, SP and UP). In the NP 5,815 sherds with a total weight of 36.905kg were recorded, giving an average sherd weight of 6.3g. The 38 heat-damaged sherds recorded in this area had a total weight of 0.79kg, and averaged 21g each. Heat-damaged sherds represent 2% of the total weight of the sherds examined from the NP, while only representing 0.6% of the total number of sherds.

In the UP 3,722 sherds weighing 22.68kg were tallied. The average sherd weight from the UP squares was 6g. 101 heat-damaged sherds, weighing 1.18kg were recovered from the UP. The average weight of these was 11.7g. In the UP heat-damaged sherds represent 2.7% of the total number and 5.2% of the total weight of the sherds collected. They also account for 7.5% of the total heat-damaged count from the entire Sikyon plateau and 4.6% of the total weight.

The SP represents the find location of the majority of heat-damaged sherds on the Sikyon plateau. From this area 21,945 sherds, with a total weight of 131.73kg were tallied. As in the NP and the UP, the average weight of each sherd found here was 6g. 1,202 heat-damaged sherds, weighing 23.48kg were recovered from this area. The average weight of these was 19.5g. Heat-damaged sherds account for 5.4% of the total sherd count, and 17.8% of the weight of all those collected in the SP. As far as heat-damaged sherd distributions across the entire Sikyon plateau, those from the SP represent 89.6% of the total count, and 92.2% of the total weight. Therefore, within the SP a particularly high concentration of heat-damaged sherds existed. 926 (77%) of the 1,202 heat-damaged sherds came from only 8 squares; 9.03, 14.04, 15.01, 15.07, 16.05, 16.13, 17.04, and 30.03. Geophysical prospection in this area returned results which seem to show clusters of magnetic anomalies that may therefore represent pottery kilns, or large pottery dumps (Fig. 3.10) (Table 3.2).

In addition to the 1,341 collected from Total Collection and Cross Section squares, another 130 heat-damaged sherds were collected elsewhere on the survey. In total therefore, 1,471 examples of heat-damaged sherds were recorded and collected from *all* squares during the Sikyon Survey Project. The extra 130 does little to impact upon the distributions seen in the to Total Collection and Cross Section squares, with 2% coming from the NP, 7.5% from the UP, and 89.6% from the SP.

The disparity in mass between heat-damaged sherds and sherds which had undergone standard firing may be explained in several ways, or as a combination of all three:

1) The notably larger size of heat-damaged sherds as compared with regular pottery fragments could simply be a result of the heat-damage. As previously noted, heat-

damaged ceramics tend to be much harder than standard ceramics due to structural changes resulting from sintering and vitrification. Harder sherds are therefore less likely to get broken into small parts than softer ones in post-depositional movement.

2) On the whole heat-damaged sherds may represent larger than average vessels. In other words the majority of sherds from these squares may represent finer ceramic types, such as lamps, or even cooking/dining vessels, whereas heat-damaged pieces may have come from vessels such as amphoras, mortaria, or heavier basins.

3) Larger heat-damaged sherds were far more likely to be spotted by field-walkers than smaller ones.

In order to test these explanations, however, it becomes necessary to try and determine what kinds of shapes these heat-damaged pots may represent. Are these sherds actually representative of heavier vessels, or do they simply have higher survival rates? At the present stage it also becomes important to attempt to determine if we can actually differentiate those cases in which vessels were heat-damaged during firing and are thus kiln-wasters, or if they were functional vessels. If this differentiation can be made then it may become possible to interpret some sort of functional delineation within the city of Sikyon based on where kiln-wasters appear.

3.2.2 – *Heat-Damaged Vessel-Types, Associated Finds and Dates*

Identifying the intended shapes that kiln-wasters may have once been is a difficult process, and one which can rarely be carried out with much success. While it might be easy enough to tell a lamp waster from a pithos waster, our ability to refine this identification to, say, a Broneer XVII type lamp of 1st century AD date, would depend on being able to detect morphological nuances, such as a flaring spout in a kiln-waster. Only in a very small percentage of cases was this type of identification possible. References to published parallels of the specific vessels discussed here are found below in section 3.3.

North Plateau

On the NP 38 heat-damaged sherds were recorded in the following squares: 31.02; 36.04; 37.06; 40.02; 42.08; 43.02; 45.01; 45.02; 50.09; 65.01; 67.03; 70.06; 81.03; 93.01; 93.02; 93.05; 93.10; 94.03; 94.07. Only three heat-damaged sherds from the NP were typologically diagnostic, a cooking pot or storage-vessel with a horizontal rim and downturned lip (70.06), a stew pot with semi-cylindrical rim (65.01), and a Hellenistic amphora (45.02) (Table 3.3).

The amphora fragment, from the NP 45.02, represents part of a toe, and has been assigned a Hellenistic date. It was found along with a roughly contemporary heat-damaged ring-base sherd from an unidentified vessel, as well as a basin, a bowl, a casserole, a Corinthian kotyle cup, and a fragment of another vessel which appears in Corinthian fabric but was not identified. Roman and later material from this square included fragments of a jug or pitcher, basins, stew pots, cooking pot lids, a krater, and several amphoras fragments. The high proportion of eating and drinking-related vessels is likely suggestive of a domestic area during both Hellenistic and Roman times, with a few amphoras possibly used for storage and/or transportation of goods. The presence of a heat-damaged ring base from an unidentified vessel may be more suggestive of use-damaged pottery, or slightly heat-damaged, but functional pottery. Furthermore, the fact that it is a fragment from a ring-base, a common feature of various cup and bowl-types, may again further hint at a domestic context here.

The cooking pot or storage vessel from the NP 70.06 is more challenging to say much about, as neither its function nor date were certainly clear. The square yielded 31 sherds in total, of which three were typologically diagnostic, and one was this heat-damaged vessel. Of the diagnostic sherds, a krater and a bowl have been assigned a Hellenistic date, while a dish with a thick ring base appears to be of Roman date. The cooking pot or storage-vessel kiln-waster has a horizontal rim with a down-turned lip, which may be suggestive of a Hellenistic date as well. At any rate, if we look at the associated material, it appears suggestive of a Hellenistic/Roman surface assemblage associated with eating and drinking. Neither a cooking pot nor a storage vessel would necessarily be out of place in this context.

Perhaps most the interesting of the all the heat-damaged ceramics identified on the NP is part of a stew pot with a semi-cylindrical rim from NP 65.01. This particular square is located in an area, directly to the east of the museum where very high concentrations of Late Roman and Early Byzantine ceramics were recorded. The stew pot kiln-waster, which displays a flat, oblique rim, has been dated to the 5th-6th century AD by Tzavella. Eleven diagnostics were recovered from this square, one was this kiln-waster, three were stew pots, four were pitchers, and three were basins. Two of the stew pots, one with an oblique flat rim, and another with an oblique ridged rim dated respectively to the late 3rd- 4th century AD, while one of the basins, a basin with a horizontal down-turned rim, dates to ca. 450 AD. Once again, this assemblage appears to represent a dining context but this time it belongs to the Late Roman or more likely Early Byzantine periods. This particular heat-damaged sherd is certainly a kiln-waster, as it is very highly fired, and represents a very warped form, likely too warped to have actually been used as a stew pot and most probably therefore represents the remains of a discarded vessel (Fig 3.11).

The minute glimpse that we can get from the NP through the heat-damaged ceramics from this area is suggestive that it was not likely to have been a workshop area, and was far more likely to have been domestic, especially during Hellenistic and Roman times. It appears more probable that the heat-damaged ceramics from this area are generally representative of functional or semi-functional heat-damaged pottery rather than as the by-products of industrial production. The exception to this may be the Early Byzantine stew pot, which, based on its fabric and condition, appears not to have been particularly functional and might represent a change in ceramic production at the site in later times.

Upper Plateau

During the survey 101 heat-damaged sherds were identified in the UP. Two main clusters of these were noted. One occurred in the south-western area of the UP, directly above the

SP, and another in west part of the UP above the theatre. Scattered heat-damaged sherds were found on the extreme west edge of the plateau and in the centre of the UP. The squares which yielded heat-damaged sherds were: 14.01; 16.02; 23.01; 24.03; 25.11; 25.08; 27.05; 31.01; 34.03; 46.01; 48.03; 48.07; 49.13; 54.05; 54.06; 56.13; 70.03 (Table 3.4).

On the UP, eight diagnostic heat-damaged sherds were identified: four stew pots with flanged, thickened rims (24.03, 31.01, 46.01, and 49.13); one basin with a moulded rim (24.03); one cylindrical-handled amphora (49.13); an amphora with a bulbous rim (54.06) and one krater with a high-folded rim (70.03). Both the stew pot and the basin from UP24.03 were recorded as being heat-damaged, as opposed to being kiln-wasters. They were found with three Hellenistic/Early Roman amphoras, a basin and a lid, and a part of a Corinthian kantharos. Associated Roman material includes four stew pots, two pitchers, an oil lamp, a basin and casserole, an amphora and an imported amphora. Once again, the nature of this assemblage does not appear to be suggestive of an industrial area. Based on these surface assemblages, during both Hellenistic and Roman times this square is likely associated with cooking, dining and storage.

The stew pot from 31.01 was found with two basins, a bowl, a casserole, a stew pot, a lamp and a plate/saucer which may all be Hellenistic. Roman finds included six amphoras, a krater, two kraters with overhanging rims and a lamp which is similar to a Broneer XVII type. The stew pot from 46.01 was found with two bowls/basins, a large stew pot-like vessel and a jug, which are all likely Hellenistic in date; no Roman diagnostic sherds were recovered.

The stew pot and amphora from 49.13 were found with a jug and a fusiform unguentarium, most likely of Late Hellenistic-Early Roman date. The 'amphora with bulbous rim' from 54.06 was found with an amphora with a short thickened rim, an amphora with cylindrical handle and a pedestal krater with a flanged foot, which likely dates to Late Hellenistic or Early Roman times. The krater waster from 70.03 was found with two kraters, one with a high-folded rim and the other with a high triangular rim which have been dated to 1st-2nd century AD.

These assemblages are all relatively similar in basic composition to vessels such as stew pots and casseroles which are predominantly related to cooking. Also frequent are dining vessels such as bowls and plates, kraters and a kantharos. Amphoras were likely used here as storage vessels. These assemblages strongly appear to point to residential, or possibly even small-scale commercial function, as could be interpreted from the amphoras. In these squares there is nothing particularly suggestive of industrial activity. In all, therefore, it seems more likely that the so-called wasters in the UP were more likely heat-damaged pottery which retained some degree of functionality.

South Plateau

The area with the highest density of heat-damaged sherds was undoubtedly the SP. In this area heat-damaged sherds were found in the majority of squares. Find spots and densities are listed in table 3.5.

A discussion of each of the individual the SP assemblages in which heat-damaged ceramics were recorded would result in a very lengthy listing of material for little potential gain. It is therefore preferable to provide a brief description of each typologically diagnostic heat-damaged sherd and discuss some associated finds within the relevant squares. This will provide a general sense of the character of the vessels which were produced at Sikyon, a time frame for when they were likely produced, and an overview of the contexts in which they were found. Prior to this discussion, however, it is worth noting that the squares SP16.05-16.13 represented the largest concentration area of kiln-wasters.

In total 1,202 heat-damaged sherds were recorded in the SP; of these 48 were typologically diagnostic. 27 of the 48 were amphoras (3.04; 5.02[2]; 8.01; 8.03[2];14.08 [3]; 16.05; 16.09; 16.11; 16.13; 17.04 [2]; 18.02 [3]; 18.03 [3]; 20.03 [2]; 22.11 [3]; 22.16; 22.17; 24.10; 26.05; 26.09), eight bowls/basins 16.05, 17.01, 19.03, 22.13, 26.04, 6.04 [3]), seven stew pots (15.01 [2], 16.11, 16.13, 26.03, 26.15, 30.01), three casseroles

(15.01, 16.13, 20.03), two jugs (24.11, 26.09), two basins (13.07, 9.03), two lids (15.01, 16.11), two loom weights (17.01, 26.18), one bowl (16.13), one lamp (16.11), and one mortarium (14.08).

3.04- Nine sherds were recorded from 3.04. Of these, five were identifiable as diagnostic types. These include one pitcher with ridged handle, two kraters of the high-folded rim-type, and two amphoras which exhibited triangular rims, of which one was a highly damaged kiln-waster. Similar amphora types were found at Corinth and in the Agora and have been connected with 2^{nd}-3^{rd} century AD dates, which are discussed further in section 3.3. The krater with high-folded rim type also dates to the 2^{nd}-3^{rd} century AD. This is not an easy assemblage to interpret as all of the vessels found here could potentially have served several functions. The amphoras were likely used for transport and/or storage, the pitcher broadly for serving, while the basins (basins) can also serve a range of functions, which makes the precise character of this assemblage difficult to interpret, although a Middle Roman storage/utilitarian assemblage may be a reasonable general interpretation.

5.02- Four diagnostic sherds were recovered from this square, with three of these recorded as being kiln-wasters. The single non-waster sherd was a rim fragment from a Hellenistic basin with a moulded rim. One of the kiln-wasters was from a pitcher with a ridged strap-handle of Roman date, while the other two belonged to amphoras of the bulbous neck type. As with 3.04 not enough of material from this particular square is identifiable so as to identify the activity which may have been talking place here.

6.04– 2,346 sherds were recorded from this square. Approximately 155 of these were potentially typologically diagnostic. Amphoras make up the vast majority of identifiable finds from this square with 117 fragments recorded in both the Roman and Hellenistic shape databases. These include amphoras of the cylindrical handle type, amphoras with triangular protrusion, amphora with double triangular protrusion, amphora with bulbous rim and triangular protrusion, amphora with oval-shaped ridged handle, amphora with flaring folded rim and triangular protrusion. Those amphoras with triangular protrusions have been connected to the Hellenistic to Early Roman Dressel 25-type, and Brindisian shapes (See section 3.3).

Other vessel-types recovered from this square include bowls/basin, several basins, stew pots, lids and an Attic skyphos. Three heat-damaged basins with moulded rims dating to the Hellenistic period were recovered from this square. From Roman times we see a lid with a conical knob, a fusiform unguentarium, a basin with a horizontal ridged rim and two casseroles. The majority of finds seem to date to Hellenistic or Roman times, while a basin with horizontal ridged rim dating to the late 3rd-early 4th century AD appearing to represent the latest identifiable material.

8.01- Of the 17 diagnostic sherds recognized from this square all but three were from amphoras. The non-amphoras include one large storage vessel with a horizontal rim, one small stew pot with a flat horizontal rim, and a pitcher with a flat horizontal rim. Four triple-ridged amphora handles were recorded as were two Middle Roman amphoras of the triangular rim and bulbous neck type. Finally, seven sherds from the amphora with bulbous rim type were recovered, of which two were kiln-wasters. Due to the prominence of amphoras in this square, despite the appearance of a small stew pot and a pitcher, it seems reasonably likely that this is not on the whole a domestic assemblage, and indeed may even reflect a commercial, or possibly even an industrial one.

8.03- Thirteen diagnostic sherds were recovered from this square; of these nine were from amphoras, two were fineware bowls, one was a krater and the last was a pitcher with triple-ridged handle. The amphoras include one with a plain conical rim, one with a triangular protrusion, five of the triple-ridged handle-variety, and one kiln-waster fragment of an amphora with bulbous neck. The latter two types date to Middle Roman and Late Hellenistic /Early Roman times respectively. The krater with high-folded rim found here dates to the same sort of time period, 1st- 2nd century AD. Interestingly, both fineware bowls from this square are very late additions, one being a bowl with a horizontal curved rim, and dark yellow glaze dating to the 19th century AD and the other is a Grottaglie ware bowl of 19th or even early 20th century AD date.

While this is clearly a highly mixed surface assemblage, the comparatively frequent appearance of amphoras may suggest that it had a roughly similar function during Hellenistic and Early-Middle Roman times. The early modern fineware bowls are noteworthy, as early accounts of the plateau, including those by Dodwell and Gell (Gell 1817; Dodwell 1819) attest to the poverty of Vasiliko. Ottoman accounts, however, mention the presence of powder mills in the Asopos valley which runs below the SP (Y. Lolos Pers. Comm. Oct 2010), so perhaps when viewed in this context these imported bowls may hint at a slightly more nuanced economy in the village during the 19th and early 20th centuries than seen by the earlier western travellers.

9.03– 806 sherds were recorded in this square. Three sherds have been identified as kiln-wasters and 115 as heat-damaged, possible kiln-wasters. Few typologically diagnostic sherds were recovered from this square, but of those that were four amphoras sherds represent the largest identified category, followed by two pitchers and two basins. A heat-damaged Hellenistic basin with moulded rim, an amphora with bulbous neck and an amphora with a high-folded rim possibly dating to approximately the 1st- 3rd century AD were also identified. The latest datable sherd in this square is from a pitcher with a vertical rectangular rim, which has been assigned a 5th century AD date.

13.07- 109 sherds were recorded from this square, of these only three diagnostic sherds were identified. These belonged to a Hellenistic basin with a projecting rim, a heat-damaged amphora handle with shallow ridges on it (which may belong to the Middle Roman period), and a heat-damaged possible kalathos with a broad horizontal rim.

14.08- Eleven sherds were recorded from this square, one of these was recorded as a kiln-waster and one as a heat-damaged fragment from a Hellenistic Edwards type II mortarium. One heat-damaged sherd from a cylindrical handled amphora, and another from an unclear amphora type were recorded. A Roman dish, a bowl and a stew pot were also identified.

15.01- 724 sherds were recovered from this square. 123 heat-damaged sherds weighing 1.06kg and 14 kiln-wasters weighing 0.64kg were also identified in this square. Eight heat-damaged amphora fragments of Hellenistic-Middle Roman date were also identified amongst these. Three examples of heat-damaged lids were found, as was a fragment of a heat-damaged 1st century AD Broneer XVII type lamp. A casserole and two stew pots possibly dating to the Hellenistic period were also found, as was the foot of a Hellenistic/Early Roman fusiform unguentarium and a kantharos of standard firing.

15.03–37 sherds and one kiln-waster were recorded in this square; of these 13 were typologically diagnostic amphoras sherds. The most common of these was the cylindrical-handled variety which dates roughly to Hellenistic-Early Roman times based on similarities to the Dressel 25-and Brindisian types. A sherd from a ridged oval-handled type was found as well, as was one of possible Middle Roman date.

16.05- 509 sherds were identified in this square; of these 102 heat-damaged sherds were recovered. Indeed based on find densities, this square along with 16.06-16.13, appears to be at the epicentre of the largest and most dense concentration of heat-damaged sherds, and likely represents a kiln site. 35 of the heat-damaged sherds accounted for about 25% of the total weight of all material found in the square. Amphoras were once again the most common of the identified shapes, with cylindrical handled amphoras and several exhibiting triangular protrusions being the most frequent. At least five kiln-wasters and four sherds of standard firing of this type were recovered here.[29]

Two standard-fired kraters with high-folded rims dating in the 1st - 2nd century AD range were found in this square, as was a 2nd- 4th century AD stew pot with a flat, horizontal rim and a 3rd century BC lamp with volute pattern (possibly of Corinthian origin). An articulated kantharos and a miniature kotyle of Hellenistic date and possible Corinthian origin also found here. Among the other particularly interesting finds in this

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[29] SP 4.02 is another potential kiln location based on the density of kiln-wasters found here. 4.03 yielded the largest number of kiln-wasters of any square, however, as none were diagnostic and thus did not help shed light on the chronology of the Sikyonian ceramics industry this square was not discussed here.

square was a fusiform unguentarium which is generally interpreted as a perfume vessel, a surprisingly common find amongst amphora kiln-wasters at Sikyon (Rotroff 2006: 137-60; Anderson-Stojanovic 1987).

16.11- 503 sherds were recovered from this square. Comparatively few amphoras were identified, rather, the most common types were eight basins, of which the basin with moulded rim was the most common type. One waster of a basin with a projecting rim of Hellenistic date was identified. Another basin waster with a high-horizontal rim, and a wasted amphora with a cup rim were also found here, both may be of later Hellenistic or Early Roman date. Heat-damaged sherds belonging to a stew pot , a lamp, a lid, bowl and a 2nd-3rd century AD casserole with oblique walls and a short out-turned rim were also found.

16.13- 1,010 sherds were recovered from this square. 78 of these were heat-damaged and six were certainly kiln-wasters based on the level of firing damage sustained. Despite the relatively high number of ceramics here, only 23 possible diagnostic sherds were identified. An imported Hellenistic amphora was found here, as was a cylindrical handled amphora (most likely of the Dressel 25-type) three bowls, two bowls/basins, one casserole, three stew pots, one plate and one fusiform unguentarium. Of these, a casserole, a stew pot and a bowl showed signs of heat-damage.

Among the sherds of Roman date were an amphora with a triangular neck protrusion, a fusiform unguentarium, a 1st-2nd century AD krater with a high-folded rim, and a thin-walled bowl with a short out-turned rim: An amphora, and a pitcher each with a triple-ridged handle, a basin with a horizontal triangular rim, and finally a kiln-waster of a bowl with a ring base also date to the Roman period.

17.01- Non-Total Collection Square- 56 sherds and six kiln-wasters, based on the amount of heat damage to these pieces were recovered. Among the Hellenistic material identified from this square were nine sherds belonging to cylindrical-handled amphoras, a Corinthian bowl with a ring foot, a possible rim of a Corinthian B amphora, and three bowls/basins, one of which was heat-damaged and was of the moulded rim variety. Another heat-damaged sherd was from a conical loom-weight, and finally a fusiform unguentarium was also found here. Those sherds identified as Roman include three amphoras, a stew pot with deep ridges and a horizontal handle, a fusiform unguentarium, and a pitcher with a triple-ridged handle.

17.04- 758 sherds were recovered from this square. 60 heat-damaged sherds with a weight of 2.37kg were recorded. The main categories of finds from this square were amphoras, bowls/basins, stew pots and/or casseroles, and stew pots. Three kiln-wasters of cylindrical-handled amphoras were recovered, along with five bowl/basin kiln-wasters. Three kiln-wasters belonged to fragments of ring bases, and the other two came from the basin with a moulded rim type. Two kiln-wasters of stew pots or casseroles each with a flanged-thickened rim were also recovered. These may all be of Hellenistic date.

The other identified kiln-wasters which may be of Roman date from this square include two amphoras. Finally, a waster from a stew pot with an everted rim with thickened end possibly dating to the 1^{st}-2^{nd} century AD, and another stew pot with a flat horizontal rim were recovered. Vessels of standard firing which appeared in this square include a 1^{st}-2^{nd} century AD krater with a high-folded rim and a 2^{nd}-3^{rd} century AD amphora with triangular rim and bulbous neck.

18.02- 90 sherds were recovered from this square. 17 heat-damaged sherds with a weight of 0.5kg, and 15 kiln-wasters with a total weighing of 1.8kg were among them. 17 sherds were identified as being of known types, 16 of which were amphoras of various types and one was a klin-waster of a pitcher with a ring base. Of the amphoras three were heat-damaged, one was a waster of an unclear type due to the condition of the fragment, and four were wasters of the cylindrical-handle type of amphoras.

18.03- Non-Total Collection Square- Seven potentially diagnostic sherds, one kiln-waster and one tile fragment were recovered from this square. The four identified sherds from this square were all amphoras, two were heat-damaged and were of the cylindrical-handled type, one was of a bulbous rim type, and the fourth was of an unknown type.

19.03- 120 sherds were recovered from this square. Four vessels from this square were identified these include a pitcher with a triple-ridged strap handle, two bowls/basins with moulded rims (of which one was heat-damaged), and a bowl/basin with a ring foot.

20.03- 140 sherds were recorded from this square. Eleven of these were typologically diagnostic; once again the majority of these were amphoras, and three of these were of the cylindrical-handled type. Three bowls/basins, a vertical rimmed casserole, and a kantharos were also found in this square. The heat-damaged vessels were the casserole, a cylindrical handled amphora and an amphora of unknown type.

22.11- Fourteen sherds typologically diagnostic were recovered from this square. Thirteen of these were amphoras, one possibly being a heat-damaged Corinthian B, seven were of the cylindrical-handled variety, two had rounded-handles, one was a globular amphora with an offset toe, and two were of unknown shape. Three of the cylindrical-handled amphoras were heat-damaged. A bowl/basin with a ring foot was also found in this square but was not heat-damaged.

22.13- Non-Total Collection Square- Five potentially diagnostic sherds and two kiln-wasters were recovered from this square. Of these one was an unknown type of amphora, one was an amphora with a button base, two were cylindrical-handled amphoras, one was a heat-damaged bowl/basin with a projecting rim, and the other was a casserole with a flat horizontal rim.

22.16- Non-Total Collection Square- Seven diagnostic sherds were recorded in this square, as well as two kiln-wasters. Of these, an amphora with bulbous neck, a pitcher with a cylindrical body and strongly protruding base may be of Roman date, while a Corinthian kotyle is of Hellenistic date. A heat-damaged cylindrical-handled amphora is most likely Late Hellenistic to Early Roman in date.

22.17- 57 sherds were recovered from this square, of these four were diagnostic. Additionally, four wasters with a weight of 506g were recovered. The diagnostic sherds include a pitcher with a flaring rounded rim, and three sherds from amphoras with cylindrical handles, of which one was heat-damaged.

24.10- Non-Total Collection Square- 27 potentially diagnostic sherds were recovered from this square. Of these amphoras make up the majority, followed by fragments of casseroles and other cooking vessels such as stew pots. Bowls/basins, two lids, a pitcher and a krater were also found here. The only heat-damaged sherd from here was a fragment of a cylindrical-handled, Dressel 25-type, amphora. Most of the identifiable sherds appear to date to the Hellenistic period, however, a krater with a high folded rim and a casserole with a flaring rim and thickened lip both date to the 1^{st}-2^{nd} century AD.

24.11- Non-Total Collection Square- Eight potentially diagnostic sherds were collected from this square. Of these, one was an imported plate possibly from Corinth, one was a cylindrical-handled amphora, one was a bowl/basin with a moulded rim, and the final one was from a heat-damaged pitcher with a flaring rounded rim.

26.03- 623 sherds were recovered from this square. Three were diagnostic sherds from a mould-made bowl, a bowl/basin with moulded rim was also recorded, and finally a stew pot with a flanged-thickened rim of Hellenistic date was noted.

26.04- Non-Total Collection Square- Six diagnostic sherds were recorded in this square. Of these two were typical cylindrical handled amphoras, one was an amphora with a triple-ridged handle and the final one was from a bowl/basin with a moulded rim.

26.05- Non-Total Collection Square- 17 potentially typologically diagnostic sherds were collected from this square, of which most are amphoras and kraters. The single heat-damaged sherd from this square is of a Dressel 25 type of amphora, which likely has a Late Hellenistic-Early Roman date. Two vessels, a pitcher with a ridged base and a krater with a high folded rim appear to date to 1st-4th century AD and the 1st-2nd century AD respectively.

26.09- Non-Total Collection Square- Eight identifiable sherds from this square were recorded. Two or possibly three belonged to amphoras, two to kantharoi, one was part of a plate and one was from a bowl/basin. Of these three were heat-damaged sherds, one was from a cylindrical-handled amphora, another was from a flaring rounded pitcher, and finally one was a fragment of an articulated kantharos, in Corinthian fabric.

26.15- 76 sherds were recovered from this square. Three of these were identified as being from a cylindrical handled amphora, a mould-made bowl, and a heat-damaged stew pot with a flanged-thickened rim.

26.18- Non-Total Collection Square- Four identifiable sherds were recorded from this square, one bowl/basin, one pitcher, one heat-damaged loom-weight and one greyware fish plate with projecting rim.

30.01- Non-Total Collection Square- 110 sherds, three kiln-wasters and some metal slag were recovered from this square. The recorded material appears to be quite mixed. Amphoras are once again the largest category of identifiable sherds from the square, followed by bowls/basins, bowls, cups, pitchers, plates, unguentaria, a pithos, a lid and a lamp. This square may show some Corinthian imports in the form of bowls and several basins.

Of the sherds categorized as Hellenistic from this square, one kiln-waster of an amphora with a cylindrical handle was recovered. One heat-damaged sherd of a stew pot with a flanged-thickened rim was also found.

The material which was potentially Roman from this square was a lid with a conical knob, and once again a fusiform unguentarium. Sherds of certain Roman date belonged to a Broneer XVII type lamp which dates to the 1st century AD, and a stew pot with a flat horizontal rim of 2nd-4th century AD date.

3.2.3–An Emerging Picture of Ceramic Production at Sikyon

Of the 1,471 heat-damaged sherds recorded during the survey, 43 (56%) were from amphoras, 31 (26%) were from storage or cooking pots, 14 (11.6%) were from bowls/basins, and 11 (9%) were stew pots. Three basin,s three casseroles, three pitchers and three lids were also identified. Two stew pots/casseroles and two loom-weights were recorded. One bowl, one lamp, one mortarium, one krater, and one stew pot were also identified. (Fig 3.12)

Those squares which most strongly reflect production of identifiable types are SP 6.04; SP 16.05; SP 17.04, SP 18.04, and on a much smaller scale also NP 65.01. The all-krater assemblage from UP 70.05 is certainly anomalous and may reflect some type of workshop and/or storage area. SP 16.11 and 15.01 may also reflect a workshop or a storage area.

Sixteen vessel-types have been identified through the kiln-wasters, these are:

1) Amphora with cylindrical handle
2) Amphora with triangular protrusion
3) Amphora with cup rim
4) Amphora with high-folded rim
5) Amphora with bulbous neck, triangular rim and triple-ridged handles
6) Pitcher with ring base
7) Krater with a high-folded rim
8) Krater with triangular rim
9) Basin with high-horizontal rim
10) Basin with ring foot
11) Basin with moulded rim
12) Stew pot /Casserole with flanged-thickened rim

13) Stew pot with everted rim with thickened end
14) Stew pot with flat horizontal rim
15) Stew pot with semi-cylindrical rim (Early Byzantine).
16) Lamp Broneer Type XVII

One of the particular difficulties of working with material collected from a surface survey is that it tends to be very small and broken up when compared generally with excavation material (Moody et al. 2003: 37-8). Due to the fragmentary nature of this type of dataset it can be difficult to fill in typological blanks. From the list above, it appears that there are five different types of amphoras, but one fragment may be a rim and another handle, and unless a shape is known prior to surveying, it can be extremely difficult to tell if both pieces belong to the same type of vessel or not. In the cases of amphoras #1 and #2, with cylindrical handle and with triangular protrusion respectively, enough different parts were collected to show that these fragments actually belong to the same type of vessel. Furthermore, categories #3 and #4, with plain, curved almost vertical rim, with cup rim, and with high-folded rim respectively, almost certainly have the same cylindrical handle, and neck with triangular protrusion as the other category. It is reasonably safe, therefore, to say that we are actually dealing with one type of amphora shape, with perhaps a few variations, as opposed to four. This shape of amphora has been given a descriptive umbrella term to account for the four variations and will be known hereafter as the Sikyonian A Amphora. Also, #5, the amphora with bulbous neck, triangular rim and triple-ridged handles has been renamed the Sikyonian B amphora, for reasons discussed in section 3.3, below. In light of these changes therefore, we know of 13 shapes that were beyond reasonable doubt produced at Sikyon:

1) Sikyonian A Amphora
2) Sikyonian B Amphora
3) Pitcher with ring base
4) Krater with a high-folded rim
5) Krater with triangular rim

6) Basin with high, horizontal rim

7) Basin with ring foot

8) Basin with moulded rim

9) Stew pot /Casserole with flanged-thickened rim

10) Stew pot with everted rim with thickened end

11) Stew pot with flat horizontal rim

12) Stew pot with semi-cylindrical rim (Early Byzantine).

13) Lamp Broneer Type XVII

3.3-*Dates, Descriptions and Distributions of Vessel Types Known from Kiln-wasters*

The current section presents the vessel-types recorded in the kiln-wasters, as these represent the best evidence for ceramics produced at Sikyon. The aim of this section is to place an approximate time frame on ceramic production at Sikyon, as well as to present the emerging picture of the general character of the industry based on the functional types of vessels that were produced at the site. In some cases, especially as regards the amphoras, current scholarly issues will also be discussed. In other cases, such as the pitcher with ring base, it is unnecessary to devote much attention to typological issues, as this descriptively-named class of vessel likely served a fairly broad range of functions and spanned a broad time frame. This section deals with the shapes known from the kiln-wasters and traces those shapes out to all identified examples of the same shape, which occur in standard firing.

The discussion of each type includes a summary of the fabric composition of each type as determined through the author's macroscopic and microscopic analysis. It is not uncommon to find several vessels with similar shape characteristics appearing in very different fabrics and it is therefore worthwhile attempting to differentiate local and non-local examples of a shape.

Finally, the frequency and distributions of each type are listed, which is an important step in attempting to delineate the use of space on the plateau across time. For example, as touched upon above, a concentration of stew pots in an area may well represent a domestic and/or dining area at a specific time, whereas a large concentration of amphoras in another may be indicative of a commercial function.

The major vessel forms as recorded in the kiln-wasters produced at Sikyon can be divided into four categories based on probable function: cooking (i.e. casseroles and stew pots), transport (i.e. amphoras), serving (i.e. jugs) and utilitarian (i.e. kraters and basins). These categories will serve as the basis of the present section.

Cooking

3.3.1 Stew Pot with Everted Rim and Thickened End- 1st century BC

Only 17 examples of the stew pot with everted rim and thickened end were identified during the Sikyon Survey Project. Shape parallels from Corinth and Knossos connect this rim type to a tall stew pot with a rounded base and a globular body. These have a slightly everted rim with a deep groove near the rim/neck join; the rim thickens at the lip. Below the lip on what would be the interior of the vessel there is a pronounced sharpish flange to support a lid (Fig 3.13). The rim diameter for this shape should be around 16-17cm. The stew pot with everted rim and thickened end has been dated to the 1st century BC (Sackett 1992: 237; Slane 1990: 81, no. 172).

These vessels usually appear in a brown (7.5YR 4/4) to yellowish red (5YR 5/8) fabric with tends to be of medium hardness and coarseness and has a bumpy to gritty surface with a rough to powdery fracture. Mineral inclusions tend to be very common and of these most typical are sub-rounded and sub-angular white and opaque glassy (mostly silicate) and powdery white/yellow (carbonates). Small sub-rounded voids appear with some regularity in the matrix of this type.

No particular areas of concentration were obvious due to the sparse occurrence of this shape. The UP yielded only 2 sherds of this type, the SP had 5, and the remaining 10 came from various parts of the NP, including the east and northeast areas where concentrations of other types of vessels associated with cooking were found in high numbers. The lone example of a kiln-waster of this type was found in SP17.04. (Table 3.6)

3.3.2- Stew Pot with Flanged-Thickened Rim- 2nd century BC-1st century AD

A vessel which straddles most of the Hellenistic period as well as the Early Roman period is the stew pot or casserole with flanged-thickened rim. One of the more common types from Sikyon, this has a rounded, slightly ovoid body with a rounded base, a wide mouth on top of which sits a tapered rim on the exterior, and a small flange on the interior. Complete examples of these cooking vessels often have a single handle which juts out from the neck and joins the body below after bending downward at a 90^0 angle. Finally, the lip diameter of these vessels range in size from 0.09cm to 0.18m (Edwards 122-4). (Fig 3.14)

The stew pot or casserole with flanged-thickened rim most often appears in a fabric which is gray (5Y 5/1 or 2.5Y 5/1), less frequently but nonetheless commonly in dark gray (2.5Y 4/1) and red (2.5YR 5/6), and rarely in light gray (1 7/N-6N), brown (7.5Y 4/2) and yellowish red (5YR 6/8). The fabric associated with this shape tends to be medium hard or hard, and of medium to fine coarseness, with a powdery or bumpy surface and most commonly a rough to flaky fracture. Mineral inclusions tend to be occasional to common and of these most frequently are sub-rounded and sub-angular white and opaque glassy (likely silicate) and powdery white/yellow (possibly carbonate). Tiny silver glitter in their fabric, possibly mica, appears with some frequency in this type. These vessels represent a good example of the colour range and nature of the cooking fabric used in Hellenistic and Roman Sikyon.

The stew pot /casserole with flanged-thickened rim appears to develop during the late 3rd or early 2nd century BC and lasts into Early Roman times (P. Stone Pers. Comm. July 2011). It represents the main type of cooking pot at Sikyon during this period and would have been well-suited to boiling and stewing food. This stands in contrast to the pattern observed in the Nikopolis Survey publication where the arrival of the Romans is connected with the emergence of flatter cooking vessels for baking and frying, while the use of earlier Greek style stewing and casserole vessels sharply declined (Moore 2001: 83).

The presence of cooking vessels is likely indicative of a domestic context. While examples of this shape were found on all three areas of the plateau, it exhibits four main areas of concentration: In the northwest area of the UP above the ancient theatre; on the eastern edge of the NP to the north of Gate 2; the southeast area of the UP near the border with the SP, and finally in the south of the SP, both in the main kiln-waster area, and in a higher concentration to the west and south of this area. Indeed, both kiln-waster examples of this shape were recovered on the SP, one in 17.04 and the other in 24.09 (Table 3.7).

3.3.3- Stew Pot with Flat Horizontal Rim - 2^{nd}-5^{th} century AD.

The stew pot with flat horizontal rim represents another class of Roman cooking vessel. This name is a general term covering several sub-types which share morphological and therefore also likely functional similarities. Common to this class is a straight or slightly oblique upper wall with a slightly thickened rim which protrudes or overhangs from the top of the vessel at a 90^0 angle +/- 15° (Fig 3.15). Similar vessels have been found at Corinth and have been assigned a date range from the 2^{nd}-5^{th} century AD. Several published forms show similarities in the second half of the 3^{rd} century and second half of the 4^{th} century AD. In these published forms some minor variations are apparent in the rim angle and thickness with earlier forms having a slightly longer overhang in the rim. The rim diameter ranges from 14 cm to 31 cm (Slane 1990: 182, no. 178; Slane and Sanders 2005: 265, no. 2-41).

The stew pot with flat horizontal rim class most commonly appears in a reddish yellow (5YR 6/6-6/8) or dark gray (2.5Y 4/1) fabric. This fabric tends to be of medium hardness and coarseness, with a smooth feel and a powdery fracture. Mineral inclusions tend to be common and most frequently are sub-rounded and sub-angular white and opaque glassy (likely silicate) and powdery white/yellow (possibly carbonate) types.

At Sikyon 76 examples of this class were collected, suggesting that this was a fairly common class of cooking vessel on the plateau during Middle Roman times. Examples of this class are found in all areas of the plateau, with the UP yielding 10 examples, and the SP yielding 17 examples including three kiln-wasters from SP31.03 and one from SP35.07. The majority of sherds of this type were recovered from the NP and concentrations in the south-central and eastern part of the NP, as well as a slightly lower concentration in the north-eastern part of the NP. Although lower in number, another concentration can be seen in the north-central part of the SP, in the area to the east of the ancient agora of Sikyon. Again, distributions of this coarse type of cooking vessel most likely hints at domestic areas. Find concentrations of the stew pot with flat horizontal rim class around the agora area and to the north and east of the plateau are worth noting as this is a slightly later vessel form than the others mentioned above. (Table 3.8)

3.3.4- Stew Pot with Semi-Cylindrical Rim- 6th century AD, or 1st half of 6th century AD.

The descriptive term stew pot with semi-cylindrical rim represents a class of Early Byzantine stew pots with a similar rim type (Fig 3.16). Five types of stew pots with semi-cylindrical handles have thus far been identified from the Sikyon material by Tzavella. Types -1 and -3 have been assigned dates in the 6th century AD, while type-4 matches a published parallel dated to the 7th century AD (Slane and Sanders 2005: 279, no. 4.27). Type-2 is slightly more complicated as it could possibly date from the 4th-6th century AD, while type-5 dates to the 6th-7th century AD (Reynolds 2004: 235, no. 211; Sanders 1999: no. 18; Slane and Sanders 2005: 267, no. 3-31; Pers. Comm. E Tzavella March 2011). The single kiln-waster of this class is from NP65.01, and has been dated to the 5th-6th century AD, but the specific sub-type (1 or 3) is not totally clear. As discussed earlier, the find spot of this kiln-waster is interesting as it appears to be the first sign that ceramic production at Sikyon was taking place outside the southern part of the SP.

The fabric of this kiln-waster is very similar to that of the others, although it might be differentiated slightly by its heaviness. The kiln-waster is, as expected, very hard and coarse with a bumpy to rough surface and a sharp fracture and is dark gray

(5YR 4/1) in colour. The colour range of the non-wasted examples of this type are generally either dark gray (5YR 4/1) or reddish yellow (5YR 6/8) to yellowish red (5YR 5/8). These tend to be medium to course, and of medium hardness and have a bumpy feel and rough fracture. Mineral inclusions are common with the usual sub-rounded and sub-angular white and opaque glassy (likely silicate) and powdery white/yellow (possibly carbonate) types being most pronounced.

The stew pot with semi-cylindrical rim class is a common one at Sikyon and examples have been found on all three plateaus. In total 244 examples have been recovered and recorded, 44 from the Upper Plateau, 91 from the South Plateau, and 109 from the North Plateau. While the category stew pot with semi-cylindrical handles represents several related sub-types of vessel, for the purposes of the present investigation it is nonetheless possible to discuss them as a whole as they all date very roughly from the same time frame and are classed by function as cooking vessels. The highest concentrations of these occurred in the northern part of the SP, to the south and east of the ancient agora, in the central section of the NP around the area of the modern museum (which is a reconstructed Late Roman bath), with a small concentration above the ancient theatre in the northernmost section of the UP, near Gate 6. Interestingly, very few examples of this shape appear in the southern part of the SP or in the adjacent eastern part of the UP, while high concentrations were collected from around the area of the agora and in the north-central part of the plateau. This is a distribution pattern which may be indicative of a shift in settlement activity at Sikyon during Late Roman-Early Byzantine times. To test such a hypothesis, however, it would be necessary to survey the area of the village of Vasiliko and the grounds of the museum, both of which were outside the area of the Sikyon Survey Project. (Table 3.9)

Transport-

3.3.5- Sikyonian A Amphora- Mid 2nd century BC-1st or 2nd century AD-

Transport amphoras account for a very large proportion of identified vessels from the Sikyon Survey Project.[30] As previously established, two types of amphoras were

[30] It is likely the case that the especially high numbers of amphoras is a result of a statistical inaccuracy

produced at Sikyon. The first and most common of these is the Sikyonian A amphora. Initially, a small range of possible amphora types were identified as local based on shapes identified among the kiln-wasters. These were amphoras with: triangular protrusion, cup rim, cylindrical handle, high-folded rim, and plain, slightly curved almost vertical rim.[31] As the study of the material progressed, however, it became clear that these fragments all belonged to the same class of vessel, the amphora with the triangular (neck) protrusion, and the most common amphora with the cylindrical handle turned out to be different parts of exactly the same type. Then, the amphora with plain, curved almost vertical rim, the amphora with cup rim, and the amphora with high-folded rim turned out to be slight variations of this class, and almost certainly have the same cylindrical handles as the others as well as the same triangular protrusion on their necks. The minor rim variations may indicate an evolution of the shape over time as seen in the related Dressel 20 class (Martin-Kilcher 1983; Peacock and Williams 1986: 137-8), it is also quite possible that these subtypes were products from different workshops (Keay 1984: 309). Based on finds from the Athenian Agora, however, it appears that the most likely the type which exhibits triangular protrusions on the neck is a Hellenistic version of a form which exhibits a cup rim in Early Roman times (Fig 3.17, 3.18).[32]

Sub-type i exhibits an ovoid body, which ends in a knob-toe, the rim of this type thickens at the top and features a horizontal triangular ridge at the point where the handles join it. Sub-type i appears to be the earlier sub-type and an example of this found in the Athenian Agora dates to the 2nd century BC. While the fabric is different, the shape of the Sikyonian Ai is reminiscent of a late Corinthian A′ type published by Koehler,

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stemming from the high surface survival rates of the thick, hard-fired amphora sherds and their easy identification. This inaccuracy is explained later in the present chapter in relation to average sherd weights.

[31] Some of the Sikyonian A amphoras discussed here were published without permission as the "Proto-Dressel 25" type by A. Opait in *Varia Anatolica XXI*- "Patabs I Production and Trade of Amphorae in the Black Sea": 155-6. A. Opait requested a visit to the Sikyon storerooms in 2006 in order to see what types of amphorae were being recovered on the Sikyon Survey. Y. Lolos granted permission for this visit and he was shown around by Lolos and E. Tzavella. Several years after his visit Opait published what he had seen without the permission of the ΛZ Ephoreia, site director Y. Lolos, or the holders of rights to the material E. Tzavella, P. Stone, and the author. While some of Opait's conclusions are indeed correct, his interpretations of the fabrics are incorrect. Opait was also not aware of any of the sub-types of the Sikyonian A amphoras as at the time of his visit we had not yet connected them to the same shape class.

[32] Future excavation at Sikyon may enable us to refine our understanding of these typological fluctuations and whether they vary based on chronology or function through excavated Sikyon.

which may represent a stylistic forerunner to the Sikyonian Ai type.[33] Koehler dates this similar type to the mid 3rd century BC, and suggests that the permeability of the fabric of these Corinthian vessels could perhaps suggest that it was used for something other than the transport of liquid.[34] In the Sikyonian Ai type, however, the relatively common presence of biotite mica in the fabric of these vessels, a featured shared only by the fabric of jugs from Sikyon, may suggest that these amphoras and jugs were being made in a the same fabric variety because they both served a similar purpose, namely to contain liquids.[35] Sub-type ii appears to date to Early Roman times. This type has a nearly vertical rim and a very subtle thickening toward the top. In this variety a groove is present at the point where the rim begins to thicken.

As was fully expected, no complete amphoras were collected or recorded during the Sikyon survey. It became necessary therefore to define this class of artefact through a combination of both typological features and ceramic fabric analysis in order to help create a more complete profile. When we discuss Sikyonian A amphoras, therefore, we are discussing a class of vessel with certain typological features that also appears in a specific fabric family, differentiating it from similar types such as the Dressel 25 amphora, or the Brindisian type.

The most distinctive typological feature of Sikyonian A amphoras is the handles which are curved in profile and cylindrical in section. The handles are also quite short and attach to the vessel at the upper part of the shoulder then curve upward to join the neck just below the rim. While we see some variety in rim types the most common one has a vertical, slightly everted rim with a thickening toward the top, above a horizontal ridge. The amphora with high-folded rim appears to be a slightly refined version of this with a nearly vertical rim and a very subtle thickening toward the top. In this variety a groove is present at the point where the rim begins to thicken. Based on the rim, handles

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[33] Koehler's fabric observations are similar to the fabrics of the Sikyonian A. See Koehler 1992.

[34] Koehler 1992

[35] As our evidence for these vessels comes from survey data, we are presently unable to ascertain how long sub-type i and ii were used, or indeed when the style changed.

and shoulders of this vessel type, it becomes clear that the profile of the Sikyonian A has very close parallels with a known amphora type most commonly classified as the Dressel 25, but also known as the Oberaden 83, Haltern 71 and Peacock and Williams Class 24, and also with the Brindisian type (Fig 3.19 a and b).[36] The body shape of the Dressel 25 type is very slightly ovoid and thickens slightly toward the bottom of the vessel. The lower section curves inward sharply and ends in fairly spiky cylindrical toe. When complete these vessels would have stood ca. 62-70cm high with a rim diameter in the 12-14cm range (Abadie-Reynal 2007: 242 no.437 pl. 68; Bezeczky 2002; Peacock and Williams 1986: 134-5; Van Der Werff 1986: 115-6). A final noteworthy point relating to these amphoras is that no example to date has exhibited signs of stamping, graffiti or *tituli picti* (noted by the author at Sikyon, and at Athens and Maresha by G. Finkielsztejn Pers. Comm. May 2012).[37]

According to Peacock and Williams this particular shape was most likely primarily used for the transportation of olive oil, although wine transportation might also be an option (1986: 82, 135-6). The Dressel 20 form was the most common oil amphora in the eastern Roman world and is strikingly similar to the Dressel 25/Sikyonian A (Fig 3.12); the former had an estimated carrying capacity of 66 litres of oil, making it one of the larger amphora types (Ejstrud 2005: 172, 175). The Sikyonian amphoras likely had a lower carrying capacity than the Dressel 20. Both olives and vines have been major crops in and around Sikyon for most of its known history, and it is therefore reasonable to assume that Sikyonian A amphoras were used to transport either wine or oil (Lolos et al Forthcoming: 39-45). Of these, however, oil appears the most likely primary original content, for reasons which are discussed in Chapter 5. It is at any rate unlikely that these amphoras were intended for the transport of a single product type. It is worth noting that, based on research by Peña, amphoras may have had a use life of 10 years, possibly even up to 50 years (2007: 39-60). It is perhaps best to think of these amphoras, therefore, as

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[36] For studies on this shape see- Abadie-Reynal 2007: 242; Beltran 1970: 519-20; Bezeczky 1998: 225-242; Bezeczky 2004: 85-97; Buchi 1971: 531-637; Cipriano and Carre 1987: 479-494); Dressel 1899: 176, 179; Mazzocchin and Pastore 1995: 84-106; Martin-Kilcher 1983: 337-47; Peacock and Williams 1986: 134-5; Roman Amphorae: A Digital Resource 2005; Van der Werff 1986: 77-137

[37] The author thanks G. Finkielsztejn and the Israeli Antiquities Authority for their kind permission to discuss these.

having a primary function and possibly also a range of later functions. The primary function was likely connected to whatever economic factor warranted the production of these vessels in such high numbers.

Peacock and Williams interpret the Dressel 25 as closely related to the Dressel 20 which originated in Spain (Peacock and Williams 1986: 134, 136). They describe the fabric of the Dressel 20 and the Dressel 25 as identical:

"very thick, rough sandy fabric, usually buff (7.5YR 7/4), light reddish-brown (2.5YR 6/4) or grey (7.5YR N6/1) in colour … prominent white and colourless inclusions of quartz and feldspar can be seen, with lesser amounts of darker coloured rock fragments and white limestone."

They then describe the fabric microscopically, the fabric has "frequent inclusions of quartz, quartzite, potash and some plagioclase feldspar, together with fragments of quartzite sandstone, chert, limestone, quartz-mica-schist and flecks of mica" and list all of these as being compatible with the geology of the Sierra Morena in the region of Guadalquivir, Spain (Peacock and Williams 1986: 140). In *Roman Amphorae: A Digital Resource* (2005) Williams lists two fabrics for Dressel 25's, a fine one, Fabric A which features 'quartz, mica, iron oxide, limestone and heaver minerals' and Fabric B, a coarser fabric with 'quartz...limestone, muscovite, rare chert [and] volcanic rock inclusions'. Fabric B is not compatible with Sikyonian geology, while Fabric A is. Fabric analysis would be helpful in adding further evidence for or against the claim of a Spanish origin, but unfortunately, in his publication of this type in Rome, Van der Werff was only able to describe the fabric of those samples that he saw in the *Mercati Trianei* storeroom in Rome as follows: "as far as could be established firm, gritty, and compact: brown (5YR 6/6) or reddish-brown (10R 5/6) in colour" (Van der Werff 1986: 115-6, ff. 27). These two different fabrics most probably suggest that this shape was being produced in at least two separate places. Indeed evidence for the production of this type has also been noted at Aigeira, suggesting perhaps that this was also a regional type of amphora common to several parts of the northern Peloponnese (as observed by the author).

The amphoras of this type produced at Sikyon appear most commonly in comparatively bright hues such as very pale brown (10YR 7/4), light brown-pinkish beige (7.5YR 6/3-7/3), red (2.5YR 5.8), reddish yellow (7.5YR 7/5) and gray (10YR 5/1). The fabric of vessel-type tends to be hard to very hard, with a few examples in medium hardness. The fabric is generally medium to fine, has a smooth feel in the majority of cases, with a bumpy feel in the minority, and a clean to sharp fracture. Mineral inclusions in these tended to be fairly common and quite small, and are generally polychrome. White and glassy opaque inclusions are the most common, but small sub-angular dull gray/pink inclusions, small dark red-black are also common. The fabric of the Sikyonian A amphoras exhibits comparatively common biotite mica, a variation also seen in Sikyonian jugs of Hellenistic date.

It seems likely that one of the rim forms of the Sikyonian A type (the rim with triangular protrusions) could be an earlier type of this form, and may represent an intermediary between Corinthian amphoras and the Brindisian amphora, a shape which shares many similar traits. The Brindisian type, also known as the Ostia LXVI and Peacock and Williams Class 1, exhibits a plain thickened rim, a cylindrical neck and cylindrical (in section) handles, which join at the top of the shoulder and below the rim. The body of this type is oval, and ends in a knobbed toe (Peacock and Williams 1986: 82).

The hypothesis that the Sikyonian type of amphora might represent a transitional type between Corinthian and Brindisian amphoras was first posited by Virginia Grace in 1961 (Grace 1961: Figs. 32, 33), subsequently by Koehler (1978: 2-3, 22-3) and Van der Werff (1986: 115-6, ff. 27) suggests a likely Peloponnesian origin. Furthermore, morphological similarities that Dressel 25 and Brindisian rims have in common with Late-Hellenistic Corinthian amphoras appears to suggest that the former types may have evolved from the latter (Fig 3.22). Building upon this hypothesis, Palazzo and most recently Finkielsztejn, also connect the development of the Dressel 25 amphora which first emerges during the later 2nd century BC with the Brindisian type (Palazzo 1989: 548-553; Finkielsztejn forthcoming). The reasonable hypothesis put forward by Palazzo is that after Corinth was sacked by the Romans, potters from the city were brought to

Brindisi as slaves where they created this new amphora type based on the late Corinthian type they had been used to making at Corinth. Potters from Corinth therefore may also have fled to Sikyon and produced the Sikyonian A type around this time based on the same stylistic influences, and indeed they match very closely with Palazzo's Brindisian iib sub-type (Finkielsztejn forthcoming; Grace 1961: 38; Palazzo 1989) (Fig. 3.21).

Regardless of the exact development of the shape, it is seems clear that it bears close connections to both Southern Italy, especially to Dressel 25 amphoras, but to a lesser extent the Lamboglia type 2 and Greco-Italian types, and also to Corinth. The shape of the Sikyonian A amphora and is recorded distributions throughout Dalmatia and Greece (Peacock and Williams 1986: 82-3), as well as trade patterns identified by the author through the identification of amphoras imported to Sikyon, may further support such typological influence. Dressel 25's seem to have had a large distribution range with examples being recorded in Britain (Williams and Peacock 1983), Germany (Beltran 1970), Georgia (Koehler 1978), Israel (Blakley 1988: 40-1 fig 8.3 and Finkielsztejn forthcoming) Italy (Van der Werff 1986: ff.27) and Turkey (Jones 1950: fig 143). Examples have also been found more locally to Sikyon in Argos (Abadie-Reynal 2007: 437.1), the Athenian Agora (seen by the author), and examples are also displayed in the Roman agora of Thessaloniki. While it may be tempting to think that these broad distributions are representative of a wide trade network relating to Sikyonian goods, it should be kept in mind that this shape was produced at more than one site, and also that these distributions could partly result from secondary use and distribution.

Circular amphoras handles and rim-types matching those of the Sikyonian A types were common finds on the Sikyon Survey, and certainly appear to represent one of the more common vessel-types at Sikyon. Of the 934 sherds which match either the handle-type or the rim-types of the Sikyonian A 801(86%) appear in variations of one silicate fabric family. The remaining 133 sherds appear in either possibly regional and/or more likely imported fabrics. Of the 934 sherds with Sikyonian A characteristics, 168 (18%) were recovered from the UP, with a very slight concentration of these in the southeast part of the UP along the border with the SP. 247 (26.4%) were recovered from the NP, an area which yielded a fairly even distribution except at the northeast edge of the plateau where numbers were low. The SP yielded the majority of these amphoras as well as the greatest concentrations. Here 519 (55.6%) examples were collected and sherds of this type were recorded in most squares of the SP. An especially high concentration however, can be seen in the southern part of the SP, in and around the area where the majority of kiln-wasters were found; this may further support the idea that the southern part of the SP was the commercial centre of ancient Sikyon. (Table 3.10)

3.3.6- Sikyonian B Amphora- Middle Roman

Based on evidence from Argos, the Sikyonian A shape may have remained in use into the 2nd century AD (Reynal 2007: 437.1 pl.68; Grace 1961: fig. 33). Around this time, however, another type of amphora emerges in the kiln-wasters at Sikyon, the Sikyonian B amphora, formerly the amphora with bulbous neck and triangular rim and with triple ridged handle.

The rim diameter of this type is in the 6-12cm range, smaller than the Sikyonian A rim diameter. This class also has triple-ridged handles which attach to the shoulder and to the middle, bulbous part of the neck (Fig 3.22). The same type of amphora was also produced at Corinth in the 2nd and 3rd century AD, and is recorded in the Athenian Agora in a 4th century AD context (Robinson 1959: 89, no. M53; Slane 1990: 116, no. 250).

The examples of this type appear in both local and Corinthian fabric at Sikyon. The appearance of this new amphora-type seems to coincide with the decline or cessation of Sikyonian A amphora production. Owing to the appearance of this type of amphora at Sikyon in both local and Corinthian fabric, it is reasonable to assume that trade between both cities had been re-established by the 2nd century AD. Furthermore, we can state that the market demand for Sikyonian A and their contents had ceased or shrunk dramatically by this time, as the significant differences in shape between Sikyonian A and B types, especially the narrowed neck size on the latter, may be indicative of different intended functions.

These amphoras were produced in the same Sikyonian Silicate Fabric as the Sikyonian A amphoras, and appear in a range of colours, with the light red (2.5YR 6/8) and light brownish (2.5Y 6/2) being most common. Several slightly finer examples of this fabric appear, as does a very coarse version, but in the majority of cases the fabric of this type is of medium to fine coarseness, and medium hardness. The feel of these tends to be bumpy, and fractures are bumpy to sharp. Two certain non-local examples have been found, one appears in Corinthian Cooking Fabric (CCF) in NP 120.02, and another in a fabric which is reminiscent of a fine Corinthian A amphora fabric in NP57.01.

In total 102, Sikyonian B amphoras were identified during the survey. Examples of this shape were found on all three parts of the plateau, but their distribution was not even. The SP yielded one primary concentration, around the ceramic production area, including two kiln-waster fragments, one with a triangular rim from SP 3.04, and another in the northernmost area of the SP to the east of the ancient agora. the UP yielded 19 sherds of this type, a small concentration in the south central area is evident. Another larger concentration was found in the northeast area above the area of the Gymnasium of Klinias. 59 Sikyonian B amphora fragments were found in the NP, and were distributed quite evenly in that part of the plateau, with perhaps a slight concentration to the west of Gate 2. (Table 3.11)

Serving-

3.3.7- Jug with Ridged Base-1st century AD- 4th century AD

Once again the name of this class of vessel is a descriptive term which is intended to serve as a catch-all. The ridged bases of jugs were a common class of find on the Sikyon Survey Project, but could represent bases from several slightly different sub-types of jugs, which are normally differentiated by their rims. Over 150 examples of this class were identified during the course of the Sikyon Survey Project. These base fragments most likely represent the lower sections of round-mouth jugs which are broadly datable to the 1^{st}-4^{th} century AD (Slane 1990: 100-1) (Fig 3.23).

These tend to appear in hues of brown, with strong brown (7.5YR 5/6) and brownish yellow (10YR 6/6) being most common, and to be medium hard to hard with a bumpy surface and rough fracture. Mineral inclusions tend to be very common, and of these most frequently sub-rounded and sub-angular white and opaque glassy (likely silicate) and powdery white/yellow (possibly carbonate) types. The most obvious inclusions, however, are large rounded matte white ones 2-4mm in size.

The distribution of the jug with ridged base class on the plateau is interesting: while the vast majority of these vessels were found in the NP, examples were also identified in the east and north areas of the UP, and the northern area of the SP. None, however, were found in the southern part of the SP. (Table 3.11)

Utilitarian-

3.3.8- Bowl/Basin with Ring Foot- Late Classical – Early Roman

The bowl/basin with ring foot is once again a descriptive name for a class of sherds from large deep vessels, and these may even represent several types of vessels. These represent foot fragments of vessels which, due to their large size, have been classified as having a utilitarian function, although a dining function cannot be completely ruled out either. It is perhaps safest to consider them as the feet of ancient basins or deep bowls (Fig 3.25). During the Sikyon Survey Project, 101 sherds of this class were identified, making it very common. Indeed it is probable that these could be the feet of the utilitarian krater with overhanging rim type, the most common of the utilitarian class identified at Sikyon. The latter is also a particularly well documented and common Hellenistic form at Corinth, Isthmia and Athens (Anderson-Stojanovich 2004: 635; Edwards 1975: 134; Pemberton 1989: 68; Rotroff 2006: 109-4). The size of these vessels also makes them quite easy to spot, as they range in rim diameter from ca.15cm to ca.46 cm with the most common examples at Sikyon having a diameter of ca.23-41cm (Rotroff 2006: 109-14, esp. 109-10).

Seven examples of this class appear in a fine/semi-fine Corinthian fabric (one of these has a black slip surviving on its interior); seven appear in unknown fabrics (one of these being a possible sigillata imitation); two appear in a coarse version of the same Sikyonian silicate rich fabric seen in all the aforementioned vessels; while 85 appear in Sikyonian Silicate Fabric (including the three kiln-wasters). The general colour range for the fabric of this type is light red (2.5YR 6/8) to red (2.5YR 5/8). The fabric of these 85 vessels tends to be of medium hardness and is medium coarse. The surfaces are generally powdery and exhibit rough fractures. Mineral inclusions are common and of these, the most frequent are sub-rounded and sub-angular white and opaque glassy (mostly silicate) types and powdery white/yellow carbonates. This particular class of vessel often exhibits some unusual inclusions when compared to the rest of the Sikyonian pottery; these are rare greenish and yellowish glassy-looking inclusions, and in several examples some large matte white inclusions too.

There are two particular areas of concentration of bowls/basins with ring feet. The first one was in the southwest part of the SP while the other was in the adjoining southeast part of the UP. The three kiln-wasters of this category all came from SP17.04, the square with the highest density of kiln-wasters in the southern part of the SP.

3.3.9- Krater with Overhanging Rim- 3rd century BC-1st half of 1st century BC.

The krater with overhanging rim is an extremely common and important shape at Sikyon and one that appears to have had a long use life. It features a carinated junction between the middle and upper wall, a rim which is pulled and thickened with a moulding on its face and usually a concavity along the outer face of the rim, as well as upturned horizontal handles attached to the upper wall (Anderson-Stojanovich 2004: 635; Edwards 1975: 134; Pemberton 1989: 68; Rotroff 2006: 109-4) (Fig 3.25). Similar types to this have been connected with a range of tasks from washing and cleaning to childbirth, to food preparation and serving (Rotroff 2006:109). The range of possible functions has led to it being classified as a utilitarian vessel and indeed it appears to have been the most common vessel of this functional category at Sikyon in Hellenistic and Early Roman times.

The fabric is most often red (2.5YR 5/6-4/8) or grayish brown (2.5Y 5/2) with a light red (10R 6/8) core. This fabric tends to be of medium hardness and of a medium to medium fine coarseness with a powdery to smooth feel and a rough to sharp fracture. Mineral inclusions tend to be common, most frequent are sub-rounded and sub-angular white and opaque glassy (likely silicate) and powdery white/yellow (possibly carbonate) inclusions. One example also appears in a fabric described as Corinthian, and another in an unknown fine fabric.

At Sikyon 154 examples of this shape were identified. The five kiln-wasters in this category all come from the south part of the SP (15.07; 16.05 [x2] and 17.04 [x2]). This shape has been found in four primary zones of concentration: one in the south part of the SP in and around the possible production site, another in the north part of the UP, above the ancient theatre, a third in the southwest part of the UP, and finally in a small cluster in the centre of the east edge of the plateau slightly to the north of Gate 2. It may be that these concentrations represent domestic and/or commercial areas during Hellenistic times, with the possible exception of the south part of the SP. (Table 3.14)

3.3.10- Krater with Triangular Rim- 3rd quarter of the 1st century BC

These appear with some frequency at Sikyon, with 103 examples recorded from the survey. This shape has a ring foot and convex flaring or oblique sides. The top of this vessel type exhibits an angular carination just under the rim, which itself is vertical concave, overhanging and triangular (Fig 3.26). The rim diameter of the 'krater with triangular rim' is approximately 30cm. Excavated parallels of this form have been recorded at Corinth (Slane 1990: 121, no. 261; Wright et al. 1980: 160 no. 262). The krater with triangular rim appears to be the Early Roman predecessor to the krater with the high-folded rim.

The majority of these vessels appear in both the reddish yellow (5YR 6/6) and red (2.5YR 5/8) range, with colours in the beige-brown, green, grey and dark grey ranges also being recorded. The fabric of these vessels tends to be hard and of medium coarseness with a bumpy to powdery feel, and a rough fracture. Mineral inclusions are common and of the usual sub-rounded and sub-angular white and opaque glassy (mostly silicate) and powdery while/yellow carbonate types. Tiny silver glitter (mica) is also apparent in the fabrics of many sherds of this type. Voids are also common in the darker coloured versions of these vessels.

Examples of this vessel type have been identified on all three plateaus, with the highest frequency in the NP. The only waster we have of this type is from SP 16.05, one of only ten squares to yield this shape in the SP. Indeed the krater with triangular rim was surprisingly rare in the south part of the SP. The main concentration of this shape occurs in the north-central part of the NP, in the same area as the concentration of the later krater with high-folded rim. Another concentration can be seen in the western part of the NP to the north of the ancient theatre, while a lower concentration of this shape was noted in the eastern area of the UP. (Table 3.14- Map)

3.3.11- Krater with High-Folded Rim- Early Roman-Middle Roman

Krater with a high-folded rim was the most common form of vessel at Sikyon during Middle Roman times. 221 examples of this shape were identified during the survey and date from 1st century-mid 2nd century AD. The shape exhibits a ring foot with thick (ca. 2cm) flaring (or oblique) sides which end either in a flaring or a folded rim. A wide but shallow carination/groove exists below the rim (Fig 3.27). Excavated parallels of this form have been recorded at Corinth (Abadie-Reynal 2007, pl. 49, no. 332; Slane 1990: 119, 121 no. 262), and have been dated to around the middle of the 2nd century AD, and may represent an evolution of a rim type from Hellenistic times. The position of the handles, however, allows for clear differentiation between Hellenistic and Middle Roman types. Hellenistic versions of this shape have a handle attached below the carination, while the Roman versions have the handle attached above it (Slane 1990:119). Early Roman kraters appear to exhibit a rather different shape of rim, which has a deeper and higher carination and a thickened flaring rim.

As is also the case at Corinth, this shape appears in cooking fabric at Sikyon (Slane 1990:119, 121 no. 262). Of the 221 examples of this shape recorded, all appeared in the same Sikyonian Silicate Fabric. 78 examples of this type appear in a reddish-yellow (5YR 6/6-6/8) colour, 51 in brownish yellow/very pale brown (10YR 6/6 and 10YR 7/4 respectively), and 21 in reddish-brown/brown (2.5YR 5/4-7.5YR 5/4 respectively). Grey, green, yellow, and dark grey hues are also represented in smaller quantities. The fabric of these vessels tends to be hard and coarse with a bumpy surface and a rough fracture. Inclusions are common and tend to be slightly larger in appearance than is typical in other coarsewares thus far encountered. The macroscopically visible inclusions are not particularly well-sorted and tend to be angular or sub-angular and white or glassy in appearance.

Kraters of this type have been found in all parts of the Sikyon plateau with the exception of the west part of the UP. There seems to be a slight concentration in the SP, especially in the southern area, with a more defined concentration in the east end of the UP, above the ancient theatre. The main concentration of this type, however, is in the NP, in the north central area. These vessels are most likely associated with domestic and dining contexts, and as such the distributions of these may be reflective of these types of activity on the plateau during Middle Roman times (Table 3.15).

3.3.12- Basin with High, Horizontal Rim

Only one example of this shape was recovered during the course of the Sikyon Survey Project. This was found in SP16.11 and is a kiln-waster. The name assigned this shape is purely descriptive and not from a known type. Given that this single example is from a kiln-waster it cannot be excluded that it is perhaps a malformed example of a known shape, such as a krater with a high-folded rim, or possibly a different type of basin. As only one sherd of this type was collected and it has not been connected with a likely-known type, this sherd was catalogued but not yet drawn.[38] The fabric of the sherd appears to be the same silicate fabric seen in all of the above vessels.

[38] This will appear in the final publication of the Sikyon Survey Project. Lolos et al. Forthcoming.

Lamp

3.3.13- *Lamp- Broneer XVII type-* Early Roman

The Broneer type XVII lamp munsell(Broneer 1930: 60-1 Nos. 294-300) appears to be related to the common Broneer type XVI which is common in 1st century AD at Corinth (Broneer 1927: 56-60; Slane 1990: 9-10). Type XVII has either a triangular nozzle, or the same type of fluked nozzle as type XVI. These are wheel-made lamps, with rounded sides and a large filling-hole in the centre. They do not have handles and have low bases (Broneer 1930: 60-1). Broneer records the clay of these as gritty red or gray-brown and they are unglazed. Based on the similarities to the Broneer type XVI (which was produced at Corinth), and the kiln-waster from Sikyon, the XVII type may have been a Sikyonian product (Fig. 3.28).

The colour of this shape is quite consistent dark grayish brown (10YR 4/2). The fabric of these tends to be of medium hardness and of semi-fine to fine coarseness, with a smooth feel and a slightly grainy to clean fracture. Inclusions in these lamps appear to be the same as those in the fusiform unguentaria.

Approximately 70 fragments were collected during the Sikyon Survey, so the Broneer XVII type represents the most common form of lamp found. Examples of these lamps have been identified on all three plateaux. The only notable concentration of these was detected in the SP in the area to the east of the agora. (Table 3.16)

3.4 - Characterisation

At this stage in the chapter, the distributions and shapes of those vessel-types most likely produced at Sikyon (i.e. those recorded in kiln-wasters) have been discussed. This preliminary view of the vessel-types appears to show a ceramics industry which may have specialized mostly in functional types of ceramics, such as cooking vessels, transport vessels, and utilitarian vessels, with a lamp type representing the fine end of the production scale.

A striking aspect which emerges from the local vessel-types is that they all appear in one fabric family. While variations exist within this fabric family, such as in coarseness of, say, lamps and coarse basins, or in the hardness of cooking vessels and amphoras, the composition of all is more or less the same. All appear in a fabric which is rich in silicate inclusions, such as quartz and chert, while exhibiting common carbonates. This silicate-rich fabric family will hereafter be described as the Sikyonian Silicate Fabric (SSF) family. While the general fabric composition may not be surprising given the local geology, the homogeneity of the fabric group at Sikyon is unusual in comparison to most sites.

Through analysis of the distributions of vessel shapes several areas of interest emerge, most notable, is the southern part of the SP, the area with the highest concentrations of both heat-damaged sherds and kiln-wasters. Indeed so many of both categories were recorded in this area that it can safely be considered at least a commercial part of the Sikyon plateau, if not more specifically a ceramic production district.

A nuanced exploration of the Sikyonian Silicate Fabric family, the kiln-wasters, and the remains collected from the SP is required at this stage. The aims of tackling these issues are to characterize the Sikyonian Silicate Fabric, to explore possible ancient clay sources, and to compare the ceramic fabrics found in the kiln-waster area with local geology.

3.4.1-Characterizing the Kiln-Wasters from the South Plateau-

While kiln-wasters are relatively easy to spot due to their irregular shape and/or colour and/or surface, they can also be quite difficult to describe precisely because of these inconsistencies. They do tend to vary significantly in size, shape and form, but some features are common to nearly all of the kiln-wasters collected during the Sikyon Survey Project (Fig. 3.29).

Colour is perhaps the most obvious shared feature of the Sikyonian kiln-wasters. In general, pottery found on the site ranged from red, to yellowish red, to dark grey, while kiln-wasters were commonly in the green-beige or even blue-gray range, with occasional beige streaky features visible within their clay matrices. The colours of wasters tended to be extremely difficult to classify using the standard Munsell Soil Colour Charts (Munsell Soil Colour Company 2000), as the colour is generally inconsistent throughout and placing a number or a range in one area is only useful for that area of the sherd.

Another trait common to all of the kiln-wasters recovered from Sikyon was their rough feel, resulting from the pock-marked surfaces which were created during firing. Occasionally, the outer surface of a kiln-waster can even appear green and glassy, as a result of early-stage vitrification.

The unusual hardness of kiln-wasters is a direct result of a combination of being highly heat-damaged and the above-mentioned early-stage vitrification. Hardness was tested and described in a standardized way using a steel blade and a modified 'Mohs Scale of Mineral Hardness' (Mohs 1812; Sanders et al. 2008: 44-5):

Very Soft = Fingernail scratches easily
Soft = Fingernail can scratch
Medium Hard = Penknife scratches
Hard = Penknife just scratches
Very Hard = Penknife will not scratch

Kiln-wasters recovered from Sikyon were all in the Hard to Very Hard range, and exhibited sharp conchoidal fractures, not dissimilar to the edges of a shard of broken glass.

The fabrics of the kiln-wasters from Sikyon all represent the same Sikyonian Silicate Fabric as the non-wasted sherds. Ten examples of kiln-wasters were sampled from the Sikyon ceramic assemblage by Stone, Tzavella and the author after the 2006 season. These samples were made into thin-sections at the Fitch Laboratory in the British School at Athens, where a preliminary microscopic analysis was carried out by Kiriatzi in 2007. The author undertook an in-depth analysis of these thin-sections between January and February 2012 using a Leitz Laborlux 12 POL polarizing microscope.[39] The samples examined were numbers 17, 18, 19, 20, 22, 23, 24, 26 and 116. All were from the SP. The only typologically diagnostic sherd is Sample 24 which is a rim fragment from a Dressel 25-type of amphora, which appears to date from approximately the 2nd century BC-1st century AD.

The typical examples of this group are Samples 17 (SP 16.05), 18 (SP 16.05), 19 (SP 16.05), 23 (SP 30.03) and 116 (SP 6.03). The characteristics of these typical samples include a greenish/yellow groundmass, within which a network of tiny crystalline needle structures with dark cores are visible. As previously mentioned, these appear to have formed as a result of sintering during high temperature firing, and appear to be melilite (See *3.1.4*). This feature shows up best at 100x magnification under cross-polarized light and suggests that the pieces may have been fired in the 1,050^{0}C -1,400^{0}C range (Fig 3.30).

The most obvious feature of the kiln-wasters is the frequent to very frequent occurrence of circular voids throughout most samples. These voids appear to have formed as a result of bubbles as the ceramic boiled during extreme heating. Occasionally some sub-rounded voids also exhibit carbonate haloes; these likely represent voids formed as a result of destroyed carbonate minerals.

The most common mineral inclusions in these typical samples include polycrystalline quartz, which appears in a range of size and sphericity, although none larger than 0.88mm-1mm. Angular chert is another common characteristic and is most common in sample 17. Monocrystalline quartz is a slightly less common inclusion. This type of quartz is generally smaller than the polycrystalline variety, and is most often sub-angular or sub-rounded in sphericity. Mudstone is occasionally present in these samples,

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[39] This analysis was carried out during the tenure of a Fitch Laboratory Research Bursary granted to the author by the British School at Athens.

however, usually in those sections with less bubbles and less obvious needle-rich melilite groundmass. Where it is present and intact, mudstone can be large (up to 2mm). Red textural concentration features occur in lower frequencies, which may represent degraded mudstone or the remains of iron-rich clay pellets. Samples 17 and 18 both exhibit rare microfossils, with radiolarian mudstone present in the former. Sample 18 has several elongated yellowish inclusions, the longest of which is slightly over 8mm long and these may be the remains of carbonate streaks which survived the firing process.

The atypical examples from this sample group were Samples 20 (SP 6.03), 22 (SP 30.03), 24 (SP 35.06), and 26 (SP 14.04), as all of these exhibit little or no needle-melilite features in their groundmasses. 22 exhibits a mixture of the greenish/yellow melilite groundmass seen in the typical examples from this group. It also, however, exhibits a significant matte, dull-red section, due to being less exposed to heat, and also lacks any circular voids. This is all likely a result of slightly lower firing conditions than seen in those typical samples. Samples 20, 24 and 26 exhibit no needle-melilite features in their groundmass at all, they also exhibit few to no circular voids. Sample 24, as discussed earlier, dates from Hellenistic to Middle Roman times and is very similar indeed to Samples 20 and 26. Samples 22 and 24 exhibit some red streaks which may indicate some type of clay mixing of a carbonate clay, with a darker, red terra rossa clay. Beyond these differences, however, the composition of the samples is otherwise the same as that of the typical samples 17, 18, 19, 23 and 116.

On the whole the impression gained from the thin sections of the kiln-wasters is one of highly heat-damaged altered carbonate clay with silicate inclusions. The quartz, chert and mudstone inclusions attest to a source with a similar geology to the clay samples, hardly surprising given the regional geology surrounding Sikyon. The lack of intact carbonates such as micrite, calcite, or sparite is unsurprising when one considers the extreme temperatures to which these sherds would have been exposed. None of the wasters appear to be strikingly different in composition from the others.

3.4.2- Sikyonian Silicate Fabric Standard-Fired Vessel-Types Known from Kiln-Wasters

With the fabrics of heat-damaged kin-wasters characterized, the next step in this stage of the investigation is to examine the fabrics of ceramics as they should have been fired, without heat-damage. During 2010 the author carried out a detailed macroscopic study on a representative sample of 279 typologically diagnostic sherds from Sikyon. The study was both systematic and very detailed and was based methodologically on the macroscopic studies conducted on the Sphakia survey. In January and February the author also conducted microscopic analysis of ceramic thin sections made from sampled Sikyonian material. This analysis was done in the Fitch Laboratory in the British School at Athens and was carried out on a Leitz Laborlux POL 12 Microscope.

These studies were designed to build upon the patterns which emerged from the study of the ceramic fabrics from the vessel-shapes associated with the kiln-wasters. Both methods of analysis were carried out on ceramics of standard firing, kiln-wasters and clay samples. The results from the present section below come from this study unless otherwise specified (Fig. 3.30).

Colour – There exists a relatively large range in colours in the silicate fabric from Sikyon; tones from very dark grey, to green, to brown, red, orange, yellow and even white exist, as well as many sub-variations of these. While many tones, hues, and sub-hues were recorded by the author using the Munsell Soil Colour Charts (2000) some very obvious patterns quickly stood out. The most common colour was red (2.5YR 5/6) which appeared in 12% of recorded instances, this was followed by reddish yellow (5YR 6/6-7.5YR) which appeared in 10% of instances. Yellowish red (5YR 5/6) was recorded in 9% of instances, light red (2.5YR 6/8) and both gray (2.5Y 5/1) and dark gray (10 and 10YR 4/1) in 4% of instances.

Hardness- As previously noted, hardness of sherds was tested using a modified version of the Mohs Scale of Mineral Hardness (as outlined on p.115). Eight categories of hardness were noted by the author in the sampled ceramics from Sikyon. Of these

Medium (53%) was most common, followed by Hard (26%), Soft (6%), Medium Soft (4%) and Very Hard (4%). On the whole the sherds from Sikyon were medium to hard.

Coarseness- As previously noted the coarseness of sherds was tested using a modified version of the Wentworth grain-sorting charts. Seven major categories for coarseness were noted by the author from this material. Of these Medium (37.3%) and Medium to Fine (37.3%) were most common, followed by Medium to Coarse (14.7%). The majority of the sherds are of medium to fine coarseness.[40]

Feel- The surface feel of sherds was recorded according to categories outlined in Orton et al. (1993: 70). The major types of surface feel for pottery recovered from the survey in SSF were Bumpy (35%), Powdery (15%), Smooth (10%) and Bumpy to Gritty (7%). Other categories were all recorded in relatively trace amounts. For the most part therefore, the silicate family ceramics recovered during the Sikyon Survey Project tend to have a bumpy or powdery feel.

Fracture- The fracture of a sherd can be extremely informative as relates to firing differentials. As we have already seen with very highly-fired kiln-wasters, the fracture will be sharp. Ceramics fired at low temperatures as in the case of, say, Middle Woodland pottery from Ontario, Canada, exhibit a very flaky fracture. Firing is not the only variable that fracture can help us interpret. For example, the extremely powdery fracture of pottery from Stymphalos, a neighbouring, roughly contemporary *polis* of Sikyon, is as a result of post depositional factors relating to the lake system in the area. As relates to tempers, grainy breaks may hint at sand-tempered pottery, as is particularly common with ceramics from parts of North Africa (all observed by the author).

The break, or fracture of the sampled sherds is based on criteria set out in the publication *Pottery in Archaeology* (Orton et al. 1993: 70). In total eight different types

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[40] N.B. Coarseness here does not necessarily translate to *coarseware* or *fineware*, rather it refers to the level of sorting of mineral inclusion in the fabric. When classifying coarse or finewares factors such as size of the inclusions, feel, fracture and hardness must all be considered in addition to grain-sorting.

and 28 sub-types of fractures were observed in the silicate fabrics from Sikyon. The most common fracture-type was Rough (29%), followed by Clean (8.6%), Powdery (6.8%) and Sharp (6.5%).

Matrix-

On the whole, the matrix of the non-heat-damaged sherds ranged in colour from orange-red to dark. In some examples there appears to be obvious clay mixing as indicated by the appearance of streaks from where calcareous and terra rossa–type clays were not mixed properly. Most thin-sections were moderately bimodal in particle size and distribution, and many samples were mildly optically active, especially the groundmasses of the amphora samples.

Mineral Inclusions in Sikyonian Silicate Fabric-

Inclusions occur in the 10-35% frequency range

Common:

As expected, the mineral inclusions in the Sikyonian Silicate Fabric family are generally of very consistent nature and frequency. Angular and sub-angular micrite and calcite along with angular to sub-rounded silicates such as monocrystalline quartz, polycrystalline quartz, and chert are the most common inclusion types. The micrite and other carbonate inclusions can range in size from <0.01 mm up to 3-4mm. The silicates tend to have a similar minimum size but rarely if ever were larger than 1mm. These primary inclusions tend to appear together in concentrations in the 20-35% range.

Occasional-Rare:

Small round to sub-rounded matte red-orange inclusions occur with occasional frequency. These may be small iron-rich textural concentration features, iron-rich clay pellets, and in rare cases perhaps also garnet.[41] Tiny biotite mica (<0.02-0.08mm)

[41] Whitbread has recorded what appear to be rare examples of garnet in samples of cooking fabrics from the Berbati Valley. Graybehl, who has seen this garnet, went through various thin sections with the author and identified some similar minerals in the Sikyonian Silicate Fabric. This garnet tends to be rounded and dark red in plain polarizing light, and dark with a few tiny orange lines in crossed polarizing light. This

inclusions occur with rare to occasional frequency. Angular inclusions of mudstone appear in occasional frequencies. Radiolarian mudstone is an occasional to rare form of inclusion, as are other marine microfossils. Large sub-angular clusters of sparite appeared in a few samples, but were pronounced.

Very Rare:

Tiny inclusions of plagioclase feldspar, and other igneous-type minerals were observed in three thin-sections from Sikyon.

Voids-

Voids in the matrices of Sikyonian Silicate fabric ceramics (non-kiln-waster sherds) are rare and occur in the 1-5% range and are vughs (most commonly mesovughs).

The analysis of the non-heat-damaged sherds in many ways complements the results of the analysis of the kiln-wasters. The kiln-wasters were highly altered due to firing, but the approximate composition of clay matrix and silicate minerals is similar to the non-heat-damaged sherds. Monocrystalline and polycrystalline quartz, chert, iron-rich textural concentration features were common in all of the samples. As expected, the kiln-wasters and the non-heat-damaged sherds differ along several lines. The wasters lack the amount of carbonate material of the non-damaged sherds. They also exhibit frequent circular voids, and tend to be much harder than the non-damaged sherds. These differences can be directly attributed to firing differentials, and are consistent with the types of changes that ought to be expected in carbonate minerals when exposed to very high temperatures. The analysis of the sherds of standard-firing and the kiln-wasters, further indicates that the ceramics of Sikyon appear in a single silicate fabric family, which therefore ought to be of local origin (Fig 3.31- 4 images of standard fired pottery).

3.5- *Clay Selection and Sampling at Sikyon*

The prominence of one silicate fabric family from which the ceramics produced at Sikyon were formed, raises the question of where that clay may have been sourced and

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bears a close similarity to some inclusions identified as iron-rich textural concentration features by the author. Until the publication of Whitbread's findings, the author has opted to err on the side of caution and leave these labelled broadly as iron-rich textural concentration features.

how it may have been composed. In order to explore these issues, a systematic programme of clay prospection and firing was undertaken at Sikyon.

Although perhaps a statement of the obvious, clay selection is a vital step in the production of pottery. Clay must be selected carefully, often by trial-and-error, as not all are suitable for creating ceramics. Due to their wide variety, clay can be a difficult substance to describe and define. Most generally speaking, clay is a very fine grained product which forms when silicate rocks rich in aluminia ($A1_2O_3$) decompose. Rocks with higher levels of aluminia such as feldspars (especially quartz) and mica are more likely to breakdown into *clay* than are those with less or none, such as some amphiboles (i.e. hornblende), pyroxenes (i.e. augite) and olivine (Rice 1987: 34-5).

While the composition of clay can vary considerably depending on the type of rocks from which it is composed, the common properties of all clays are that they are very fine-grained and that they become malleable, or plastic, when mixed with water (Orton et al. 1987: 115-6; Rice 1987: 36). The latter point is of critical importance for creating ceramics. Clay must have enough plasticity so as to allow shaping and forming, but overly plastic clay will not retain a form. A clay can be differentiated from other very fine-grained earthy materials, such as silt, by placing a small sample on one's tongue and pressing it into the roof of the mouth; if the tongue can detect grains, it is a silt and not a clay; conversely, if the tongue cannot detect any grains then the sample is a clay (R. Siddall Pers. Comm. April 2011). The simplest test to detect whether a clay is possibly of suitable plasticity is to sample some, mix it with water, dry it, and try to shape it.

As discussed in the Introduction, Sikyon is located within a geologically sedimentary area composed largely of marine terraces which were created during the past 238ka (Higgins and Higgins 1996: 40; Lolos et al. forthcoming; Tataris et al. 1970). White-pale yellow calcite clays are extremely common in the area. Pockets of red terra rossa-type clays are present but are less common and tend to be found in the upper few metres of each level of the marine terrace system. This can be seen in places around the

Sikyon plateau, and on a newer marine terrace near the village of Souli, above Sikyon but well within the territory of ancient Sikyonia.

As part of the Sikyon Survey Project the author oversaw two clay-sampling initiatives, in cooperation with Kiriatzi, Lolos and Tzavella. The first was mostly centred on scarps around the surface of the Sikyon plateau in late summer 2006, and the other occurred in November 2008 mostly around the lower edges of the plateau and along the Asopos River valley. The latter was done as those clays most suited for creating ceramics tend to be found near rivers or under dry lake beds (Rice 1987: 37) (Fig 3.31).

Seven clays were collected during sampling in 2006. These were labelled by their location (i.e. A, B, C, D, E) and by 1 or 2 to differentiate possible red *terra rossa* clays (A1, B1, D1, E1) from white calcareous clays (A2, C1, E2). In November 2008, during the second phase of clay sampling six further samples were collected, which were simply labelled 6-12 so as to allow easy differentiation from the 2006 group (Fig 3.32). Furthermore, the 2008 samples were taken with the aim of finding suitable potting clays, as opposed to the aim of the earlier sampling which was to search out a range of different clays in order to establish a geological range of these minerals on the plateau. The finest looking samples were the white/yellow marl clays and all came from the top and bottom of large limestone cliffs and scarps along the south and southwest side of the plateau. Each sample site was recorded using a hand-held GPS device and by prose description. Clays were sampled using a geological hand-pick and samples generally ranged in weight from approximately 1.5kg - 4.5 kg, although only about 500g at the most was used for testing (Fig 3.33). Samples were then placed in buckets and in large clear plastic bags, each sample was recorded in a notebook, numbered and a sample location on a separate page was also left with each sample. All of these clays were then taken to the Fitch Laboratory in the British School at Athens for testing by the author and Kiriatzi.

The first step of testing the Sikyon samples involved cleaning the clay. This was done by taking several handfuls of each clay sample and breaking each up by hand and removing any large impurities such twigs, leaves, or larger mineral inclusions. With the samples free of large impurities the author then ground them using a mortar and pestle, placed each sample in a 1L laboratory beaker, and finally immersed each in water. Each clay sample was left immersed for several days to approximately one week to facilitate the clay and water mixing thoroughly, and to allow for levigation of the clay which would further purify it. During this process, remaining organic impurities in the clay floated to the surface and were removed while minerals and other heavier impurities sank to the bottom of each beaker. This technique of levigation also enables a potter to select grades of clay, with that nearer the surface of the water tending to be more suited to fine pottery, while that closer to the bottom is generally chunkier and more suited for heavier, larger ceramic vessels. Once satisfactorily levigated, water was then carefully drained and the finer clay from the top and middle sections of the beaker were separated from the less pure clay at the bottom and left to dry for several days.

During the forming phase of the briquettes some samples were disposed of, as they were not of suitable plasticity (Samples: B2, C1, 7 and 9). The size, weight, and Munsell colour of the remaining 11 samples (A1, A2, B1, D1, E1, E2, 6, 8, 10, 11 and 12) were then recorded.

Once reasonably dry, each clay sample was formed into four 3-5cm long rectangular briquettes, each briquette was then labelled with an A, B, C, D suffix (i.e. A1*A*, A1*B*, A1*C*, A1*D*) and a 2cm mark was impressed into each one. This was designed to serve as a control to measure changes in briquette size which may occur during both drying and firing. These briquettes created from the sampled Sikyonian clays were air-dried on paper towels on trays for several months in the cases of both sample groups. While it was probably not strictly necessary to dry such small briquettes for this length of time, a combination of time constraints and a desire to make sure the briquettes were totally dry led the author to err on the side of caution in this instance. The samples were then tested at four different temperatures (unfired, 750°C, 950°C, and 1050°C) for changes to their colour, their rate of survival, and shrinkage.

3.5.2 *–Suitability of Sampled Clays*

This section explores the suitability of the sampled clays for the manufacture of ceramics. The samples discussed are: A1, A2, B1, D1, E1, E2, 6, 8, 10, 11, 12. Each sample was formed into four briquettes. Each briquette was given an alphabetic label and was fired accordingly. Samples with an 'a' –suffix (i.e. A1a or 6a) represent unfired clay samples, 'b' represents those fired at 750^0C, 'c' represents those fired at 950^0C, and 'd' represents samples which have been fired at 1050^0C (Fig 3.34). The colour, size and condition of each briquette was recorded so that changes during and after firing could be tracked.

The clays sampled at Sikyon were collected from different areas, both from the top surface of the plateau and from the lower scarps of the plateau. Those which were plastic enough to be shaped were fired at a range of temperatures, so a broader range of colours, consistencies and properties ought to be expected than found in the kiln-wasters. Furthermore, as the clays have been sieved and levigated, the amount of mineral inclusions visible in their matrices should be minimal. For these reasons, therefore, the sampled clays have been described macroscopically according to three basic criteria: coarseness; colour; and on their condition after firing. All of the clays described are the ones that were plastic enough for firing, so plasticity is not necessarily issue with these samples. Colour has been described using the Munsell Soil Colour Charts (Munsell Soil Colour Company 2000). In those instances where samples were destroyed as a result of firing and a sample has in itself a range of colours, a general prose description of the material has been provided by the author. All firings of the clay samples were conducted in an oxidizing atmosphere.

Briquettes with 'a', 'c', and 'd' suffixes were studied macroscopically, while samples with the 'b' suffix were thin-sectioned. This was done in order to maintain methodological consistency, as any transformations and/or structural damage would theoretically occur at a uniform level since samples were all exposed to a firing temperature which would have been low enough so as to avoid structural damage. Analysis on these thin sections was carried out by the author once again in the Fitch

Laboratory in the British School at Athens using a Leitz Laborlux 12 POL polarizing microscope.

The underlying goal of the clay sampling programme on the Sikyon Survey Project was to explore the compatibility of the fabrics from the ceramics collected on the survey with the local geology. As ceramics collected during the survey ranged significantly in colour it seemed most sensible to collected a variety of clay types and colours. As mentioned above in the Introduction, the region of Sikyon has two main types of clays; the most common of these is a highly calcareous light yellow clay, and the other is a less common red iron-rich, or terra rossa type clay which can typically be found on the top few metres of the plateau. During clay sampling the author selected clays which appeared to be reasonably good examples of either type of clay, and as such, the present discussion has been divided up along these lines.

<u>Calcareous Samples (Table 3.17 and Fig. 3.35)</u>:

A2, D1, E2, 6, 8 and 12 represent the samples of calcareous clays which were suitable enough to be formed into briquettes. A2, D1 and E2 were collected in 2006, while 6, 8 and 12 were collected during the 2008 sampling campaign. A2 was collected from the surface of the plateau in the area between SIT 1 and UP 54 (03868014/204040), D1 came from NP74 (0386570/4204697), while E2 came from SP 2 (0387165/4203782). Sample 6 came from below the South Plateau SP 2 (386780/4203600), 8 was sampled from a scarp below the SP on a bend in the road where the cemetery of Ancient Sikyon/Vassiliko (mod. village) is located (386380/4203398) and 12 from a scarp near a gate on the north side of the plateau.

In all these clays were of very fine texture, meaning that they exhibited few macroscopically visible inclusions or impurities. The unfired colour of all of these samples was within the Pale Yellow (2.5Y 7/3-4, 8/3-4; 5Y 7/3, 8/2-3) range.

The mineral composition of these samples was also very similar, although not identical. All are characterized by the frequent presence of carbonates, especially calcite and micrite. Sub-angular monocrystalline quartz and sub-angular to angular polycrystalline quartz are the next most common inclusions and are common in D1, 6 and 12, while they appear with an occasional to rare frequency in A2 and E2, and in 8, polycrystalline quartz is rare, while monocrystalline quartz is common. Throughout all of these samples, dark red textural concentration features appear with rare to occasional frequencies. The author has identified these primarily as iron-rich clay pellets. In E2, however, a feature of similar appearance in Plain Polar Light (PPL) seems to be garnet, which can be identified more clearly under Crossed Polar Light (XPL).

Rare features appear throughout the samples, which include microfossils of uncertain type in D2 and 12, tiny biotite mica (<0.125mm) in D2, 6 and 8, radiolarian mudstone in D2 and an an orange-red mudstone in 6. Finally, in 8 is what appears to be a highly weathered piece of plagioclase feldspar, clearly from another geological environment.

All of the unfired briquettes and those fired at 750°C survived perfectly intact, albeit with occasional colour variation (see Table 3.1). Of those fired at 900°C, however, samples A2c and D1c both took on a mottled greenish hue and in the weeks following the firings cracked and eventually disintegrated. Sample E2c underwent a slight colour change and became structurally weaker over the following weeks, but did nonetheless remain intact. The final test firing at 1050°C resulted in similar results, with A2d disintegrating into a mottled beige-gray dust and D1d into a mottled brown-green dust. Sample E2d survived this highest firing, which unexpected as E2c at 900°C had weakened significantly. Samples 6, 8 and 12 remained solidly intact throughout firing.

The disintegration of samples A2c, A2d, D1c and D1d was most likely a result of the amount and size of carbonates present in these clays which appear to have become hygroscopic. This caused the samples to lose structural integrity as the carbonates absorbed water vapour from the air and expanded after firing. As a result of this, it seems unlikely that these clays would have been a suitable for use by ancient potters. Samples 6, 8, 12 would have all been well suited to making ceramics, and even E2 would have been a suitable clay. Samples 6 and 8 were collected from scarps at the base of the plateau in the valley of the Asopos River. Sample 12 was extracted from below a gate on the north side of the plateau, while E2 came from SP 2 in the south part of the South Plateau. Indeed E2, 6 and 8 were all found in close proximity to where the largest clusters of kiln-wasters and heat-damaged ceramics were found.

<u>*Terra Rossa* Samples (Table 3.18 and Fig 3.36):</u>

A1, B1, E1, 10 and 11 represent the samples of yellow, red, or brown iron-rich *terra rossa* clay samples which were plastic enough to be formed into briquettes. A1, B1 and E1 were collected in 2006, while 10 and 11 were collected during the 2008 sampling campaign. A1 was collected from the surface of the plateau in the area between SIT 1 and UP 54 (03868014/204040), B1 came from the eastern slope of Special Tract 1 (0385891/4204017), while E1 was collected from a scarp near the edge of SP 16 and SP 17 (0371144/203795). Sample 10 was sampled from a scarp on a bend in the road where the cemetery of the modern village is located, below the UP/SP boundary (386830/4204026). Sample 11 was collected from a tile-line scarp near UP1 (0385667/4204234)

The five terra rossa-type clay samples ranged in texture, B1 which was very fine, E1 fine, A1 was semi-fine to medium coarse, while both 10 and 11 were medium coarse clays and exhibited fairly common macroscopically visible mineral inclusions and impurities. A range in the natural colours of these clays also exists, with A1 and E1 being Yellowish-Red (5YR 4/6-5/6). Sample 11 represents something of an intermediate in this category with a colour ranging from Yellowish-Red (5YR 4/6) to Reddish Brown (5YR 4/4). Finally, samples B1 and 10 are in the Brown (7.5YR 5.4) to Strong Brown (7.5YR 5/6) range. These certainly represent different variations of local Sikyonian clay both in colour and in texture, but are nonetheless categorized together as they are all in the same rough yellow, red, brown colour range.

The mineral composition of these samples is, as expected, very similar. As with the carbonate-type clay samples the frequent presence of carbonates, especially calcite and micrite is once again the most obvious feature. Sub-angular chert, monocrystalline quartz and polycrystalline quartz are the next most common inclusions. Rounded red textural concentrations features appear with occasional frequency and have been identified as iron-rich clay pellets by the author, although the possibility that some of these may be very small iron-stained garnet should be entertained similar to E2. The groundmasses of A1, 10 and 11 exhibit tiny (<0.125mm) elongated biotite mica inclusions.

Rare inclusions include a long narrow microfossil of an unclear type, and radiolaria in A1b. B1, E1 and 10 all exhibit mudstone, which in E1 also shows signs of shearing, or 'mica fish'. E1 also has common sparite in it.

Once again, all of the unfired briquettes and those fired at 750°C survived perfectly intact, albeit with occasional colour variation (see Table 3.2). Of those fired at 900°C, however, samples A1c and B1c took on mottled red, brown and slightly green colours, cracked and eventually disintegrated in the weeks following the firing. E1c retained a yellowish-red colour, but nonetheless cracked and disintegrated into large chunks in the weeks which followed. The final test firing at 1050°C resulted in similar results, with A1d, B1d and E1d all taking on reddish-yellow, brown and greenish hues and disintegrating. Samples10d and 11d remained solidly intact, and of consistent colour throughout and after all firings.

The disintegration of samples A1d, B1d and E1d was most likely the result of similar factors which caused those calcareous samples to disintegrate as well. As a result of this, it seems unlikely that these clays would have been a suitable for use by ancient potters. Samples 10 and 11 would have been well suited to making ceramics. Sample 11 was collected from a scarp near the western end of the plateau. Interestingly, Sample 10 was collected in a scarp below the plateau in the Asopos River valley, in the same area where the well-suited calcareous samples E2, 6 and 8 were also collected.

3.6- Preliminary Comment on Clay Samples and the Comparison to Sikyonian Ceramics

As with the analyses of samples of ceramics, the sampled clays from Sikyon unsurprisingly reflect a sedimentary geological origin. In general, the sampled clays exhibit a lot of carbonates, most prominently in the form of micritic limestone followed by calcite, and rarer sparite. The most common mineral inclusions are monocrystalline quartz and polycrystalline quartz, followed by chert. The appearance of occasional or rare mudstone fragments and red textural concentration features are compatible with the general sedimentary picture. The rare microfossils also fit into this category.

Those clays which appear most suited to pottery production, based on their reactions to firing are E2b, 6b, 8b, 10b, 11b, and 12b. On the whole, the clay samples exhibit more frequent carbonates than are visible in the kiln-waster samples. This difference may be explained in several ways or more likely a through a combination of explanations:

1) The ancient Sikyonian clay was being sourced in a different location from where the clays were sampled.

2) The kiln-wasters exhibited far fewer carbonates than the clay samples because they were so highly fired that most of the carbonates burnt off during firing.

3) Potting clays from Sikyon were mixed and were composed of both calcareous marl clay and red terra rossa type clay.

Any of the three possibilities could potentially explain the more frequent carbonates in the clay samples as compared to the kiln-waster thin sections. The kiln-wasters did have their carbonate material burnt off during firing. The use of a clay source, or sources, outside the sampled area must not be excluded either, but the base composition of the clay samples and of the kiln-wasters is nonetheless similar, with the needle-melilite formations in the groundmass of the latter attesting to a likely one-time presence of carbonates. Clays sampled and fired from Corinth by both Farnsworth and Whitbread also exhibited more carbonates than were present in Corinthian pottery (Farnsworth 1970: 20; Farnsworth et al.1977: 460; Whitbread 2003: 11), a pattern which could suggest that ancient potters were reducing the carbonates in their clays before firing. The easiest way to reduce carbonates in a clay is to mix it with another clay, such as a terra rossa clay, which has fewer carbonates, and this seems likely to have been the case with at least some Sikyonian pottery.

The sampled clays are geologically highly compatible with the clay of the kiln-wasters. While an exact clay recipe for ancient Sikyonian pottery is not apparent, as the clays are slightly more calcareous than the wasters, these results do nonetheless suggest that potters could certainly have been using clay from a local source. Furthermore, most of the best of the tested clays were found directly to the south of the SP, at the base of the plateau. It seems likely therefore the location of the production area of Sikyon was in the southern part of the SP because of its close proximity to clay sources, and because of its defensible location atop the limestone cliffs.

Summary-

At this stage we have established that ceramics were being produced at Sikyon during Hellenistic, Early and Middle Roman times with some possible small-scale production during Early Byzantine times. Based on the very high concentrations of kiln-wasters and other heat-damaged ceramics, the high proportion of amphoras, basins and kraters, and the very close proximity to the most suitable potting clays from the sampled sites around the plateau, the southern part of the SP most likely represents the centre of ceramic production for Middle and Late Hellenistic and Early and Middle Roman Sikyon.

This chapter was designed to explore what was most likely produced at Sikyon, how, where, and from what it was likely produced. With this established, the next step is to investigate a more complete range of vessels which were also most likely produced at Sikyon. These vessels, however, will be connected to the types discussed in this chapter, through similarities in their fabrics, as this will provide a geological connection between vessel shapes known from kiln-wasters and those which were not known. This will provide a more complete picture of the character, chronology and scale of ceramic production at Sikyon.

Chapter 4:

Exploring The Sikyonian Ceramics Industry

"We may suppose that the pottery works, no doubt outside the city of Corinth proper, were spared in 146 B.C. or soon rebuilt, perhaps by citizens of neighbouring Sikyon, and that they continued to produce for export."
(Grace 1961: 22)

Introduction-
During the Sikyon Survey Project 739,313 sherds of pottery were collected. Only 1,471 (0.7%) of these collected sherds were examples of heat-damaged pottery, yet through analysis of this tiny proportion of the complete ceramic assemblage it has been possible to establish that ceramic vessels were produced at Sikyon. We can also safely state that during at least part of the Hellenistic and/or Roman periods several types of amphoras, cooking pots, basins, kraters, jugs and a single type of lamp were produced, and indeed consumed, at Sikyon. There is also evidence for the production of a single stew pot on the plateau during Early Byzantine times. Additionally, the analysis of the heat-damaged sherds has proven helpful in ascertaining that this ceramic production centred on an area located in the southern part of the SP, which is situated above large clay beds that may well have been used as clay sources by ancient potters. Yet these interpretations have been drawn from a small class of ceramic material that the ancient Sikyonians themselves would most likely have considered to be junk. So, what of the rest of the ceramic assemblage from the site?

The profile of the Sikyonian Silicate Fabric established in the previous chapter provides a means for exploring the larger ceramic assemblage from Sikyon. By identifying sherds in the same silicate fabric it becomes possible to differentiate local and non-local pottery at Sikyon, without having to rely on shapes recorded in the heat-damaged and kiln-waster sherds. Through classifying the ceramics from the Sikyon Survey Project by fabric it will be possible to interpret a broader range of the vessel-types produced at Sikyon. It will also be possible to view the proportion of ceramics that were produced and consumed in the local silicate fabric, as well as to explore some of the outliers and imported types.

The latter point is linked to several problematic issues relating to the study of the Sikyonian ceramic fabrics. The first of these issues regards Late Roman ceramics at the site, which have a slightly different appearance to the earlier ceramics and do not appear to be produced on the plateau. Another issue which was explored through ceramic fabric analysis combined with typological analysis is that of imported amphoras. Through these non-diagnostic, or semi-diagnostic, finds it is possible to consider some possible trade networks in which Sikyon participated. The final issue relates to the largest category of finds on most archaeological projects in the Aegean: architectural terracotta, such as tiles, pipes, pithoi and architectural members.[42] These coarse, heavy, and generally common finds are rarely studied in much detail due to the uniformity of their production. Yet they undoubtedly played a significant economic role and were explored accordingly by the author. This chapter concluded with a discussion of the issue of the provenance of the architectural terracottas found at Sikyon.

4.1- The Major Shapes Produced in Sikyonian Silicate Fabric

Interpretation of the ceramic assemblage from the Sikyon Survey Project unsurprisingly revealed that a broader range of vessel-types were produced in the Sikyonian Silicate Fabric than was noted in the heat-damaged shapes, and these are the focus of this section. For example, a strong case for a semi-fine Sikyonian Silicate Fabric is seen in some small fusiform unguentarium oil-flasks and lamps. The likelihood of Early Byzantine settlement and possible ceramic production on the plateau also increases based on a study of the non-heat-damaged shapes. This broadened range of vessel-types, however, does not significantly alter the general character of our picture of the Sikyonian ceramics industry during Hellenistic and Roman times and the majority of vessels are still representative of coarse work-a-day types, such as cooking vessels, amphoras and basins.

A listing and discussion of all the possible vessel-shapes produced at Sikyon would not be suited to the space or scope of the present investigation. Furthermore it

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[42] Although pithoi are technically ceramic vessels, I have included them as architectural terracotta as at Sikyon they appear in the same type of fabric as the architectural terracotta. Furthermore, by virtue of their function as storage vessels which would rarely if ever have been moved, it is perhaps more correct to think of a pithos as a piece of semi-movable architecture than a pot.

would not necessarily be a useful addition to the present investigation as such a listing would involve a very large amount of highly hypothetical interpretations that could be addressed much more accurately through systematic excavation at the site. Rather, a discussion of the Sikyonian shapes that appear in significant numbers or are particularly chronologically indicative provides a clear overall picture of the ceramics industry at Sikyon across time. It is also possible to assign dates and functions to each type, enabling a study of the evolution of ceramic production at Sikyon from around the 3rd century BC to the 7th century AD. The vessel forms produced at Sikyon have been divided into five categories based on probable function, these are: cooking, transport, serving, utilitarian, and cosmetic. These categories will serve as the outline of the present section.

Cooking

4.1.1- *Stew Pot with Flanged, Thickened Rim.* 2nd century BC- 1st century BC. - See *3.3.2.*

4.1.2- *Casserole with Angled Rim and Straight Wall-* 2nd century BC to Early Roman

In total 23 sherds of this vessel-class were recovered during the survey. Shape parallels of these casseroles have been published at Corinth and encompass two related forms of cooking pots which have a convex bottom, a low wall (which may be articulated or semi-articulated), and an interior flange for supporting a lid. This class have rim diameters in the 10-24cm range, and are both thickest and widest at the top. The earlier, smaller variety of these have two circular handles which project obliquely outward and are triangular in plan and circular in section. Larger examples of this class have two circular loop handles that level off at the height of the rim and project extend horizontally around part of the rim. In both vessel-types the handles attach to the outer body (Edwards 1975: 124-5) (Fig 4.1).

Most Sikyonian examples of this type exhibit colours in the very dark grey and dark gray (2.5Y 3/1-4/1 respectively) range, with a few in light red to red (2.5YR 6/8-5/8) range. The fabric of these casseroles tends to be coarse, with a few medium coarse and medium hard examples. The feel of these vessels was generally bumpy, with a few examples being slight gritty, and the majority of fractures were rough. Mineral inclusions in these tended to be more common and slightly larger than seen in the flanged stew pot with a thickened rim of cooking vessel. All vessels had sub-rounded and sub-angular white and glassy silicate and possibly carbonate inclusions.

Examples of this form have been identified in the UP and the NP, but not in the SP. Those from the UP tended to be concentrated in the area in the area above the theatre, between it and Gate 6. The majority of the examples of this shape, however, came from the NP and were concentrated in the east of the plateau clustered in the area immediately north of Gate 2 (Table 4.1**)**.

4.1.3- *Casserole with Short, Squared Rim*- Early Hellenistic- Early Roman

The descriptively-named casserole with short, squared rims class of vessel encompasses two different vessel-types which are discussed here together as they have similar traits. The defining trait of both types is an oblique ca. 45^0 rim which projects from an interior flange and ends with a short squared lip. The earlier type (3^{rd} century BC) has a thick, very slightly concave base and a fairly straight wall, while the later variety (120 BC- 20 AD) has a slightly rounded convex base which curves upward and attaches to a straight wall. Both types have a rim diameter in the 24-25cm range (Rotroff 2006: 315 no. 673-4). (Fig 4.2)

The fabric of this class of vessel ranges in colour from reddish brown (5YR 5/4) to dark gray (2.5Y 4/1), with very dark greenish gray (Gley 3/1 10GY) recorded in some instances. The fabric tended to be of medium coarseness, and medium hard to hard, with a rough feel. The most common type of fracture for these was rough, with less common powdery fractures also recorded. Mineral inclusions tended to be common and quite small. All vessels had small sub-rounded and sub-angular white and glassy mostly silicate inclusions was well as powdery white/yellow carbonate ones, most also exhibited some tiny biotite inclusions.

During the survey, 23 sherds of this type were recorded. The majority of these were found in the southern part of the SP, while low concentrations can be seen in the UP above the theatre, and in the NP to the north of Gate 2 (Table 4.2).

- *Globular Stew Pot with Everted Rim and Deep Groove-* Early Roman – See *3.3.1*

4.1.4- *Globular Stew Pot with a High, Vertical Rim-* Early Roman-Middle Roman.
Parallels to this form have been published from Corinth. These have globular bodies and rounded bases with straight necks which thicken toward the top and slightly bevelled inward. They exhibit either one or two vertical handles which join at the shoulder and the neck, and have rim diameters of approximately 20cm (Hayes 1973: 467, no. 240; Slane 1986: 293, no. 96) (Fig 4.3).

At Sikyon these tend to appear in a dark gray (2.5Y 4/1) fabric with a medium coarseness and of medium hardness. The feel of these vessels was generally bumpy to gritty and they have a rough to sharp fracture. Mineral inclusions tend to be common and quite small, and are of the sub-rounded and sub-angular white and glassy mostly silicate and powdery white/yellow (carbonate) types.

Only seven examples of this type of stewpot were found, and all came from the NP and the UP. No particular concentrations of this type were evident, beyond the noteworthy point that none of these were found in the SP.

4.1.5- *Casserole with Strongly Everted Rim-* Early Roman
This is a large type of casserole vessel with a 29.4 cm rim diameter. These have a convex rounded bottom, a very slightly oblique wall which is widest at the top and a strongly everted and outward thickened rim with an interior flange for a lid. This type has two handles which are circular in section, attach to the exterior wall and press up against the rim (Hayes 2003: 457, nos. 31 and 33; Slane 1990: 79, no. 168) (Fig 4.4).

Examples of this vessel appeared in a range of colours, from very dark gray (7.5YR 3/1), to greenish gray (Gley 1 6/1 10Y) to yellowish red (5YR 5/8). The fabric of these tends to be of medium coarseness and medium hardness. The feel of these vessels was generally bumpy and the exhibit a rough fracture. Mineral inclusions are of the typical Sikyonian Silicate fabric types recorded.

During the survey 24 examples of the casserole with strongly everted rim were identified. While examples of this shape can be found on all three areas of the plateau, the majority, 18, came from the SP, particularly from the southern part of the SP (Table 4.3).

4.1.6- *Stew Pot with Flat, Horizontal or Oblique Rim*- Middle Roman

This descriptive name refers to a class of vessels which share typological features but appear in a broad range of sizes. These vessels have a rounded bottom with an ovoid body that narrows toward the top. The rims of these come in several varieties as suggested by the name, while two vertical and ridged handles attach near the rim and on the upper part of the body (Hayes 1983: 105-106; Slane 1990: 85, no. 182) (Fig 4.5).

The fabric of these vessels tends to be reddish yellow (5YR 6/6-6/8) and of medium coarseness, medium hardness, exhibits a smooth feel and a powdery fracture. Mineral inclusions tend to be smaller and less common in this shape than in other examples of the typical cooking vessel fabric from Sikyon, but are otherwise the same.

During the survey 103 examples of this class were recorded. By far the largest amount of these, 60, came from the NP where distribution of this type was fairly even. The 32 examples of this shape found in the SP tended to be clustered in the northern area of the SP, around the south and east edges of the agora. The 11 examples from the UP mostly came from the area above the theatre in the area to the east of Gate 6 (Table 4.4).

4.1.7- *Stew Pot with Short (plain rounded) Almost Vertical Rim* –Early Byzantine
The stew pot with short (plain rounded) almost vertical rim type has a rounded bottom and slightly ovoid walls which are thinnest toward the top of the vessel under the short thickened, everted and rounded rim. This type can have one or two vertical rounded handles which attach to the middle of the wall near its widest point and again to the rim. The rim diameter for this type is ca.12.5 cm (Slane and Sanders 2005: 279, no. 4-27) (Fig 4.6).

This shape tends to appear in a reddish brown (5YR 4/4) fabric of medium coarseness, medium hardness, with a bumpy feel, and a rough fracture. Mineral inclusions tended to be fairly common and small, but are otherwise of the typical varieties.

During the survey 12 examples of this late stew pot were identified. Examples of this shape were recorded the NP and the SP only. One concentration in the SP can be seen around the southern and eastern edge of the agora, while another can be seen in the north-central part of the NP, the area surveyed directly to the north of the SP finds of this shape. It is probable therefore that these small concentrations could be fragments of a larger, connected concentration which is bisected by the museum (Table 4.5).

Amphoras/Transport-
The Sikyonian amphora shapes were discussed in Chapter 3, but are nonetheless listed here for consistency.
- *Sikyonian A Amphora-* Late Hellenistic-Early/Middle Roman *See 3.3.5*
- *Sikyonian B Amphora-* Middle Roman. *See 3.3.6*

Serving-
4.1.8- *Jug with Round or Trefoil Mouth-* Poss. 3rd century BC-End of Hellenistic Period.
Jug with round or trefoil mouth is the name for a category of vessels which likely encompasses several types with similar typological properties. They tend to have deep,

broad and well-rounded bodies with indented or concave bases that would have increased vessel stability. These tend to be ovoid in shape and can either have a high or a low thickening. They all have a neck, and a vertical handle attached to the upper part of the shoulder and the rim. As suggested in the name for this vessel-category, these vessels can have either round or trefoil mouths, but all known examples have sharply everted lips (Anderson-Stojanovich and Reese 1993: 285-6; Edwards 1975: 139-43; Pemberton 1989: 68-70) (Fig 4.7).

This class appears in the pink-red-orange range of colours, such as light red (2.5YR 6/8), red (10YR 5/8 and 2.5YR 5/8), and most commonly in reddish yellow (5YR 6/6). The fabric of these differs slightly from the typical cooking fabric we have thus far seen in that it tends to be of medium to fine coarseness, medium to soft hardness, and bumpy to powdery in feel. Mineral inclusions are less common than in the cooking vessels and tend to be small. The usual sub-rounded and sub-angular white and opaque glassy and powdery white/yellow varieties are present. The fabric in which this shape is made exhibits common biotite mica throughout, as well as tiny rounded red and dark inclusions. This appears to be the same silicate fabric variation from which the Sikyonian A amphoras were constructed.

Approximately 20 certain examples of this class were identified. One was found in the NP, while five were identified in the eastern areas of the UP. The remaining 14 were all found in the SP, and particularly in the southern part of the SP in and around the area where the kiln-wasters were found. (Table 4.6)

4.1.9- *Jugs with Flat Horizontal Rim* – Early Roman.

The shape of these vessels is generally the same as discussed above in the jug with round or trefoil mouth section with the exception of the rim, which is horizontal as opposed to everted (E. Tzavella. Pers Comm. Feb 2012) (Fig 4.8). The fabric of these vessels tends to be gray (2.5Y 5/1) and light yellowish brown (10YR 6/4). It is generally of medium hardness, and of medium to fine coarseness, with smooth or less commonly bumpy feel and exhibits a rough fracture. Mineral inclusions in these tended to be less common than in most other cooking vessels and quite small, but are nonetheless of the typical Sikyonian silicate types.

During the survey 37 jugs of this flat horizontal rim type were identified. 31 were from the NP, four from the SP and two from the UP. The majority of these came from the northeast area of the NP in the area to the north and east of Gate 7 and the north and west of Gate 2 (Table 4.7).

- *Jug with Ridged Base-* Early and Middle Roman- *See 3.3.7*

4.1.10- *Jug with a Half-Round or Flattened Rim and Sturdy Handles-* Early Byzantine
Based on parallels from Corinth, these shapes have a globular body with a flat base which is slightly thickened at the edges, possibly to add extra stability. They have a single rounded handle which attaches to the upper shoulder and again to the rim, which is either half-rounded or flattened (Slane and Sanders 2005: 272, no 3-43 and 280, no. 4-38) (Fig 4.9).

These jugs tend to have a grayish brown (2.5YR 5/2) to red (2.5YR 5/8) fabric which is hard, with a medium to fine coarseness, bumpy feel with a rough fracture. Mineral inclusions once again are of the typical Sikyonian Silicate Fabric variety.

Only a few examples of this shape have to date been identified, from the SP in the area to the south of the agora, and the area to the north of the museum, representing a similar distribution pattern to the slightly later stew pot with short (plain rounded, almost) vertical rim (Table 4.8).

Utilitarian-

- *Krater with Overhanging Rim-* Early Hellenistic-Early Roman. *See 3.3.9.*
- *Wheel Made Kraters.* Most common category of kraters with a probable dining-function, and includes the aforementioned shapes krater with triangular rim and krater with high-folded rim. See *3.3.10* and *3.3.11* respectively.

4.1.11- *Krater with Folded Rim* – Early Roman

The krater with folded-rim is a very common shape at Sikyon. These are large vessels with rim diameters of around 46 cm. Based on this large size, these were likely utilitarian-class vessels, with flat bases and thick slightly oblique walls which reach their widest point at the everted-thickened rim. Hayes mentions parallels of this type from Paphos, Cyprus, having a strip handle which is pressed against the rim (Hayes 2003: 464, no. 93; similar to- Slane 1990: 119, no. 262) (Figure. 4.10).

These kraters appear in a reddish brown (5YR 5/4) to yellowish red (5YR 5/6) fabric which tends to be hard, and of medium coarseness with a powdery to bumpy feel with a rough fracture. Mineral inclusions are of the typical Sikyonian variety, except some minor ones which are tiny sub-rounded dark and glassy.

During the survey 158 sherds belonging to this type were identified and examples were found on all three plateaux. The majority, 119, were identified in fairly even and dense distribution across the NP. Only 13 examples were found in the SP, and these were concentrated in the north area, near the edges of the agora. 26 examples were identified in the UP and once again these tended to be concentrated along the eastern edge of the Sikyon plateau (Table 4.9).

4.1.12- *Krater with Deep Body and a High Flaring Rim with a Down-Turned Lip*- Middle Roman

Parallels for this type from Corinth and Argos have 28cm rim diameters, deep bodies and high oblique flaring rims with downward pointing lips (Abadie-Reynal 2007: 206, no. 343; Slane 1990: 126, no. 271) (Fig 4.11). This type was made in exactly the same fabric variation as the krater with the folded rim.

Of the 33 examples of this type 21 were identified in the NP, where we see a significant concentration in the north-central area, to the north of the museum. Nine were identified in the SP, again from the area around the agora, and the remaining two were found in the UP (Table 4.10).

Cosmetic-

4.1.13- *Fusiform Unguentarium*- Early Hellenistic-Early Roman

Between 125 and 158 fusiform unguentaria were identified from the survey. 125 of these oil flasks have been securely identified, while the additional 33 sherds were fragmentary and could also come from other semi-fine gray ceramics. That at least 125 unguentaria were identified on the survey make this a very common shape at Sikyon.

The type found at Sikyon tends to be small with a likely maximum height in the 7-9cm range, and relate to Rotroff's category-5 which generally have a flat disk foot, a thick base about the foot and an elongated ovoid form which is at its widest about 1/3 of the way up the vessel. The narrowest point of this shape occurs at the base of the very slightly everted neck that terminates in an everted rim. These have a broad date range and seem to have been produced between the early 2nd century BC until Early Roman times (Rotroff 2006: 154). The narrow necks of these small vessels appear to have been designed to restrict the outward flow of liquid. As such it is thought that precious oil, such as perfume, appears to have been the most likely contents for these vessels (Fig 4.12). The best account of the shape and various sub-forms of the fusiform unguentarium is by Rotroff (2006: 137-60; see also Anderson-Stojanovic 1987).

The fabric of most of these is interesting as it represents a common semi-fine to fine version of the same type of fabric noted from the other vessels at Sikyon. These vessels appear in a grey or dark version of the SSF family and range in colour from very pale brown (10YR 8/3-8/4), gray (10YR 6/1), to light gray-gray (Gley 1 7/N-6N). Many examples of fusiform unguentaria recorded at Sikyon have a light red (2.5YR 6/6-6/8) core. They appear in a medium to hard fabric with a smooth to powdery feel and exhibit a clean fracture. The mineral inclusions in this fabric are smaller than seen in other variations of this fabric, and have a macroscopic frequency few to rare. They include the usual sub-rounded and sub-angular slightly powdery white and opaque glassy silicate and carbonate inclusions.

Examples of these vessels have been identified on all three plateaus, and have fairly even distribution, with particularly high numbers in the southern part of the SP. Although no certain kiln-wasters of this shape have been found at Sikyon, unguentaria were frequently recorded throughout the Sikyon plateau. Particularly high concentrations, however, were evident in the southern part of the SP. Fusiform unguentaria are generally found in burial contexts, so a large concentration in a commercial area suggests that they were either being produced in this area, or were used in some commercial capacity (Anderson-Stojanovic 1987). Indeed it is possible that these perfume vessels which appear in the commercial area of the SP, may be indicative of perfume production or processing (Table 4.11).

4.1.14- *Mortarium- Edwards' Type II* – Early and Middle Hellenistic.

This type of mortarium has a disk foot with a slightly concave bottom, wide oblique walls and a short upward rounded or squared rim. These vessels have a spout at the rim and have a piecrust type feature on the outer rim, which appears to have doubled as a hand grip for users when using these grinders (Edwards: 1975: 111) (Fig 4.13).

These vessels generally occur in light red (2.5YR 6/6), red (10R 7/4), or very pale brown (10YR 7/4). They tend to appear in a necessarily coarse fabric, with the interior being especially coarse, and the exterior being of medium fine coarseness. These vessels have a powdery feel on the exterior, and a rough interior, as well as a rough fracture. The mineral inclusions in this fabric are generally similar to what has been seen in other varieties of the Sikyonian Silicate Fabric family- sub-rounded and sub-angular powdery yellow/white ones and opaque glassy inclusions. On the interior, however, a very coarse version of this fabric, with large angular inclusions of similar silicate types can be noted. Such a coarse interior floor was connected with their function, enabling grinding, crushing or pounding within the vessel.

Although an important shape for reasons discussed later, only two examples of this shape are known in a particularly coarse version of the Sikyonian Silicate Fabric. Both of these are from the southern part of the SP, the ceramic production area (Table 4.12).

Summary-

Those 15 vessel-types/classes listed above, represent common or diagnostic types which were produced in Sikyonian Silicate Fabric, but which were are not known from heat-damaged or kiln-wasted sherds. These, combined with the 12 types/classes in the previous chapter present a reasonably clear overview of the temporal scope and character of the Sikyonian ceramics industry. As previously mentioned the vessels were all produced in one ceramic fabric family, although within this several variations can be noted. Two such variations include the slightly finer fabric from which the unguentaria and the Broneer type XVII lamp were made, or the slightly more micaceous variation in which the Sikyonian A amphora and the jug/jug with round or trefoil mouth were made.

On the whole the functional character of the vessels produced attests to a ceramics industry which likely had a local or regional focus. The majority of vessels, such as cooking vessels, or utilitarian vessels were most likely created with local or regional consumption in mind. Amphoras and unguentaria, however, may stand in contrast to this pattern - certainly Sikyonian A amphoras appear to have been distributed quite widely. While the same type of fusiform unguentarium from Sikyon has also been recorded in Athens in significant numbers, comparative fabric analysis on the latter would be required to investigate if they are indeed of Sikyonian origin.

That no certain evidence of fineware production was noted is of interest. The ancient Sikyonians may have imported their finewares, as noted in Chapter 3 with reference to Corinthian fine vessels such as kantharoi, or perhaps more simply this class of vessel may not have survived in sufficient condition to be identified in survey material.

Another interesting absentee from the Sikyonian ceramic assemblage is any evidence for the production of Late Roman vessels on the plateau. While Late Roman material was recorded in considerable numbers at Sikyon, the ceramics appear in a slightly different fabric. Only one type of ceramic fabric family has been discussed in relation to the Sikyonian ceramics in this work. This Sikyonian Silicate Fabric, although the most common medium for the production of ceramics, was not the only fabric type recorded on the Sikyon Survey Project.

4.2 - *Distributions, Counts and Proportions of SSF based on Macroscopic Observation and Analysis*

During the Sikyon Survey Project the author classified 89,924 sherds which weighed 524.21kg, from Total Collection and Cross-Section squares. From this sample 207 fabric groups, subgroups and minor variations were identified.

Of these 207 fabric variations 89 were recorded only in only one instance, 25 were recorded twice, and 46 were recorded occurred less than ten times. Due to the rarity of these fabric variations they were classified as *trace* fabrics, meaning that each category was indicative of between one and ten vessels.

The majority of the vessel-types which occur in these trace fabric groups and subgroups appear to represent transport amphoras, a commonly circulated type of vessel. While very few of the sherds in these trace fabrics were diagnostic, amphora handles were common types of fragments amongst these. The average weight of those sherds appearing in trace fabrics appears to further support the supposition that they belong to amphoras. The average sherd weight from the total ceramic assemblage at Sikyon was 6g while the average sherd weight in trace fabrics was 54.4g, nearly 10 times the weight of the average sherd. Of the 47 fabric groups and subgroups which do not fall into the *trace* category, the average sherd weight was 5.7g. This significant differential in the average sherd weight suggests that those vessel-types represented in trace fabrics either represent well-constructed and fired ceramics (hence their higher surface survival rates), or that they represent significantly larger-than-average vessels, or some combination of both factors. Given that these ceramic fabrics occurred so rarely, it is most probable that these amphora fragments are not indicative of any kind of meaningful trade link between Sikyon and another state, and may even represent some type of secondary usage (Peña 2007: 341-7). A smaller number of other trace fabrics surely also represent imported non-amphora shapes, such as fine table wares (i.e. sigillata types) which with no surviving slip were not necessarily distinguishable macroscopically.

The ten most common fabric classifications from Sikyon account for 96% of the total number of sherds, and 94% of the total weight. These categories are listed below followed by counts and weights of each (See Table 4.13).[43]

As is clear from the above table the vast majority of ceramic finds from Sikyon, 82.8%, occur in the Sikyonian Silicate Fabric family. The 74,444 sherds that occur in this family weigh 408.18kg, giving an average weight of 5.4g. As has been noted in relation to the trace fabrics and in the shapes related to the kiln-wasters, vessels such as amphoras have a significantly greater average weight per sherd than more mundane types such as cooking and serving vessels, perfume vessels or other work-a-day types. Although the shapes thus far examined from the SSF family turned up a very high proportion of amphoras, the average sherd weight of the family as a whole suggests that amphoras may not have been the major shape produced in this fabric, despite the comparatively very high survival rates of these.

A few other notes on the other major fabric categories are warranted at this stage. The second category entitled *unknown/small sherds* is not a fabric category in itself rather it represents a range of fabrics that the author was unable to identify clearly, generally because these sherds were either very small (smaller than the size of a thumbnail) or they survived in particularly poor condition. In the interests of statistical accuracy this catch-all category ought to be excluded from the present analysis. Without

[43] Once again space and scope of the present investigation do not permit discussion of the majority of these fabric groups and subgroups, as the focus is on ceramic production at Sikyon. Some identified imports, however, will be discussed by the author in the forthcoming publication Lolos, et al. *Sikyon Volume 1: The Survey*.

the unknown/small sherds category the total of all the sherds studied from Total Collection/Cross Section squares is 82,895 (491.63kg) and the average sherd weight is only very minimally impacted.

The second fabric type has been dubbed descriptively as 'Architectural Fabric' by the author. While this fabric is discussed in detail in section 4.4 it is worth noting several points about it presently due to its frequency. This fabric family or class is generally beige to very pale yellow and features very pronounced angular dark red or dark gray/black inclusions and is reminiscent of the Corinthian A′ class-1 amphora fabric (Whitbread 1995: 271). This type appears to have been reserved for especially large or heavy terracotta constructions such as pipes, tiles, architectural terracotta and pithoi. Despite the name of this fabric it is not clear if this is certainly a Sikyonian fabric or if it is Corinthian, and it has long been established that Corinth was home to a major architectural terracotta industry (Whitbread 1995: 293-4).

The most common likely imported fabric type at Sikyon is the 'powdery pink with fine' fabric. In the majority of cases this seems to represent earlier Hellenistic pottery and Corinthian B amphoras, and was recorded in 322 instances. It appears to represent the fine variety of Whitbread's Corinthian amphora fabric class 2 (1995: 276). The contrast is certainly pronounced when one considers that the next most common pottery fabric after Sikyonian Silicate Fabric and Architectural fabric, 'pale with fine', represents only 1.7% of the total sherds studied. Indeed, out of the ten most common fabrics recorded at Sikyon, five have been classed as fine by the author: Pale with Fine, Beige with Fine, Orange with Fine, Powdery Pink with Fine, and Sharp Beige with Fine. The fabric of fine ceramics is notoriously difficult to study both macroscopically and even microscopically, and it is not impossible that several of these categories may actually belong to the same fabric group or family, with the colour range being representative of firing differentials (Farnsworth 1970: 11).

The fabric of Late Roman ceramics at Sikyon is so similar to Sikyonian Silicate Fabric that it was initially not differentiated. Closer study, however, revealed it to be a much harder fabric, with more common glassy, likely silicate inclusions.

4.3- *Late Roman Sikyon*

Ceramics from the Late Roman period, or the 4^{th}-5^{th} century AD, are amongst the most frequently recorded on surface surveys in the Aegean (Alcock 1993; Pettegrew 2007). Ceramic production in the Eastern Mediterranean region appears to have greatly increased during this time, and improvements in firing technology led to the manufacture of harder, more resilient pottery which appears to fare well during the processes of post-depositional movement that push buried material to a surface (Moore 2000: 84). On top of these factors, Late Roman ceramics also often exhibit distinct combed or grooved surfaces which can create a collection and identification bias on surveys. As ceramics from this period tend to be easily identifiable because of these grooved surfaces, body sherds which might otherwise not have typologically distinctive traits can be spotted easily and roughly dated. This means that a significantly larger proportion of Late Roman vessels will typically be identifiable than, for example, earlier vessels with undecorated surfaces (Alcock 1993: 53, 58-60; Pettegrew 2007: 751). The common occurrence of highly identifiable, hard-fired ceramics on surveys has led to the broadly accepted hypothesis that the Aegean area experienced a population explosion during Late Roman times (Pettegrew 2007: 744; Shipley 2002: 329-31; Ward-Perkins 2000: 321). The picture that we have of Late Roman Sikyon differs from this.

Late Roman pottery was found in significant quantities at Sikyon. The majority of ceramics of this period tended to be centred around the agora, in the vicinity of several known Late Roman structures in the area including a disused bath and the Archaeological Museum of Sikyon which is housed in a reconstructed Late Roman bath complex. Beyond this locus Late Roman finds were relatively sparse. Thus the impression gained is that habitation and activity on the plateau appears to have shrunk by Late Roman times and nucleated around the agora, a trend which may have begun during later Middle Roman times. Indeed Pausanias on his visit to Sikyon during the mid-2^{nd}

century AD describes a city in decline which had recently suffered damage after an earthquake, dated to the 2nd century AD (2.71; Lolos 2001: 30; Papaphotiou 2002: 181-2, 196-7). Perhaps this earthquake also had some impact on the settlement and general activity patterns on the plateau.

Two early Christian basilicas which most probably date to the 5th century AD are known on the Sikyon plateau. One is located underneath the present Ag. Triada church in the modern village of Vassiliko while the other was built on top of the Archaic temple (likely to Apollo) in the agora of the Hellenistic and Roman city. Both churches are very small in comparison to the basilica in Kiato, but along with two Late Roman baths in the vicinity of the agora, and the collected ceramics from the survey, it appears that there was a locus of habitation on the plateau around the agora area during the 5th century AD. The location of the basilica, presently beneath Ag. Triada, may hint that Late Roman activity on the plateau extended to the area of the modern village, but this area which was impossible to survey for obvious reasons.[44]

Despite there being no certain evidence for local ceramic production at Sikyon during Late Roman times, it is worth looking at the major types of vessels, their fabrics, and some of their distributions. The aim of this is both to present an overview of the ceramic-types associated with Late Roman Sikyon, but also to interpret what these ceramics might suggest about the Sikyonian economy during the 4th and 5th century AD.

4.3.2- *Late Roman Pottery found at Sikyon* -

In total, 1,703 Late Roman sherds were identified during the survey. This number compares to 5,652 from early, middle and Late Hellenistic Sikyon, 4,088 from the Early Roman period, 2,887 from Middle Roman and 1,390 from Early Byzantine times. While sherds from the 4th-5th century AD represent a significant proportion of the ceramic

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[44] Instead, in the built up area of Archaia Sikyona Lolos conducted a *spolia* survey, which focussed on the reuse of ancient materials in modern construction. During the course of this study Lolos found architectural and epigraphic remains from Hellenistic, Roman, Late Roman, Byzantine, and most surprisingly Archaic and Classical times reused in the modern village (Y. Lolos Pers. Comm. 2010). It appears possible, even probable therefore that the area of the modern village could have been the site of long term ancient and post-antique activity. Furthermore, this suggests that our picture of the plateau likely has a significant and unavoidable blank area in its midst.

assemblage recorded at Sikyon, they certainly do not appear to be indicative of a population increase at the site during this time.[45]

Perhaps the most interesting aspect of the Late Roman ceramics from Sikyon, as relates to the present investigation, is that none appear to have been produced on the plateau. Indeed, the extremely homogeneous Sikyonian Silicate Fabric family of earlier (and later) Sikyon changes slightly during Late Roman times.

Initially this difference went unnoticed, as the general appearance, colour and composition of later Roman pottery appeared much the same as the rest of the assemblage. Systematic analysis of the ceramic fabrics revealed the following differences:

1) Late Roman ceramic fabrics found at Sikyon tend to be much harder-fired than earlier ceramics, and the fracture of the vessels also tends to be sharper.

2) The once most prominent matte white/yellow inclusions in Sikyonian Silicate Fabric appear to be replaced by more frequent angular, glassy, and milky inclusions.

3) The colour range for Late Roman ceramics found at Sikyon tends to be similar to the range noted in the Hellenistic, Early Roman and Middle Roman ceramics on the whole. The major difference was that red (2.5yr 4/6-4/8) was the most frequent Late Roman colour, as opposed to reddish yellow (5YR 6.6) for the earlier ceramics. This result is consistent with the red to pink hues produced in the firing experiments of Sikyonian ceramics conducted in the Fitch Laboratory.

As with the all other vessel-types listed in this investigation, Late Roman material can also be classified quite clearly into functional categories: Transport, Cooking, Serving and Utilitarian:

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[45] The study of the Late Roman and Early Byzantine shapes was done by E. Tzavella. Some of the material discussed in this section will appear in Tzavella et al. forthcoming.

Cookware-

The two main types of cooking vessels from Sikyon which date to the Late Roman period are almost certainly related (Fig 4.14). Both share the same distinct shape of triangular to rectangular rim and have similar straight walls. The majority of these vessels tend to be deep and are thus classified as stew pots, while a minority of these have shallower bases and are regarded as casserole vessels. Both are listed as two separate types below, but are discussed together as the majority of published parallels relate to the deeper stew pot-variety and both vessel-types appear in the same fabric (Tzavella et al. forthcoming)

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4.3.3- Stew Pot with Oblique Rectangular or Square Rim -

This is a typical type of Late Roman stew pot which exhibits a distinct slightly oblique out-turned thickened square to rectangular rim. The walls of this type are vertical for the upper 2/3 of the vessel. The widest part is 1/3 of the way up the vessel and below this the walls are strongly oblique and the vessel narrows quickly toward the bottom which ends in a small hollow base.

The date range for these types of vessels appears seems to span from the 3rd century AD (Pickersgill and Roberts 2003: 570; Reynolds 2004: 227; Walter 1958: 61) until the 5th century AD (Moore 2001: 84 fig 6.1-2; Slane and Sanders 2005: 256, 1.34).

4.3.4- Casserole with Oblique Rectangular or Square Rim-

These are very similar to the aforementioned stew pots except that the walls are less deep on the casseroles and they also have only a slightly rounded floor. The date range for these types is the same.

The examples of these shapes found at Sikyon appear in several different fabric-types, attesting that these vessels were produced at several different sites. The most common fabric of these found at Sikyon appears in the reddish-yellow (5YR6/6-6/8) to yellowish-red (5YR5/8) colour range. The fabric of these is medium coarse to coarse and medium hard to hard and tends to have a bumpy to gritty surface and a rough to sharp fracture. The most common mineral inclusions are frequent opaque glassy ones, followed by some evidence of large inclusions of degraded limestone and less frequently some sub-rounded glassy red ones. Although this fabric is not identical to our earlier local cooking fabric, its general composition is certainly very similar.

Distributions of cookware on the plateau have two main broad concentrations, in the area directly to the east of the agora, and in the NP north of the agora. Both concentrations extend over significant areas with the concentration to the north stretching right up to the edge of the plateau. Two minor concentrations of cookware have also been noted, one in the SP slightly north of the old ceramic production area and another small cluster in the northeast of the plateau north of Gate 2. Examples of this shape occur in several fabric variations, including one noteworthy fabric-type that exhibits rare, green glassy inclusions, which may suggest production in a geologically volcanic area and is therefore not local (Table 4.14).

Transport-

4.3.5- *African Amphora Imitations in Regional Late Roman Fabric* -

The largest and group of Late Roman amphoras found during the Sikyon Survey Project appear to be local or regional imitations of amphoras produced in North Africa and found with some frequency in Catalonia (Keay 1984: 298-9; 303-50). In the main, these types have a straight vertical neck with rims which range from vertical rectangular to a triangular shape, with a convex outer surface and a concave upper surface (Fig 4.15). Tzavella has interpreted these vessels as smaller imitations of Simon Keay's types 57, 61 and 62 (Tzavella et al. forthcoming). Differences in size and fabric from the original forms have led to the interpretation that the examples found at Sikyon are in fact imitations. The North African types have rim diameters in the 12-14cm range (Keay 1984: 298-9; 303-50) while those from Sikyon, however, are significantly smaller, with rim diameters ranging from 7.5-10 cm.

The Keay 57, 61 and 62 forms have well over 20 subtypes making a full typological discussion of these impractical, but it is possible to make some general observations about the relevant shapes. All three were tall amphoras and would have stood at just over 1 meter high and would have had a width of approximately 40 cm. They all exhibited tall cylindrical necks with gently inverted sides, large ear-shaped handles that were elliptical in profile, and, in the cases of types 61 and 62, had a horizontal combed decoration on the neck. The most distinctive feature of many of the sub-types of these vessels is the presence of a vertical neck, a thick squared rim and an undercut at the junction of their necks, a feature also present in the Sikyonian material (Fig 4.16).

The Keay 57, 61 and 62-types appear in several fabric variations although the vast majority discussed in Keay's study were made in one fabric which most likely originated in Tunisia. The most common colour range for the Sikyonian vessels is reddish-yellow (5YR 6/8) / yellowish-red (5YR 5/8), followed by light red (2.5YR 6/8-6/6), while less common colours occur in the ranges of pale brown (10YR 6/3) to brown (10YR 5/3) and rarely, grey (2.5YR 5/1) to dark grey (2.5YR 4/1). These tend to appear in a medium to hard fabric, which is of medium coarseness with a sharp or occasionally grainy fracture. The inclusions which feature most prominently in this fabric are clear and milky angular ones, as well as glassy red, small dark glassy ones, small dark red ones, and finally rare silver glitter (mica). All of these are consistent with the fabric of the other regional Late Roman ceramics found at Sikyon.

Keay has dated the 57-type to the mid-late 5th century AD (Keay 1984: 299), type 61 to the mid-6th century AD (Keay 1984: 309), and the 62-type to 2nd quarter of the 5th century AD to the mid-6th century AD (Keay 1984: 350). If the amphoras found at Sikyon are indeed imitations of these Keay types, as opposed to the less likely case of them being coincidental skeuomorphs, then we may assign similar approximate dates.

On the Sikyon plateau we see a several concentrations of these shapes. The largest concentration may surround the agora, as high numbers were recorded directly to its east and west. Lower concentrations were recorded in the central area of the NP, and unexpectedly in the southern part of the SP, slightly to the west of the old ceramic production area (Table 4.15).[46]

While no certain original intended function has been identified for Keay's shapes, he hypothesized that the originals may have been used for transporting olive oil (Keay 1984: 299; 309; 347). Therefore, were the types found at Sikyon intended for a similar or a related function? Their small size, however, may be suggestive that they may have functioned as serving vessels, as table amphoras or even large jugs. That they appear to be imitations of North African shapes may be reflective of the large amounts of goods being exported from that region during the 4th century and 5th century AD (Tzavella et al. forthcoming). The closest parallel is from Corinth, where two amphoras with a rim and a groove on the upper surface were published and are also considered to be of 'regional' origin, although the shape of these is not very similar (Slane and Sanders 2005, 255, no. 1-26, 264, no. 2-30). The shapes found at Sikyon may represent a new local/regional form as no known instances of similar vessels from other sites appear to have been published.[47] Future excavations on the plateau around the agora may help clarify this issue.

4.3.6- *Late Roman Amphora 2* (Imported and Regional types)

The Late Roman Amphora 2 (LRA2 hereafter) type is one of the most frequently identified types of transport vessel from this period in the Aegean. While these represent a common type, Slane and Sanders point out that the LRA2 name has also come to be somewhat of a catch-all term for amphoras with combed grooving on the shoulder, cylindrical handles, a globular body and a tapering neck (Slane and Sanders 2005: 286). The Sikyonian imitations of this shape tend to have a rim diameter of 10.5-14 cm, a short conical neck or more rarely a vertical one, with an everted rim (Peacock and Williams 1986: 182-3). When complete these would have likely stood ca. 75-80 cm in height, would have had two handles which are in portrait circular and in section cylindrical, a

[46] Examples of this imitation have also been identified at both Aigeira and on the Livatho Valley Survey Project (Kephalonia) by the author and may represent a larger pattern throughout the Corinthian Gulf.

[47] E. Tzavella, the author, and M. Maher presented these types in Thessaloniki on April 7th 2011 at the 4th *Conference on Late Roman Coarsewares, Cooking Wares and Amphorae.* The question of this being a new shape was put to the audience, but no known parallels were suggested. Investigation of this issue remains ongoing.

knob toe at the bottom and distinctive grooving on the shoulder (Fig 4.17) (Slane and Sanders 2005: 285-6; Tzavella et al. forthcoming)

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The LRA2s found on the plateau appeared in several fabric-types, including a regional one in the so-called Southern Argolid Fabric. The regional Late Roman fabric ranges in colour from gray (5y 5/1)–dark gray (2.5y 4/1) most commonly and less commonly in reddish yellow (5yr 6/8)–yellowish red (5yr 5/8). These regional LRA2s appear in a hard fabric which is of medium coarseness and have a clear to sharp fracture. Common inclusions are generally angular, opaque glassy and milky in colour, while small occasional inclusions can be sub-rounded glassy red and dark ones.

Most examples of the LRA2 shape appear at Sikyon in the Southern Argolid Fabric which is generally reddish yellow (7.5 YR 6/6) and light gray (10YR 7/2) and tends to be of medium to fine coarseness. This is a hard fabric which exhibits a smooth to sharp fracture and has pronounced angular gold mica inclusions which appear with occasional frequency, also sub-rounded matte beige to yellow ones which appear with an occasional to common frequency (M. Hammond Pers. Comm. July 2010; Slane and Slanders 2005: 287). There has been much debate as to the origin of these vessels as they appear frequently at Corinth, but gold mica is not geologically compatible with the area around that site. Research by Peacock and Wilson (1986) pointed to an origin in the southern Argolid to the south of Porto Cheli. Vroom (2003) also restated the southern Argolid as the likely origin, and the most recent petrographic investigations by Graybehl and Hammond appear to confirm that indeed the Kounoupi island kilns in this area mark the production site for this type of vessel in this fabric (Graybehl 2010: 10-2, 28, 52-4; Munn 1985:342).

LRA2s from the Kounoupi island kilns have been associated with olive oil production and transport (Karagiorgou 1999). One example of this shape from the Pontic region exhibits *tituli picti* which records resin (Scorpan 1976) although this mention could refer to a secondary usage (Peacock and Williams 1986: 183). LRA2s appear to have been produced from the 4th century AD to the late 6th or even early 7th century AD

(Fulford and Peacock 194; Peacock and Williams 1986: 183-3; Radulescu 1976; Riley 1981; Robinson 1959: M272). The few LRA2s found at Sikyon were found around to the east of the agora. (Table 4.16).

4.3.7- *Late Roman Amphora 1-*

An important Late Roman shape which is very rare at Sikyon and therefore worth noting is the Late Roman 1 Amphora ("LRA1" hereafter). A common type at Corinth, the LRA1 type most likely originated in the area of Antioch, Syria (Peacock and Williams 1986: 186) and appears in a hard, sandy pinkish-cream (7.5YR 8/2-4) to reddish-yellow (5YR 7/6) micaceous fabric (Peacock and Williams 1986: 187; Slane and Sanders 2005: 285-6). The rim diameter of the few examples of this type found at Sikyon is ca. 10cm. The rims of this type tend to be mostly vertical and are very slightly everted and exhibit a folded-thickened lip. The body of this amphora type ranges from globular to slender and elongated and the distinguishing trait they share is horizontal grooving on the body which is most spaced out at the centre and become much more dense at both the top and bottom of the body (Fig. 4.18). Finds of this type at Sikyon were from around the agora but only in one or possibly two identified examples.

The original intended content of the LRA1 is unknown but if they are indeed from Antioch it may have been oil, as we know the city had a significant oil industry during Late Roman times (Liebeschuetz 1972: 79-81). If they were indeed primarily amphoras for the transport of oil, then perhaps either Sikyon was not importing as much oil as Corinth, or, more likely, Sikyon did not have access to the same Eastern Mediterranean trade routes as Corinth. The production dates for the LRA1 ranges from the early 5th century AD until the mid-7th century AD, however this shape is most common in late 5th century and early 6th century AD contexts (Riley 1979).

4.3.8- *Niederbieber77-*

A type of imported amphora which was found in some frequency on the Sikyon Survey Project is the Niederbieber 77. This shape straddles the Middle Roman and Late Roman periods and dates to the 3rd and 4th centuries AD (Panella 1973; Carandini and Panella

1981). This is a tall amphora with distinct thick broad handles which arch slightly above the narrow thickened rim of the vessel. This type of amphora has a long cylindrical neck which narrows toward the top and has a series of relatively large grooves toward its join to the shoulder. The body is widest at the shoulder and tapers to a long hollow grooved base (Peacock and Williams 1986: 193-4) (Fig 4.19). Niederbieber 77's were a reasonably common shape at Corinth, and examples of the long necks of this type were even reused as fire-bellows there and as water-pipes at other sites (Slane 2011: 101)

The fabrics of these imported vessels tend to be hard and reddish yellow, often with a gray core at Sikyon. Inclusions were gray, white-beige and reddish-gray and up to 4mm. Niederbieber 77's may have an Aegean origin based on find concentrations and are occasionally also known as the 'Big Red Aegean' –type. No certain production site for these is known at the time of writing. The original intended content for the Niederbieber 77, although also unclear, may have been wine based on the long narrow rim of this shape and similarities with other similar shapes such as earlier Rhodian amphoras (Peacock and Williams 1986: 194).

Finds of this type were recorded around the agora area once again. Occasional finds were also recorded in the area above the theatre and mainly in the central area of the NP to the north of the agora (Table 4.17).

Serving-

The serving category from Late Roman Sikyon is composed of jugs, largely due to a lack of fine table wares such as cups and plates.

4.3.9- *Jug with Ring-rim -*

The most common Late Roman jug at Sikyon has a ring-rim which is semi-cylindrical in section (Fig 4.20). Based on published parallels at Argos these appear to date to 4^{th}-5^{th} centuries AD (Abadie-Reynal 2007: 230, no. 399). Jugs of this type from Sikyon generally appear in a light coloured, buff, semi-fine fabric.

During the 6^{th}-7^{th} centuries AD varieties of this type develop an elongated rim and a heavy D-shaped handle (Slane and Sanders 2005: 272, no. 3-43), these appear in a gritty dark grey cooking fabric at Sikyon, which is the same as the aforementioned regional cooking and amphora fabrics.

The primary distributions of Late Roman jugs found at Sikyon were recorded in the area around the agora. A few outliers were also identified in areas to the north and south of the agora area as well (Table 4.18).

Utilitarian-

4.3.10- *Bowl/Basin with Heavy Horizontal Rim and Ridged Upper Surface -*

These are large bowls with rim diameters of 25–37 cm and exhibit a heavy horizontal rim which is ridged on the upper surface. The inner edge of the rim can occasionally exhibit pie-crust decoration (Fig 4.21). Based on published parallels these bowls appear to date to the later 4^{th} century AD (Slane 1990: 126, no. 274; Pickersgill and Roberts 2003: 570, no. 50; Tzavella et al. forthcoming).

At Sikyon these appear in two main fabric groups. The first one exhibits a darker grey exterior with a reddish-yellow core with large angular, opaque glassy inclusions along with some matte white, occasional small glassy red ones, and rare tiny glitter. This fabric looks very similar to that of the earlier local Sikyonian material. The second group has a reddish yellow colour and contains large angular glassy and matte white inclusions, as well as tiny dull powdery red ones and could represent a regional fabric.

4.3.11- *Basin/Basin with In-Turned Upper Body and Heavy Everted Rim -*

These are a very common vessel type from Late Roman Sikyon and seem to represent the continuation of a typological tradition from earlier Roman times. Late Roman basins/basins found at Sikyon generally exhibit an in-turned upper body and a horizontally folded a heavy rim (Fig 4.22) (similar to: Hjohlman 2005: 209, no. 218; Slane and Sanders 2005: 257, no. 1.42). Based on associated finds which commonly date to the 5^{th}-7^{th} centuries AD it is possible that this class of basin may even have been in use for over a century (E. Tzavella Pers. Comm. March 2011)

These basins occur in a local (or possibly regional) medium to hard-fired fabric which tends to be of medium coarseness with a powdery surface and a sharp to rough fracture. The main colour range of these tends to be reddish-yellow (5YR 6/8) to yellowish-red (5YR 5/8) and the most common mineral inclusions tend to be angular opaque glassy, matte white and small sub-rounded glassy red ones. Tzavella points out that it is worth noting that Late Roman basins which are typical of assemblages at both Corinth and Argos are not at all typical of Sikyonian assemblages (Pers. Comm. E. Tzavella, March 2011).

Both types of Utilitarian vessels dating to Late Roman times were found in largest numbers in the area directly to the east of the agora, two lower concentrations were found in the SP to the north and west of the old ceramic production area. Several clusters of this category were also found throughout the NP, generally to the north of the agora, and one to the northeast of Gate 2 (Table 4.19).

4.3.12- *The 'Regional' Ceramic Fabric from Late Roman Sikyon*

At first glance, the Late Roman ceramics from Sikyon appear to have been made in the same fabric as those ceramics that were produced on the plateau. Some slight differences become apparent, however, through closer systematic examination. The most obvious of these differences is that Late Roman ceramics are generally harder than the Hellenistic, Early and Middle Roman fabrics produced on the plateau. Cooking and occasionally utilitarian vessels of Late Roman date can occasionally be further differentiated from earlier types based on the occasional appearance of frequent large sub-rounded matte white and opaque glassy inclusions in their fabrics. Under a 40X hand-held microscope the Late Roman ceramics from Sikyon appear to have glassier matrices than earlier ceramics from the site, as well as the slightly more common dark and red glassy inclusions (Fig 4.23).

Based on an absence of evidence for ceramic production on the plateau during Late Roman times, and an apparent change in the production of the ceramic fabrics at this time, it appears that the pottery was imported to the plateau during these times. As previously noted, however, nothing in the fabrics of the Late Roman ceramics from the site is obviously incompatible with the local/regional geology of Sikyon. If this is the case, then it would seem likely that these ceramics may have been produced somewhere in the region, if not on the plateau itself. In order to address this issue it is necessary to incorporate the results of the author's microscopic analysis of two thin-sectioned samples of Late Roman ceramics from Sikyon.[48] Once again these samples were analysed by the author in the Fitch Laboratory in the British School at Athens using a Leitz Laborlux 12 POL polarizing microscope.

Sample 10, although not highly typologically diagnostic, does appear in the Late Roman cooking fabric from Sikyon, while Sample 13 is from a rim fragment belonging to a Late Roman 2 Amphora. Both samples were analysed at the Fitch Laboratory by the author in February 2012.

Groundmass-

On the whole, the groundmass of these Late Roman samples was in the orange-red colour range. The samples were moderately bimodal in particle size and distribution. The groundmass of the LR2A, Sample 13 exhibited frequent tiny (<0.02mm) biotite.

Voids-

Voids in the matrices of Late Roman pottery tended to be uncommon an in the 1-5% range and are mostly mesovughs.

Mineral Inclusions in Sikyonian Silicate Fabric-

Common:

The mineral inclusions in the Late Roman ceramic fabric exhibited common sub-angular monocrystalline quartz (some very large, up to 0.8mm); common polycrystalline quartz

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[48] The samples were taken 2007 prior to the large scale collection of Late Roman material on the survey began. For this reason only two representative fabric samples were sent.

(some large up to 0.8mm) and angular chert, which was more common in the amphora sample (Sample 13).

Occasional-Rare:

Small round to sub-rounded matte red-orange inclusions occur with occasional frequency. As in the Sikyonian Silicate Fabric, these may be small iron-rich textural concentration features, iron-rich clay pellets, and rare cases perhaps also garnet.[49] Tiny biotite (<0.02-0.08mm) inclusions occur with rare to occasional frequency. Angular inclusions of mudstone appear in occasional frequencies. Radiolarian mudstone is an occasional to rare form of inclusion, as are other marine microfossils. Large sub-angular clusters of sparite appeared in a few samples, but were vary.

Very Rare:

Tiny inclusions of plagioclase feldspar, and other igneous-type minerals were observed in a 3 thin-sections from Sikyon. Both samples are compatible with the geology of Sikyon and appear to belong to the earlier Sikyonian Silicate Fabrics. Sample 13 was assigned to Silicate group 1b, which shows ceramics that exhibit evidence of clay-mixing, while Sample 10 belongs to group 1a, the typical Sikyonian Silicate Fabric group.

4.3.13- *Summary*

The overall impression gained from the Late Roman assemblage from Sikyon is rather a different one from the earlier periods. During Early Roman times the majority of vessels belonged to the transport functional category, followed by utilitarian, and cooking vessels. During Middle Roman times the majority of vessels identified were connected with a utilitarian function, followed by cooking related vessels, and finally transport vessels. During Late Roman times, however, the majority of vessels identified relate to transport then to cooking, a pattern which is reversed on the plateau during Early Byzantine times. In contrast to the earlier transport vessels most of those dating to Late

[49]As discussed n Ch 3 with reference to the characterization of SSF.

Roman and Early Byzantine times found during the survey do not appear to have been produced on the plateau (See Tables 4.22 and 4.23).

The recorded differences in the colour, the hardness and the frequency of crystalline inclusions in the fabrics of the Late Roman and earlier Sikyonian pottery therefore appear most likely to be connected to firing differentials. Indeed the red colour of Late Roman pottery is closest to the colour achieved when the SSF samples were fired at 1050°C in the firing experiments. The hard fabric and sharper breaks are both also consistent with higher temperature firing, which developed during this time (Moore 2000: 84). Finally, the more prominent appearance of glassy inclusions and the more common voids within the matrices of the Late Roman vessels may also be connected with this, as carbonate minerals may have burnt off leaving voids, while the surviving silicate minerals appear more prominently (Kilikoglou et al. 1998). While the fabric composition is the same as that of the earlier ceramic fabrics, the lack of any evidence of production on the plateau seems to suggest that production may have taken place elsewhere.

During Late Roman times, the inhabitants of the Sikyonian plateau were bringing in a significant percentage of goods and resources, either from what were most probably local or regional networks, as well as from some more widespread ones. The reduced presence of dining and serving vessels may further indicate that either less habitation took place on the plateau, or that the inhabitants of the Sikyon plateau were not as economically well-to-do as were their early and Middle Roman ancestors. The number of identified vessels of each category breaks down as listed in Table 4.21.

The Late Roman fabric appears to be the same as the Sikyonian Silicate Fabric, however, no kiln-wasters or heat-damaged sherds dating to this period were recorded. In addition to this, the extent of settlement of the Sikyon plateau was clearly reduced during Late Roman times. Moreover the extent and range of imported amphoras appear to be reduced during the 4th-5th century AD, a period characterized by long distance trade. Reduced trade, a nucleated settlement size and an apparent absence of evidence for manufacture of what were locally produced ceramics, could all be suggestive that the main settlement in the area may not have been on the plateau by Late Roman times.

4.4- *Architectural Fabric*

Returning briefly to the known fabric types from Sikyon discussed in 4.2, the second largest fabric family at Sikyon is the so-called 'Architectural Fabric'. This term serves as a catch-all category for groups initially classified by the author as 'beige with large red inclusions', '...with large dark inclusions', 'white with large inclusions'. 2,310 sherds in this fabric family were recorded by the author during the analysis of the ceramics from Total Collection and Cross Section squares. The total weight of these was 32.9kg, giving an average weight of 14.2g per sherd, considerably higher than the average sherd weight from Sikyon of 6g. The heaviness of sherds appearing in this fabric family is easily explained through its associated function as a fabric for architectural terracotta constructions, such as pipes, pithoi, architraves, perirrhanteria, and most commonly roof and floor tiles. The most common artefact of this class, however, is tile, on which the majority of the present section will be focused. This fabric family generally appears in the beige to light-yellow to white colour range and can be quite easily identified based on the common presence of pronounced large dark or large red angular inclusions in the matrix (Fig 4.24).

On surveys in Southern Greece, tiles generally represent the single most common find (Koskinas 2011: 549). Nonetheless, they are a problematic class of artefact. Aside from some decorated terracotta and a few classes of pithoi which stand as exceptions to this, tiles, pipes, and other architectural terracotta types are generally only classified and dated very broadly (Blitzer 1990; Christakis 2005; Randsborg 2002). While it may not be possible to assign very specific dates or workshops, it is still possible to explore certain issues through this class of artefact.

The earliest post-Mycenaean tiles known in Greece date to the early 7th century BC and are from the north eastern Peloponnese, specifically from either the Temple of Apollo at Corinth (Robinson 1984: 55-66; Sapirstein 2007: 196) or the Temple of

Poseidon at Isthmia (Rostoker and Gebhard 1981: 211-27). The tiles of the Sikyonia have been broadly studied by Aristotelis Koskinas as part of Lolos' extensive regional survey and fall into several wide date ranges: Geometric to Hellenistic; Roman; Late Roman; Medieval; Ottoman; and early Modern.

The names of the two main classes of tile, Lakonian and Corinthian, reflect the initial regional distributions of each tile type. Lakonian tiles were not necessarily all produced in Lakonia and while tiles of this type are associated with that region these appear in a range of fabrics which suggest a range of production sites. Corinthian tiles on the other hand, were in all likelihood mostly produced at Corinth as indicated by the common presence of large mudstone inclusions in ceramics.

4.4.1 *Corinthian Tiles*

Early petrographic studies by Farnsworth determined that Corinth was the only known site to use hornfels (mudstone) as temper in ceramics, which was most likely sourced from the slopes of Acrocorinth (Farnsworth 1970: 10). Indeed, the excavation of a tile-works at that site has served to further bolster this hypothesis. Corinthian tiles tend to be "flat rectangular slabs with raised edges along their long sides, and they taper toward their lower short side" (Koskinas 2011: 556-7). The long sides of these tiles have raised edges and beveled tops. On the whole, Corinthian tiles tend to be thicker than the Lakonian types, ranging in thickness between 3 and 4 cm. The undersides of these tiles are coarse as a result of added mudstone temper which appears to have served as a parting agent to minimize the tiles sticking to their mould (Sapirstein 2007: 203-4). The top surfaces of these tiles can be slipped in the brown-yellow-pale yellow colour range (Fig 4.25). The fabrics of these tiles tend to range from reddish yellow (5YR 6/6) to light greenish gray (Gley 1 7/10Y). They also tend to be hard-fired and very coarse with common angular red and dark inclusions being most common, with occasional rounded white inclusions being present but less frequent (Koskinas 2011: 558).

During Whitbread's study of Corinthian transport amphoras, he also undertook macroscopic and microscopic investigations into the ceramic fabrics of other Corinthian products. He analysed samples of tiles, architectural terracotta, terracotta sculptures and perirrhanteria and medium coarse ceramics which dated between the Archaic and Hellenistic periods. One of the conclusions Whitbread arrived at regarding this Archaic to Hellenistic period material was that it was made in the same fabric family as that of coarse Corinthian A′ amphoras (Whitbread 1995: 306, Table. 5.2). Whitbread describes this fabric type as being pink (7.5YR 7/4) to pinkish reddish yellow (7.5YR 7/4 -7.5YR 7/6) and occasionally exhibiting a light red core. After refiring at 1100^{0}C for three hours in an oxidizing atmosphere his samples became yellow to light yellowish brown to olive yellow. This fabric sub-type ranges from soft to hard, has a smooth to harsh feel and a smooth to hackly fracture. The most common inclusions in this fabric are angular dark reddish brown ones, and occasionally greyish rock fragments. Small white inclusions are rare and are probably quartz. Rounded very small, very pale brownish inclusions, which are likely limestone, are very rare (Whitbread 1995: 270-1). The most common minerals he recorded were mudstone, which occasionally exhibits radiolaria, breccia mudstone, limestone and light greyish brown textural concentration features.

4.4.2- *Lakonian tiles*

These "are slightly concave and taper at their lower short side in order to fit the next tile, and thus serve at water conduits" (Koskinas 2011: 552) (Fig 4.26). This broad type of tile tends to be thin and ranges from about 1.2cm to 3cm in thickness. Tiles of this type that are connected with Archaic-Classical times most often have slanted edges, while those associated with the Hellenistic period are generally more rounded or flat in profile (Koskinas 2011: 552). Most Lakonian tiles have a slip on the inside concave surface that is most often in the red-brown-black colour-range. Lakonian tiles in the most general terms tend to be slightly finer than Corinthian ones. They appear in the reddish-yellow colour range (7.5YR 6/6-5YR 6/6), in sandy fabrics which exhibit angular dark, red and rounded white inclusions, and occasional mica. Koskinas, based on observations made during the Lakonia Survey, notes that Lakonian tiles can also exhibit grog- reused pottery- as a temper (Cavanagh *et al.* 1996: 86; Koskinas 2011: 556).[50] During Roman

[50] This appears quite unlikely, as the 'grog' identified on the Lakonia survey tiles was rounded in shape. Rounded inclusions in ceramic fabrics are usually indicative of naturally or chemically weathered

times, the Lakonian-type was the only variety found in the region of Sikyon and were the most common form of tile found during Lolos' regional survey.

Late Roman Lakonian tiles are quite easily identifiable as they are commonly decorated with patterned finger grooves (Fig 4.27) (Koskinas 2011: 559-60). Their fabrics tend to be hard with common voids and tempered with black and red angular inclusions and white rounded ones. Koskinas also identifies mica, grog and straw as tempers, citing the common presence of circular voids as the indication of organic matter once having existed in the matrix. Furthermore, greenish heat-damaged tiles of this type were found during the regional survey by Lolos. These sherds were found in the area around Bozika (near the village of Asprokampos) which is located in the mountains to the southeast of Sikyon at the east end of the Stymphalos valley system (Y. Lolos Pers. Comm. June 2012). While Bozika is located near the southwest edge of the probable boundaries of ancient Sikyonia, the surrounding areas surveyed by Lolos registered the presence of Late Roman and Early Byzantine tile-wasters (Fig 4.28).[51] Furthermore, immediately to the northwest and southeast of Bozika are three large flysch, shale and mudstone deposits very similar to those found on Acrocorinth, where the temper for tiles probably originated (Farnsworth 1970: 9-11; Tataris et al. 1970; Whitbread 2003: 6). This suggests that during Late Roman times tiles were made in this area because the geology was suitable. This may serve to present a more centralized picture of tile production than scholarly opinion currently holds, which favours itinerant craftsmen with moulds based on the perceived difficulty of transporting tiles (Wells and Runnels 1996: 219). It also illustrates that Corinth was not the only known site in the area using hornfel as temper.

The Corinthian and Lakonian tile-types are not necessarily mutually exclusive. During the excavations of the Vari House in Attika, it was noted that tiles used on the

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inclusions and not of types that have been broken up artificially, as *grog* would surely have been.

[51] Bozika is also located in the same valley system as Ancient Stymphalos where we know that ancient tiles were produced. See the permanent exhibition in the Piraeus Bank Museum of the Environment in Stymphalia for an example of this.

same structure can vary in type and even fabric, with the house exhibiting both Lakonian and Corinthian types (Jones et al. 1973: 373).

4.4.3- *Tiles from the Sikyon Survey Project*

The fabrics of the tile types recorded during the Sikyon Survey Project, as well as those from pithoi, pipes, perirrhanteria, and architectural terracotta appear to be generally very similar. The colour range for these tends to be fairly consistently reddish yellow (7.5YR 6/6-5YR 6/6) or light greenish gray (Gley 1 7/10Y). They appeared in a hard, sandy fabric with pronounced red and dark angular inclusions with occasional to rare rounded white ones, and rare mica. Based on the identifiable material from Sikyon, the Lakonian-type tiles as well as pithoi and pipes are more likely to appear in the reddish-yellow range, while the Corinthian-type along with architectural terracottas seem to appear more frequently in the light greenish gray range. Perirrhanteria appear to straddle this divide. It presently remains unclear if this colour variation is the result of different production centres, or simply firing differentials.

Koskinas states that during Roman times the Lakonian-type was the only tile type found at Sikyon, and that this tile could likely have been produced locally. While this is not beyond the realms of possibility, there are several problems with this hypothesis.

Distributions of the 'Architectural Fabric' family were widespread. Of the 2,858 20x20m squares covered during the course of the Sikyon Survey Project, 2,509 yielded tile, pipe, terracotta, perirrhanteria, or pithoi fragments. The vast majority of these, 2,463, were tiles of which 707 were of the Corinthian-type and 968 were of the Lakonian-type, with the remaining 788 being of undetermined type. If Corinthian tiles do indeed only represent architectural remains from the Hellenistic period (ca. 2-3 centuries at Sikyon) while Lakonian represent architectural remains from the Hellenistic to Late Roman periods (ca. 8-9 centuries), then the frequency of Lakonian tiles really ought to be significantly higher than the frequency of Corinthian types, which it is not.

Furthermore, how Koskinas specifically differentiated Hellenistic and Early Roman in that study remains unclear. Indeed attempting to differentiate Late Hellenistic and Early Roman pottery, a class of object with far clearer chronologies than tiles, is in many cases asking a gray to become black and white. Differentiating tiles between these periods must be treated with some scepticism.

On the issue of local or regional production, however, Koskinas may be correct. The composition of samples of this fabric examined by the author in the Fitch laboratory, shows close similarities to the Corinthian A′ ceramic fabric, with similar colour and composition of both fabrics being recorded

This fabric family is certainly different from the standard Sikyonian Silicate Fabric associated with ceramics from the plateau, and the composition suggests that production was not necessarily local, although it could have been regional. It is possible that tiles could have been produced in either Corinth or in a similar geological environment such as Bozika. Further geological sampling and testing against the tiles will surely help clarify this issue.

4.5- *A Glimpse at Imports*

The majority of the ceramic fabric groups and subgroups appeared only in trace levels. Based on weights, the majority of sherds in these trace fabrics appear to have been amphoras as discussed in section 4.2. In the vast majority of cases it has not been possible to connect these with published comparable parallels due to the often fragmentary condition of these finds. The most common parts of amphoras found during the Sikyon Survey Project were handles, rims, and toes, the thickest parts of these vessels. Often these sherds were not in themselves typologically diagnostic, but an examination of what remained of the shapes in tandem with the fabric occasionally proved to be quite revealing. For an example, a double-barrelled handle fragment in a pale fabric with a pinkish core might indicate a Koan amphora, while the same shape in a pinkish fabric with dark volcanic glass inclusions could indicate a Campanian amphora. Both types of amphoras served rather different purposes, one was for wine while the other was likely for fruit, one has an Aegean origin while the other is Italian and has a much more restricted date-range. In some cases through a combination of macroscopic fabric analysis and comparison with analysis of typological features of known amphora types, the author was able to draw some connections.

4.5.2- *Shapes, Fabric Descriptions, Dates and Possible Contents of Imported Amphoras*

The presence of imported fine ceramic finds such as Italian Sigillata and the African Red Slip on the Sikyon Survey show that these luxury goods were arriving at the city either directly or as secondary arrivals through another port. Given that the sources of post-Hellenistic finewares are consistent with the sources of the post-Hellenistic amphoras found at Sikyon, we might reasonably assume that both categories of ceramics are reflective of an established trade route upon which Sikyon was located. Finewares were imported for what they were, high-quality ceramics. The amphoras, on the other hand, would have been imported for what they contained. With this in mind, the major imported types of amphoras are presented and briefly discussed below; they are classified by period with details of their shape and fabric, possible points of origin and possible original intended cargoes.

Hellenistic

4.5.3- Rhodian –

The most distinctive parts of this type are the long, slightly curved cylindrical handles which culminate in sharp peaks near or even above the level of the rim. The rim itself tends to be gently rounded and sits atop a cylindrical neck. The bodies of Rhodian amphoras tend to be widest at the shoulders and then progressively narrow down to the solid spike base (Fig 4.29). This type appears to have had more than one production site and some fabric variation exists within this type. The main fabric which probably originated in the region of Rhodes is reddish pink (5yr 7/6), hard and quite fine with rounded red-brown and angular white inclusions. These may also exhibit a pale slip on the surface. Rhodian amphoras range in date from the late 4th century BC until the mid 2nd century AD and are among the most commonly identified forms of Hellenistic amphoras. The original content of these was likely Rhodian wine. A wreck dating to the mid 1st century AD revealed a Rhodian amphora containing figs, which may reflect secondary usage (Whitbread 1995; Keay and Peacock 2005).

4.5.4- Knidian –

The most identifiable feature of the Knidian amphora is their ringed toe. These amphoras have a cylindrical neck with a low rolled rim and a broad shoulder which narrows as the shape elongates over time. The handles attach at the shoulder and just below the rim and tend to be broad with rounded edges (Fig. 4.30). The colour of these is generally yellowish-red (5YR 4/6-5/6) and the fabric tends to be hard, of semi-fine coarseness, and exhibits a smooth fracture. The most obvious inclusions in these are angular grey ones followed by very small angular white ones. The date range for these amphoras spans from the early 3rd century BC until the early 2nd century AD. The original content of these was likely wine from Knidos (Whitbread 1995: 68-76).

4.5.5- *Corinthian B -*

This is a distinctive type of amphora which Whitbread described succinctly as having a "turnip-shaped body" (Whitbread 1995: 259). Corinthian B amphoras are generally short with rounded cylindrical handles. Initially, these had a squat body and a short neck, but as with Knidian amphoras the shape elongates and narrows over time. Corinthian B amphoras have a rounded rim with a carination or a ridge at the base. Their bodies are widest at the shoulders and they narrow toward the toe which is short and cylindrical (Fig. 4.31). Based on the general morphological traits of this shape, and its disappearance around the 2nd century BC after ca. 400 years of production, it is extremely tempting to see this shape as a predecessor to the Sikyonian A amphora, which itself may have been a predecessor to the Brindisian amphora (Whitbread and Fink/Palazzo). Whitbread identified four types of fabric associated with these vessels: types 1 and 2 are respectively coarse and fine variations of a yellow fabric, while types 3 and 4 are respectively coarse and fine variations of a reddish brown fabric. Those found at Sikyon appear to fall into fabric class 2 and tend to be in the pink (7.5YR 7/4) -very pale brown colour range (10YR 8.3) with cores in the reddish yellow (5YR 7/6) to very pale brown (10YR 7/4) range. They tend to be medium hard and semi-fine with a powdery feel (possibly as a result of post-depositional factors) and exhibit white and light grey sub-angular inclusions and matte orange-red to dark red rounded ones. Corinthian B amphoras were likely used for the transportation of wine (Whitbread 1995: 258-61; Koehler 1992).

4.5.6- *Parian* - One likely example of a Parian amphora was identified from the Survey assemblage.[52] The Parian fragment is from the handle area and exhibits a stamp with 'ΠΑΡ' (as identified by Lawall). The fragment is likely of the Parian type II or type III types, which date to the 2nd century BC. The original intended function of these types appears to have been wine (Whitbread 1995: 224-5) (Fig. 4.32).

Later Hellenistic/Early Roman

4.5.7- *Early Greco-Italian*-

This is a very common type of late Republican amphora found at Sikyon. The most distinctive feature of this type is the triangular rim. These have a long cylindrical neck and long handles which are ovoid in section and attach to the shoulder and the top of the neck. The body is thickest at the shoulder and narrows toward the bottom, ending with a solid spike toe (Fig 4.33). This type had several production sites and as such has a range of fabrics, but the type from Sikyon which dates to Hellenistic times appears in a hard to very hard fabric, of medium fine coarseness and has a smooth feel. It appears in a light brownish gray fabric (2.5Y 6/2) with slightly darker cores. Rounded and sub-rounded small matte white inclusions are most common, followed by small flat black ones. This shape generally dates from the mid 3rd century BC to the first half of the 2nd century BC. The most likely source for these was the Italy, or possibly Sicily, and their original content appears to have been wine (Peacock and Williams 1995: 105-6).

4.5.8- *Lamboglia* 2 (includes Dressel 6) –

The two most indicative features of this shape category are the ovoid body which thickens toward the bottom, a morphology sometimes referred to as being bag-shaped,

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52 The author is very grateful to M. Lawall for identifying this piece.

and the thickened collar-like rim. The necks of this type tend to be long and cylindrical, while the handles are vertical and long in profile and ovoid in section. The handles join the neck below the rim and attach to the upper carinated shoulder. The widest part of these vessels occurs at approximately one quarter of their height, below this point the vessel tapers sharply and ends in a pointed toe (Fig 4.34). Examples of this type found at Sikyon appear in a medium to soft smooth fabric, with some white and opaque glassy inclusions, occasional mica, and some occasional to rare small orange-red ones. The distinguishing feature of the fabric associated with the Lamboglia 2-type is its pale, very light yellow to white fabric (10YR 8/3- 5YR 6/4) (Peacock and Williams 1986: 100-1). The date range for Lamboglia 2's appears to have extended from the 2nd century BC to the mid 1st century BC. These appear to be from Apulia and initially may have been used for olive oil. Remains from a wreck also turned up traces of wine in one (Formenti et al. 1978).

4.5.9- *Dressel 1* (continuation of the Greco-Italian Type)-

Dressel 1 has been subdivided by Lamboglia into sub-types 1a, 1b and 1c (1955). All are morphologically related and have been connected with main production centres on the west coast of Italy in Etruria and Campania (Fig 4.35). All three sub-types share some common features which include tall cylindrical bodies, rounded shoulders and long rod-like handles. Sub-type 1a exhibits a short triangular rim, 1b has a collar rim, 1c also a collar rim and ribbed, twisted handles. The date range for all the Dressel 1 subtypes spans the mid 2nd century BC until the later 1st century BC (Peacock and Williams 1986: 86-95). These all appear in the distinctive dark sand fabric from Campania which appears in the darker pink to red range of colours and exhibit common dark glassy volcanic inclusions which have been identified by Peacock as dark green augite crystals. The same fabric is also used in the Campanian Dressel 2-4 type (Peacock and Williams 1986: 87-8). The Dressel 1a-type was used for the transport of wine initially, while remains of sponge, shells, raisins and nuts have been found in the 1b-type, and both *garum* and olives have been associated with the 1c-type (Peacock and Williams 1986: 93-5).

4.5.10- *Brindisian Amphora-*

Very similar to the Sikyonian A amphora, and probably a later version of this type. These vessels have a fairly short cylindrical neck with a thickened, rolled rim. The handles of these are cylindrical or round in section and attach below the rim and to the top of the shoulders. The body of this shape is ovoid and is thickest at the shoulder and narrows toward the knobbed toe (Fig 4.36). The fabric of these tends to be medium to hard, contains a few small white inclusions and is in the reddish-yellow colour range (5YR 7/6-7.5YR 7/4). This type, although a related type to the Sikyonian A type, has a slightly different fabric, and has been connected with a kiln at Apani, north of Brindisi. Brindisian amphoras were most likely used for the transport of olive oil, but may also have been used for the transport of wine. Brindisian amphoras date from the late 2nd century BC to the mid 1st century BC (Finkielsztejn forthcoming; Palazzo 1990; Peacock and Williams 1986: 82-3).

4.5.11- *Campanian/Dressel 2-4 –*

Exhibits a simple rolled rim, a cylindrical neck which narrows toward the shoulders and a cylindrical body that narrows toward a solid cylindrical spike at the bottom. The handles of this type tend to be double-barrelled, long, and attach to slightly sloping shoulders and to the neck just below the rim at a roughly 90^{0} angle (Fig. 4.37). The distinctive trait of this type from Campania is its fabric which is in the darker pink to red range of colours and exhibits common dark glassy volcanic inclusions that have been identified by Peacock as dark green augite crystals (Peacock and Williams 1986: 87). The same fabric is used in Dressel 1a, 1b and 1 c types making sherds of this type which are not from rims or handle-joins very difficult to distinguish. The main content of these appears to have been wine and indeed these were the most important wine amphoras during early Imperial times (Peacock and Williams 1986: 105-6).

4.5.12- *Rhodian –*

Taller and more slender variations of the Rhodian Type discussed in #1 (Fig 4.38).

4.5.13- *Koan* –

Koan amphoras are among the most identifiable of all the Aegean amphora types due to the distinct double-barrelled handles, which appear in most sub-types. The rims of Koan amphoras are simple rolled ones with cylindrical necks and the handles attach at the slanted upper shoulder and to the neck just below the rim. The handles are vertical and bend into the neck at an angle usually slightly greater than 90^0. Koan amphoras reach their widest point just below the shoulder and below this the body tapers down to a knob toe (Fig 4.39). The taper at the bottom is more pronounced in the earlier types and becomes slightly baggier as time goes on (Whitbread 1995: 81-2). Whitbread has identified five fabric types associated with this shape category. The samples of these from Sikyon are generally pink-red, hard and semi-fine with a conchoidal fracture. They exhibit small sub-rounded grey and dark inclusions as well as small rare yellowish ones, and occasional to common tiny sub-angular white ones. A distinctive light yellow to white wash on the exterior of Koan amphoras was also common among the examples from Sikyon. The most likely production site many of these vessels is at Kardamena on Kos and possibly also on the neighbouring Datça and Myndos peninsulas along the west coast of Turkey. Koan amphoras date between in the 4th century BC and the 1st century AD. Kos was well-known in antiquity for producing wine and it is therefore probable that these vessels were used for this type of transport (Whitbread 1995: 82).

Middle Roman/Late Roman

4.5.14- *Sikyonian B shape of Corinthian production-*

As the Sikyonian B has already been discussed at length in Chapter 3, further discussion here will be limited to the fabric of the Corinthian variety, which is light-red (2.5YR 6/6-6/8). The fabric is medium to hard and is medium to coarse. Inclusions in these are small rounded white and grey ones and occasional matte orange-red ones, which appears to be the main point of differentiation between coarser Corinthian fabrics more generally and SSF (Slane 1990: 116 no. 250).

4.5.15- *Tripolitanian III* -

These feature a short neck and short roughly cylindrical handles which join at the top of the sloped shoulder (which is occasionally ridged) and attach to the neck below the everted collar rim. Tripolitanian amphoras feature a long cylindrical body which tapers toward the centre, broadens toward the bottom and ends with a spike toe (Fig 4.40). These appear in two main fabrics, with the one we see at Sikyon being semi-fine to fine, hard and light pink-red in colour (10 YR 6/6) with a light yellow to white surface, not unlike those of the Koan type. Few inclusions are visible macroscopically and those that are tend to be white to opaque glassy and sub-angular. The type found at Sikyon has a date range from the 2nd century AD until the second half of the 3rd century AD and was produced in the region of Tripoli in Libya. The main content of these may have been oil (Peacock and Williams 1986: 169-70).

4.5.16- *Africana 2B Grande* –

The Africana 2B Grande features a long cylindrical body, a short cylindrical neck and a thickened rolled rim in most cases, or a slightly collar-like rim in some others. The handles of these are fairly short and rounded, feature a single ridge on their exterior, and connect the sloped shoulder and the neck, below the rim. The bodies of these are for the most part vertical with tapering only occurring at the shoulder near the top and above the knob base at the bottom (Fig 4.41). This type originates in Sahel in Tunisia and features a hard, grainy, "brick red" (2.5YR 6/6) fabric with a very light yellow to white surface wash (Riley 1979: 203-5; Peacock and Williams 1986: 155-7). This class ranges in date from the 2nd century AD until the 4th century AD and were likely used for the transport of oil and/or *garum* and/or fish (Peacock and Williams 1986: 156).

Late Roman/Early Byzantine

- *Late Roman 2*. See *4.3.5*.

- *Niederbieber 77*. See *4.3.8*.

4.5.17- Concluding Thoughts

The earliest certain imports to the Sikyon plateau included some very fragmentary ceramics of fine Attic or Argive ceramics and appear to date to the 3rd century BC. Around this time or slightly later some rare examples of amphoras of Rhodian, Knidian, and Parian types appear, and slightly more Corinthian B and early Greco-Italian types. By the later 2nd- 1st century BC some fine Eastern Sigillata A plates with upturned rims and hemispherical bowls of Levantine origin, as well as some mould-made bowls which appear to be from Corinth.[53] At this time amphoras such as the Lamboglia 2, Dressel 1 and Brindisi types also seem to have been arriving at Sikyon. This presents an interesting dichotomy between the finewares and the amphoras, with the former appearing to have an eastern origin while the latter generally having a western one. That the finewares and the amphoras do not reflect the same trade patterns may suggest that the finewares could have been arriving at Sikyon indirectly, perhaps via Corinth by way of its eastern port of Kenchreai (e.g. Rife et al. 2007: 167-8).

Some amphora types such as the Lamboglia 2, Dressel 1 and Dressel 6a types as well as some rare devolved forms of Rhodian, some Koan, and a few pseudo-Koan types straddle the Late Hellenistic, Early Roman historical divide, so refining these dates was difficult to impossible based on surface survey finds. Several examples of early Italian Greyware and some Eastern Sigillata A plates were recorded and date to around the 1st century BC–1st century AD. While Eastern Sigillata A occurs in comparatively frequent numbers, the majority of finewares from this time, however, are Italian Sigillata types. A possible regional import is a regional imitation of a late Italian Sigillata bowl with a rosette appliqué which has parallels at Corinth dating to the first half of the 2nd century AD.[54] Around the end of the 1st century AD we can see a shift from Italian imports to those from North Africa, and early African Red Slip begins to emerge as a common type at this time. We also see the beginnings of Late Roman C wares as well as Eastern

[53] Results here relating to finewares are based on the research of P. Stone (Hellenistic) and M. Maher (Roman).

[54] Roman era fineware was produced at Patras (as can be seen in the Archaeological Museum of Patras). Roman era fineware was also produced at Aigeira (as identified by the author). Production of these types was certainly taking place in the northern Peloponnese, however, at present none is known from Sikyon.

Sigillata B and five examples of Çandarli ware. African Red Slip and Late Roman C wares dominate the fineware imports at Sikyon from the 2nd century AD until the 6th century AD.

During Middle Roman times Sikyonian B amphoras in both local and Corinthian fabrics became common local/regional types. Amphoras from further afield, which reflect the trade patterns already seen in the finewares, such as Tripolitanian and Africana 2B Grande amphora types appear in significant numbers and date from the 1st to the 4th century AD. Late Roman and Early Byzantine amphoras include Late Roman 2 amphoras in both Corinthian Cooking Fabric and in Southern Argolid Fabric as well as several examples of Niederbieber type 77's, and one Keay 52 (Figure 4.42).

On the whole imported ceramics at Sikyon appear to have been relatively sparse. For example, approximately 15.7% of the identified Roman vessels appear to have been imported; if those vessels which are likely Corinthian or regional (11.1%) are excluded, then only 4.6% of identified Roman identified vessels are non-local. The vast majority of the vessels used on the Sikyon plateau were local therefore. What can this large-scale pattern of ceramic production and consumption tell us about the history of Sikyon?

Chapter 5:
Synthesis

5.1- *Overview of the Sikyonian Ceramics Industry*

The beginnings of the ceramics industry at Sikyon are slightly unclear, and will likely remain that way in the absence of ceramics from excavated contexts.[55] The bowl/basin with ring foot may span from late Classical times until Early Roman times, a period of around 400 years, which may suggest that the industry could have begun as early as the 4th or 3rd century BC. Sikyonian A amphoras from stratified contexts at Sikyon have recently been studied by Dimitra Lykoudi, and the earliest of these appear to be of 3rd century BC dates.[56] It was during the years around the mid 2nd century BC, however, that the industry at Sikyon appears to have really begun to flourish. During this time a large range of vessels appears in the Sikyonian Silicate fabric family, as did the Sikyonian A amphora and the krater with overhanging rim. The production of a range of vessel shapes which date to around the mid 2nd century BC provides evidence for the certain beginning of this industry. Future excavations may show that production began earlier in some instances, however, based on the survey assemblage and on the proportion of vessels which date to this time, the mid-2nd century BC currently represents the safest date for the start of the ceramics industry.

Sikyon was used by the Romans as a base from possibly as early as 198 BC (Livy 32.19.5) or 168/7 BC (Polybius 30.10.4; Livy 44.6.3, 8.8) during their campaigns against the Macedonians at Corinth, and so we might not necessarily expect to see a visible change in material culture at the site during the Early Roman historical period. It should be expected therefore that initial Italian influence would certainly be under way by the early to mid 2nd century BC. Indeed little change in the character of production can be

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[55] While excavations have taken place at Sikyon most of these took place in the late 19th and early to mid-20th century and ceramics were not published with the findings. The various on-going excavations in the area by the 37th Ephorate of Prehistoric and Classical Antiquities, and of the 25th Ephorate of Byzantine Antiquities, however, represent good opportunities for issues relating to chronologies and ceramics to be clarified. Some emerging results appear in Morgan et al. 2012: 44.

[56] Lykoudi 2013.

noted between later Hellenistic and Early Roman times. Shapes such as the stew pot with everted rim and thickened lip, the stew pot /casserole with flanged thickened rim, and the Sikyonian A amphora appear to straddle this divide. During Early Roman times the major new shape to appear in the kiln-wasters at Sikyon was the krater with triangular rim. This shape does not appear to have developed as a result of some new Roman influence but rather from an earlier related regional vessel-type (Slane 1990: 121, no. 261).

By the beginning of the Middle Roman period in the 2nd century AD the Sikyonian B amphora replaced its larger predecessor, the Sikyonian A. Amphoras of the Sikyonian B shape were produced at several different sites, and those which are classed as Sikyonian were done so based on both shape and fabric characteristics. The later amphora type likely represented a change in the Sikyonian economy during Middle Roman times, as well as a reconnection with Corinth. The very common krater with a high-folded rim also emerged at Sikyon around the Early-Middle Roman transition and then becomes the most common Middle Roman type at the site. The stewpot with flat horizontal rim was also being produced around this transitional time.

It is not until Early Byzantine times in the 6th century AD that we see another new shape certainly produced at Sikyon, the stew pot with semi-cylindrical rim. Late Roman pottery and architecture were fairly common finds at Sikyon, but no certain kiln-wasters from this period were identified. By the 6th century AD, however, the character of the ceramics industry at Sikyon appears to have changed considerably from Hellenistic, Early and Middle Roman times.

Perhaps the most remarkable aspect of the pottery produced at Sikyon is that it all occurs in one fabric family, the Sikyon Silicate Family, which was certainly used from around the middle of the 2nd century BC until the 7th century AD. Even the Late Roman ceramics, which may not have been produced on the plateau, still appear in this fabric family.

5.2- *Sub-Groups of the Sikyonian Silicate Fabric Family*

Within the Sikyonian fabric family, some minor variations are evident. For example, Sikyonian A amphoras and jugs of a Hellenistic date appear to have the same clay preparation, which may be been one more suited to the containment of liquids, as both vessel categories may have shared this function. As noted in Chapters 3 and 4, some finer variations of the fabric family were used for the manufacture of lamps and possibly also fusiform unguentaria, and once again, these vessels shared a similar basic requirement in that they were required to contain oil.

5.2.2- *Petrographic Subgroups*

Variations within the silicate fabric family were observable microscopically. Within the family, five subgroups were identified based on compositional similarities of the samples within the each group (Table 5.1). For the general composition and character of this fabric family see Chapter 3.4. The sample numbers and any associated diagnostic sherds are grouped as listed below:

Subgroup 1a- Silicate Fabric (Fig 5.1)

Samples:1; 2 ; 3; 4; 5; 6; 10; 11b; 12; 27; 62; 68; 74; 94; 95; 98; 101; 109; 112; 112a.
Kiln-wasters from Subgroup 1a:17; 18; 19; 20; 22; 23; 24; 26; 29; 116
Diagnostics from Subgroup 1a:
3= Jug with flat-rim – Early Byzantine; 24= Sikyonian A amphora- 2nd BC to 1st or 2nd AD; 25= Early Roman casserole; 62= Round-mouth jug- early to Middle Roman; 68= Sikyonian A amphora- 2nd BC to 1st or 2nd AD; 74= Mortarium (Edwards' Type I) = Hellenistic; 112– basin with high-folded rim- 1st to 2ndcentury AD.

Subgroup 1b- Silicate Fabric with Evidence of Clay Mixing (Fig 5.2)

Samples:13; 21; 53; 66; 67; 75; 76; 76a; 93; 109; 110; 111
Kiln-wasters from Subgroup 1b:21- Undetermined Shape
Diagnostics from Subgroup 1b:
13= Sikyonian A amphora- 2nd BC to 1st or 2nd AD; 76= Sikyonian A amphora- 2nd BC to 1st or 2nd AD; 76a= Amphora with ridged neck= poss. Late Classical

Subgroup 1c- Medium Silicate (Fig 5.3)

Samples: 14;15;34;42;57;60;69;70;80;85;86;87; Variant-113 Kiln-wasters in subgroup 1c: None Diagnostic from Subgroup 1c: 14= Stew pot with a flanged, thickened rim- Hellenistic and Early Roman; 69= Possible fragment of a Broneer XVII lamp- Early Roman; 85=Fusiform Unguentarium- Late Hellenistic- Early Roman; 86= Fusiform Unguentarium- L Hellenistic- E Roman

Subgroup 1d- Semi-fine Silicate (Fig 5.4)

Samples:51 and 52 Kiln-wasters from subgroup 1d: None Diagnostics from subgroup 1d: None

Subgroup 1e– Silicate Fabric with Serpentine and Biotite (Fig 5.5)

Samples: 16; 30; 44; 45; 46; 54; 55; 56; 59; 61; 73; 78; 88; 89; 96; 97; 114; 115 Wasters from subgroup 1e: None Diagnostics from subgroup 1e: None

The differences in these five subgroups are largely self-explanatory and are based on the size and frequency of mineral inclusions. Subgroups 1a, 1c, and 1d were classified as coarse, medium and semi-fine varieties of the same fabric based on the frequency of mineral inclusions within the samples.

Subgroup 1a represents the typical Sikyonian Silicate Fabric family type. The diagnostic sherds in this subgroup reflect this, and range in date from the 2nd century BC until Early Byzantine times, and range in functions from cooking, transport, and serving to utility. It is also worth noting that Sample 10 and Sample 13, the two Late Roman samples, belong to subgroups 1a and 1b.

Subgroup 1b represents sherds in this fabric family which exhibit evidence of clay-mixing, either through dark or light streaking through the groundmass, or through the obvious mixed presence of silicates and carbonates in the matrix. 1b differs from 1a based only on its less-well mixed clay composition. All identifiable sherds in this group were amphoras, and it may be that the mix of clays was tailored to suit a particular function of these vessels. Amphoras of the same type, however, were also found in the 1a group in two cases.

The likelihood of clay-mixing is supported by the results of the controlled firings of the sampled clay briquettes discussed in Chapter 3. When fired at 1050°C in a oxidizing atmosphere for one hour in an electric kiln within the Fitch Laboratory, the sampled clays either fired to red-brown hues in the case of terra rossa type clay samples, or a pale yellow/white hues in the case of calcareous clay samples. A small sample of each ceramic from Sikyon that was analysed in the Fitch Laboratory was also fired in oxidizing conditions at 1050°C for one hour. After firing all of the sherds took on a reddish-pink hue, which suggests that ancient potters used a mixture of both terra rossa and calcareous types of clay. Indeed the samples belonging to subgroup 1b frequently exhibited carbonate textural concentration features interspersed with iron-rich red textural concentration features and occasion tiny biotite mica, which may be suggestive of such a mix.

Subgroup 1c represents a finer variation of the Sikyonian Silicate Fabric family. Unguentaria, lamps and a fine variety of the stew pot with flanged thickened rim was also produced in this variety. Nothing certainly dating beyond the 1st century AD was identified in this fabric variation.

Of all the subgroups, 1d is particularly troubling. The general groundmass appears very similar to the rest of the silicate family but all examples in this category are very fine, and so detailed interpretation was not possible using a polarizing microscope. While subgroup 1d appears to be of similar composition to the rest of the subgroups, it should be noted that the samples in this subgroup may not necessarily be examples of the SSF family.

Subgroup 1e represents something of an outlier. Although geologically compatible with the rest of this Silicate family, 1e also exhibits serpentine and biotite, and may be indicative of a slightly different clay source within the same broad region.

5.2.3- *Firing Differentials across Functional Categories over Time*

The main functional categories of vessels produced at Sikyon were: cooking, transport, serving, utilitarian and cosmetic. As discussed with reference to subgroup 1b, the clay of all the ceramics sampled from Sikyon turned reddish-pink when fired at 1050°C for one hour. This result raises the issue of both clay-mixing and of firing differentials. If all clay fired to a reddish-pink colour at 1050°C , then why is such a range of colour evident in the Sikyonian Silicate Fabric pottery? In order to address this, it is necessary to discuss patterns in colour and appearance of vessel-types produced on the plateau within four of the five aforementioned functional categories across time. The fifth functional category, cosmetic vessels, is excluded from this as it solely covers the fusiform unguentarium shape, a specific shape and fabric which do not seem to change during the life of this vessel-type at Sikyon.[57]

Cooking Vessels (Table 5.2):

Hellenistic- These tend to come in two colour ranges, brown-reddish brown to red light-yellowish red range and in the slightly more common very dark gray to very dark greenish gray to light gray range. The fabrics of cooking vessels from Hellenistic Sikyon tend to be medium hard to hard, and of medium coarseness. In addition to the usual white and opaque glassy inclusions, many appear to exhibit some small silver glitter in their fabrics.

Early Roman- As we have seen in the Hellenistic cooking vessels, the colours of Early Roman vessels of this category come in both a more frequent gray and red range of colours but are slightly narrowed in their range of hues. These are: dark gray-gray and light gray on the one hand, and brown-red-light red and reddish yellow on the other. The fabrics of cooking vessels from Early Roman Sikyon tend to be of medium hardness and

[57] Colours listed here are based on the names supplied for the relevant colours in the Munsell Soil Colour Charts (2000). Names rather than names and specific Munsell numbers are listed here as these colours represent ranges rather than specific hues of colour.

coarseness. Silver glitter (mica) appears to be less common in cooking fabrics of this time than it was in the Hellenistic forms.

Middle Roman- The two most common colours of Middle Roman cooking vessels at Sikyon are reddish brown and reddish yellow, with dark gray being a less common colour. Once again, most of these vessels appear in a medium hardness and coarseness. They tend to have a smooth feel and a powdery fracture.

Early Byzantine- The fabric of Early Byzantine cooking vessels appears in the same range as the earlier cooking wares, although as with the Early Roman, the gray range is the most common. The colours of these tend to be: dark gray-gray and reddish brown-reddish yellow. The fabrics are generally medium to coarse and of medium hardness, but tend to feel heavier than the earlier fabrics of this class. One possible distinguishing feature of Early Byzantine cooking vessels from Sikyon is that they occasionally exhibit large sub-rounded matte white inclusions (Table 5.2).

Transport Vessels (Table 5.3):

Hellenistic and Early Roman- Sikyonian A amphoras appear in a range of generally light colours and cover the spectrum from: very pale brown to light brown-pinkish, beige-red-reddish yellow and gray. Their fabric tends to be hard to very hard and mineral inclusions in these tended to be fairly common and quite small, are generally white and glassy, but also small red matte, small dark glassy and surface silver glitter may all appear in these.

Middle Roman- Sikyonian B amphoras appear in a range of generally light colours and cover a more restricted spectrum than the Sikyonian A form with light red and brownish gray being by far the most common colours. Mineral inclusions and hardness are generally of the same type as seen in the Sikyonian A type.

Early Byzantine- None identified

Serving Vessels (Table 5.4):

Hellenistic- Serving vessels from Hellenistic Sikyon generally appear in a fabric which is medium to fine in coarseness, and medium to soft, and which is generally reddish yellow-red-light red in colour. Occasional silvery glitter is also present in these shapes.

Early Roman- Serving vessels from Early Roman Sikyon generally appear in a fabric of medium fine coarseness, and medium hard fabric with a smooth feel. The major colours of these are gray and light yellowish brown.

Middle Roman- Serving vessels from Middle Roman Sikyon are generally appear in a fabric of medium fine coarseness, and medium hard fabric with a smooth feel. The major colours of these are now strong brown and brownish yellow.

Early Byzantine- Serving vessels from Early Byzantine Sikyon generally appear in a fabric of medium fine coarseness, with a hard fabric with a bumpy feel. The major colours of these are grayish brown and red.

Utilitarian Vessels (Table 5.5):

Hellenistic- Utilitarian vessels from Hellenistic Sikyon generally appear in a medium to fine coarse, and medium to hard, fabric. The majority of these appear in the light red-red range of colours, with a minority appearing in a grayish brown fabric. Most exhibit the usual common glassy and white mineral inclusions, however, in a small minority of cases some small matte green inclusions can be seen.

Early and *Middle Roman*- Utilitarian vessels from early and Middle Roman Sikyon generally appear in a fabric of medium coarseness, and medium hard fabric. The majority of these appear in the red-reddish yellow range of colours, with brownish-yellow-very pale brown also being common colours, and a minority appearing in a grayish brown-reddish brown fabric.

Early Byzantine- None Identified

5.2.4- *Comparison with Corinthian Ceramics*

One of the issues at the very heart of the present investigation is the differentiation of Sikyonian and Corinthian ceramics. The material culture of both city-states was very similar for much of their known history. As previously noted, this similarity proved to be extremely beneficial, as many parallels to the vessels found at Sikyon have been published from the American School of Classical Studies at Athens' excavations at Corinth. Indeed the rise of the Sikyonian ceramics industry appears to have been closely connected with the decline of Corinth as an economic force in the region during the mid 2nd century BC. While the presence of kiln-wasters on the survey provided certain evidence for ceramic production at Sikyon, it was the ceramic fabric of the Sikyonian vessels which enabled the extent and scope of the local industry to be interpreted.

Ceramics from Corinth are amongst the best understood in the Mediterranean region. As well as interpreting and presenting extensive and thorough ceramic chronologies, scholars working at the site have also produced pioneering work on ceramic fabrics analysis (See Chapter 2.2 for an overview of this research).

Farnsworth classified three main types of Corinthian clays: Acrocorinth Red Clay, which fired to a red colour and featured mudstone inclusions; Acrocorinth White Clay which is buff and slightly rosy after firing and has inclusions of feldspar, quartz and schist; and finally White Clay of the Corinthian Plain which fires to a creamy greenish colour (Farnsworth 1970: 19-20; Whitbread 2003: 7). At its most general, Corinthian pottery tends to be fine, calcareous, and contains small grains of calcite and quartz (Farnsworth 1964: 224). In sturdier terracotta constructions such as tiles, pipes and some amphoras mudstone (hornfel) is the most common temper, and was likely sourced from Acrocorinth (Whitbread 2003).

The range of products created in Corinthian clays was enormous, from very fine cups and perfume jars, to architectural terracotta (i.e. *sima*), tiles, pithoi, cooking vessels, serving vessels and transport amphoras. Each of these functional categories would have required a slightly different clay composition. As is the case at Sikyon, however, an exact clay match for ancient ceramics has not yet been replicated, as the best raw clays from around Corinth are far more calcareous than those of the ancient ceramic fabrics.

Two main fabrics are connected with Roman-era Corinth. The first is a buff fabric with a gritty texture which is of soft to medium hardness and usually appears in reddish yellow (5YR 7/6-7.5YR 7/6) and less commonly in very pale brown (10YR 8/3). Coarser variations of this fabric exhibit medium-sized dark and white inclusions, as well as medium to large red ones and sand, and tend to have few voids (Slane 1990: 3). This fabric appears to be a variant of a finer Corinthian fabric tradition from Hellenistic times (Edwards 1975:7) and is very reminiscent of the fabric in which some of the earlier Hellenistic finds from Sikyon appear. Indeed many of the Early Hellenistic finds, such as kantharoi listed in Chapter 3, are likely of Corinthian origin.[58] This fine fabric family is almost certainly related to a fine variation of the fabric in which Corinthian B amphoras were made (Whitbread 1995: 274-8).

The other major Roman-era fabric from Corinth is known as Corinthian Cooking Fabric (CCF hereafter) as this was the fabric used initially for the manufacture of Corinthian cooking pots.[59] This fabric tends to be red (2.5YR 5/6) or reddish brown (5YR 5/4), medium to hard and exhibits angular silicate white inclusions, as well as weathered orange and dark ones, and occasional mica. The exterior surface or even entire vessels in this fabric can be fired gray. The fabric itself is found in grades from very fine to medium coarse (Slane 1990: 3). The most recent analysis carried out on this fabric group was done by Graybehl 2010. A brief summary of Graybehl's results for this group states that CCF, which appears in her 'Chert Fabric Group', is likely a mix of two fabrics, one *terra rossa*, as determined by the presence of quartz and mica inclusions, and the other calcareous which accounted for the common appearance of micrite in the fabric family. The characteristic inclusions of this group are common angular chert, sub-

[58] An interesting aside to this are vessels such as the mortarium of Edwards' type II, and the krater with overhanging rim, which appear both in this Corinthian-looking buff fabric and in the likely later Sikyonian Silicate Fabric, which raises the possibility that some craftsmen or schools may have operated in both poleis.

[59] It should be stressed here that Corinthian Cooking Fabric, while the fabric in which most Roman cooking pots at Corinth appear, is not necessarily of Corinthian origin itself.

rounded micrite, monocrystalline quartz and clay pellets. Less common and finer inclusions are mica and very rarely some schist and plagioclase feldspar, and rare garnet. Graybehl also identified several subgroups of this fabric family, such as one with iron-rich clay pellets, another with schist and metamorphic rocks, and a chert and quartz subgroup (Graybehl 2008: 23-6, App. I: 77-80).

Both the CCF and Sikyonian Silicate Fabric are very similar fabrics, both appear to have been utilised for the same range of vessel-types and have very similar appearances both microscopically and macroscopically. The most obvious macroscopic differences between CCF and SSF are that the former has more common and obvious brown-red inclusions. In thin-section under a microscope Sikyonian Silicate Fabric exhibited fewer inclusions of monocrystalline quartz, and fewer iron-rich clay pellets than are seen in CCF. The Sikyonian fabric is also richer in carbonate inclusions, such as micrite, and in polycrystalline quartz than the Corinthian fabric. Differences between these are subtle, but they do exist. The emergence of CCF as the main cooking fabric at Corinth during Early Roman times, a time when the nearby Sikyonian ceramics industry would have been in full swing may suggest that potters with a familiarity of Sikyonian ceramic manufacturing techniques played a role in its development, especially as it differs so much from earlier Corinthian ceramic fabrics and is so similar to the Sikyonian one (Fig 5.6 – Photos and TS of CCF and SSF).

5.3- *Absentees*

The ceramic assemblage from Sikyon is slightly anomalous as all locally produced ceramics were manufactured in a single fabric family. The reduced size of the Late Roman settlement, the lack of finewares, and the lack of drinking vessels would be atypical of other assemblages in the region.

The homogeneous fabric family has been discussed at length, and the general scarcity of finewares appears to reflect of a larger pattern of survey finds. The lack of drinking vessels and the apparent anomalous Late Roman activity remain to be addressed.

Most obviously, the very low count of possible local drinking vessels is striking. While some cups were recorded from the survey, these were few in number. Several dozen Hellenistic mould-made bowl fragments in a powdery likely Corinthian fabric, and even a mould were found during the course of the survey. These finds tended to be concentrated in several areas: in a small area to the east of the NP to the north of Gate 2; in the southern part of the SP around the production area; and in low concentrations in the UP along its eastern edge above the theatre and above the SP (Table 5.6). In the same areas in the NP and the SP, some Hellenistic conical cups were also found. Several examples of Middle Roman thin-walled cups which appear in a thin semi-fine grey version of SSF were recorded, but less than five examples of these were certainly identified. Several Middle Roman thin-walled cups were also found in parts of the NP and the SP (Fig 5.7). Drinking vessels often make up a significant proportion of contemporary ceramic assemblages in the area, but it is clearly not the picture presented from the identified ceramics from the Sikyon Survey Project.[60] This relative lack of drinking vessels appears likely connected to the relative lack of other finer ceramics, and it could be that these types simply do not survive well in surface assemblages.

The interpretation of Late Roman Sikyon being a nucleated settlement than in previous times is a more complex issue. Ceramics were still produced in SSF during Late Roman times, but evidence for the production on site of vessels dating to this period is lacking.

5.3.2- *Late Roman Ceramic Production*

It seems most likely that the ceramic workshop(s) in the southern part of the SP went out of use sometime during or slightly after Middle Roman times (ca. 2nd- late 3rd century AD) based on evidence, or the lack thereof, from the kiln-wasters and heat-damaged sherds. Roughly around this time there appears to be a clear indication that much of the

[60] The author's on-going research on the excavations at the neighbouring site of Aigeira indicates that fine grey thin-walled Early to Middle Roman cups are amongst the most common shapes identified from the site.

settlement on the Sikyon plateau nucleated around the area of the agora, while habitation in the NP appears to have continued on in a possibly reduced manner. During a period associated with population increase, Sikyon appears to undergo a population decrease.

Like the Sikyon plateau, ancient Corinth was located slightly inland. The site had two ancient harbours, Kenchreai located on the coast of the Saronic Gulf, and Lechaion on the coast of the Gulf of Corinth. A significant amount of Late Roman ceramics and architecture has been uncovered at both harbours and at Lechaion an enormous (150m+ in length) Christian basilica was constructed during this time (4^{th}–5^{th} century AD). Similar examples of large coastal basilicas can also be found at Hermione, Patras and Kiato, among other coastal sites. This appears to be part of a larger pattern in the Peloponnese as observed by Sweetman (2012). It is widely accepted that widespread and long-range trade was a hallmark of the Mediterranean economy during Late Roman and Early Byzantine times and as such it is not surprising to see large-scale constructions such as basilicas placed at or near harbours which were the gateways of these trade networks.

Approximately 12km along the coast from Lechaion is the modern town of Kiato, the main town in the region of Sikyon today, and the main harbour of ancient Sikyon. At Kiato a similar very large, very elaborate Christian basilica was also constructed sometime around 500 AD (Orlandos 1954).[61] Similarly to the one at Lechaion, the Kiato basilica was monumental in size and was presumably the most important church in the area around Kiato.

If the major settlement of Sikyon was down on the coast, then the diminished size of the settlement on the plateau and the relative absence of obvious industry there may be accounted for in this way. If the main settlement of Late Roman Sikyon was indeed down on the coast then it seems most likely that the ceramics industry which produced the

[61] One of the column capitals from this building, which features carved animal heads is currently on display in the museum in Sikyon, and a parallel to this capital can be found in Ag. Demitrios in Thessaloniki and is of Constantinopolitan origin (observed by the author)

pottery in SSF at this time was also relocated down there. Indeed, if harbours were the economic lifeblood of the Late Roman and Early Byzantine economy, then it would be only logical that the ceramics industry would be located close to the market. It could even be the case that the potters of Late Roman Sikyon continued to use the established reliable clay sources during this time, hence the fabric remaining the same.

5.4- *Consumption Patterns on the Plateau Based on the Distribution of Functional Types in SSF*

Most of the vessels produced at Sikyon were likely for daily usage. Many of these products were both produced and consumed on the plateau for purposes likely related to cooking, eating, serving, cleaning and other general household tasks. The amphoras most probably served a more commercial purpose, and it is possible to elucidate something about the delineation of space on the Sikyon plateau across time based on the consumption patterns of the locally-produced vessel types. Probable domestic, commercial/industrial, and public areas can be recognized on the plateau.

Cooking Vessels (Table 5.7: a, b, c, d):

Hellenistic- Four areas of concentration:

1) Northwest area of the UP above the ancient theatre;
2) Central part of the NP, to the north of Gate 2;
3) Southeast area of the UP, near edge of the SP extending from the theatre to Gate 6.
4) In the south part of the SP, both in the ceramic production area, and in a higher concentration to its west and south.

Early Roman-

Four areas of concentration which are the same as the Hellenistic ones.

Middle Roman-

The vast majority of Middle Roman cooking vessels came from the NP, suggesting that activity that had been taking place in the SP may had reduced considerably in scale, and that the NP became the main area of domestic activity at Sikyon. Those Middle Roman cooking vessel sherds from the SP tended to appear around the edges of the agora, while those from the UP were identified along the eastern edge of this part of the Sikyon plateau

Early Byzantine-

By Early Byzantine times the domestic activity on the Sikyon plateau appears to have contracted further than it had during Middle Roman times, and pottery production had changed considerably in character. The vast majority of cooking vessels dating to this time came from the NP and the UP, especially in and around:

1) The northern part of the UP, to the east of Gate 6, (the same area in which the Early Byzantine kiln-waster was collected) .

2) From the north-central area of the NP, and around the edges of the agora, which is the findspot of the only Early Byzantine cooking vessels from the SP were found.

Transport Vessels (Table 5.8: a, b, c, d)

Hellenistic/Early Roman-

Examples of the Sikyonian A amphora were recorded all over the Sikyon plateau, although the highest concentrations came from the southern part of the SP in and around the production area.

Middle Roman-

Although less common than its predecessor, examples of the Sikyonian B amphora were found throughout the plateau.

1) A particularly high concentration of these was noted in the SP, around the production area.

2) A smaller concentration in the UP the area above the area of the 'Gymnasium of Klinias'

Early Byzantine- None Identified

Serving Vessels Table 5.9: a, b, c, d):

Hellenistic-

Few of these were found in the UP and the NP, while the majority of these were recovered from the southern part of the SP, in and around the production area.

Early Roman-

The majority were recorded in the northeast area of the NP in the area to the north and east of Gate 7 and north and west of Gate 2.

Middle Roman-

The vast majority of vessels in this functional class were recorded in the NP, although serving vessels were common finds across most of the Sikyon plateau. Interestingly, none were found in the southern part of the SP, in or around the ceramic production area. Two particular areas of concentration appear in:

1) In the east and north of the UP

2) In northern area of the SP

Early Byzantine-

These came from the SP in the area to the south of the agora and in the NP from the area to the north of the museum.

Utilitarian Vessels (Table 5.10: a, b, c, d):

Hellenistic- Five primary zones of concentration for this functional category have been identified:

1) In the southern part of the SP in and around the ceramic production site

2) In the northern part of the UP, above the ancient theatre

3) In the southwest part of the UP

4) In a small cluster in the center of the eastern edge of the plateau

5) Slightly to the north of Gate 2.

Early Roman- Two areas of particularly high concentrations were identified.

1) In the southwest part of the SP

2) In the adjoining southeast part of the UP.

*The kraters with triangular rim, with folded rim, and 'with high-folded rim types all have significant numbers throughout the NP but no specific concentrations.

Middle Roman-

Kraters of Middle Roman date have been found in all parts of the Sikyon plateau with the exception of the western part of the UP.

1) A slight concentration can be noted in the SP, especially in the southern area

2) A clearer concentration is evident in the eastern end of the UP, above the ancient theatre

3) The concentration of this type was identified in the north-central area of the NP

Early Byzantine- None Identified

Perfume Vessels (Table 5.11):

Hellenistic/Early Roman- The only certain form in this category appearing in Sikyonian fabric is the fusiform unguentarium. These appear on all three plateaus, and have fairly even distribution for the most part. The highest number of these appears in the NP, but a definite concentration is evident in the southern part of the SP in the ceramic production area.

Middle Roman- None Identified

Early Byzantine- None Identified

5.4.2- *Summary-*

The major public area on the plateau unsurprisingly appears to have been in and around the agora, the stadium and the theatre, all areas which were generally off-limits for survey due to permit restrictions.

Domestic areas are well represented on the survey. Based largely on the distribution of cooking and serving/pouring related vessels we see four areas of concentration in Hellenistic and Early Roman times:

1) Northwest area of the UP above the ancient theatre

2) Central east area of the NP, to the north of Gate 2

3) Southeast area of the UP, near the border with the SP extending from the theatre toward Gate 6, and finally

4) Southern area of the SP, both in the ceramic production area, and in a higher concentration to the west and south of the production area.

During Middle Roman times this settlement pattern appears to contract toward the NP and to a lesser extent toward the SP around the edges of the agora, and the UP along its eastern edge. As discussed above, the Late Roman material found in the survey appears to represent a nucleation of habitation around the agora area (Tzavella et al. forthcoming). During Early Byzantine times the domestic activity on the Sikyon plateau appears to have further contracted to the north part of the UP, to the east of Gate 6, and the north-central part of the NP (Table 5.12- Habitation phases).

Commercial activity and ceramic production was almost certainly taking place in the south part of the SP during Hellenistic, early and Middle Roman times. By Late Roman times this activity appears to have ceased, and during Early Byzantine times the only kiln-waster came from the north-central area of the NP. An interesting side-note to this relates to iron slags. Although presently undated, the majority of these industrial by-products were found in the northeast corner of the plateau in NP 19.01, 19.06 and 19.07, squares in which a slight majority of identified ceramics date to the 1^{st}-2^{nd} century BC (Table 5.13). These slags are strongly suggestive that metallurgical activity had taken place in this area at some stage in the history of the plateau, possibly during Early and Middle Roman times based on the associated ceramics. If these dates are correct, then a more nuanced picture of commercial Sikyon may yet be presented in the future through further investigations in this area.

5.4.3- *The Ceramic Production Area*

The main centre of the Sikyonian ceramics industry was focused in the SP, specifically in the squares SP 16.05-SP16.13. While this was surely not the only area of production, more kiln-wasters were identified here than in any other area. The majority of the shapes identified in this area were amphoras, followed by bowls/basins, and then stew pots.

Clearly this area has a strong connection with amphoras, which would fit with a commercial/industrial function. Both Sikyonian A and B types of amphoras are present in this area. In addition to the frequent occurrence of kiln-wasters and heat-damaged sherds in the southern part of the SP, that very fine clays sampled from below this area were among the best of all the sampled varieties appears to further support the supposition that this area was a centre of ceramic manufacture.

5.5 – *The Nature of Commerce at Hellenistic and Roman Sikyon*

The Sikyonian Silicate Fabric family and the ceramic industry on the plateau of Sikyon began sometime between the late 3rd century BC and the mid-2nd century BC. The jug with round or trefoil mouth, the krater with overhanging rim, and the bowl/basin with ring foot are all shapes which could date to as early 3rd century BC and as late as the 1st century BC based on parallels from other sites. At Sikyon these may also date as far back as the 3rd century BC to around the re-foundation of the city on the plateau, however, refining these date ranges will require excavation. Based on the current available survey ceramics, it seems more likely to place the beginning of this industry may have been around the 3rd century BC, with a significant expansion around the mid-2nd century BC.[62] This type is contemporary with the earliest appearances of the casserole with angled rim

[62] Lykoudi 2013

and straight wall, stew pot/casserole with flanged thickened rim, and the common krater with overhanging rim.

The expansion the ceramics industry at Sikyon during the mid-2nd century BC appears to have a logical explanation, most likely connected with the destruction of Corinth by the Roman general Mummius in 146 BC. Most probably this destruction led to a significant increase in Sikyon's economic role in the region, as its major economic competitor had been eliminated from the markets. In the years prior to the Roman destruction, Acrocorinth had been the main Macedonian garrison in the Peloponnese, while the fortified city of Sikyon and rest of the Achaian League sided with the Romans. The 17km of fertile farmlands, rivers and coastline between both cities became the front line of the battle between the Romans and the Macedonians in southern Greece and suffered terribly as a result (Livy 27.31.1). After the Romans sacked Corinth, Sikyon, presumably for their cooperation, was granted leases to the fertile Corinthian farmlands, as well as control of the games at Isthmia. It would appear as a result of these factors, coupled with the elimination of competition, that Sikyon may have experienced an economic boom.

Letters between Cicero and Atticus and Pliny's *Natural History* show that Sikyon had been experiencing serious financial difficulties in the middle of the 1st century BC and even went bankrupt and was forced to sell its famous civic art collection in 56 BC (Cic *Ad. Att*. 1.13.1; 2.13.2; 2.21.6; 89 Pliny *NH 35*.127; Griffin 1982: 89; Lolos 2012: 97), prior to the re-foundation of Corinth in 44 BC. It would appear that this civic bankruptcy had little to no impact on the ceramics industry within the walls of Sikyon. That the Sikyonian A amphora was still produced during this time indicates that whatever industry it serviced at Sikyon was also on-going during Early Roman times regardless of the civic financial troubles. In 44 BC Caesar began the refoundation of Corinth as a Roman colony, which was cut short by his assassination, but continued fully under Octavian. After its re-foundation Corinth once again became the dominant economic power in the region.

By the 2nd century AD, the beginning of the Middle Roman period, the fortunes of Sikyon seem to taken a turn for the worse. Pausanias writes of damage to the buildings in the city as a result of an earlier earthquake (Paus. 2.7.1). During Middle Roman times (2nd-4th AD) the new Sikyonian B amphora type was manufactured at Sikyon, which replaced the Sikyonian A, although whether this replacement occurred during the 1st or the 2nd century AD remains unclear, and once again systematic excavation may help clarify this issue. At any rate, by the 2nd century BC, if not earlier, whatever industry at Sikyon, or market abroad, which required the production of the Sikyonian A amphora appears to have ceased. The Sikyonian B amphoras have significantly smaller mouths than the A-type and therefore might well indicate a different intended function.

Historically, the two main crops in the region around Sikyon were vines and olives. Indeed those amphora shapes which are closely-related to the Sikyonian A such as the Dressel 20, and the Greco-Italian, the Lamboglia 2, Brindisi amphora, and the Corinthian A′ amphora have been connected with the transport of olive oil. It seems reasonable therefore to connect the Sikyonian A type with a similar function, oil primarily, but possibly also wine or other foodstuffs. Peacock and Williams state that the Dressel 25 amphora type was almost certainly used for oil.

A reference to the quality of Sikyonian wine exists, which seems to show that Sikyon had an established wine industry by third quarter of the 1st century AD when Pliny wrote (NH 14.74). It is not impossible therefore, that the Sikyonian A amphoras may have been used for transporting both oil and wine, and perhaps that the Middle Roman Sikyonian B amphora which first appears around the time of Pliny's writing may have been used for wine. The narrow neck and mouth of the Sikyonian B type might serve to support this supposition.

The high frequency of fusiform unguentaria recorded at Sikyon might shed further light on the nature of commerce at Sikyon during the Middle and Late Hellenistic and Early and Middle Roman periods. These fine perfume vessels are commonly found in funerary assemblages. At Sikyon, however, they were commonly recorded in squares which exhibited two types of assemblages:

1) In squares with jugs, stew pots and more rarely mould-made bowls and kantharoi.
2) In squares with Sikyonian A amphoras, basins/basins of the moulded rim variety, and later with the krater of high folded rim type, as well as with heat-damaged and wasted versions of these and cooking pots.

Assemblage 1 appears most commonly in the NP and the UP. As unguentaria are usually interpreted as perfume vessels or oil flasks, their appearance in association with jugs, stew pots, etc. is not unusual. This shape seems to form part of a Hellenistic-Early Roman domestic and/or dining assemblage at Sikyon.

Assemblage 2 was almost exclusively found in the SP, and was more surprising. It could simply be the association of unguentaria with amphoras, basins/basins, kraters and over-fired/wasted ceramics shows that these vessels were all produced together. If we consider the function of these vessels, however, then it might be possible to produce a more complex interpretation of the evidence. If the Sikyonian A amphoras were used predominantly for olive oil, and unguentaria are perfume flasks, then this type of assemblage might represent signs of a perfume industry at Sikyon.

Perfume industries existed in Athens, Corinth, Delos, Pompeii, Herculaneum, Mendes in Egypt, Naples, and Capua among other places (NH 13.4-5; Brun 2000; Rotroff 2008: 137-60). After the Roman conquest of Greece, Delos was eventually granted free port privileges from Rome and developed into a very important commercial hub with a very significant slave market and also became home to the largest perfume industry in the Aegean during Late Hellenistic times. Brun connects the rise of Delos as an important perfume production centre to the sack of Corinth (Brun 2000: 282). If this is the case, could Sikyon also have captured part of this market?

The perfume industry at Corinth appears to have begun as early as late Geometric times, and certainly by Archaic times the large scale production and widespread distribution of aryballoi used for this perfume attest to a very significant perfume industry in the city (Salmon 1984: 118; Shanks 1999). This industry appears to have continued until the time of the Roman sack and during Hellenistic times Corinthian blister-ware aryballoi became the favoured vessels for containing perfume (Brun 2000: 281; Edwards 1975:144).

Through a combination of written accounts and archaeological evidence from Delos it is possible to roughly reconstruct the production process of ancient perfumes. Ancient perfumes were made from two components: liquid, most commonly oil, and scent. Oils were called *stymmata* (thickeners) and scents *hedysmata* (sweeteners) (Humphrey et al. 1997: 388-9). To the combination of these, colour was often added, as was salt or resin to help with preservation (Pliny *NH* 13.7). Some of the most common scents used were sweet-wine, bitter almonds, aspalathos, cardamom, lily, rose, ginger-grass, sweet-flag, myrrh and frankincense (Pliny *NH* 13.8; Theophrastus *Od* 21-2, 5). The most plentiful source for oil used in perfumes came from olives, and the best olives for use in perfumes were slightly under-ripe white or secondarily green ones (Pliny *NH* 12.130). References to other rarer oils such as saffron oil from Soli in Cilicia also exist (Pliny *NH* 13.4-5; Humphrey et al. 1997: 388-9).

In some cases it seems that oil could be infused with scent while cold, but the best perfumes were made from heating the ingredients in basins which would have stood in water. It was of paramount importance that none of the ingredients came into contact with direct heat otherwise the perfume could have been ruined (Theophrastus *Od.* 21-2). Heat appears to have been highly detrimental to perfumes in ancient times, and Theophrastus recommends that perfumers seek as their store shaded upper floor rooms not facing the sun (Theophrastus *Od.* 40). This is particularly interesting as his advice on storage appears to be reflected in the evidence of perfume production and storage at Pylos nearly 1000 years before Theophrastus wrote (Shelmerdine 1985).

Oil would have been extracted through pressing, possibly in a wedge press, as seen on wall paintings from Pompeii (Brun 2000: 299). The oil would then have flowed out from the press onto a rectangular block with a circular channel around its edges and a spout on its end and into a basin. The oil and the basin it was in were then placed in a larger vessel (perhaps a cauldron) filled with water and heated over a fire or over a series of small furnaces. The scent would then be added to the oil and it would be heated slowly and stirred constantly until the essential oils of the scent were completely infused with the oil. At this stage another finishing scent could be added to the mix, and it was this scent that Pliny tells us would become the dominant one. After the scent and the oil had been completely infused, salt or resin could be added to a perfume to help contain the aroma. Excavations at Delos provide examples of this production process which would be roughly contemporary with the possible industry at Sikyon (Brun 2000: 283-9) (Fig 5.9). From these we see fairly small scale production within Late Hellenistic period houses. The finds associated with this industry at Delos included a press or several presses, rectangular stone counterweights, basins, and storage jars. In one case a series of small built furnaces, a long rectangular stone structure with four small firing chambers and four circular vents at the top upon which the basins or cauldrons presumably sat, was identified (Brun 2000: 183-9). Indeed through the material remains at Delos we appear to be able to approximately retrace the perfume production process described by both Theophrastus and Pliny.

At Sikyon, however, the remains consist of surface finds as opposed to excavated remains and it is only possible to hypothesize about the presence of a perfume industry at the site. The slightly odd but common association of unguentaria in the SP with amphoras, basins and later kraters may represent such an industry. The amphoras could have been used for storage and/or transportation of oil, while the Hellenistic basins/basins and the Roman kraters could be good candidates for collecting the oil and mixing it with the scents over heat. While no evidence for presses or weights associated with perfume production, was found, the fairly frequent presence of heat-damaged cooking and utilitarian vessels in the same areas that unguentaria are found may be further evidence that these were being heated in close proximity.

The rise of an oil industry at Sikyon could help explain the widespread appearance of the Sikyonian A amphora type, and indeed may have resulted in an influx of wealth in to the city which could have spurred on the rest of the ceramics industry at the site. A perfume industry could explain the rise of Sikyon as well as its apparent economic problems during the 1st century BC, as Delos would have then become the major perfume producer in the Aegean. The emergence of the Sikyon ceramics industry does seem connected to the decline of Corinth as an economic power in the region, and it is tempting to connect the birth of the Sikyonian industry with this event, even possibly with the arrival of Corinthian potters seeking refuge. That the ceramic production area of Sikyon is located inside the walled city is perhaps noteworthy too. This may suggest that the industry, or aspects of it had begun prior to the sack of Corinth in 146 BC when the hinterland of both states would have been a battlefield. Locating an industry within city walls therefore, may have been a precautionary measure hearkening back to that turbulent period in the oft-connected histories of Sikyon and Corinth.

Conclusions:
The Ceramics Industry at Sikyon during Hellenistic, Roman and Byzantine Times

C.1- *Overview of the Sikyonian Ceramic Repertoire*

At present we have a reasonably clear, general picture of ceramics production at Sikyon and can state that from approximately the mid-2nd century BC until ca. the 4th century AD the city was home to a ceramics industry. This appears to have specialized in the production of coarse pottery such as cooking vessels, kraters, basins, jugs and transport amphoras, and, to a lesser extent, lamps, mortaria and unguentaria.

During Early and Middle Hellenistic times shapes such as mortaria, bowls, fish plates, and casseroles - among others - all appear at Sikyon in a sandy buff fabric with small matte orange-red, occasional glassy and occasional white inclusions. Macroscopically this fabric appears very similar to a contemporary fabric being used at Corinth to produce similar shapes and it is quite likely that these are in fact Corinthian imports.

The earliest possible shape to appear in the local Sikyonian SSF is the bowl/basin with ring foot which may have been produced as early as the end of the 3rd century BC, the Sikyonian A amphora also likely has its origin around this date.[63] Mortaria which appear in both the Corinthian-looking buff fabric and in SSF may serve to illustrate the emergence of the Sikyonian ceramics industry. Mortaria of Edwards' types I and II were found on the plateau. The earlier type I has been dated from the end of the 5th century BC until ca. 275 BC and appears only in the buff, possibly Corinthian fabric (Edwards 1975: 109-10). The later version or mortarium, the type II which Edwards dates to ca. 175-146 BC appears in both the buff fabric and in SSF, suggesting that Sikyonian potters were starting to make shapes themselves which they once needed to import. If we approximately follow Edwards' dates we can hypothesize that the emergence of the ceramics industry on the plateau began sometime round the 2nd quarter of the 2nd century BC (Edwards 1975: 111; P. Stone Pers. Comm. June 2011).

[63] Lykoudi 2013

The repertoire of shapes produced at Sikyon seems to have remained fairly consistent during the transition between the Late Hellenistic and Early Roman periods, although the range of shapes did expand slightly in the latter. Around the beginning of the Middle Roman period, ca. 2nd century AD, we see a marked shift in the ceramics industry at the site. While the general focus appears to remain the same, new vessel forms come in at this time, perhaps most notably a new amphora form (the Sikyonian B), which is suggestive of a possible shift in focus of the export economy of Sikyon. During Late Roman times ceramic production on the Sikyon plateau appears to have ceased, while during the Early Byzantine period a slight revival seems evident albeit much reduced in scale, with a focus on cooking vessels and jugs.

The major shapes produced at Sikyon by period are as follows:

Hellenistic Period -Late 4th century BC- mid 2nd century BC

*Early Hellenistic** - Late 4th -3rd century BC

- Bowl/Basin with ring foot	-Bowl/Krater with overhanging rim
- Fusiform unguentarium	-Mortarium- Edwards' type II
- Sikyonian A amphora	

Middle Hellenistic - 1st half of the 2nd century BC

- Bowl/Basin with ring foot	-Bowl/Krater with overhanging rim
- Casseroles with short, squared off rim	-Fusiform unguentarium
- Jug with round or trefoil mouth	- Krater with overhanging rim
- Mortarium- Edwards' type II	- Sikyonian A amphora

Late Hellenistic - 2nd half of the 2nd century BC- mid 1st century BC

- Bowl/Basin with ring foot	- Bowl/Krater with overhanging rim
- Casserole with angled rim and straight wall	-Casseroles with short, squared off rims
- Stew pot/Casserole with flanged thickened rim	- Stew pot with flanged, thickened rim
-Fusiform unguentarium	- Jug with round or trefoil mouth
- Krater with overhanging rim	- Sikyonian A amphora
- Mortarium- Edwards' type II	

Roman Period -1st century BC – 5th century AD

Early Roman- 1st century BC- 2nd century AD

- Bowl/Basin with ring foot	- Bowl/Krater with overhanging rim
- Casserole with angled rim and straight wall	- Casseroles with short, squared off rim
- Casserole with strongly everted rim	- Flanged stew pot with a thickened rim
-Stew pot /Casserole with flanged thickened rim	- Fusiform unguentarium
- Globular stew pot type with a high, vertical rim, slightly thickened at the top	
- Globular stew pot with an everted rim and a deep groove for receiving the lid	
- Krater with overhanging rim	- Krater with folded rim
- Krater with a high-folded rim	- Krater with triangular rim
-Lamp- Broneer XVII type	- Jug with flat horizontal rim
- Jug with ridged base	- Sikyonian A Amphora
- Stew pot with everted rim and broadened lip	

Middle Roman - 2nd century AD-4th century AD

- Globular stew pot with an everted rim and a deep groove for receiving the lid	
- Globular stew pot type with a high, vertical rim, slightly thickened at the top	
- Krater with deep body and a high flaring rim with a downturned lip	
- Krater with folded rim	- Krater with a high-folded rim
- Krater with overhanging rim	- Jug with ridged base
- Round-mouth jug, typically with a ridged base	
-Sikyonian A Amphora*	- Sikyonian B Amphora
- Stew pot with flat, horizontal or oblique rim	

Late Roman - 4th century AD -5th century AD

No confirmed production on Sikyon plateau during this time.

Early Byzantine Period 6th century AD- 7th century AD

- Jug with a half-round or flattened rim and sturdy handles, D-shaped in section
- Stew pot with semi-cylindrical rim
- Stew pot with short (plain rounded) almost vertical rim

(*- possible production at this time)

C.2- *Assessment of the Collection Strategy and Ceramic Fabric Analysis Methodology*

The collection strategy employed on the Sikyon Survey Project was hyper-intensive in comparison to most other surveys. As a result the amount of material collected at Sikyon is significantly larger than that generally gathered. With a big dataset came the responsibility, time, and expense associated with cleaning, studying and storing it all, the latter point being cited as an argument against such intensive collection (Tartaron et al. 2006: 476). The unique circumstances of a largely undisturbed ancient city, within a region with the rich typological comparanda available in the Corinthia, were the two major factors in the decision to employ such an intensive collection strategy.

While the Sikyon Survey Project was most certainly methodologically influenced by other surveys, it is perhaps best to evaluate it based on the results produced. The overall data resolution at Sikyon was extremely high for a survey. There are two reasons for this; firstly the hyper-intensive collection strategy and breadth of material gathered as a result provided a lot of data from which to draw interpretations. The most important reason, however, was simply the proximity of Sikyon to Corinth and the enormous amount of excavated datable shape parallels. Surveys near well-excavated and studied sites are more likely to produce higher data resolution than those which explore less well-studied regions. The amount of ceramics collected at Sikyon served us well. Through the integrated programme of typological analysis and ceramic fabric analysis we were able to extract useful information from approximately 12% of our ceramics that were typologically diagnostic, and we were able to get accurate proportions of what was local and what was imported. Due to the grid system used and the sheer amount of material gathered it was possible to present highly accurate maps of ceramic type distributions, as well as to trace the diachronic development of the use of space on the plateau. Had less material been systematically collected then these results would not have been as accurate. Conversely, had more material been collected, such as if Total Collection squares were to have occurred, say every second square, as opposed to every fifth, we would surely have gained higher data resolution again, but would certainly still be cleaning and analyzing ceramics at the time of writing.

The incorporation of thin section petrography into the ceramic analysis strategy enabled the classification and characterization of the fabrics on the plateau as well as the analysis of clays, which helped us identify potentially viable sources of ancient potting clay. Indeed, as well as the waster concentrations, the results of an intense programme of geophysical prospection in the area further helped us determine the probable locations of a kiln or kilns. The typological, macroscopic and microscopic fabric analyses all worked well together, however, in hindsight the resolution of the latter could have been improved through more careful sampling. With the main ceramic types established at Sikyon it would have been methodologically sounder to have sampled from these typologically diagnostic examples, as it only would have been possible both to understand their composition, and to study their evolution over time in more detail through a broader sample (see arguments in Kiriatzi 2003). The homogeneity of the ceramic fabric family at Sikyon was such that this did not turn out to be necessary, but a survey with more varied ceramic fabrics would certainly benefit from such an approach.

The homogeneous fabric family at Sikyon was both an interpretative blessing and a curse. On the one hand it presented a picture of a localized and prolific ceramics industry. On the other, however, concepts such as fabric suites, used effectively in other survey projects to help attach approximate chronologies to otherwise non-diagnostic sherds, were not possible in any meaningful way (Moody et al. 2003: 53-4).

One area in which ceramic fabric analysis and typological analysis complemented each other particularly well was imported amphoras. In many cases fragments of this vessel class were only partially typologically diagnostic, but when combined with studies of the fabric a more complete picture emerged. The previously cited example of a double-barrelled handle being found in an orange-pink fabric with dark green volcanic glass will serve us well again here. The double-barrelled, or bifid, handles could be indicative of several different amphora types, as could the fabric. When both of these traits were combined, however, it became obvious that we had a Dressel 2-4 of Campanian origin, likely dating to Early Roman times, that was possibly initially used in the transportation of dried fruit (Peacock and Williams 1986: 87-8).

In all, the collection strategy employed on the Sikyon Survey Project yielded excellent results and very high data resolution. The method of ceramic fabric analysis integrated well with the collection strategy and with the typological analysis.

C.3 *Historical Overview*

It can be stated safely that the Sikyonian economy benefited from the Roman sack of Corinth in 146 BC. We know that the Sikyonians sided with the Romans early in their war against the Macedonians garrisoned at Corinth (Livy 32.19.5; 39.3-4, 40.18-19; Polyb.18 16.14; *IG* 4.426 (*poss*); Griffin 1982: 86). We also know that the plain between Corinth and Sikyon was left ravaged after years of battle as it was the front line in the fight between the Romans and the Macedonians. After their victory, the Romans granted Sikyon control of the Isthmian Games as well as leases to fertile Corinthian lands as a reward/compensation for their cooperation (*Cic. Leg. Agr.* 1.5; Hill 1946: 88; Lolos 2011: 77). In this context it is worth noting the location of the ceramic production area on the Sikyon plateau, within the walls of the city, four kilometres from the coast/harbour. This kiln location may be connected to the Roman-Macedonian war. Locating kilns inside a fortified city, as opposed to near the harbour which would have allowed for easier access to export markets, may have been done if security in the area was a concern. If this was the case then the earliest stages of the ceramics industry on the plateau may well have overlapped with the final years of Roman-Macedonian fighting, and may indicate that the origins of this industry precede the mid 2nd century BC. Certainly the fact that the ceramics industry at Sikyon flourished around the middle of the 2nd century BC shows an inverse relationship with the economic decline of Corinth at that time.

In addition to the cooking, serving and utility vessels produced and consumed within the city of Sikyon during the 2nd century BC, the large scale emergence of the Sikyonian A amphora is suggestive of an additional industry. As suggested by Grace, Koehler, Finkielsztejn, Palazzo and Van der Werff, the shape of this amphora type appears to have been influenced by Hellenistic Corinthian amphoras, which, based on fabric similarities with blister-ware vessels used primarily for oil, was probably also an oil amphora (Whitbread 1995: 256-7). Although the types may not be directly related, Peacock and Williams' connection of the Dressel 25 (of which the Sikyonian A is a sub-form) to the Dressel 20 is also noteworthy as both types share many morphological traits. The Dressel 20 was the most common oil amphora in the Early Roman Empire, so it would not be unreasonable to connect a similar function to the Dressel 25/Sikyonian A types (Ejstrud 2005: 172, 175). If we take these two pieces of evidence, and combine them with the sheer numbers of amphoras produced at the site, it seems wholly probable that Sikyon was the home to an oil industry that may have sprung up roughly around the time of the Roman sack of Corinth. It appears that by the end of the 2nd century BC Sikyonian amphoras were going as far as Thessaloniki as well as Caesarea Maritima and Maresha in Israel. This is particularly interesting as the imported ceramics at Sikyon appear to reflect a more westward-looking economy. Furthermore, the frequent appearance of basins, kraters and unguentaria in the industrial/commercial sector of Sikyon (the south part of the SP) could well show that some of this oil was being used to make perfume, a market previously dominated by Corinth (Brun 2000: 282).

While the rise of the Sikyonian ceramics industry appears to be related to the reduction or elimination of Corinth as a commercial power in the region, other historical connections are not always so forthcoming. The most obvious and important example of the material remains of Sikyon not supporting the commonly held historical narrative regards the Romanization of Sikyon. The traditional date for the Romans gaining control of the northeast Peloponnese is 146 BC, and indeed around this time a definite change is reflected in the material culture of Sikyon. The problem is that the date of 146 BC is certainly not relevant to the *Romanization* of Sikyon, for we know that the Romans were involved with the city and the Achaian League certainly from as early as 198 BC and more closely involved by 168/7 BC when Aemilius Paulus toured the site and commented on its fortifications (Livy 44 6.3, 8.8; Polyb. 30.10.4). In 156 BC Sikyon played the role of Roman arbitrator in a dispute between Athens and Oropos, surely a trusted position to occupy (Paus. 7.4-5; Griffin 1982: 87). Certainly, by the early half of the 2nd century BC Sikyon was in close political contact with Rome, a political alliance which is apparently not reflected in the ceramic record at this stage. A similar lack of evidence for Romanization in the ceramic record during the 1st century BC has been observed by Rotroff in Athens (Rotroff 1997b: 97-113). In contrast to these, Moore observed evidence of Romanization through pronounced changes in cooking vessels at Nikopolis in Epirus, during the Early Roman period (2001).

Another interesting case of socio-political circumstances apparently not being reflected in the material record relates to the civic bankruptcy of Sikyon, and the subsequent sale of its public art gallery in 56 BC (Cic. *Ad. Att.* 1.13.1; 2.13.2; 2.21.6; Pliny *NH* 35.127; Griffin 1982: 89). Insofar as we can tell from the survey ceramics, the Late Hellenistic and Early Roman periods appear to represent the peak of ceramic production on the Sikyon plateau. The civic bankruptcy, therefore, would not appear to have had any impact on production, suggesting that public finances and at least some commercial activity in Sikyon at this time were not necessarily closely connected.

In 44 BC Caesar refounded Corinth as a *colonia*, making it the capital of the province of Achaia. The re-emergence of Corinth does not appear to have had much initial impact on the Sikyonian economy, at least as regards the ceramics industry. The continued production of the Sikyonian A amphora during this time is an indicator that Sikyon continued to produce and export the same type of goods that were produced during the previous century at the city. This production appears to have continued in much the same manner until the 1st or possibly 2nd century AD.

One event which may have had a serious impact upon Sikyon was the 2nd century AD earthquake mentioned by Pausanias. During his visit to the site in the mid-2nd century AD, he mentions that the city had suffered as a result of an earthquake and that it was weak when he visited it (Paus. 2.7.1). It was also around this time, the Middle Roman period, that we see the production change from the large and very common Sikyonian A to the smaller less common Sikyonian B amphora. The difference in the sizes, shapes and numbers of these local amphora types suggests that during Middle Roman times the industry of Sikyon changed focus, possibly from oil to wine (Pliny *NH*

14.74), although presumably a range of industries would have existed during both times. The scale of the new production appears to be much reduced from the earlier one. While we see new ceramic shapes emerge at this time, the main industry at the site declined, or changed significantly in character. While we cannot say that the earthquake was certainly the reason for this it must have impacted upon the city. The weakened Sikyon seen by Pausanias and the presence of damaged buildings that he mentions suggests that, by the 2nd century AD, the city was in a slow economic decline, likely also impacted by the resurgence of Corinth. Stew pots followed by kraters, jugs, and amphoras compose the ceramic assemblage from Middle Roman times. Lamps and unguentaria do not seem to be produced at this stage, and amphoras are reduced in number.

Sometime toward the end of Middle Roman or at the beginning of Late Roman times ceramic production at Sikyon appears to have stopped altogether and activity in the former commercial area, the south part of the SP, appears to be much reduced. The settlement nucleated around the agora area and extended toward the north of the NP. Early Byzantine activity at the site appears to represent a continuation of this trend, although the production of some cooking vessels and jugs apparently resumes on a very small scale until the settlement was abandoned sometime during or just after the 7th century AD.

C.4- Future Directions

This investigation was a study of the ceramics industry at Sikyon through data collected during the course of the Sikyon Survey Project. The steps were to establish that Sikyon indeed had its own ceramics industry, to characterize what the ceramics at the site looked like, to outline the main types and character of the industry, and then to explore some outlying issues.

As mentioned in the Introduction, if excavation is a tool designed to examine a small area in extreme detail, much like a microscope, then survey can present a general picture of a landscape within its context, like a telescope. This thesis has presented the telescopic picture of the ceramics industry at Sikyon. We know generally what was produced, when it was produced and how these products were consumed within the walls of the city of Sikyon. Further research building upon the conclusions reached here can follow in four main directions:

1) Targeted systematic excavation could be undertaken to refine the chronologies and typologies presented here, but also to explore some of the ideas of production and consumption presented in this thesis. Perhaps most useful would be to excavate the production area on the SP to see if we could gain a clearer picture of what was happening at Sikyon over time, to refine our interpretations of the area and to help clarify the range of vessels produced there. Residue analysis on the amphoras and possibly on unguentaria may also yield results relevant for our interpretations of the industries related to the function of these vessels.

2) Systematic ceramic fabric analysis should be undertaken on the pre-2nd century BC ceramics from Sikyon. It would be extremely informative to know if these represent Corinthian imports or whether a local ceramics industry was producing vessels in the broader area prior to the industry which developed on the plateau.

3) Similar survey work and ceramic fabric analysis should be conducted along the coast of the Corinthian Gulf to the west of Sikyon to build upon the emerging economic picture from both Corinth and Sikyon. Are similar production and consumption patterns visible further from Corinth? Was Sikyon the only polis to benefit economically from the Roman sack of Corinth? Can we see similar settlement movements in contemporary settlements during Hellenistic and Late Roman times? Do ceramics industries exist in other poleis in the region, or did the industry at Sikyon spring up and decline in reaction to the decline and rise of Corinth?[64]

4) Finally, further study of the tiles, pipes, pithoi and architectural fragments should be undertaken. The present study, Whitbread's work at Corinth and especially Koskinas'

[64] To this end the author is beginning the study of the Late Hellenistic and Early Roman ceramics from Aigeira, the next poils to the west of Sikyon. In addition to this the author is also involved in the investigation and publication of contemporary ceramics from the Livatho Valley Project on Kephalonia, at the mouth of the Corinthian Gulf.

results in Lolos' extensive survey of the Sikyonia present a complex picture of this industry in the area. Typological classification of this type of material in excavated contexts at Sikyon should be undertaken as well as a more intensive archaeological and geological survey of the area around Bouzika as a possible site of Late Roman tile production. For a long time coarseware represented a lock to be opened for archaeological survey. It made up the majority of ceramic material, but no one was able to do much with it until Moody began to interpret composition, which presented a range of interpretative possibilities of this material. Similarly architectural terracottas are incredibly common in survey areas, but our ability to incorporate them into historical interpretations of sites remains somewhat elusive.

Final Thoughts-

The questions and issues addressed in this thesis are very much the product of modern survey methodologies, current knowledge of ceramic types in the region, and the ever-evolving role that ceramic fabric analysis plays in such datasets. Developments arising from the near-obsessive quest for better questions and methodologies by practitioners of survey archaeology have enabled the author to uncover of a set of historical data from Sikyon that would otherwise have been lost. Had coarse ceramics from the survey not been recorded and studied, had clays not been sampled, and had the collection strategy of the Sikyon Survey Project not been so systematic and intensive, then surely little or nothing of this entire industry would be known today. Moreover, without the integration of microscopic analysis, the Late Roman corpus of ceramics from Sikyon might all have been considered imports. It is the most sincere hope of the author that the benefits of the approaches highlighted in this thesis and the otherwise lost historical narratives which have been accessed as a result, can play some small part in the continuing development of survey archaeology to help make it more than just dots on maps.

Ceramics, Clays, and the Technological Landscape of Urban Sikyon

(2nd century BC - 7th century AD):

Some Results from the Sikyon Survey Project

Bibliography

*All abbreviations follow American Journal of Archaeology conventions

Abadie-Reynal, C. 2007. *La céramique romaine d'Argos: fin du IIe siècle avant J.-C. - fin du IVe siècle après J.-C.*, Athens

Abscal, M., G. Harbottle, and E. Sayre. 1974. 'Correlation between terracotta figurines and pottery from the Valley of Mexico and source clays by activation analysis,' In *Beck, C.* (ed.) *Archaeological Chemistry Advances in Chemistry 138*, ed. C. Beck: 81-99.

Alcock, S. 1989 'Roman Imperialism in the Greek Landscape,' *JRA* 2: 5-34.

Alcock, S. 1991. 'Urban Survey and the Polis of Phlius,' *Hesperia* 60: 421-63.

Alcock, S. 1993. *Graecia Capta: The Landscapes of Roman Greece,* Cambridge.

Alcock, S. 1995. 'Pausanias and the *Polis*: Use and Abuse,' in *Sources for the Ancient Greek City-State* (Symposium August 24-27, 1994), ed. M. Hansen, Copenhagen: 326-44.

Alcock, S. and J. Cherry. 2004. *Side-by-Side Survey: Comparative Regional Studies In The Mediterranean World*, Oxford.

Ames, R. and D. Hall. 2003. *Dao De Jing: A Philosophical Translation*, New York.

Anderson-Stojanovic, V. 1987. 'The Chronology and Function of Ceramic Unguentaria,' *AJA* 91: 105-22.

Anderson-Stojanovic, V. 1996. 'The University of Chicago Excavations at the Rachi Settlement at Isthmia, 1989,' *Hesperia* 65: 57-98.

Anderson-Stojanovic, V. and D. Reese. 1993. 'A Well in the Rachi Settlement at Isthmia,' *Hesperia* 62: 257-302.

Andrews, A. 1956. *The Greek Tyrants*, London.

Arthur, P. 1989. 'Some Observations on the Economy of Bruttium Under the Later Roman Empire,' *JRA:* 133-42.

Avramea, A. 1997. *Le Péloponnèse du IVe au VIIIe siècle: changements et persistances*, Paris.

Bald Romano, I. 1994. 'A Hellenistic Deposit from Corinth: Evidence for the Interim Period Activity (146-44BC)," *Hesperia* 63: 57-104

Beltran Lloris, M. 1970. *Las ánforas romanas en España,* Zaragoza

Bennet, J., J. Davis and F. Zarinebaf-Shahr. 2000. 'Pylos Regional Archaeological Project, Part III: Sir William Gell's Itinerary in the Pylia and Regional Landscapes in the Morea in the Second Ottoman Period,' *Hesperia* 69: 343-80.

Berlin, A and K. Slane. 1997. 'Tel Anafa II, i. The Hellenistic and Roman Pottery,' in *Tel Anafa II, Journal of Roman Archaeology Supplementary Series* no. 10.2, ed. S. Herbert.

Bertin, E. 2006. *Principles and Practice of X-ray Spectrometric Analysis*, New York.

Bezeczky, T. 2002. 'Brindisian olive oil and wine in Ephesus', in *Vivre, produire et échanger: reflets Méditerranéens, Mélanges offerts à Bernard Liou, Archéologie et histoire romaine:* 355-358. Montagnac.

Bintliff, J. ed. 1991. *The Annales School and Archaeology*, Leicester

Bintliff, J. *nd.* Unpublished Lecture. 'Regional field survey in Greece – a short history and a review of its strengths and weaknesses for writing history.' Danish Institute at Athens- January 25th 2007.

Bintliff, J., A. Snodgrass. 1985. 'The Cambridge/Bradford Boeotian Expedition: The First Four Years,' *JFA* 12: 123-61.

Bintliff, J.and A.Snodgrass (1988) "Mediterranean survey and the city". *Antiquity 62*: 57-71.

Bintliff J, and E. Farinetti. 2000. 'The Tanagra Survey- Report on the 2000 Season,' *Pharos:* 93-127.

Bintliff, J. and K. Sbonias. 2000. 'Demographic and ceramic analysis in regional survey,' in *Extracting Meaning from Ploughsoil Assemblages*, eds. R. Francovich, H. Patterson and G. Barker, Oxford: 244-58.

Bintliff, J. and N. Evelpidou . 2001. 'The Leiden Ancient Cities of Boeotia Project : Preliminary Report on the 2001 season,' *Pharos*: 33-74.

Bintliff, J, P. Howard and A. Snodgrass. 2007. *Testing the Hinterland; the Work of the Boeotia Survey (1989-1991) in the Southern Approaches to the City Thespiai*, Cambridge.

Blakely, J. 1988. 'Ceramics and Commerce: Amphorae from Caesarea Maritima,' *BASOR:* 31-50.

Blegen, C. 1920. 'Corinth in Prehistoric Times,' *AJA* 24: 8-13.

Blegen, C. 1925. 'Excavations at Phlius 1924,' *Art and Archaeology XX:* 23-33

Blitzer, H. 1990. 'Koroneïka: Storage-jar Production and Trade in the Traditional Aegean,' *Hesperia* 59: 675-711

Bobrik, K. 1839. *De Sicyoniae Topographia,* Königsberg.

Braidwood, R. and L. Braidwood. 1960. *Excavations in the Plain of Antioch I: The Earlier Assemblages. Phases A-J*, Chicago.

Braudel, F. (S. Reynolds *trans.*) 1996. *The Mediterranean and the Mediterranean World in the Age of Philip II*, Berkeley.

Broneer, O. 1927. 'A Late Type of Wheel-made Lamps from Corinth,' *AJA 31*: 329-37

Broneer, O. 1930. *Corinth IV.2. Terracotta Lamps*, Princeton.

Broodbank, C. 1999. 'Kythera survey: preliminary report on the 1998 season,' *BSA* 94: 191-214.

Broodbank, C. and E. Kiriatzi. 2003. *The Kythera Island Project Webpages*, http://www.ucl.ac.uk/kip/

Broodbank, C and E. Kiriatzi. 2007. 'The First 'Minoans' of Kythera Revisited: Technology, Demography, and Landscape in the Prepalatial Aegean,'*AJA* 111: 241-274.

Brownson, C. L. and C. H. Young. 1893. 'Further Excavations at the Theatre of Sicyon in 1891,' *AJA* 8: 397-409.

Brun, J-P. 2000. 'The Production of Perfumes in Antiquity: the cases of *Delos* and Paestum,' *AJA* 104: 277-308.

Butterworth, B. 1956. 'Lime blowing: some notes on literature,' *Transactions of the British Ceramic Society*: 532-44

Callaghan, P.J. 1978. Review. *"American School Excavations, Vol. vii, Part iii. Corinthian Hellenistic Pottery by Corinth; G. R. Edwards" The Journal of Hellenic Studies*, Vol. 98, (1978): 212-213

Callender, M.H. 1965. *Roman Amphorae*, Oxford.

Camp, J. 2003. 'Excavations at the Athenian Agora: 1998-2001,' *Hesperia 72:* 241-80

Carandini, A. and C. Panella. 1981. 'The trading connections of Rome and Central Italy in the late second and third centuries: the evidence of the terme del Nuotatore excavations, Ostia,' *The Roman west in the Third century. BAR* 109: 487-503

Cardew, M. 1969. *Pioneer Pottery*, Longman

Cavaignac, E. 1919. 'Apropos d'un document nouveau sur les Orthagorides,' *RÉG xxxii:* 64.

Cavanagh, W., J. Crouwel, R. Catling and G. Shipley. 1996. *Continuity and Change in a Greek Rural Landscape: The Laconia survey* 2: *Archaeological Data*, London.

Cavanagh, W., J. Crouwel, R. Catling and G. Shipley. 2002. *Continuity and Change in a Greek Rural Landscape: The Laconia survey* 1: *Methodology and Interpretation,* London.

Chandler, G. 2001. 'Development of a Field Petrographic Analysis System and its Application to the Study of Socioeconomic Interaction Networks of the Early Harappan, Northwestern Indus Valley of Pakistan,' Oxford

Cherry, J., J. Davis, and E. Mantzourani. 1991. *Landscape Archaeology as Long-Term History: Northern Keos in the Cycladic Islands from Earliest Settlement until Modern Times*, Los Angeles.

Christakis, K. 2005. *Cretan Bronze Age Pithoi: Tradition and Trends in the Production and Consumption of Storage Containers in Bronze Age Crete*, Philadelphia.

Coe, M. and R. Diehl. 1980. *In the Land of the Olmec,* Austin

Cohen, G. (1995) *The Hellenistic Settlements in Europe, the Islands, and Asia Minor.* University of California Press.

Davis, J. 1991. *Landscape Archaeology as Long-Term History: Northern Keos in the Cycladic Islands*, Los Angeles.

Davis, J., S. Alcock, J. Bennet, Y. G. Lolos, and C. Shelmerdine. 1997.' The Pylos Regional Archaeological Project,' *Hesperia* 66: 391-494.

Davis, J., S. Alcock, J. Bennet, Y. Lolos, C. Shelmerdine and E. Zangger. 1996-2010. *The Pylos Regional Archaeological Project- Internet Edition*, http://classics.uc.edu/prap/

Dawkins, R. and J. Droop. 1911. 'Excavations at Phylakopi in Melos, *1911,'BSA 17*: 19.

Day, P., E. Kiriatzi, A. Tsolakidou, and V. Kilikoglou. 1999. 'Group Therapy in Crete: A Comparision between Analyses by NAA and Thin Section Petrography of Early Minoan Pottery,' *JAS26:* 1025-36.

Day, P. and V. Kilikoglou. 2001. 'Analysis of Ceramics from the Kiln,' in *A LM IA Ceramic Kiln in South-Central Crete: Function and Pottery Production*, ed. J. Shaw. *Hesperia Supplement 30*: 11-133.

de Polignac, F. 1995. *Cults, Territory, and the Origins of the Greek State,* Chicago.

de Soete, D., R. Gijbels, and J. Hoste. 1972. *Neutron Activation Analysis*, New York.

Di Peso, C. 1974. *Casas Grandes: A Fallen Trading Centre of the Gran Chichimeca*, Flagstaff.

Dodwell, E. 1819. *A Classical and Topographical Tour through Greece, Volume 2*, London.

Doménech-Carbó, A., M. Doménech-Carbó and V. Costa. 2009. *Electrochemical Methods in Archaeometry, Conservation and Restoration*. Berlin.

Dörpfeld, W. 1883. 'Das Schatzhaus der Sikyonier,' *AM* 8: 67-70.

Dörpfeld, W. 1892. 'Schatzhaus von Sikyon,' in *Die Baudenkmäler von Olympia*, ed. F. Adler, R. Borrmann, W. Dörpfeld, F. Graeber and P. Graef, Berlin: 40-4.

Droutsos, T. and D. Piper. 1990. 'Listric faulting, sedimentation, and morphological evolution of the Quaternary eastern Corinth rift, Greece: first stages of continental rifting,' *Geological Society of America Bulletin* 102: 812-829.

Dunbabin, T. 1962. *Perachora II. The Sanctuaries of Hera Akraia and Limenia: the pottery, ivories, scarabs and other objects from the votive deposit of Hera Limenia*, Oxford.

Earle, M. 1889. 'Excavations at the Theater of Sikyon: Supplementary Report of the Excavations,' *AJA* 5: 286-292.

Earle, M. 1891. 'Supplementary Excavations at the Theatre of Sikyon, in 1891,' *AJA* 7: 281-282.

Earle, M. 1892. 'New Sicyonian Inscriptions,' *CR* 6: 132-135.

Earle, M. 1893. 'Excavations in the Theatre at Sicyon in 1891,' *AJA* 8: 388-96.

Edwards, G. 1975. *Corinth Vol. VII.3 Corinthian Hellenistic Pottery*. Princeton.

Einfalt, H-C. 1979. 'Chemical and Mineralogical Investigations of Sherds from the Akrotiri Excavations.' in *Thera and the Aegean World I. Papers Presented at the Second International Scientific Congress, Santorini, Greece, August 1978,* ed. Ch. Doumas, London: 459-69.

B. Ejstrud. 2005. 'Size matters: estimating trade of wine, oil and fish-sauce from amphorae in the first century AD, in Ancient fishing and fish-processing in the Black Sea region,' in *Black Sea Studies*, ed. T. Bekker-Nielsen, Aarhus: 171-81.

Evans, A. 1921. *The Palace of Minos*, London.

Evely, D. H. Hall, C. Morgan, C., R. Pitt. 2007-8. *Archaeology in Greece 2007-2008. AR* 54" 1-113. Athens.

Farnsworth, M. 1964. 'Greek Pottery: A Mineralogical Study,' *AJA 68:* 221-8.

Farnsworth, M. 1970. 'Corinthian Pottery: Technical Studies,' *AJA* 74: 19-20.

Farnsworth, M., I. Perlman, and F. Asaro. 1977. 'Corinth and Corfu: a neutron activation study of their pottery,' *AJA 81:* 455-68.

Farnsworth, P. 1986. 'Optical Emission Spectroscopy,' *Metals Handbook*, Coordinator, R.E. Whan, Vol. 10, *American Society for Metals*. Ohio

Felts, W. 1942. 'A Petrographic Examination of Potsherds from Ancient Troy.' *AJA 46:* 237-244.

Fiechter, W. 1931. *Das Theater in Sikyon*, Stuttgart.

Finkielsztejn, G. Forthcoming. 'Amphoras and Amphora Stamps 1989-2000,' in *Maresha Excavations Final Report. Israeli Archaeological Authority Reports*, Jerusalem.

Flannery, K. 1968. 'The Olmec and the Valley of Oaxaca: a model of inter-regional interaction in Formative times,' in *Dumbarton Oaks Conference on the Olmec*, ed. E. Benson, Washington: 79-110.

Formenti, F, A. Hesnard and A. Tchernia. 1978. 'Une amphore (Lamboglia 2) content du vin dans l'épave de la Madrague de Giens,' *Archaeonautica* 2: 95-100

Forsén, J. and B. Forsén (eds.). 2003. *The Asea Valley Survey*, Uppsala.

Fossum, A. 1905. 'The Theater at Sikyon,' *AJA*: 263-76.

Frazer, J. C. 1913. *Pausanias's Description of Greece,* 2nd ed., London.

Friis Johansen, K. 1919. *Sikyoniske Vaser: En arkæologisk Undersøgelse*, Copenhagen.

Fulford, M. and D. Peacock. 1984. *Excavations at Carthage: The British Museum Mission 1.2: The Avenue du Président Bourguiba, Salammbo: The Pottery and Other Ceramic Objects from the Site*, Sheffield.

Furumark, A. 1950. 'The Settlement at Ialyssos and Aegean History c. 1550-1400BC,' *OpArch* 6: 150-271.

Gell, W. 1817. *Itinerary of the Morea*, London.

Giannopoulou, M. 2010. *Pithoi Technology and history of storage vessels through the ages.* Oxford.

Given, M. and A. Knapp. 2003. 'The Sydney Cyprus Survey Project: Social Approaches to Regional Archaeological Survey,' *Monumenta archaeologica 21* . Los Angeles.

Godley, C. 1920. *Herotodus Histories (4 Vols.)*, Cambridge, Massachusetts.

Goldman, H. 1950. *Excavations at Gözlü Kule, Tarsus. Volume 1- The Hellenistic and Roman Periods,* Princeton.

Grace. V. 1961. *Amphoras and the Ancient Wine Trade*, Princeton.

Graybehl, H. 2010. *A Study of Cookwares & Amphorae from Panayia Field, Corinth Using Petrographic Analysis.* MSc. In Archaeological Materials. University of Sheffield.

Gregory, T. (ed.) 1993. '*The Corinthia in the Roman Period*,' *JRA Supplement 8*, Ann Arbor.

Griffin, A. 1982. *Sikyon*, Oxford.

Grim, R. 1968. *Clay Mineralology, 2nd Edition*, New York.

Hagen, E. 1831. *Sicyonia,* Königsberg.

Haggis, D. and M. Mook. 1993. 'The Kavousi Coarse Wares: A Bronze Age Chronology for Survey in the Mirabello Area, Crete,' *AJA 97:* 265-293

Harland, J. 1925. *Prehistoric Aigina, A History of the Island in the Bronze Age*, Princeton.

Hayden, B., J. Moody and O. Rackham. 1992. 'The Vrokastro Survey Project 1986-1989: Research Design and Preliminary Results,' *Hesperia* 61: 293-353.

Hayes, J. 1972. *Late Roman Pottery*, London

Hayes, J. 1983. 'The Villa Dionysos Excavations, Knossos: The Pottery,' *BSA 78*: 97-169.

Hayes, J. 2003. 'Hellenistic and Roman Pottery Deposits from the 'Saranda Kolones' Castle Site at Paphos,' *BSA* 98: 447-516.

Hayes, J. 2008. *Agora XXXII. Roman Pottery: Fine-Ware Imports*, Princeton.

Hayward, C. 2003. 'Geology of Corinth: The Study of a Basic Resource,' in *Corinth, the Centenary: 1896-1996. Vol XX*, eds. C. Williams and N. Bookidis, Princeton: 15-42.

Hasaki, E. 2002. *Ceramic Kilns in Ancient Greece: Technology and Organization of Ceramic Workshops*. PhD. Diss. University of Cincinnati.

Hazard, H (ed.). 1975. *A History of the Crusades, Volume III*, Wisconsin.

Hedges, R. and M. McLelllan. 1976. 'On the Cation Exchange capacity of Fired Clays and its Effect on the Chemical and Radiometric Analysis of Pottery,' *Archaeometry* 18: 203-7.

Higgs, B. 1988. 'Syn-sedimentary structural controls on basin formation in the Gulf of Corinth, Greece,' *Basin Research,* 1: 155-65.

Higgins, M. and R. Higgins. 1996. *A Geological Companion to Greece and the Aegean*, Ithaca.

Hilditch, J. 2008. *Reconstruction of technological choice, social practice and networks of exchange from a ceramic perspective in the Middle Bronze Age Cyclades*. PhD. Diss. University of Exeter.

Hill, H. 1946. 'Roman Revenues from Greece after 146 B.C.,' *CP* 41: 35-42.

Hjohlman, J., A. Penttinen, and B. Wells. 2005. *Pyrgouthi: A Rural Site in the Berbati Valley from the Early Iron Age to Late Antiquity. Excavations by the Swedish Institute at Athens 1995 and 1997*, Stockholm.

Homann-Wedeking, B. 1950. 'A Kiln Site at Knossos,' *BSA* 45: 165-92

Hood, M. 1967. 'Some Ancient Sites in South-West Crete,' *BSA* 62: 47-56.

Hood, M., P. Warren and G. Cadogan. 1964. 'Travels in Crete 1962,' *BSA* 59: 50-99.

Hood, M., P. Warren and G. Cadogan. 1965. 'Minoan Sites in the Far West of Crete,' *BSA* 60: 99-113.

Hood, M., P. Warren and G. Cadogan. 1966. 'Ancient Sites in the Province of Ayios Vasilios, Crete,' *BSA* 59: 163-191.

Hope Simpson, R. 1958/59. 'Nemesis: A Mycenaean Settlement near the Menidi Tholos Tomb,' *BSA* 53/54: 292-94.

Hope Simpson, R. 1965. *A Gazetteer and Atlas of Mycenean Sites*, London.

Humphrey, J., J. Oleson, and A. Sherwood. 1997. *Greek and Roman Technology: A Sourcebook: Annotated Translations of Greek and Latin Texts and Documents*. New York.

Iakovidis, S. 1950. *Περατή το νεκροταφείον*, Athens.

Jackson, J., J. Gagnepain, G. Houseman, G. King, P. Papadimitriou, C. Soufleris and J. Virieux. 1982. 'Seismicity, Normal Faulting, and the Geomorphological Development of the Gulf of Corinth (Greece): the Corinth Earthquakes of February and March 1981,' *Earth and Planetary Science Letters* 57: 377-97.

James, S. 2010. *The Hellenistic Pottery from the Panayia Field, Corinth: Studies in Chronology and Context*, PhD. Dissertation. University of Texas at Austin.

Jameson, M., C. Runnels, and T. van Andel. 1994. *A Greek Countryside: The Southern Argolid from Prehistory to the Present Day.* Stanford.

Jarvis, K., A. Gray and R. Houk. 1992. *Handbook of Inductively Coupled Plasma Mass Spectrometry*, New York.

Jenkins, R. 2008. *X-ray Fluorescence Spectrometry.* New York.

Jennings, J. 1998. *Glen Canyon: An Archaeology* Summary, Salt Lake City.

Jones, F. 1950. 'The Pottery' in *Excavations at Gözlü Kule, Tarsus*, ed. H. Goldman, Princeton.

Jones, R. 1984. 'Greek Potter's Clays: Questions of Selection, Availability, and Adaptation,' in *Ancient Greek and Related Pottery*, ed. H. Brijder, Amsterdam: 21-30.

Jones, R. 1986. *Greek and Cypriot Pottery: A Review of Scientific Studies*, Athens.

Jones, H., A. Graham, and L. Sackett. 1973. 'An Attic Country House below the Cave of Pan at Vari,' *BSA* 68: 355-452.

Joyner, L. 2007. 'Cooking Pots as Indicators of Cultural Change: A Petrographic Study of Byzantine and Frankish Cooking Wares from Corinth,' *Hesperia 76*: 183-227.

Kallet-Marx, R. 1995. *Hegemony to Empire: the Development of the Roman Imperium in the East from 148 to 62 B.C.*, Berkeley.

Kapitän, G. 1973. 'A Corinthian Shipwreck at Savelletri (Brindisi, Apulia, Italy).' *IJNA* 2: 185-6.

Karagiorgou, O. 1999. 'LR2: a Container for the Military *Annona* on the Danubian Border?'in *Economy and Exchange in the East Mediterranean during Late Antiquity: Proceedings of a Conference at Somerville College*, ed. S. Kingsley and M. Decker, Oxford: 129-66.

Keay, S. 1984. *Late Roman Amphorae in the Western Mediterranean. A Typology and Economic Study: the Catalan Evidence*, Oxford:

Keay, S. and D. Williams. 2005. *Roman Amphorae: A Digital Resource:* http://ads.ahds.ac.uk/catalogue/collections/blurbs/463.cfm

Keraudren, B. and D. Sorel. 1987. 'The Terraces of Corinth (Greece)—A Detailed Record of Eustatic Sea-level Variations during the last 500,000 Years,' *Marine Geology* 77: 99-107.

Kilikoglou, V., G. Venkins,, Y, Maniatis, and P. Day. 1998. 'Mechanical Performance of Quatrz-Tempered Ceramics, Part 1, Strength and Toughness,' *Archaeometry 40: 261-79.*

Kiriatzi, E. 2003. 'Sherds, Fabrics and Clay Sources: Reconstructing the Ceramic Landscapes of Prehistoric Kythera,' in *METRON: Measuring the Aegean Bronze Age, Proceedings* *of the 9th International Aegean Conference, 18-21 April 2002*, eds. K. Foster and R. Laffineur, New Haven.

Kiriatzi, E and W. Gauss. 2011. *Pottery Production and Supply at Bronze Age Kolonna, Aegina. An Integrated Archaeological and Scientific Study of a Ceramic Landscape*, Vienna.

Koehler, C. 1978. 'Corinthian A and B Transport Amphoras,' *PhD. Dissertation*. Princeton.

Koehler, C., P. Vandiver. 1986. 'Structure, Processing, Properties, and Style of Corinthian Transport Amphoras,' *Technology and Style*. Ceramics and Civilization 2, eds. W. Kingery and E. Lense, Columbus: 173-215.

Koehler, C. 1982. 'Amphoras on Amphoras,' *Hesperia* 51: 284-92.

Koskinas, A. 2011. 'Roof Tiles,' in *Land of Sikyon Archaeology and History of a Greek City-State. Hesperia Supplement 39*. Y. Lolos, Princeton: 549-69.

Kruger, P. 1971. *Principles of Activation Analysis,* New York.

Krystalli-Votsi, K. 1984. 'Σικυώνα,' *ArchDelt* 31: 65.

Krystalli-Votsi, K. 1988. 'Ανασκαφή Σικυώνος,' *Prakt* 1984: 241-242.

Krystalli-Votsi, K. 1991a. 'Ανασκαφή Σικυώνος,' *Prakt* 1987: 66-68.

Krystalli-Votsi, K. 1991b. 'Ανασκαφή Σικυώνος,' *Prakt* 1988: 30-31.

Lamboglia, N. 1955. 'Sulla cronologia delle anfore romane de età republican,' *Rivista Studi Liguri 21*: 252-60.

Laneri, N. 2011. 'The Life-history of the Potter's Wheel in the Ancient Near East,' in *Archaeological Ceramics: A Review of Current Research*, ed. S. Scarcella, Oxford.

Laroche, D. and M.-D. Nenna. 1990. 'Le trésor de Sicyone et ses fondations,' *BCH* 114: 241-84.

Larsen, J. 1953. 'The Early Achaean League,' in *Studies presented to D.M. Robinson,* eds. G. Mylonas and D. Raymond, Saint Louis: 797-815.

Lattimore, R. 1961. *The Iliad of Homer*, Chicago.

Lavezzi. J. 2003. 'Before the Mycenaeans,' in *Corinth, the Centenary: 1896-1996. Vol XX,* eds. C. Williams and N. Bookidis: 63-74.

Leake, W. 1830. *Travels in the Morea* 3, London.

van der Leeuw, S. and Pritchard, A. 1984. *The Many Dimensions of Pottery: Ceramics in Archaeology and Anthropology*, Amsterdam.

Lepsius, G. 1890. *Greichische Marmorstudien*, Berlin.

Liebeschuetz, J. 1972. *Antioch: City and Imperial Administration in the Later Roman Empire*, Oxford.

Lolling, H. 1888. *Hellenische Landeskunde*, Nördlingen.

Lolos, Y. 2004. 'Οι σχέσεις Στυμφάλου-Σικυώνος κατά την αρχαιότητα,' *Αίπυτος* 31-33: 46-54.

Lolos, Y. 2005. *The Sikyon Survey Project*, http://extras.ha.uth.gr/sikyon/

Lolos, Y. 2011, *Land of Sikyon: The Archaeology and History of a Greek City-State. Hesperia Supplement 39,* Princeton.

Lolos, Y., B. Gourley, D. Stewart. 2007. 'The Sikyon Survey Project: A Blueprint for Urban Survey?' *JMA 20:* 267-96.

Lolos, Y., B. Gourley, A. Sarris, C. Hayward, C. Trainor, E. Kiriatzi and N. Papadopoulos. 2012. "Surveying the Sikyonian Plateau. Integrated Approach to the Study of an Ancient Cityscape." *Hellenic Society for Archaeometry V.*

Lykoudi, D. 2013. *The Study of Hellenistic and Roman Pottery from a rescue excavation in Ancient Sikyon*, MA Thesis, University of Thessaly.

Mackenzie, D., T. Atkinson, C. Edgar. 1899. 'Excavations in Melos, 1899,' *BSA5*: 3-19.

MacKenzie, W.S. and Guilford, C. 1980. *Atlas of Rock-forming Minerals in Thin Section*, New York.

MacNeish, R. (ed.) 1967-1972. *The Prehistory of the Tehuacán Valley. Vols 1-5*, Austin.

Maniatis, Y., R. Jones, I. Whitbread, A. Kostakis, A. Simopoulos, Ch. Karakalos and C. Williams. 1984. *Punic Amphoras Found at Corinth*, Greece: an Investigation of Their Origin and Technology. *JFA 11*: 205-222.

Marchand, J. 2002. *Well-built Kleonai: A history of the Peloponnesian city based on a survey of the visible remains and a study of the literary and epigraphic sources.* PhD. Dissertation, University of California, Berkeley.

Mariolakos, I. and S. Stiros. 1987. 'Quaternary Deformation of the Isthmus and Gulf of Corinthos, Greece,' *Geology 15:* 225-8.

Martin-Kilcher, S. 1983. 'Les amphores romaines à huile de Bétique (Dressel 20 et 23) d'Augst (Colonia Augusta Rauricorum) et Kaiseraugst (Castrum Rauracense). Un rapport préliminaire,' *Producción y comercio del aceite en la antigüedad. II congreso internacional*: 337-347.

Martinón-Torres, M., T. Rehren, and I. Freestone. 2006. 'Mullite and the mystery of Hessian wares,' *Nature* 444: 437-8.

Matson, F. 1937. 'Review of A. Shepard, 'The Technology of Pecos Pottery,' *AmerAnt* 2.4: 325-7.

Matson, F. 1942. 'Technological Ceramic Studies,' *College Art Journal*: 25-8.

Matson, F. 1945. 'Technological Development of Pottery in Northern Syria during the Chalcolithic Age,' *Journal of the American Ceramic Society* 28: 20-5.

Matson, F. 1960. In *Excavations in the Plain of Antioch I: The Earlier Assemblages*, *Phases* in A-J. R.J. Braidwood and L.S. Braidwood, Chicago.

Matson, F. 1972. 'Ceramic Studies,' in *The University of Minnesota Messenia Expedition: Reconstructing a Bronze Age Regional Environment*, eds. W. McDonald and G. Rapp, Jr., Minneapolis: 200-24.

McDonald, W. and R. Hope Simpson. 1961. 'Prehistoric habitation in the southwestern Peloponnese,' *AJA* 65: 221-6

McDonald, W. and G. Rapp. 1972. *The Minnesota Messenia Expedition: Reconstructing a Bronze Age Regional Environment*, Minneapolis.

McGing, B.C. 2010. *Polybius' Histories*, Oxford.

McGlew, J. 1993. *Tyranny and Political Culture in Ancient Greece*, Ithaca.

McMurtry, W. 1889. 'Excavations at the Theatre of Sikyon,' *AJA* 5: 267-86.

Mee, C. and H. Forbes (eds.). 1997. *A Rough and Rocky Place: The Landscape and Settlement History of the Methana Peninsula, Greece*, Liverpool.

Melluso, L., S. Conticelli, M. D'Antonio, N. Mirco, E. Saccani. 2003. 'Petrology and Minerology of Wollastonite- and Melilite-bearing paralavas from the Central Apennines, Italy,' *American Mineralogist*: 1287-99.

Merker, G. and C. Williams. 2006. *The Greek Tile Works at Corinth: The Site and the Finds. Hesperia Supplement 35*. Princeton.

Meyer, G, and P. Betancourt. 1981. 'The Composition of Vasilike Ware and the Production of the Mottled Colors of the Slip," in *Scientific Studies in Ancient* Ceramics, ed. M.J. Hughes, British Museum Occasional Paper 19: 51-5.

Millet, M. (ed). 1979. *Pottery and the Archaeologist*, London.

Millett, M. 1999. 'Dating, Quantifying and Utilizing Pottery from Surface Survey,' in *Extracting Meaning from Ploughsoil Assemblages*, eds. R. Francovich, H. Patterson, G. Barker, Oxford: 53-59.

Mohs, F. 1812. *Versuch einer Elementar-Methode zur naturhistorischen Bestimmung und Erkennung der Fossilien*, Vienna.

Moody, J. 1987. *The Environmental and Cultural Prehistory of the Khania Region of West Crete*, PhD dissertation, University of Minnesota.

Moody, J., H. Robinson, J. Francis, L. Nixon and L. Wilson. 2003. 'Ceramic Fabric Analysis and Survey Archaeology: The Sphakia Survey,' *BSA* 98: 37-105.

Papageorgiou, S. and St. Stiros. 1996. 'The Harbour of Aigeira (North Peloponnese, Greece): an Uplifted Ancient Harbour,' in *Archaeoseismology,* ed. S. Stiros and R. E. Jones, Athens: 211-14.

Papaphotiou, A. 2002. *Σεισμοί και κατασκευές στην Κορινθία (ιστορική αναδρομή),* Corinth.

Parker, V. 1992. 'The Dates of the Orthagorids of Sicyon,' *Tyche* 7: 165-75.

Parker, V. 1994. 'Some Aspects of the Foreign and Domestic Policy of Cleisthenes of Sicyon,' *Hermes* 122: 404-24.

Payne, H. 1931. *Necrocorinthia: A study of Corinthian Art in the Archaic Period,* Oxford.

Peacock , D. 1968. 'A Petrological Study of Certain Iron Age Pottery from Western England,' *PPS* 34: 414-27.

Peacock, D. and Williams, D. 1986. *Amphorae and the Roman Economy: an introductory guide*, London.

Pemberton. E. 1989. *Corinth Volume XVIII.1. The Sanctuary of Demeter and Kore: The Greek Pottery*, Princeton.

Perlman, I. and F. Asro. 1969. 'Pottery Analysis by Neutron Activation," *Archaeometry* 11: 21-52.

Perrin, B. 1920. *Plutarch Life of Demetrius. In Plutarch Lives IX*, Cambridge Massachusetts.

Perrin, B. 1926. *Plutarch Lives XI*, Cambridge Massachusetts.

Petersen, S. 2009. *Thin-Section Petrography of Ceramic Materials*, Philadelphia.

Pettegrew, D. 2007. 'The Busy Countryside of Late Roman Corinth: Interpreting Ceramic Data Produced by Regional Archaeological Surveys,' *Hesperia* 76: 743-784.

Pharaklas, N. 1971. *Sikyonia (Ancient Greek Cities* 8), Athens.

Phelps, W. 2004. *The Neolithic Pottery Sequence in Southern Greece*, Oxford.

Philadelpheos, A. 1926. 'Ανασκαφαί Σικυώνος,' *ArchDelt* 10: 46-50.

Pickersgill, C. and P. Roberts. 2003. 'Roman Pottery from the Sparta Theatre and Stoa,' *BSA* 98: 549-97.

Pullen, D, S. Allen, P. Halstead, J. Hansen, A. Karabatsoli, M. Kayafa, K. Krattenmaker, N.Gale and Z. Stos-Gale. 2011. 'The Early Bronze Age Village on Tsoungiza Hill,' *Nemea Valley Archaeological Project, I*. Princeton.

Rădulescu, A. 1976. 'Amfore romane şi romano-bizantine din Scythia Minor,' *Pontica 9:* 99-114.

Randsborg, K. (ed.) 2002. *Kephallénia: Archaeology and History: the Ancient Greek Cities. Acta Archaeologica* 73, Copenhagen.

Reedy, C. 2008. *Thin-Section Petrography of Stone & Ceramic Materials*, London.

Reynolds, P. 1995. *Trade in the Western Mediterranean, AD 400-700: The Ceramic Evidence*, Oxford.

Reynolds, P. 2004. 'Catalogue of Roman ceramics and selected medieval pottery from Butrint 1994-99,' in *Byzantine Butrint: Excavations and Survey 1994-1999*, eds. R. Hodges, W. Bowden and K. Lako, Oxford: 327-95.

Rice, P. 1987. *Pottery Analysis, A Sourcebook*, Chicago.

Richards, E. and K. Hartley. 1960. 'Spectrographic Analysis of Romano-British Pottery,' *Nature* 185: 194-6.

Rife, J., M. Morison, A. Barbet, R. Dunn, D. Ubelaker, and F. Monier. 2007. 'Life and death at a port in Roman Greece: The Kenchreai Cemetery Project 2002-2006,' *Hesperia* 76: 143-81.

Riley, J. 1979. 'The Coarse Pottery from Berenice,' *Libya Antiqua Supplement 5.2*, Tripoli: 91-466

Riley, J. 1979b. 'The Petrological Investigation of Roman and Islamic Ceramics from Cyrenaica,' *LibSt* 10: 35-46.

Riley, J. 1981. 'The Late Bronze Age and the Roman Mediterranean: A Case for Comparison,' *Production and Distribution: A Ceramic Viewpoint*. Oxford.

Riley, J. 1983. 'The Contribution of Ceramic Petrology to our Understanding of Minoan Society, in Minoan Society,' in *Proceedings of the Cambridge Colloquium* 1981, eds. O. Krzyszkowska and L. Nixon, Bristol: 283-92.

Riley, J.1984. 'Pottery Analysis and the Reconstruction of Ancient Exchange Systems," in *The Many Dimensions of* Pottery, eds. S. van der Leeuw and A. Pritchard, Amsterdam: 55-73.

Robinson, H. 1959. *Agora V. Pottery of the Roman Period: Chronology*, Princeton.

Ross, L. 1840. 'Les forteresses de la Sicyonie et le temple d'Asklepios à Titane,' *BdI 1839:* 21-8.

Rostoker, W. and E. Gebhard. 1981. 'The Reproduction of Rooftiles for the Archaic Temple of Poseidon at Isthmia, Greece,' *JFA* 8: 211-27.

Rotroff, S. 1982. *Agora XXII. Hellenistic Pottery: Athenian and Imported Mouldmade Bowls*. Princeton.

Rotroff, S. 1997. *Agora XXIX. Hellenistic Pottery: Athenian and Imported Wheelmade Table Ware and Related Material*, Princeton.

Rotroff, S. 1997b. 'From Greek to Roman in Athenian Ceramics,' in *The Romanization of Athens* eds. Hoff and Rotroff , Oxbow:97-116.

Rotroff, S. 2006. *Agora XXXIII. Hellenistic Pottery: The Plain Wares*, Princeton.

Rudolph, H. 1971. *Die ältere Tyrannis in Sikyon*, Munich.

Rudolph, W. 1977. Review of 'Corinth VII.3 Corinthian Hellenistic Pottery by G. Roger Edwards, ' *AJA* 81: 246-7.

Rye, O. 1981. *Pottery technology: Principles and reconstruction*, Washington.

Sackett, L. (ed.). 1992. *Knossos from Greek City to Roman Colony: Excavations at the Unexplored Mansion. II*. (BSA Suppl. 21), London.

Salmon, J. 1984. *Wealthy Corinth. A History of the City to 333 B.C.*, Oxford.

Sanders, G. 1999. 'A Late Roman Bath at Corinth: Excavations in the Panayia Field 1995-96,' *Hesperia* 67: 441-480.

Sapirstein, P. 2007. 'How the Corinthians Manufactured Their First Roof Tiles,' *Hesperia* 72: 195-229.

Scorpan, C. 1976. 'Oriini ai linii evolutive in ceramic romano-bizantina (sec IV-VII) din ariile mediteraniana si pontic,' *Pontica* 9: 155-88.

Shaw, J., A Van de Moortel, P. Day and V. Kilikoglou. 2001. *A LM IA Ceramic Kiln in South-Central Crete: Function and Pottery Production, Hesperia Supplement 30*, Princeton.

Shepard, A. 1936. 'The Technology of Pecos Pottery,' in *Papers of the Southwestern Expedition*, New Haven: 389-587.

Shepard, A. 1956. *Ceramics for the Archaeologist*, Washington.

Shipley, G. 2002. 'Continuity and Change in a Greek Rural Landscape,' in *The Laconia Survey, i: Methodology and Interpretation*, Cavanagh, et al., London.

Skalet, C. 1928. *Ancient Sicyon, with a prosopographia Sicyonia*, Baltimore.

Slane, K. 1990. *Corinth XVII.2. The Sanctuary of Demeter and Kore: The Roman Pottery and Lamps*, Princeton.

Slane, K. 2003. 'Corinth's Roman Pottery: Quantification and Meaning,' in *Corinth, the Centenary: 1896-1996. Vol* XX, eds. C. Williams, C. and N. Bookidis, Princeton: 303-20.

Slane, K. and G. D. R. Sanders. 2005. "Corinth: Late Roman Horizons," *Hesperia* 74: 243-97.

Souček, J. 1997. *Kultur in Sikyon unter der Herrschaft der Tyrannen (Kultura v Sikyónu v době vlády tyranů)*, Prague.

Sparkes, B. 1962. 'The Greek Kitchen,' *JHS 82:* 121-37.

Strassler, R. 1998. *The Landmark Thucydides: A Comprehensive Guide to the Peloponnesian War*. New York.

Stewart, D. 2007. *Landscape Change and Regional Variation in an Early 'Provincial' Setting: The Rural Peloponnese at the Late Hellenistic to Roman Transition*. PhD Dissertation. University of Leicester.

Stewart, D. 2012. 'The Peloponnese (Archaic to Roman),' in *AR 58*, Morgan, C., et al., Cambridge: 42-57..

Stiros, S. 1988. 'Model for the Northern Peloponnesian (C. Greece) Uplift," *Journal of Geodynamics* 9: 199-214.

Stiros S., P. Pirazzoli, R. Rothaus, S. Papageorgiou, J. Laborel, M. Arnold. 1996. 'On the Date of Construction of Lechaion, Western Harbor of Ancient Corinth, Greece,' *Geoarchaeology* 11: 251-63.

Sweetman, R. *nd*. Unpublished Lecture. 'The Late Antique Churches of the Peloponnese: place, memory, and emergent change,' Lecture in the Upper House Series at the British School at Athens. May 21st 2012.

Tartaron, T., T. Gregory, D. Pullen, J. Noller, R. Rothaus, J. Rife, L. Diacopoulos, R. Schon, W. Caraher, D. Pettegrew, D. Nakassis. 2006. 'The Eastern Korinthia Archaeological Survey: Integrated Methods for a Dynamic Landscape,' *Hesperia* 75: 453-523.

Tataris, A. N. Mouragoudakis, G. Kounis, G. Christodoulou and St. Tsalia-Monopoli. 1970. *Geological Map of Greece, 1:50 000 Nemea Sheet*. IGSR, Athens.

Tausend, K. 2006. *Verkehrswege der Argolis. Rekonstruktion und historische Bedeutung*, Stuttgart.

Tolstov S. 1962. *Along and Ancient Deltas of Oxus and Jaxartes* (По древним дел'там Окса и Яксарта). Moscow.

Tomber, R. and J.Dore. 1998. *The National Roman Fabric Reference Collection: A Handbook*, London.

Trigger, B. 1989. *A History of Archaeological Thought*, Cambridge.

Τσούντας , Χρ. 1908. *Αι προϊστορικαί ακροπόλεις Διμηνίου* και *Σέσκλου*, Athens.

Tzavella, E, C. Trainor and M. Maher. Forthcoming. 'Late Roman pottery from the Sikyon Survey Project: local production, imports, and urban evolution (4th - 7th c. AD)," Proceedings from the 4th *Conference on Late Roman Coarse Wares, Cooking Wares and Amphorae*, Thessaloniki, 7-10 April 2011. Oxford.

Van der Werff, J. 1986. 'The amphora wall in the house of the porch, Ostia,' in *Excavations in the House of the Porch (V;ii.4-5) at Ostia*, eds. J. Boersma, D. Yntema and J. Van der Werff, *BABesch* 61: 77-137.

Van Grieken, R. and A. Markowicz. 2002. *Handbook of X-Ray Spectrometry 2nd edition*, New York.

Vermule, E. 1987. 'Baby Aigisthos and the Bronze Age,' *PCPS* 213: 122-52.

Vita-Finzi, C. 1978. *Archaeological Sites in their Geological Settings,* London.

Vita-Finzi, C., and G. King. 1985. 'The seismicity, geomorphology and structural evolution of the Corinth area of Greece,' *Philosophical Transactions of the Royal Society, London:* 379-407.

Vitelli, K. 1993. *Franchthi Neolithic Pottery*, Bloomington, Indiana.

Vogeikoff-Brogan, N. 2000. 'Late Hellenistic Pottery in Athens: A New Deposit and Further Thoughts on the Association of Pottery and Societal Change,' *Hesperia* 69: 293-333.

Von Freyberg, B. 1973. 'Geologie des Isthmus von Korinth,' *Erlanger Geologische Abhandlungen 95.*

Vroom, J. 2003. *After Antiquity: Ceramics and Society in the Aegean from the 7th to the 20th Century A.C.: A Case Study from Boeotia, Central Greece*, Leiden.

Walbank, F.W. 1933. *Aratos of Sicyon.* Cambridge.

Walter H. 1958. 'Der archaeologische Befund,' in *VI Bericht über die Ausgrabungen in Olympia*, ed. E. Kunze, Berlin: 41-67.

Ward-Perkins, B. 2000. 'Land, Labour, and Settlement,' in *Late Antiquity: Empire and Successors, AD 425-600 (CAH),* ed. B.Cameron, B. Ward-Perkins, and M. Whitby, Cambridge: 315-45.

Waterhouse, H. and R. Hope Simpson. 1960. 'Prehistoric Laconia: Part I,' *BSA* 55: 67-107.

Waterhouse, H. and R. Hope Simpson. 1961. 'Prehistoric Laconia: Part II,' *BSA* 56: 114-75.

Watrous, L. 1974. *An archaeological survey of the Lasithi Plain in Crete : from the Neolithic to the late Roman period.* PhD Dissertation, University of Pennsylvania. Philadelphia.

Wells, B. and C. Runnels (eds.). 1996. *The Berbati-Limnes Archaeological Survey 1988-1990*, Stockholm.

Welz, B. and M. Sperling. 1999. *Atomic Absorption Spectrometry*, Weinheim, Germany.

Wentworth, C. 1922. 'A scale of grade and class terms for clastic sediments,' *Geology* V.30: 377-92.

Whitbread, I. K. 1995. *Greek Transport Amphorae: A Petrological and Archaeological Study.* Athens.

Whitbread, I. 2003. 'Clays of Corinth: The Study of a Basic Resource for Ceramic Production,' *Corinth, The Centenary 1896–1996, Corinth XX*, in C. Williams and N. Bookidis, Princeton: 1-13.

Whitbread, I., M. Ponting and B. Wells. 2007. 'Temporal Patterns in Ceramic Production in the Berbati Valley, Greece,' *JFA* 32: 177-93.

Whitehead, D. 1980. 'Euphron, tyrant of Sikyon: an unnoticed problem in Xenophon, *Hell.* 7.3.8,' *LCM* 5: 175-8.

Whitley, J., D. Urem-Kotsou, A. Dimoula, I. Nikolakkopoulou, A. Karnava, S. Germanidou and E. Hatzaki. 2005. *AR* 51: 1-118.

Whitelaw, T. M. Bredaki, and A. Vasilakis. 2007. 'The Knossos Urban Landscape Project: investigating the long-term dynamics of an urban landscape,' *Archaeology International 2006/7(10)*: 28-31.

Williams, C. 1988. 'Corinthian Trade in Roof Tiles,' in Praktικά του XII Διεθνούς Συνεδρίου Κλασικής Αρχαιολογίας (Athens, September 4-10, 1983), Athens: 227-230.

Williams, C, and N. Bookidis. 2003. *Corinth Volume XX. Corinth, the Centenary: 1896-1996. Princeton.*

Williams, C. and O. Zervos. 1984. 'Corinth 1983: The Route to Sicyon,' *Hesperia* 53: 83-122.

Williams, D. 1979. ' Ceramic Petrology and the Archaeologist,' in *Pottery and the Archaeologist*, ed. M. Millett, London: 73-75.

Williams, D. and D. Peacock. 1983. 'The importation of olive-oil into Roman Britain,' *Producción y comercio del aceite en la antigüedad. II congreso internacional*, Saville: 263-80.

Willey, G. 1953. ' Prehistoric settlement patterns in the Virù Valley, Peru,' *Bureau of American Ethnology Bulletin* 155. Washington.

Winter, F. 1971. *Greek Fortifications*, London.

Winther-Jacobsen, K. 2010. *From Pots to People: A ceramic approach to archaeological interpretation of ploughsoil assemblages in Late Roman Cyprus.* Leuven.

Worley, J. and S. Kvech. 2000. ICP-MS, http://www.webapps.cee.vt.edu/ewr/environmental/teach/smprimer/icpms/icpms.htm

Wright, J., J. Cherry, J. Davis, E. Mantzourani, S. Sutton, and R. Sutton. 1990. ' The Nemea Valley Archaeological Project: A Preliminary Report,' *Hesperia* 59: 579-659.

Wyse, T. 1865. *An Excursion in the Peloponnesus in the year 1858*, London.

Zevi , F. 2002. 'Appunti sulle anfore romane,' *Archaeologica Classica 18:* 207-47.

Zimmerman Munn, M-L. 2003. 'Corinthian Trade with the Punic West in the Classical Period,' ' in *Corinth, the Centenary: 1896-1996. Vol XX*, eds. C. Williams and N. Bookidis, Princeton: 195-217.

Ancient Sources, Papyri and Inscriptions Cited

Aristotle - Pol. 1315b

Aineus Tacticus- 29.12

Cicero - *Ad Att.* 2.13.1; 2.13.2; 2.21.6;

Cicero- *Leg. Arg.* 1.5

Cicero- *De Off.* 2.23.81.

Cicero -*Verr.* ii. 1,17.44-45

Diodoros of Sicily- 15.70.3

Eusebios- Chronikon I

Frontainus- *Stret.* 3.7.6

Gorgias- 513E2

Herodos - 6.126-30

Homer- *Il.* 2.572

IG- xi.4, no704

Livy- 33, 15

Nikolaos of Damaskos, FGrH 90 F.61.1-2

Papyrus Oxyrhynchus - 1365

Papyrus Oxyrhynchus- 1241 col.iii

Pausanias- 2. 12.2; 7.27.12.

Pliny – *Nat Hist.* 13.8; *36*.9-10

Plutarch- *Aratos* 9-12;

Plutarch Mor. 553 a-b 859 b;

Plutarch- *Perikles* 19.

Polyainos. *Strat.*3

Polybios- 2.43.3-6.

Scholiast to Aischines- 2.77

Scholiast to Pindas- *Nem.* 9

Strabo- *Geog* 8.338

Theophrastus - *Ad. Od.* 21-2, 5

Thucydides- 1.3.2;

Xenophon. *Hell.* 7.1.45-6

Area	Count	% of Total
North Plateau	38	2.83%
South Plateau	1,202	89.63%
Upper Plateau	101	7.53%
Total	1,341	100%

Table 3.1-
Heat-Damaged Sherd Counts and Percentage of Total

Area	Total Sherd Count	Total Sherd Weight	Kiln-Waster Count/ Percentage	Kiln-Waster Weight/ Percentage	Average Sherd Weight	Average Kiln-Waster Weight
NP	5, 815	36.9kg	38/0.6%	0.79kg/2%	0.006kg	0.021kg
SP	21,945	131.73kg	1,202/5.4%	23.48kg/17.8%	0.006kg	0.019kg
UP	3, 722	22.68kg	101/2.7%	1.18kg/5.2%	0.006kg	0.011kg
TOTAL	**31,482**	**191.31kg**	**1,341/4.2%**	**25.45kg/13.3%**	**0.006kg**	**0.019kg**

Table 3.2- Kiln-Waster Counts and Weights Relative to Total Collection and Cross Section Surface Assemblages.

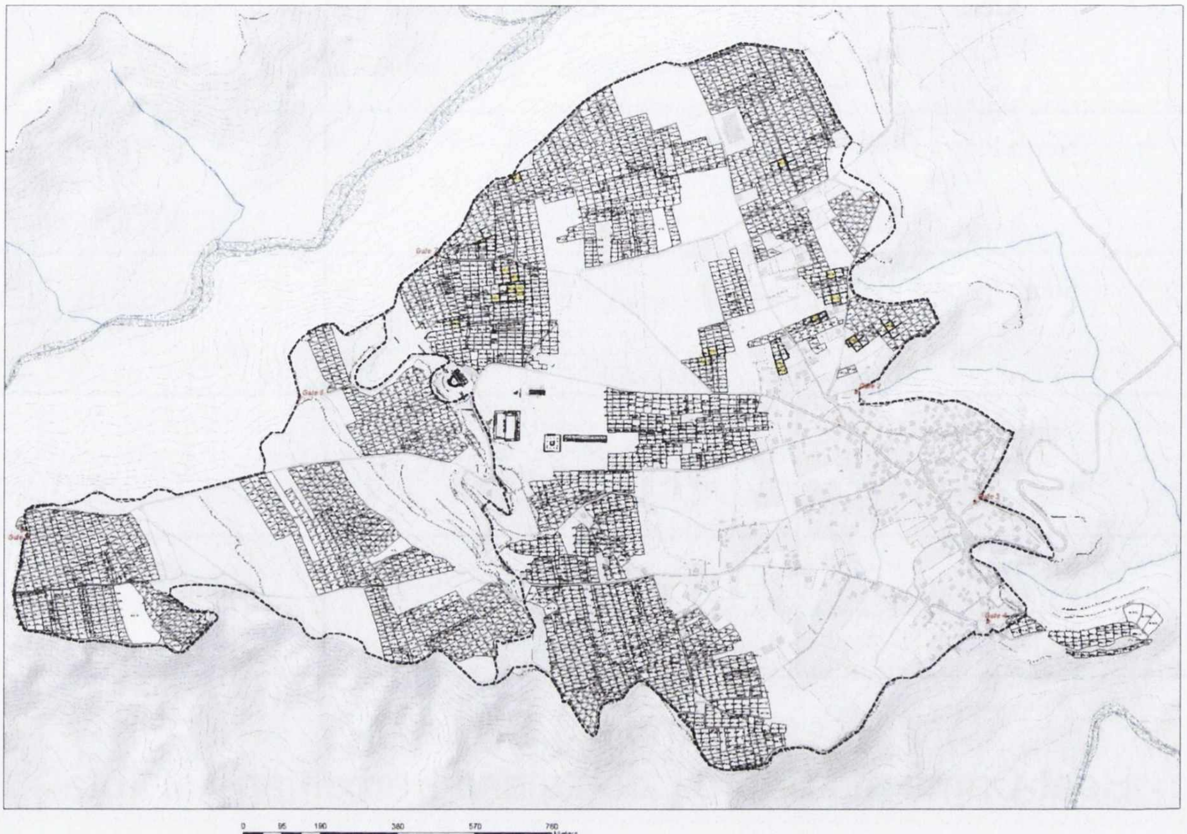


Table 3.3- Heat-Damaged Ceramics from NP

Table 3.4- Heat Damaged Ceramics from UP

Table 3.5- Heat Damaged Ceramics from SP

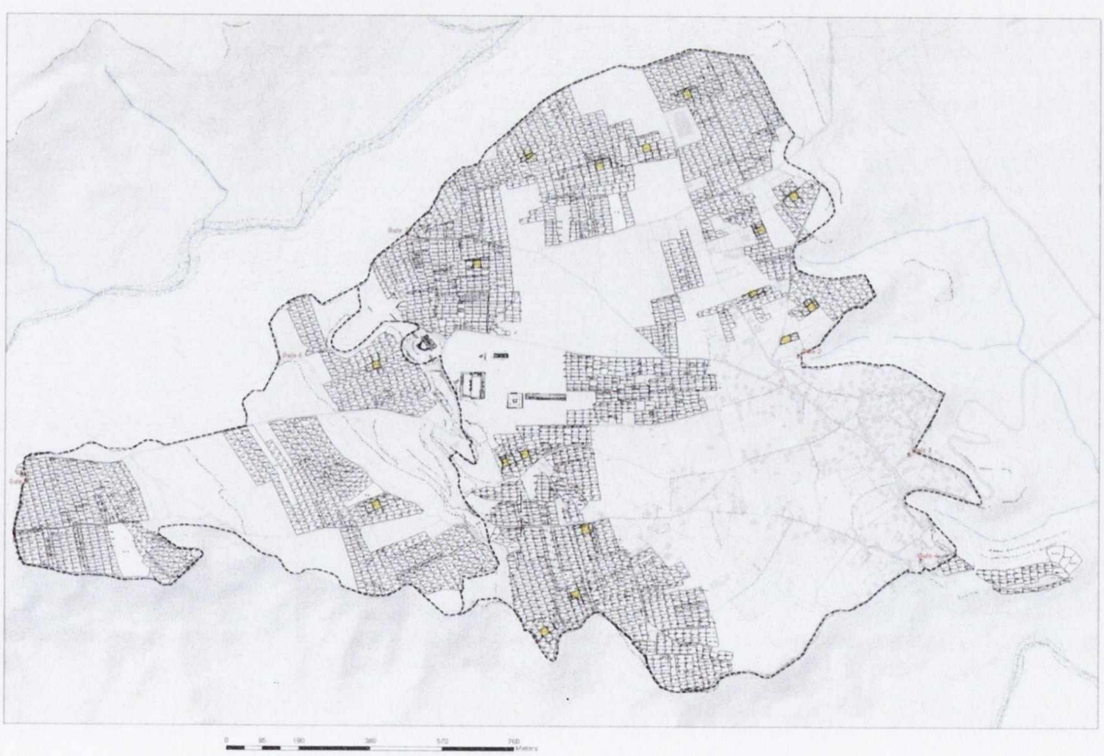


Table 3.6-
Distribution Map- Stew Pot with Everted Rim and Thickened End

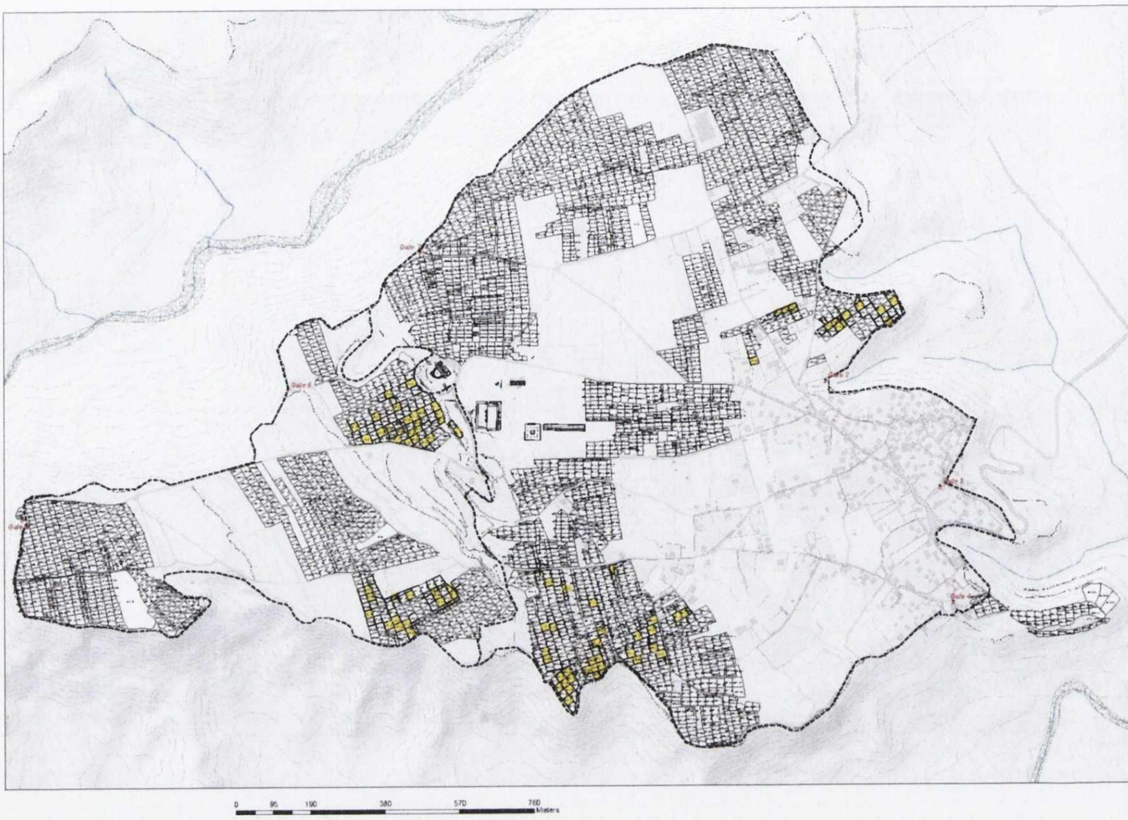


Table 3.7-
Distribution Map- Chytra with Flanged Thickened Rim

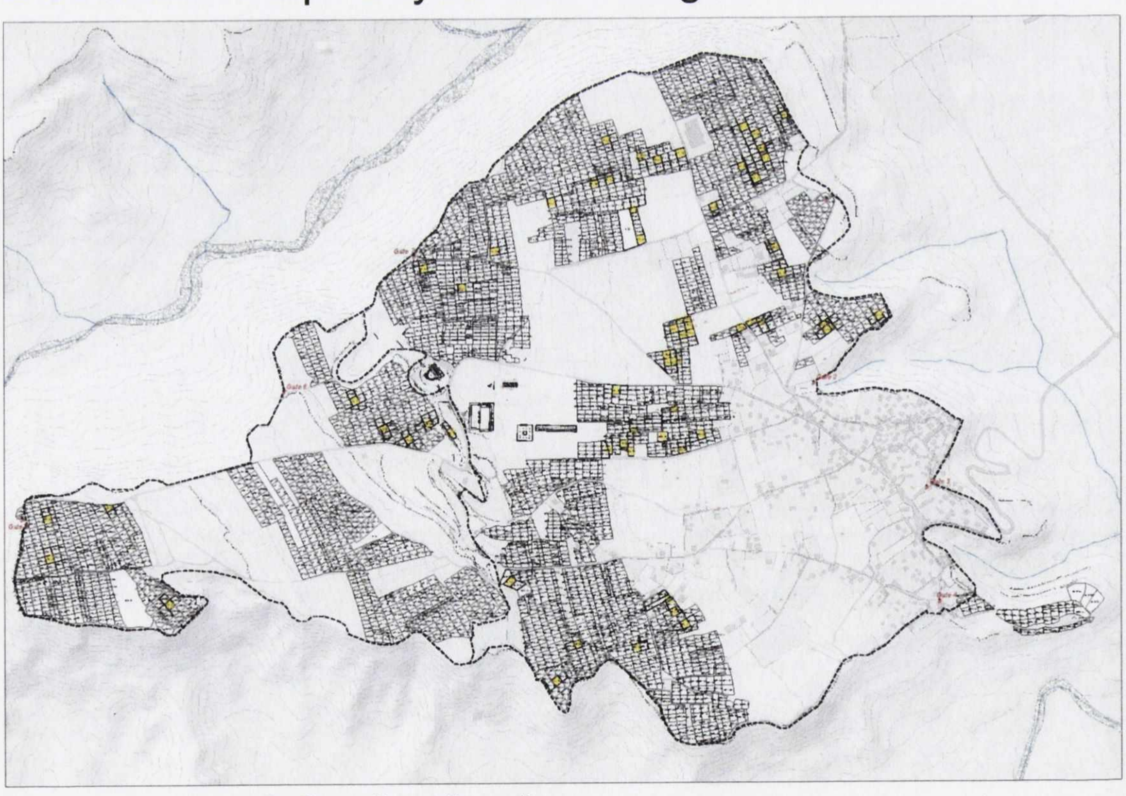


Table 3.8-
Distribution Map- Stew Pot with Flat Horizontal Rim

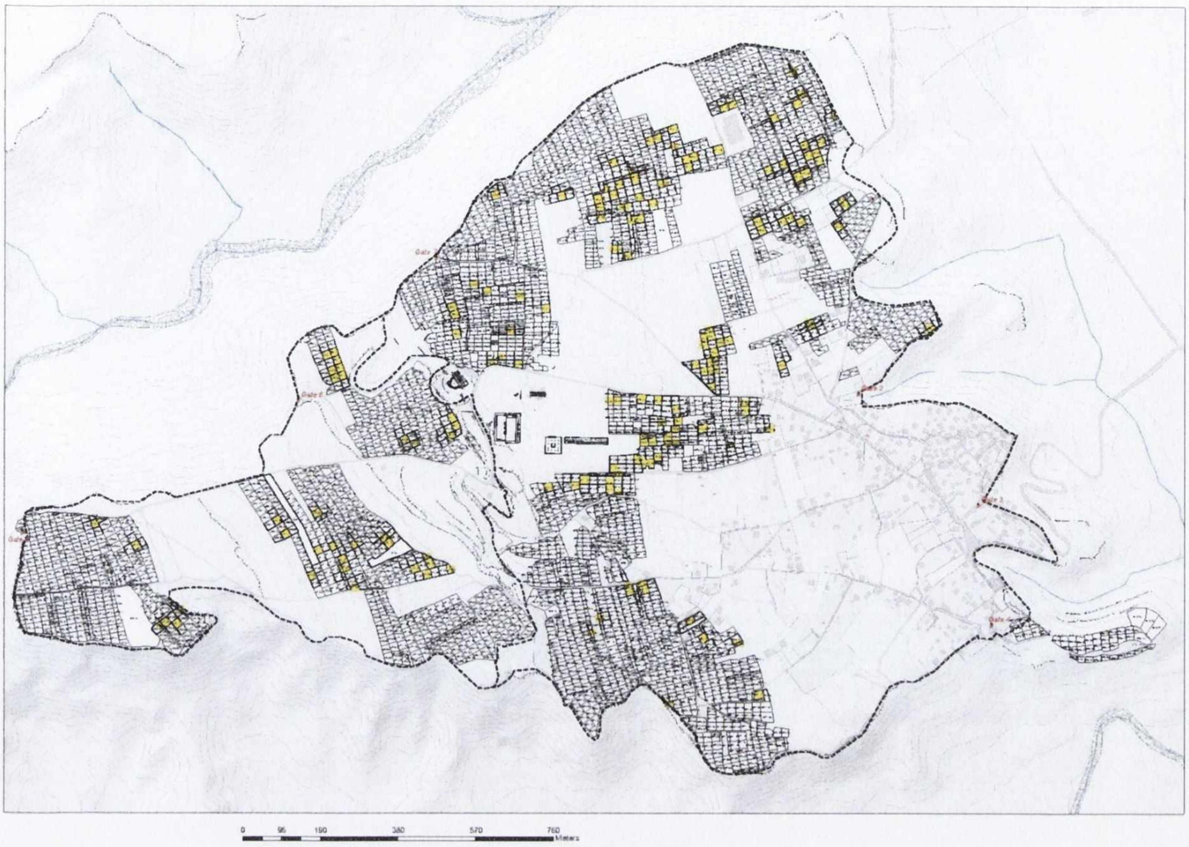


Table 3.9-
Distribution Map- Stew Pot with Semi-Cylindrical Rim

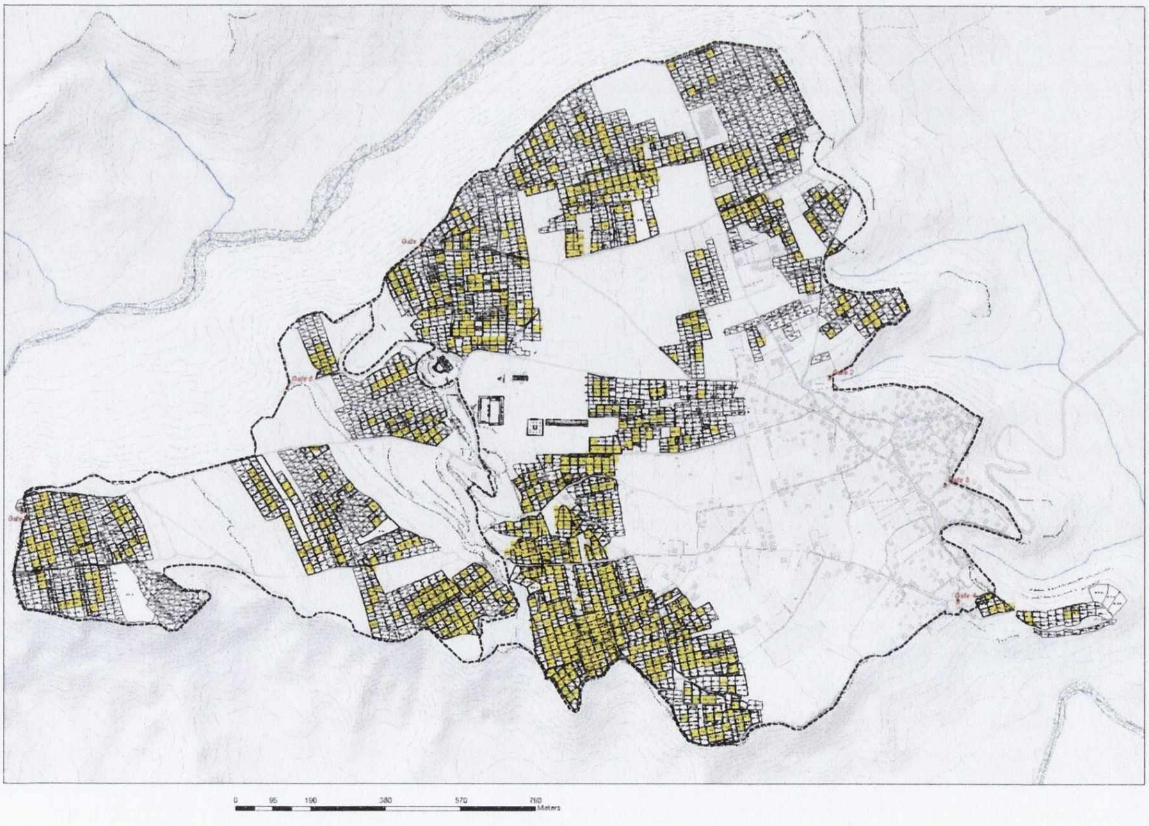


Table 3.10- Distribution Map- Sikyon A Amphora

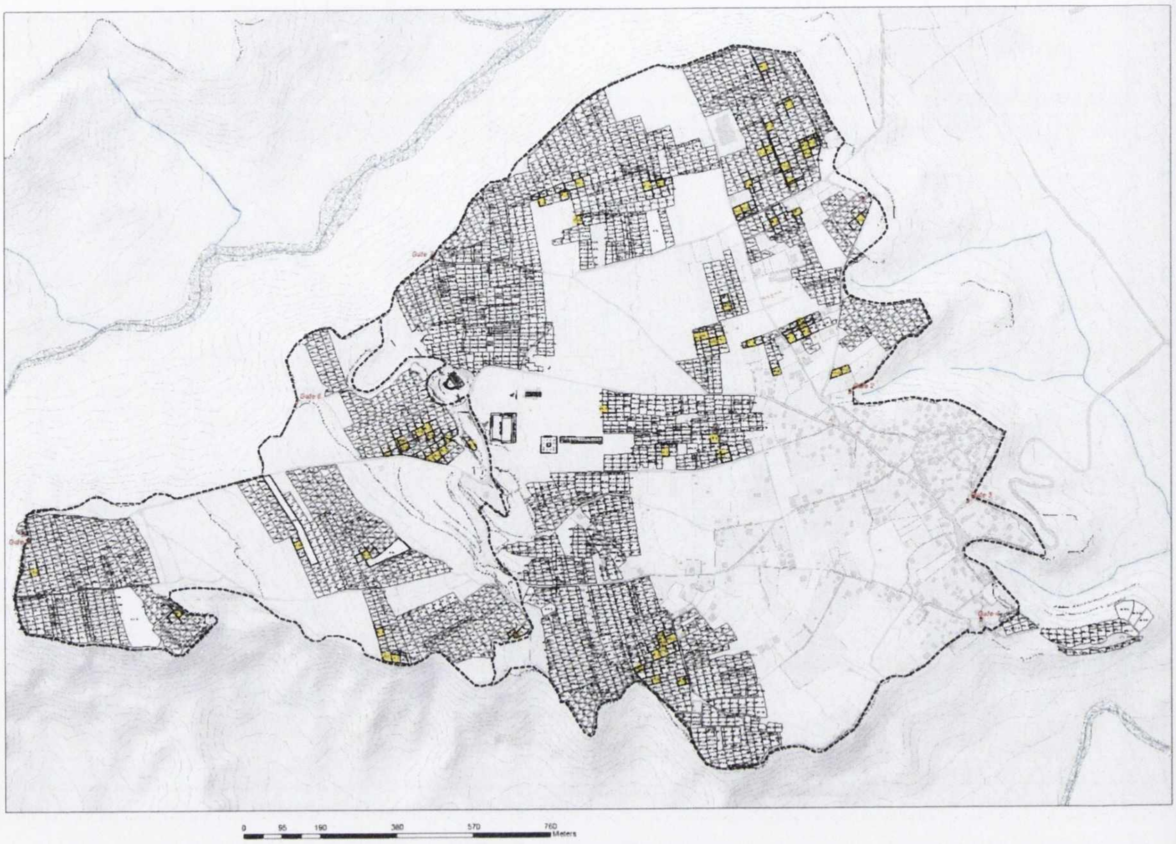


Table 3.11- Distribution Map- Sikyon B Amphora

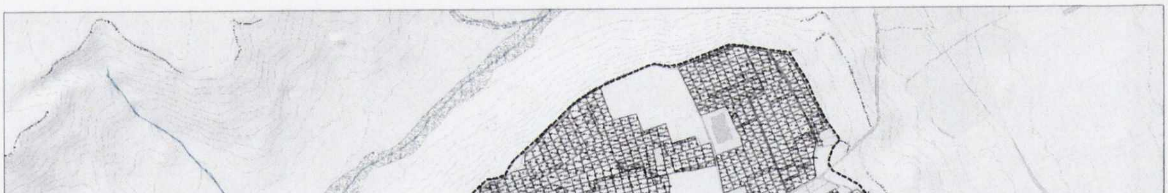


Table 3.12- Distribution Map- Jug with Ridged Base

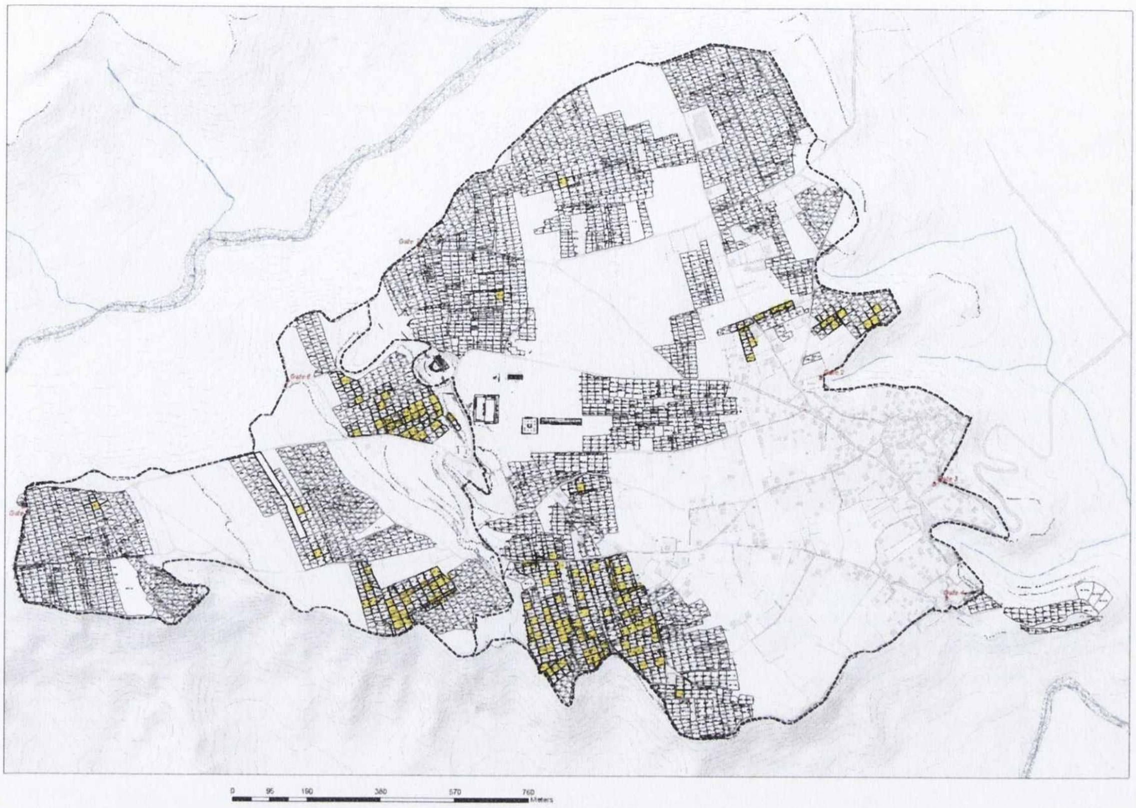


Table 3.13- Distribution Map- Krater with Overhanging Rim

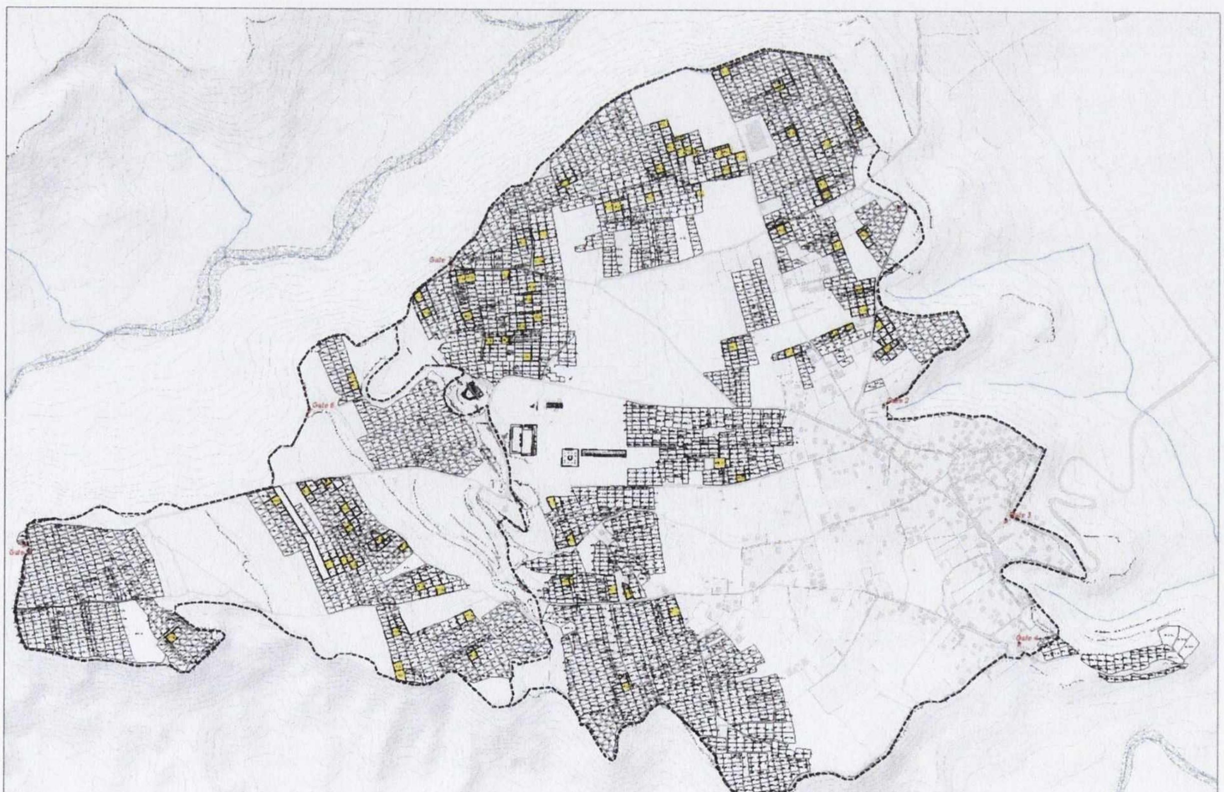


Table 3.14- Distribution Map- Krater with Triangular Rim

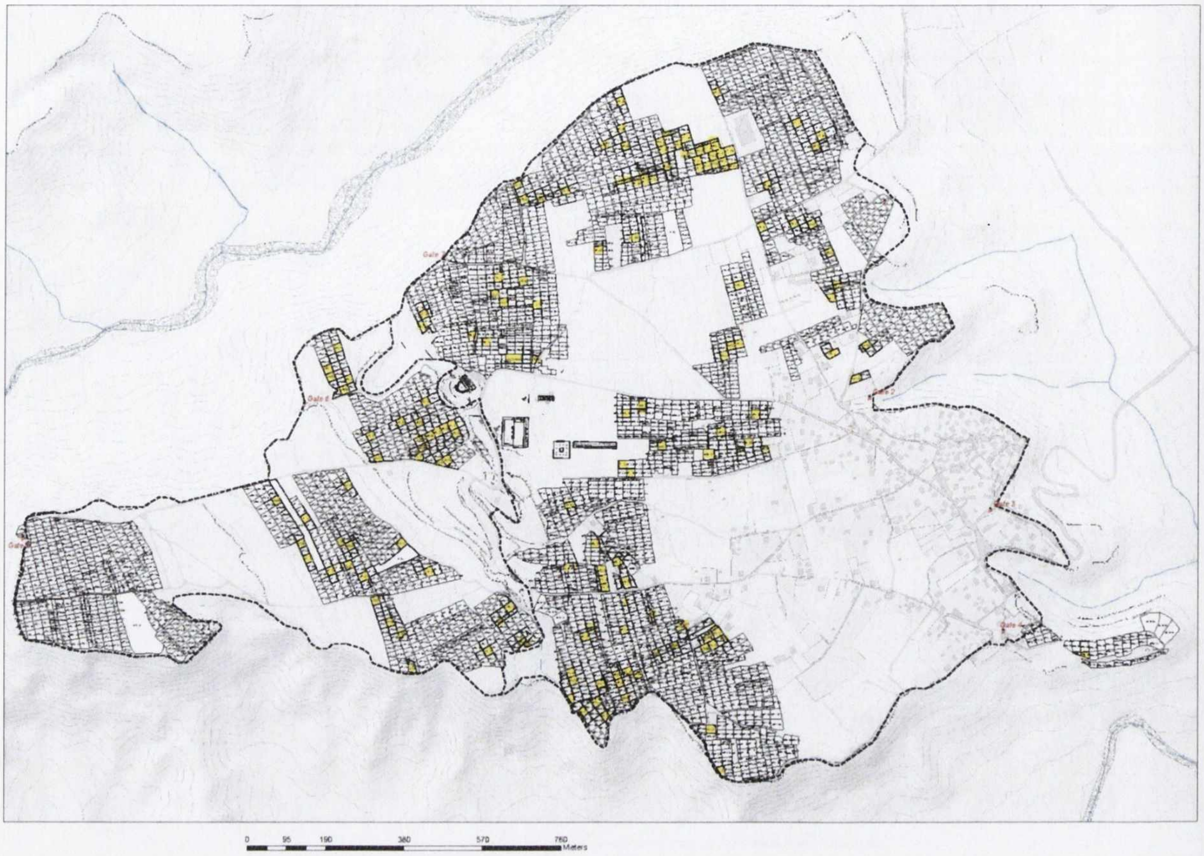


Table 3.15- Distribution Map- Krater with High-Folded Rim

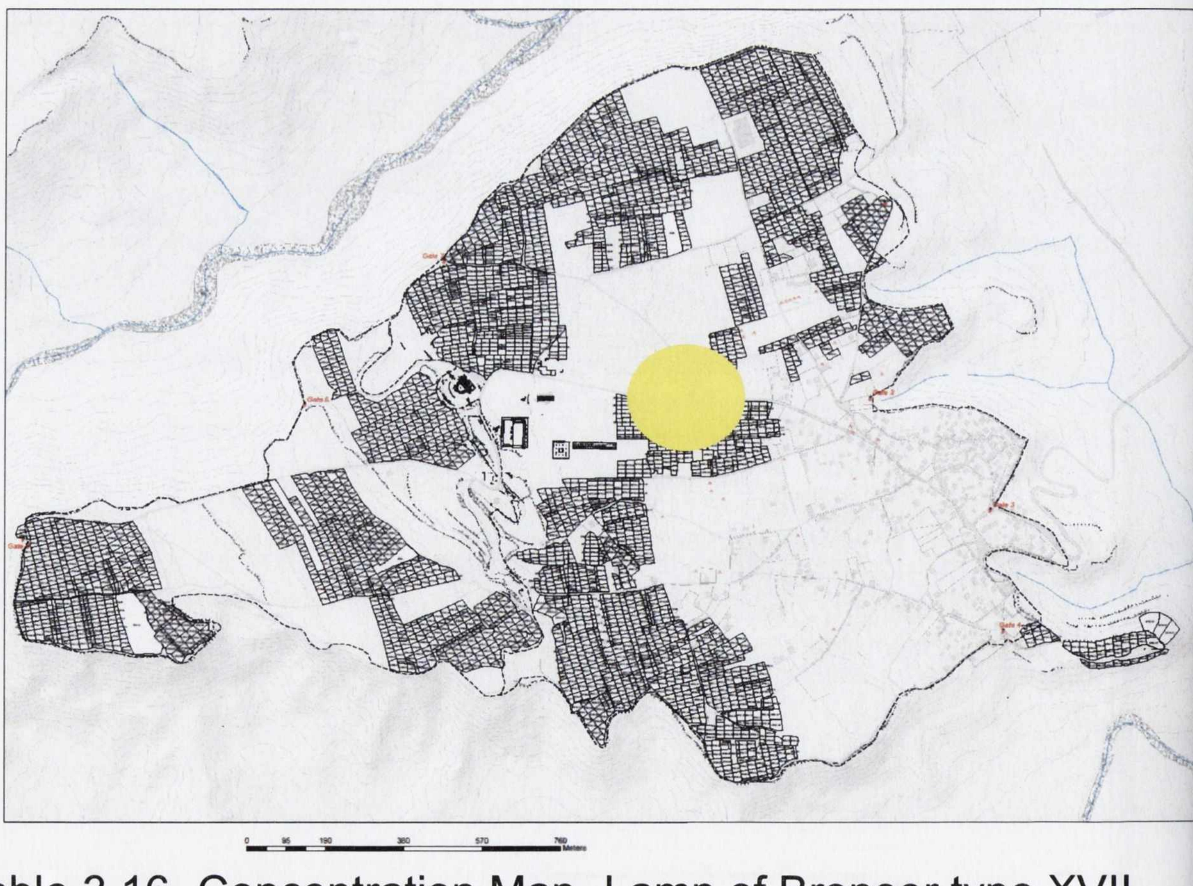


Table 3.16- Concentration Map- Lamp of Broneer type XVII

Sample ID	-a (unfired)	-b (750°C)	-c (900°C)	-d (1050°C)
A2	Pale Yellow (2.5Y 8/3-8/4)	Pale Yellow (2.5Y 7/3-7/4)	Mixed colours ranging from white/beige to a pale green. Sample disintegrated.	Beige and grey gravel and dust. Sample disintegrated.
D1	Pale Yellow (2.5Y 7/3-7/4)	Very Pale Brown (10YR 7/3-7/4)	Marl/Green; mostly particles. Sample disintegrated.	Brown/Green marl; mostly dust. Sample disintegrated.
E2	Pale Yellow (5Y 8/2)	Light Olive Grey (5Y 8/2)	Pale Yellow (5Y 7/3) Still partially intact, but crumbly.	Pale Yellow (5Y 8/3)
6	Pale Yellow (5Y 7/3-8/3)	Pale Yellow (5Y 7/3). Slightly more olive than 6A	Pale Yellow (5Y 7/3)	Pale Yellow (5Y 7/3)
8	Pale Yellow (5Y 8/2-8/3)	Pale Yellow (5Y 8/2)	Pale Yellow (5Y 8/2)	Pale Yellow (5Y 8/2-8/3)
12	Pale Yellow (5Y 8/3)	Pale Yellow (5Y 8/3)	Pale Yellow (5Y 8/3)	Pale Yellow (5Y 8/3)

Table 3.17-
Colour and Condition of Test-Fired Calcareous Clay Briquettes

Sample ID	-a (unfired)	-b (750°C)	-c (900°C)	-d (1050°C)
A1	Pale Yellow (2.5Y 8/3-8/4)	Pale Yellow (2.5Y 7/3-7/4)	Mixed colours ranging from white/ beige to a pale green Sample disintegrated.	Beige and grey gravel and dust Sample disintegrated.
B1	Brown-Strong Brown (7.5YR 5/4-5/6)	Yellowish-Red (5YR 5/6)	Orangey-marl mix Sample disintegrated.	Grey/brown, some orange particles and dust in the mix Sample disintegrated.
E1	Yellowish-Red (5YR 5/6)	Yellowish-Red (5YR 5/6)	Retained similar colour to E1B, but fell apart into large chunks Sample disintegrated.	Reddish/brownish/grey, fell apart into large chunks Sample disintegrated.
10	Strong Brown (7.5YR 5/6)	Strong Brown (7.5YR 5/6)	Strong Brown (7.5YR 5/6)	Strong Brown (7.5YR 5/6)
11	Reddish Brown (5YR 4/4) – Yellowish Red (5YR 4/4)	Reddish Brown (5YR 4/4) Yellowish Red (5YR 4/6)	Yellowish Red (5YR 4/6)	Reddish Brown (5YR 4/4) – Yellowish Red (5YR 4/6)

Table 3.18- Colour and Condition of Terra Rossa Clay Briquettes

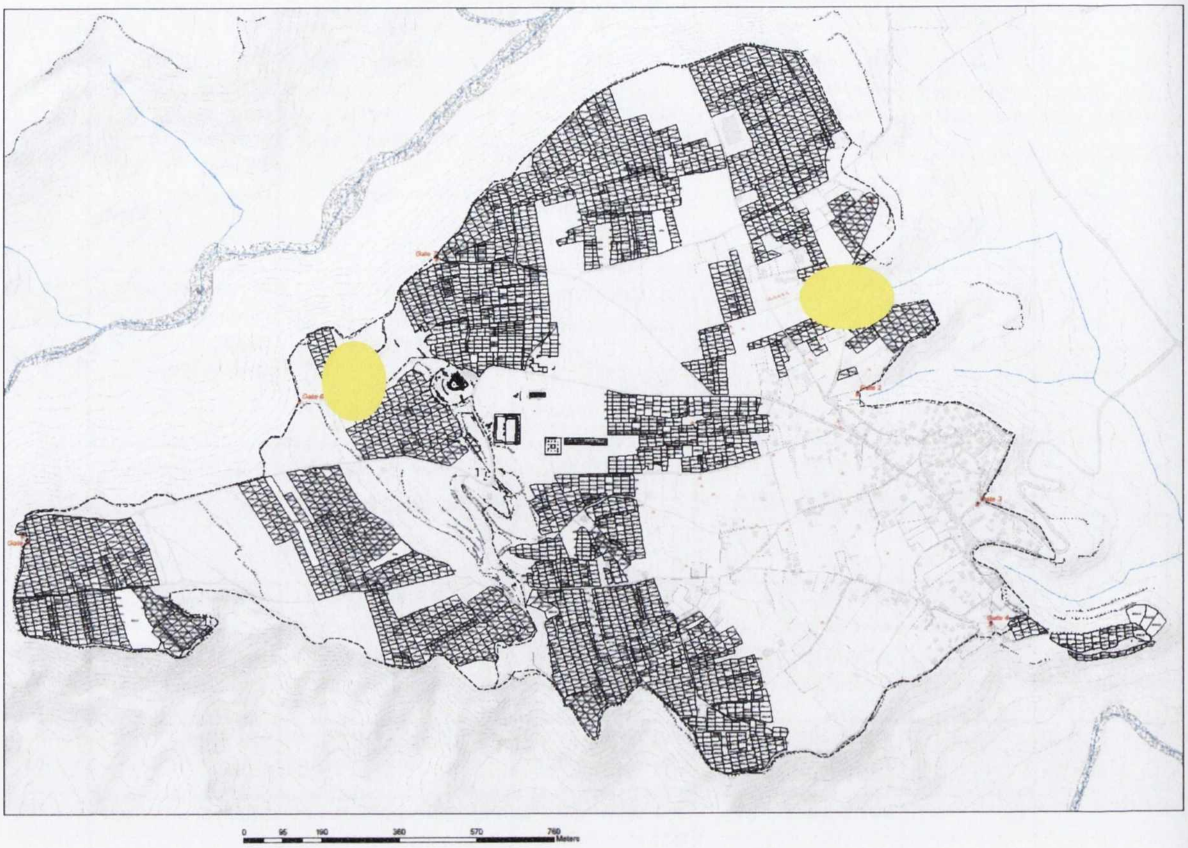


Table 4.1- Concentration Map-
Casserole with Angled Rim and Straight Wall.

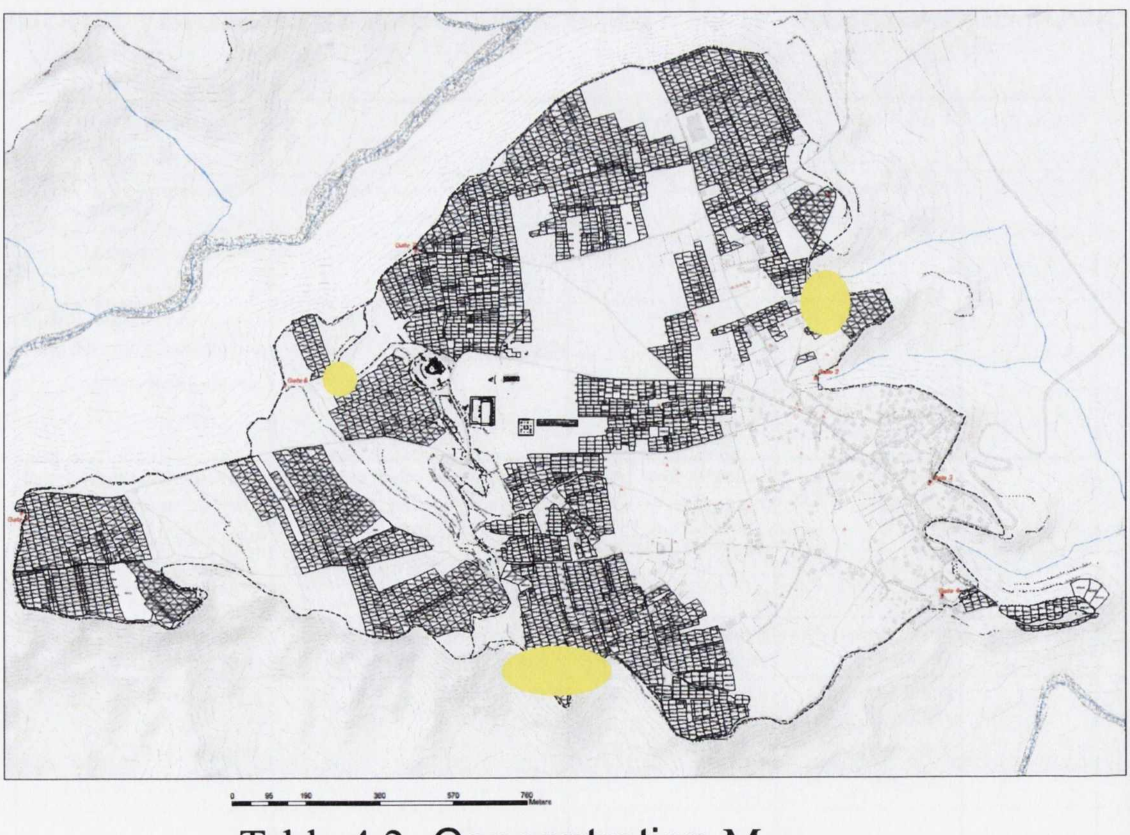


Table 4.2- Concentration Map-
Casseroles with Short, Squared Rims (2-types).

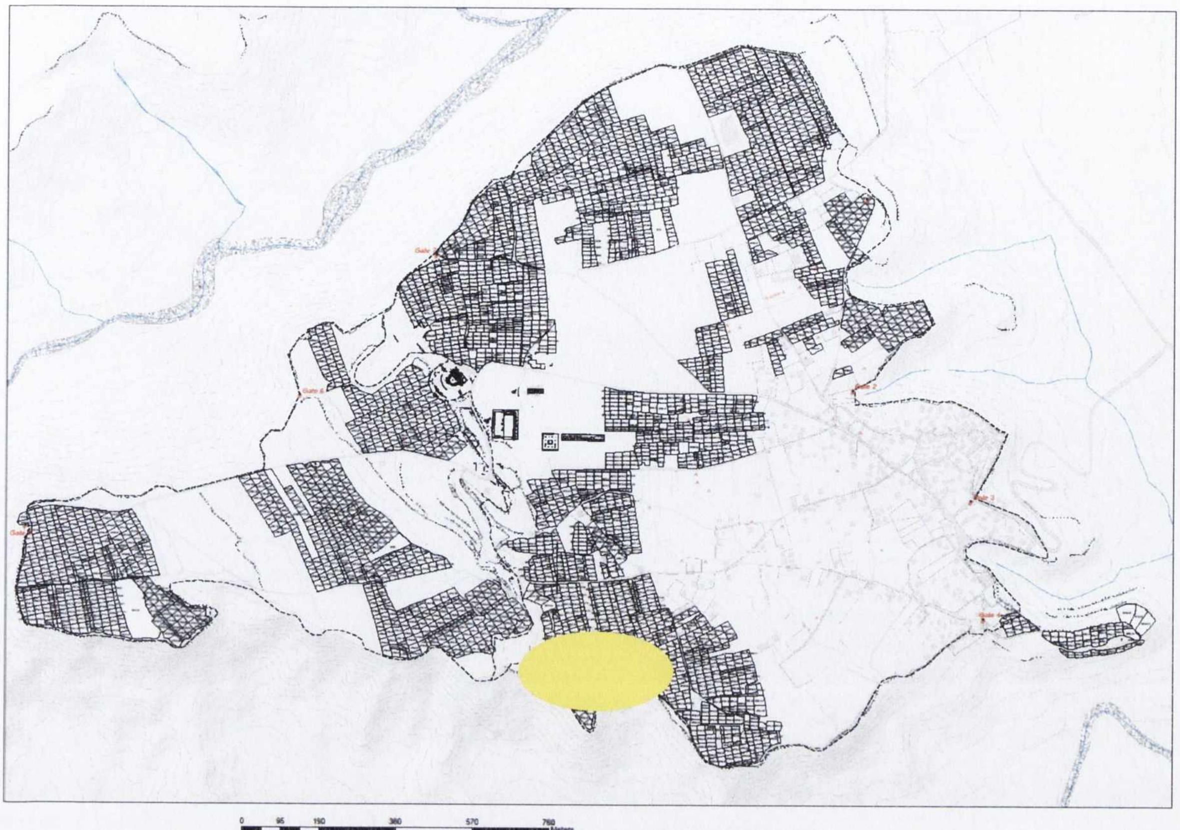


Table 4.3- Concentration Map-
Casserole with Strongly Everted Rim

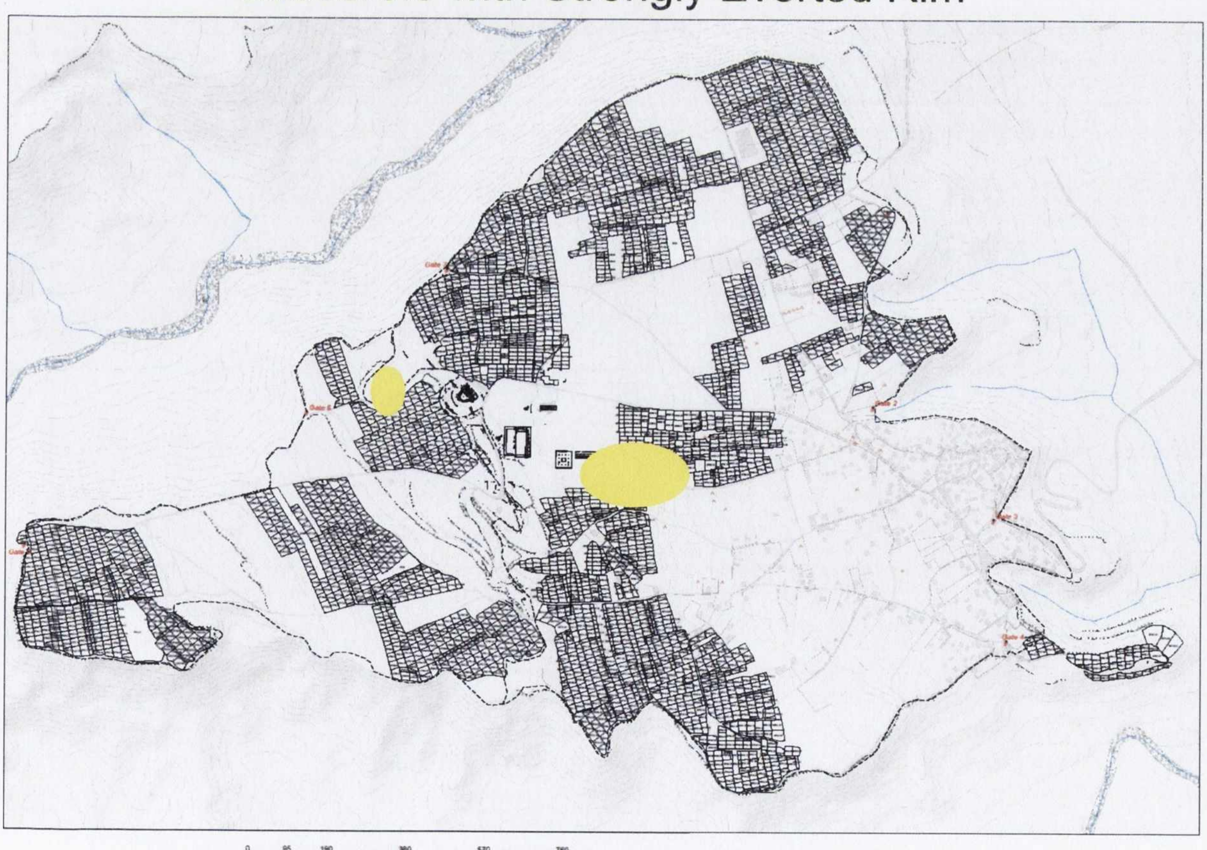


Table 4.4- Concentration Map-
Stew Pot with Flat, Horizontal or Oblique Rim

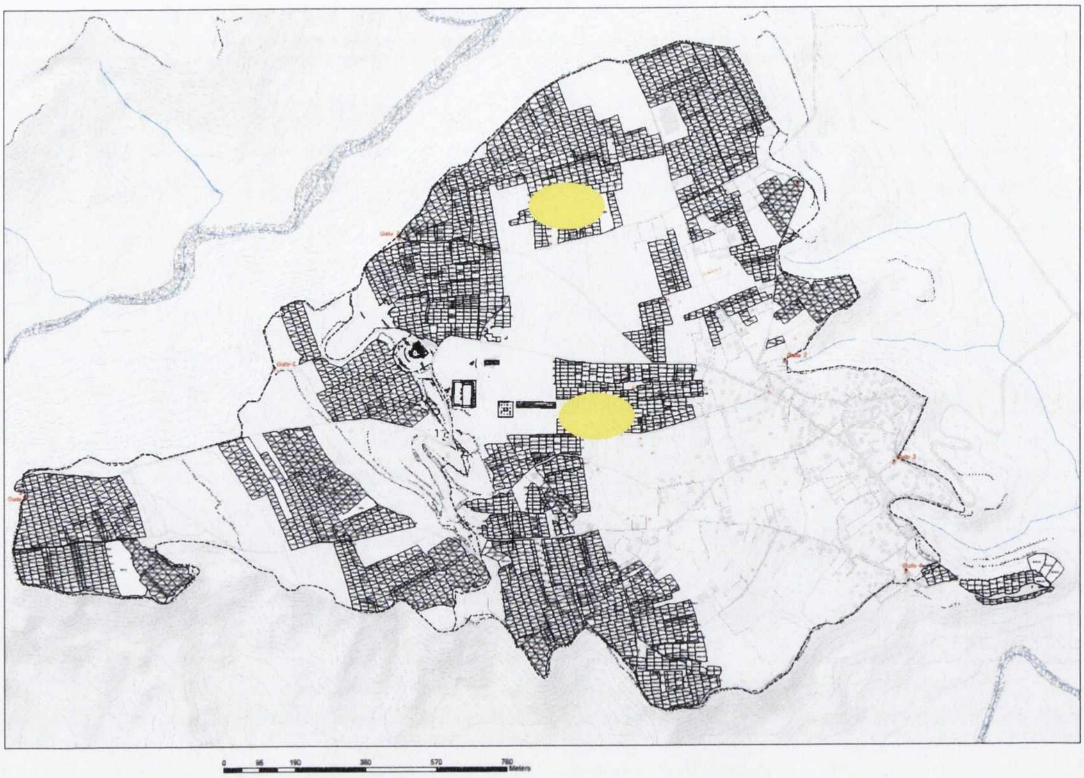


Table 4.5-
Concentration Map- Stew Pot with Short (plain rounded) almost Vertical Rim

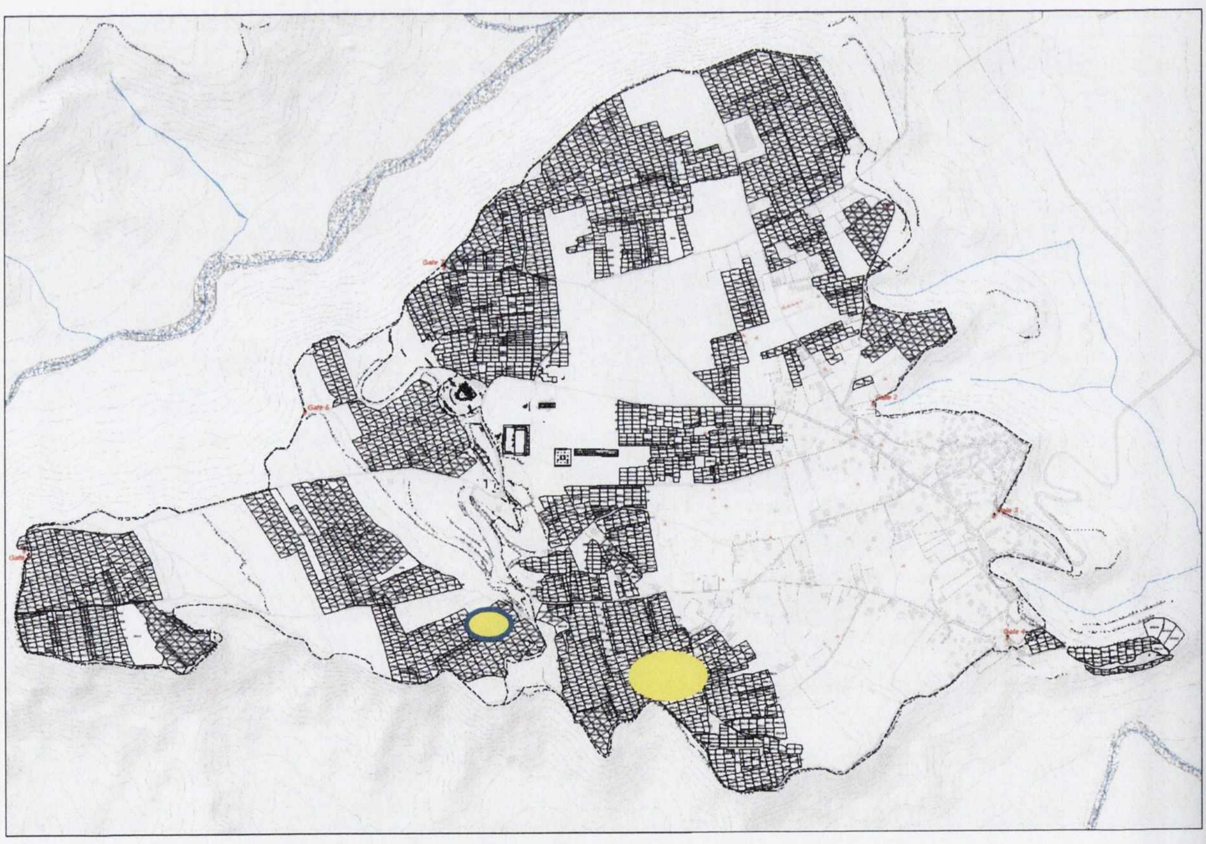


Table 4.6-
Concentration Map- Jug with Round or Trefoil Mouth

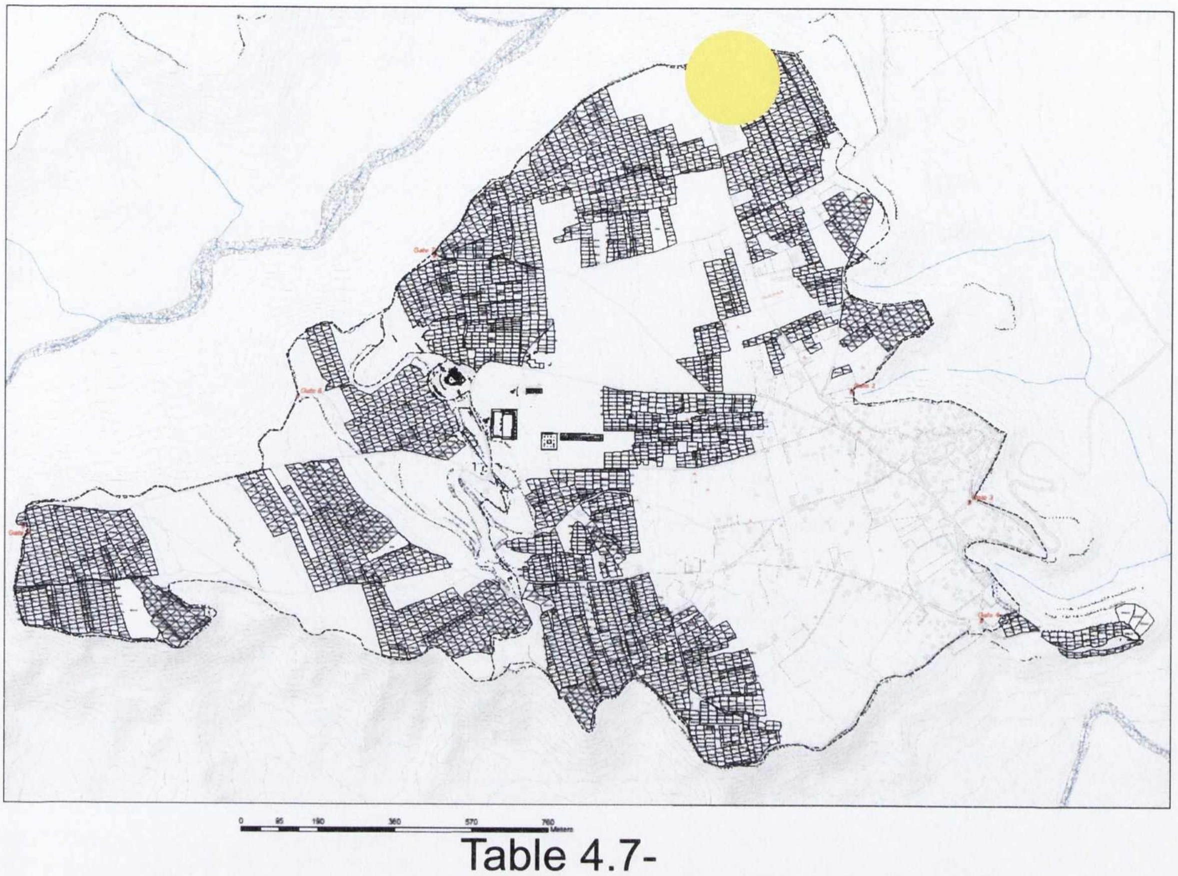


Table 4.7-
Concentration Map- Jug with Flat Horizontal Rim

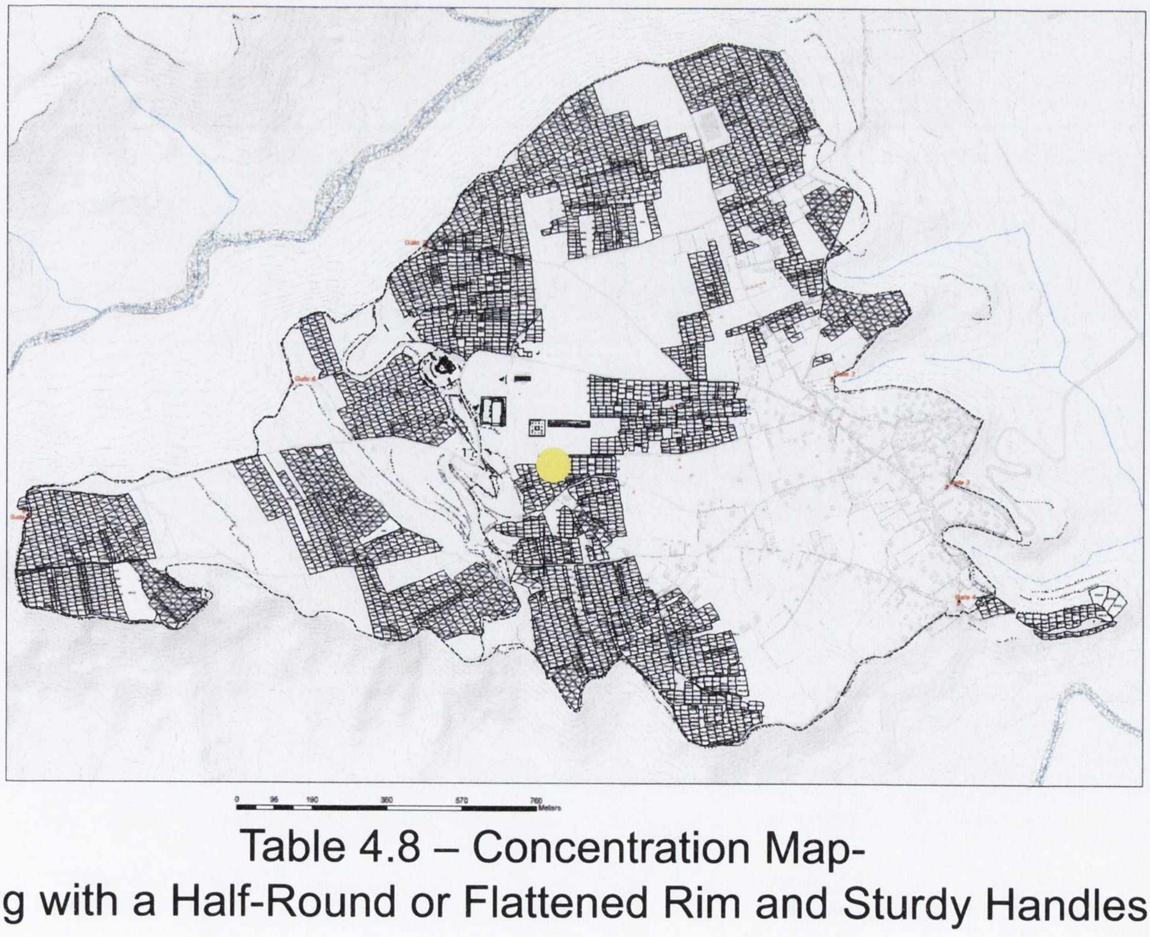


Table 4.8 – Concentration Map-
Jug with a Half-Round or Flattened Rim and Sturdy Handles

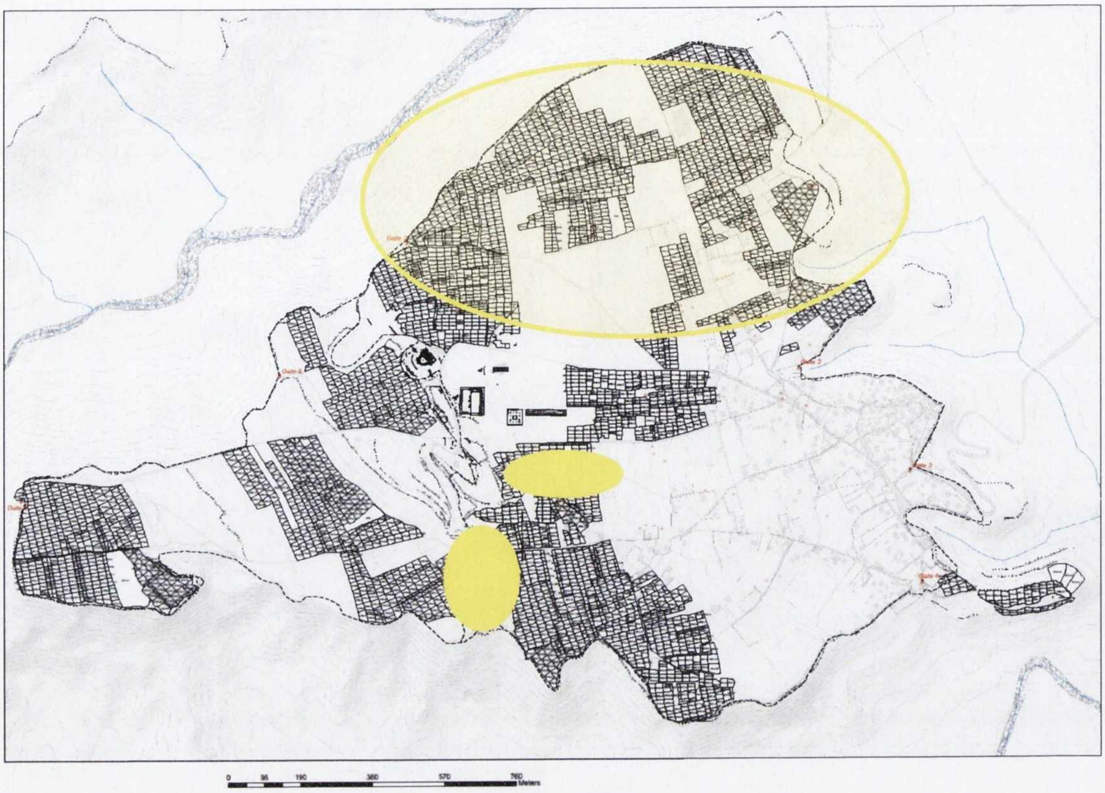


Table 4.9 –
Concentration Map- Krater with Folded Rim

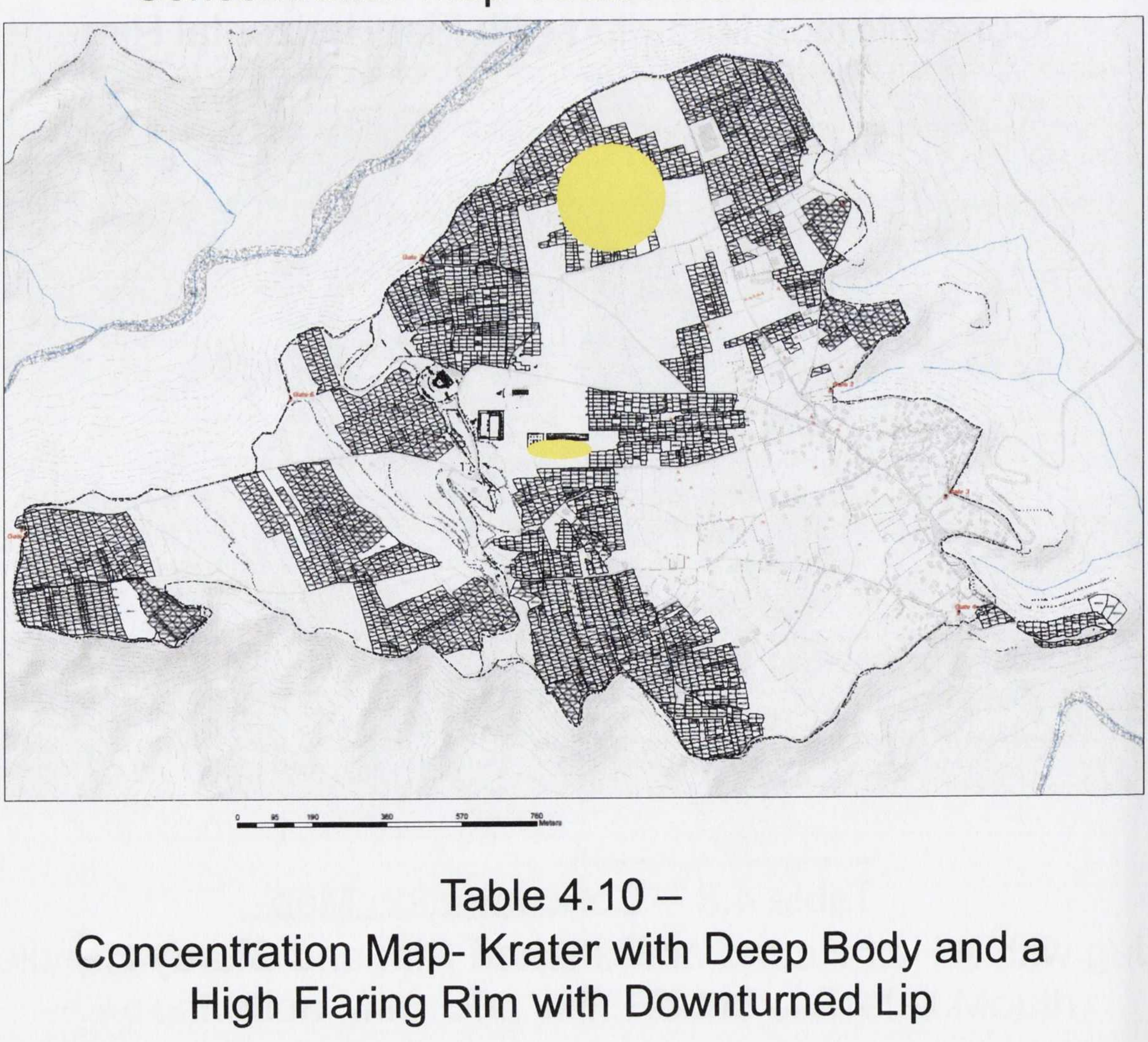


Table 4.10 –
Concentration Map- Krater with Deep Body and a High Flaring Rim with Downturned Lip

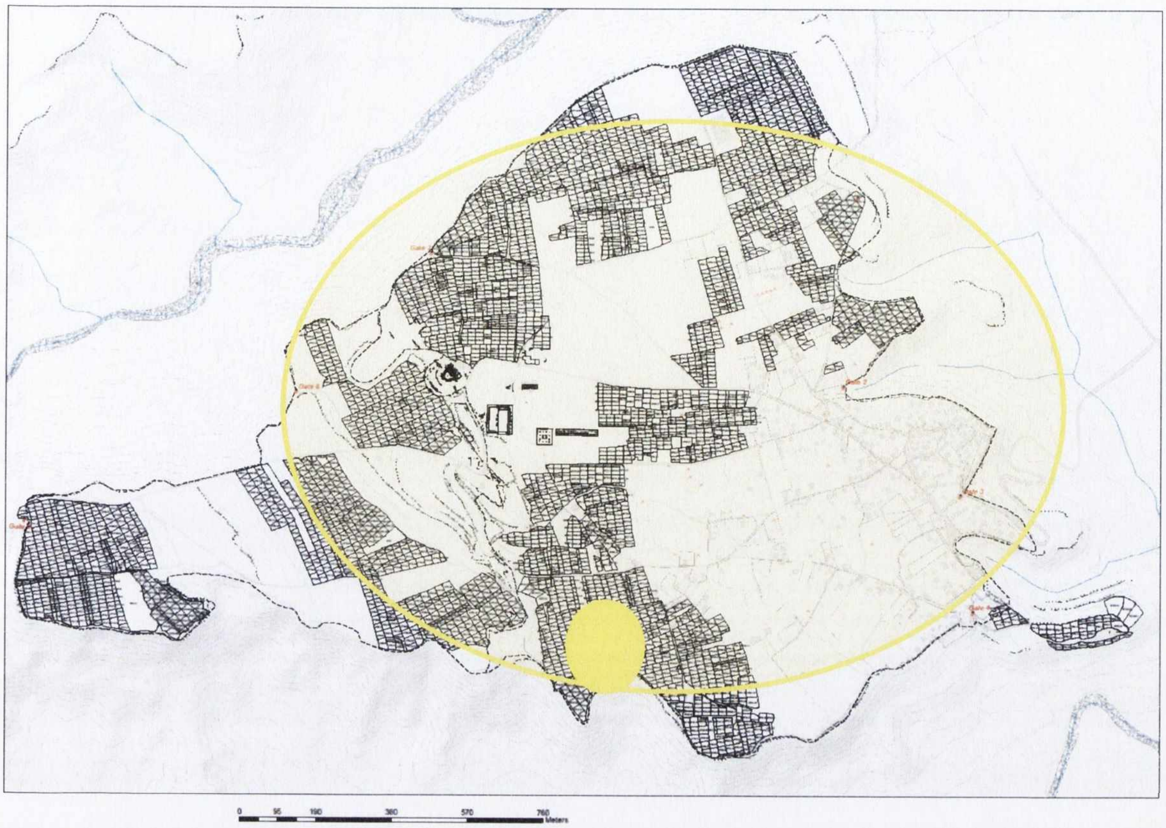


Table 4.11–
Concentration Map- Fusiform Unguentarium

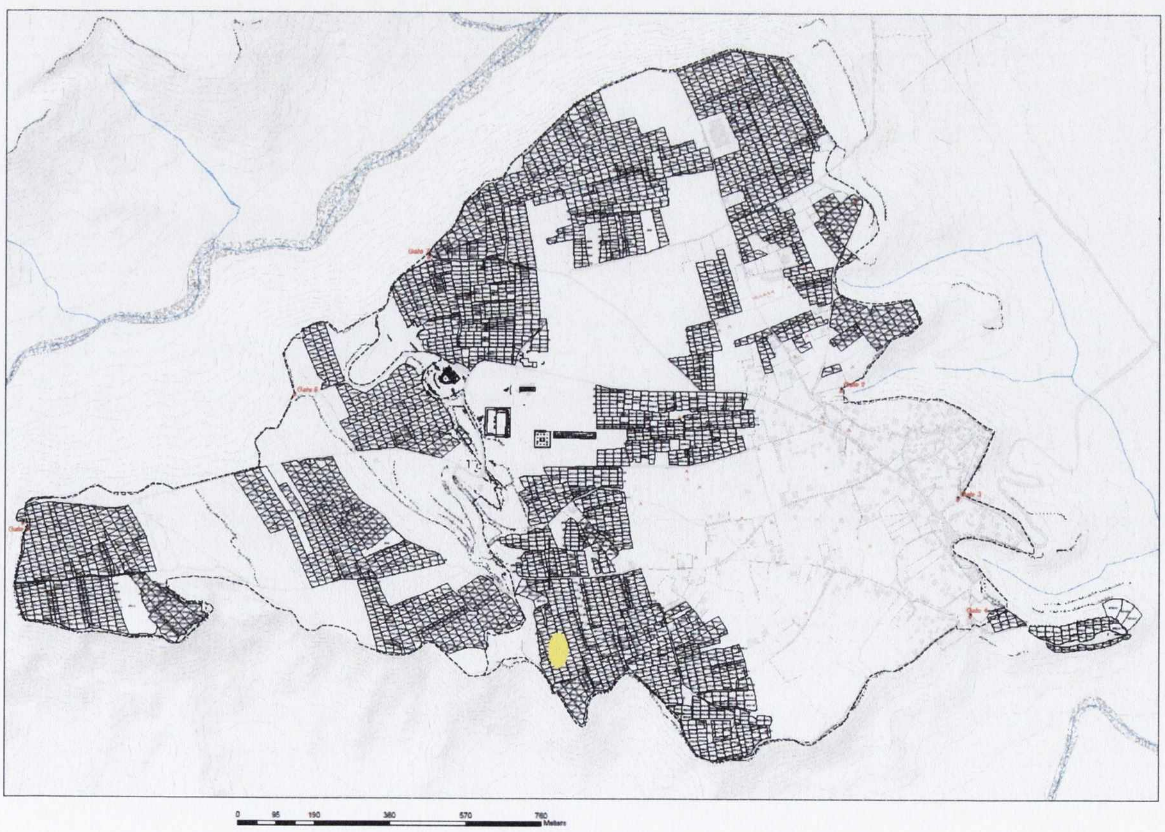


Table 4.12– Concentration Map- Mortarium- Edwards' II Type

	Count	Count %	Weight	Weight %
Sikyonian Silicate Fabric	74444	82.80%	408893	78.00%
Unknown/Small Sherds	7029	7.80%	32585	6.20%
Architectural fabric	2310	2.50%	32913	6.20%
Pale with Fine	1572	1.70%	7221	1.40%
Beige with Fine	588	0.60%	2244	0.40%
Orange with Fine	474	0.50%	2065	0.40%
Hard Beige Fabric	447	0.05%	3436	0.70%
Powdery Pink with Fine	322	0.30%	3540	0.70%
Sharp Beige Fine	179	0.20%	3140	0.60%
Orange with Mica	169	0.20%	1120	0.20%

Table 4.13 – Proportions of Ceramic Fabric Groups

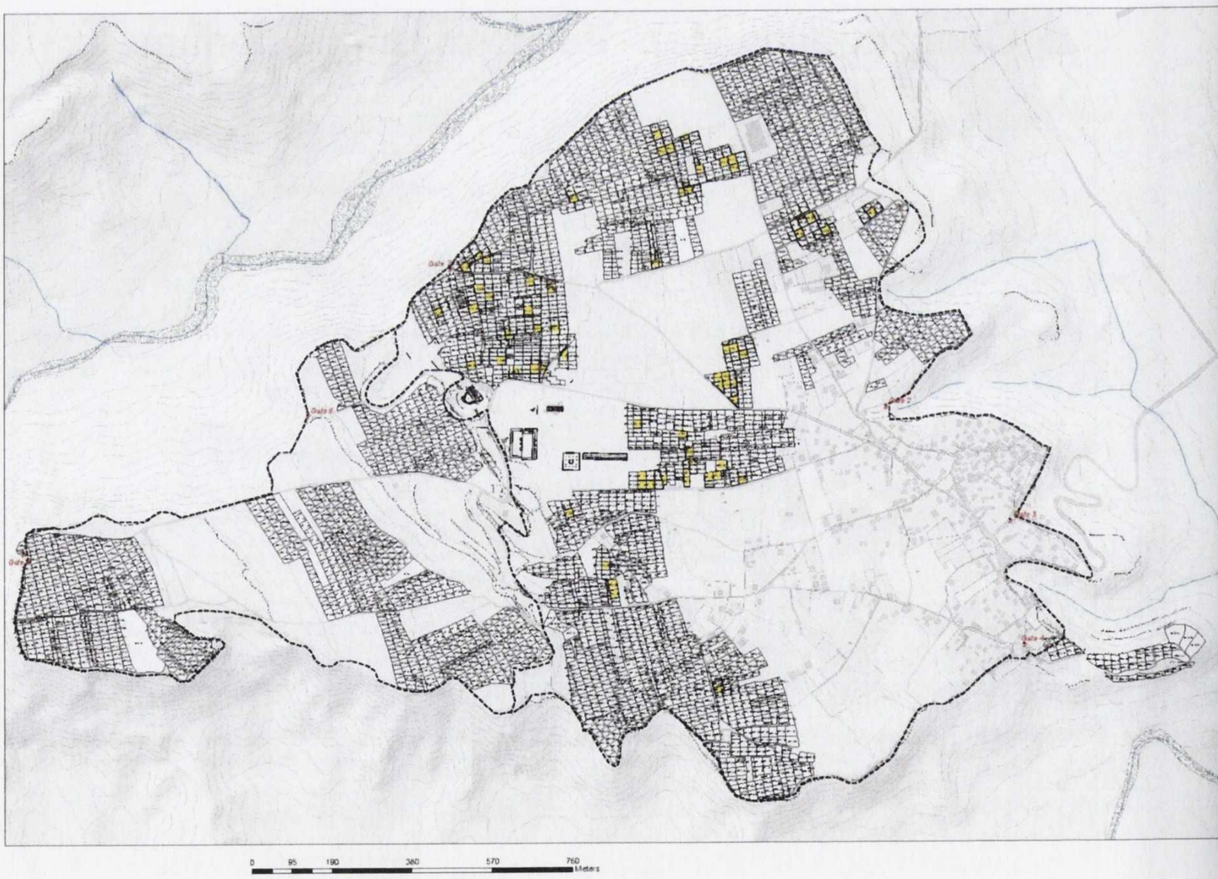


Table 4.14-
Distribution Map- Late Roman Cooking Vessels

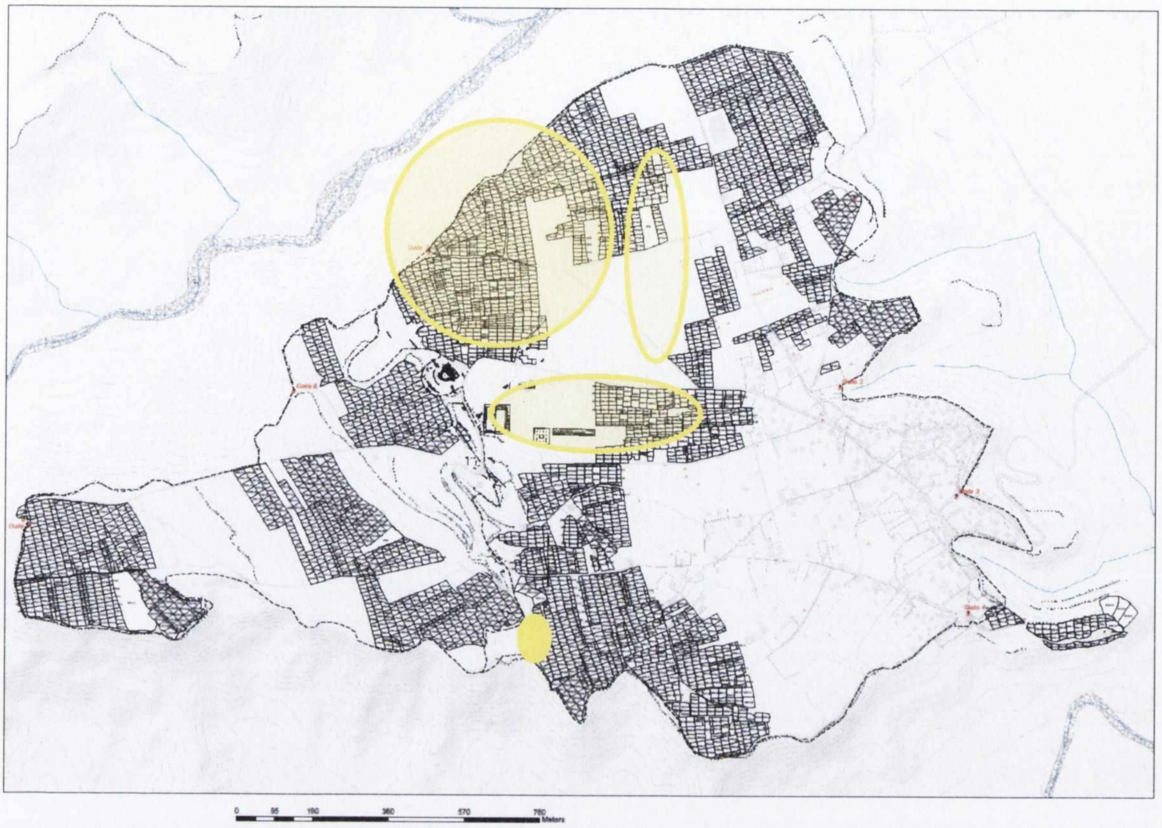


Table 4.15- Concentration Map-
African (Keay 57, 61 and 62) Imitations

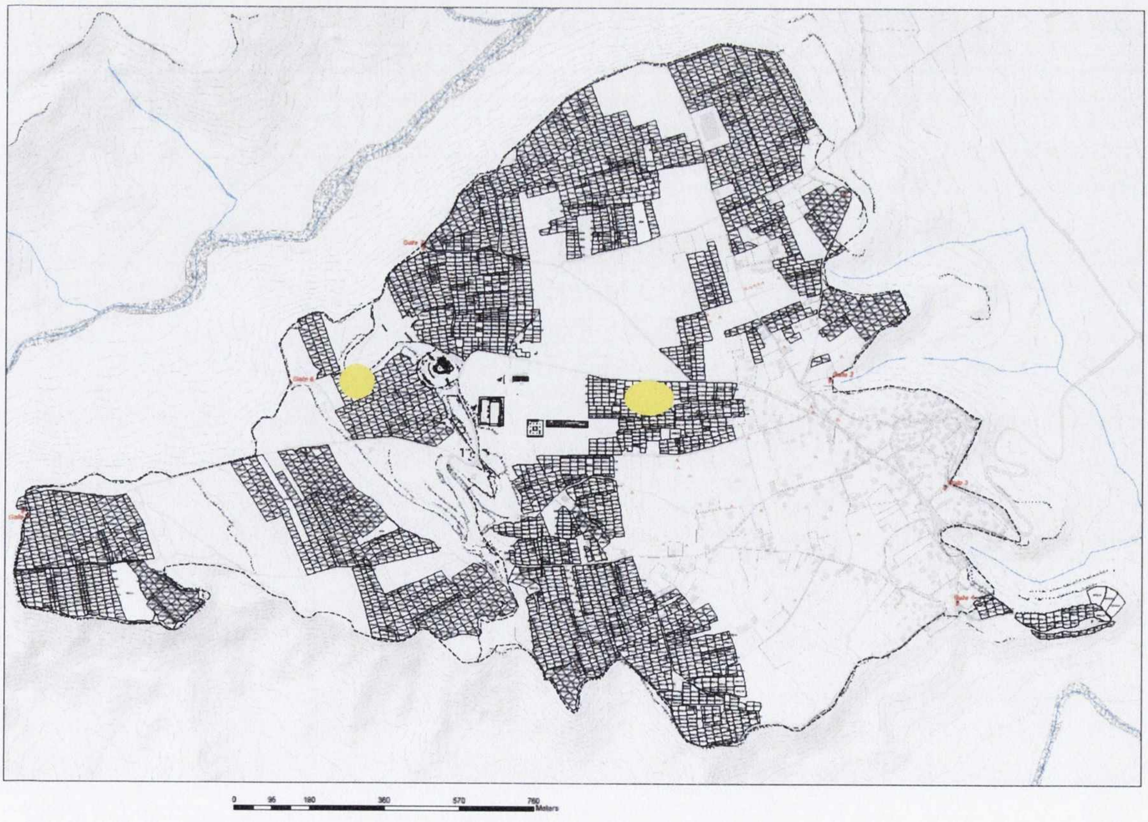


Table 4.16- Distribution Map LRA2

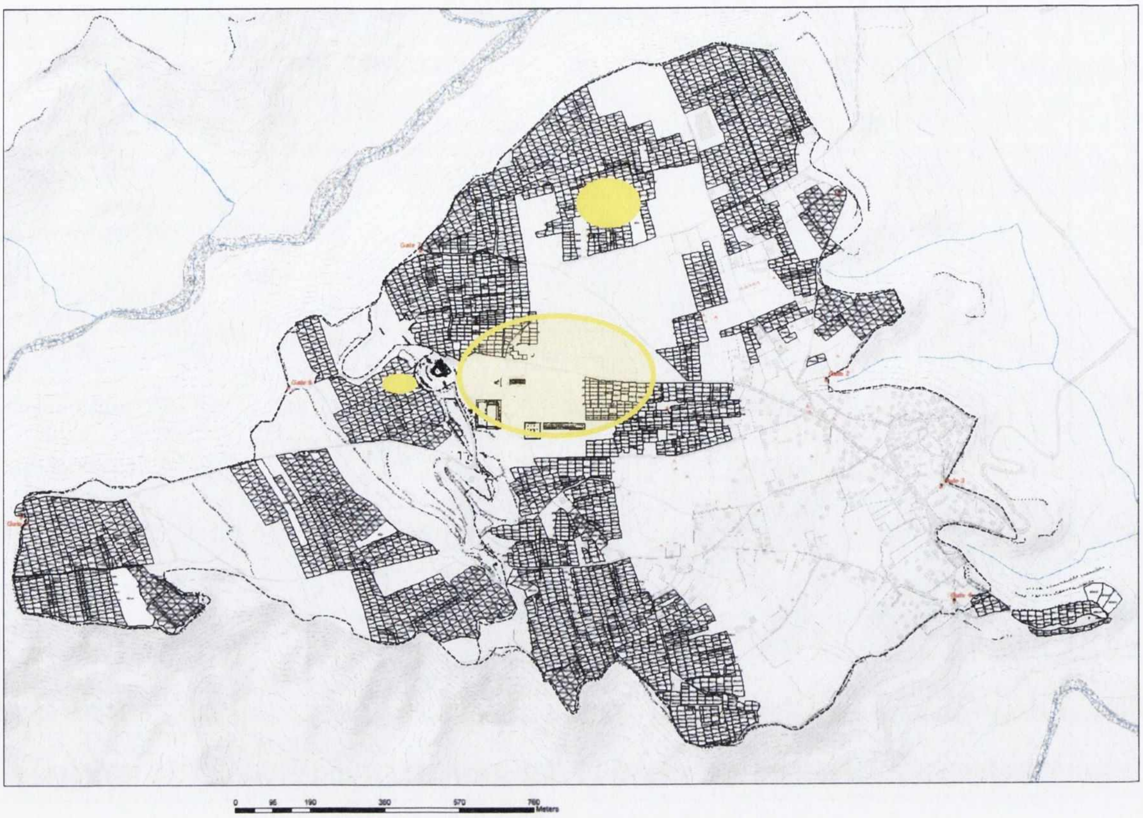


Table 4.17- Concentration Map- Niederbieber 77 Amphora

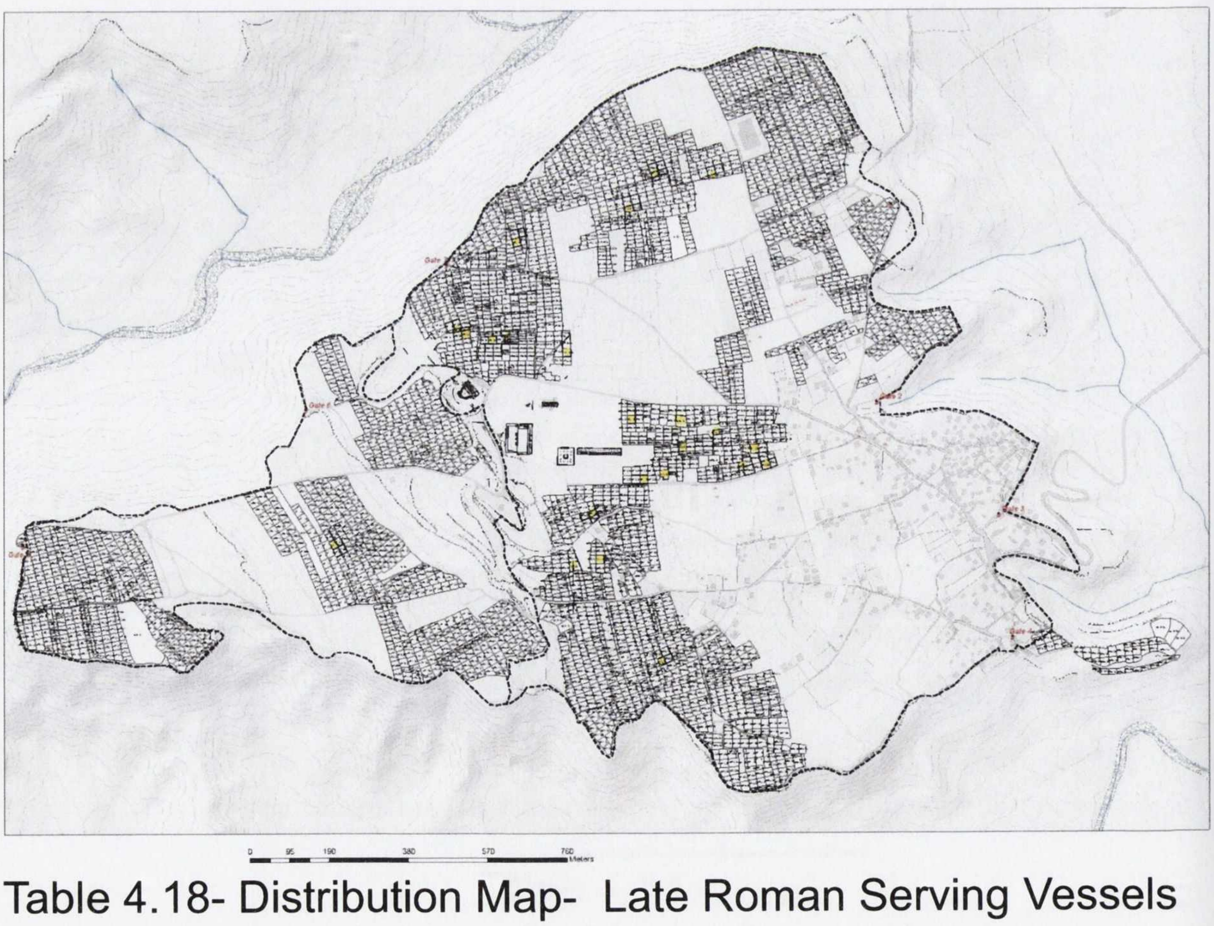


Table 4.18- Distribution Map- Late Roman Serving Vessels

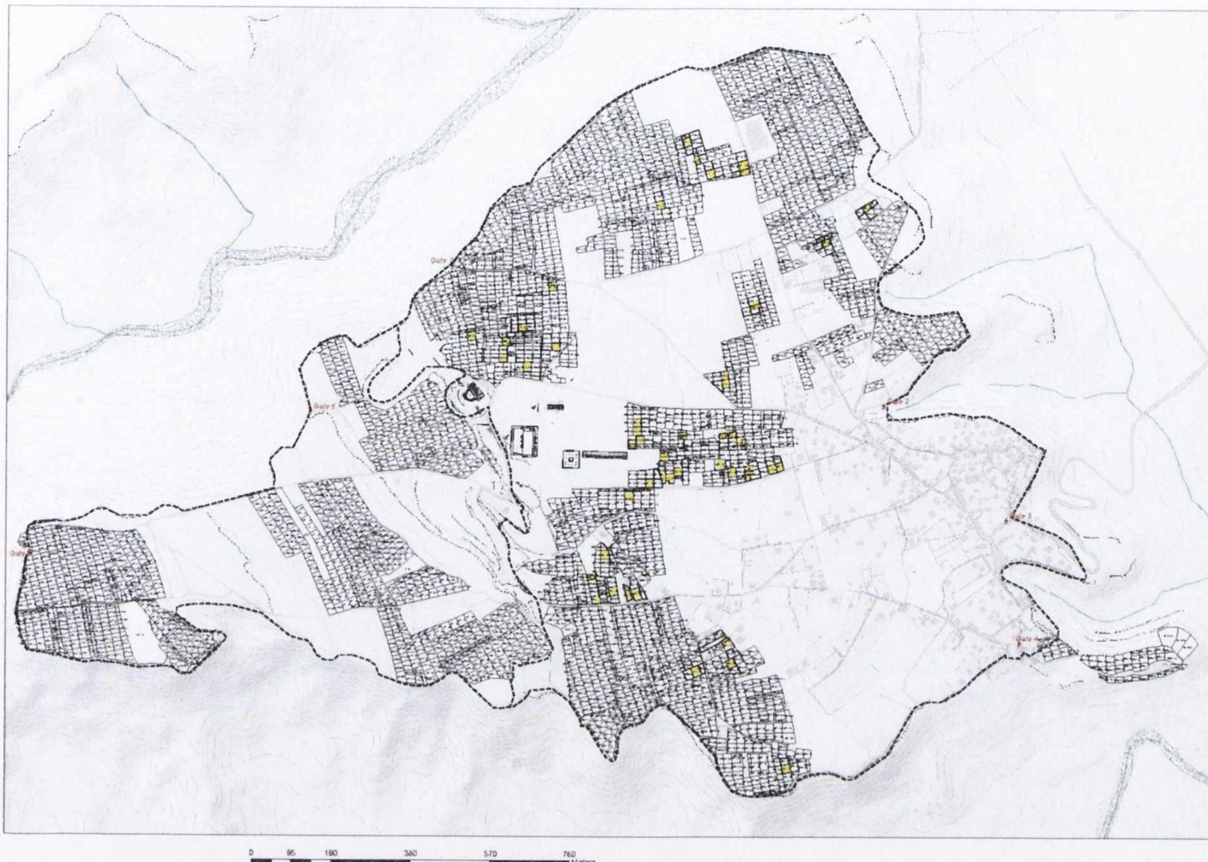


Table 4.19- Distribution Map-
Late Roman Utilitarian Shapes

	E. Roman	M .Roman	L. Roman	E. Byzantine
Most Common	Transport	Utilitarian	Transport	Cooking
	Utilitarian	Cooking	Cooking	Serving
	Cooking	Transport	Serving	Transport
Least Common	Serving	Serving	Utilitarian	N/A

Table 4.20-
Diachronic Chart of Proportions of Functional Categories at Sikyon

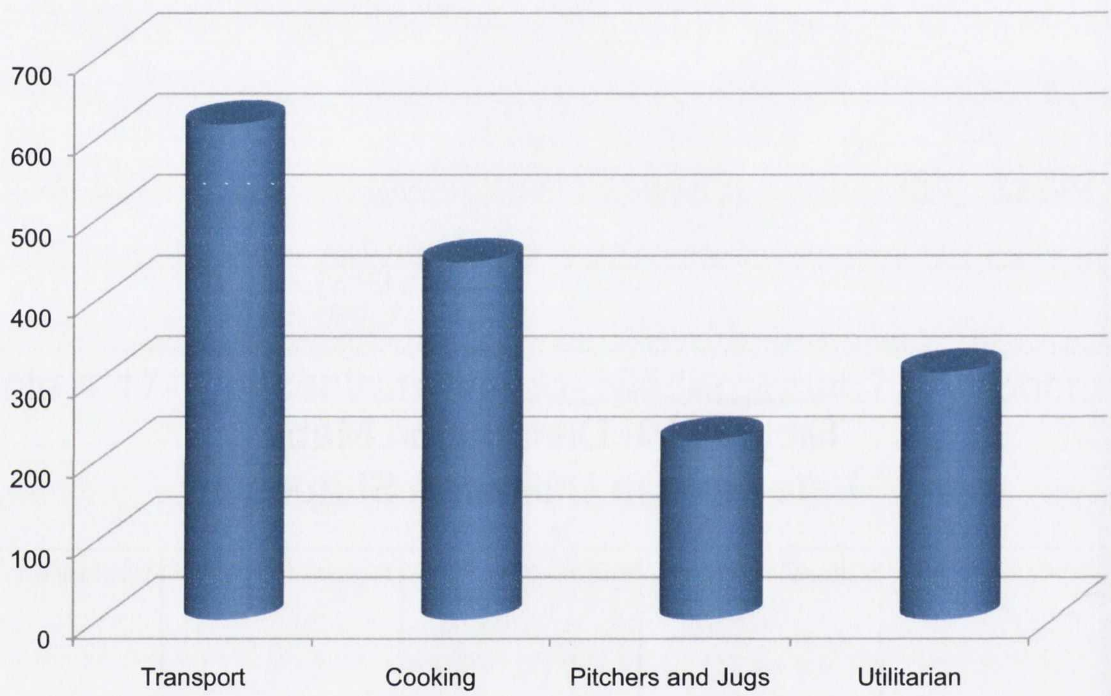


Table 4.21-
Counts of Late Roman Vessels by Functional Category from Sikyon

Subgroup 1a- Typical Sikyonian Silicate Fabric
Subgroup 1b- Silicate Fabric- Exhibiting Evidence of Clay Mixing
Subgroup 1c- Medium Silicate Fabric
Subgroup 1d- Semi-fine Silicate Fabric
Subgroup 1e- Silicate Fabric with Serpentine and Biotite

Table 5.1-
Subgroups within the Sikyonian Silicate Fabric Family

Cooking Vessels from Sikyon
Typical Colour Range
Hellenistic- Brown-Reddish Brown to Red Light-Yellowish Red
Early Roman- Dark Gray-Gray and Light Gray to Brown-Red-Light Red and Reddish
Middle Roman- Reddish Brown and Reddish Yellow, with Dark Gray
Early Byzantine- Dark Gray-Gray and Reddish Brown-Reddish Yellow

Table 5.2- Chart of Colour Variations in Cook Vessels

Transport Vessels from Sikyon

Typical Colour Range

Hellenistic- Very Pale Brown to Light Brown-Pinkish Beige-Red- Reddish Yellow and Gray Brown-Reddish Brown to Red Light-Yellowish Red

Early Roman- No Major Colour Change from Hellenistic Roman

Middle Roman- Light Red and Brownish Gray

Early Byzantine- N/A

Table 5.3- Chart of Colour Variations in Transport Vessels

Serving Vessels from Sikyon

Typical Colour Range

Hellenistic- Reddish Yellow-Red-Light Red.

Early Roman- Gray and Light Yellowish Brown

Middle Roman- Strong Brown and Brownish Yellow

Early Byzantine- Grayish Brown and Red

Table 5.4- Chart of Colour Variations in Serving Vessels

Utilitarian Vessels from Sikyon

Typical Colour Range

Hellenistic- Light Red-Red to Grayish Brown

Early Roman- Red-Reddish Yellow to Brownish-Yellow-
Very Pale Brown

Middle Roman- No Major Colour Change from Early Roman

Early Byzantine- N/A

Table 5.5 -Graph of Colour Variations in Utilitarian Vessels

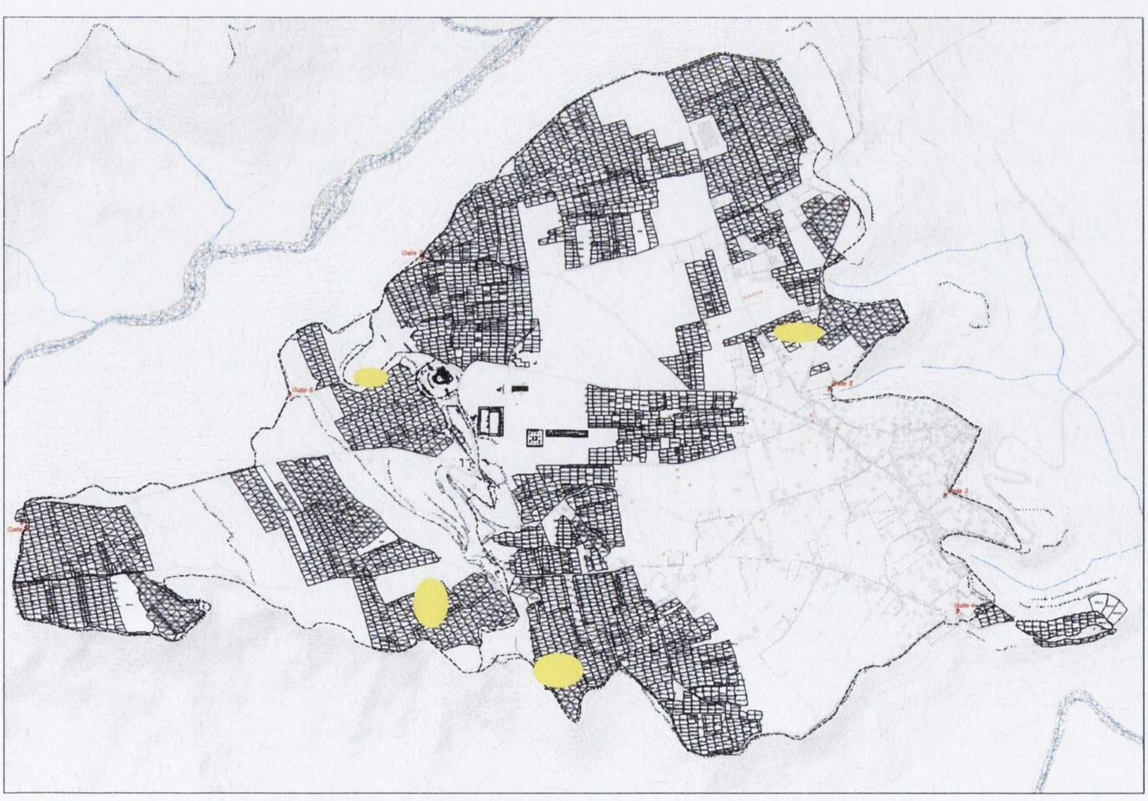
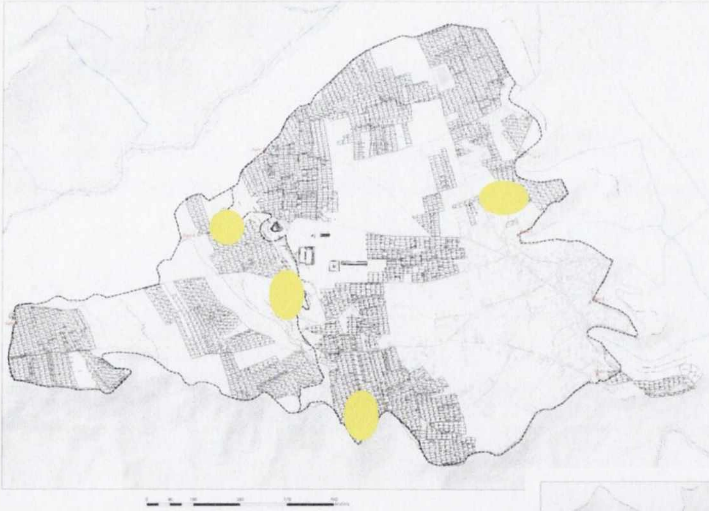
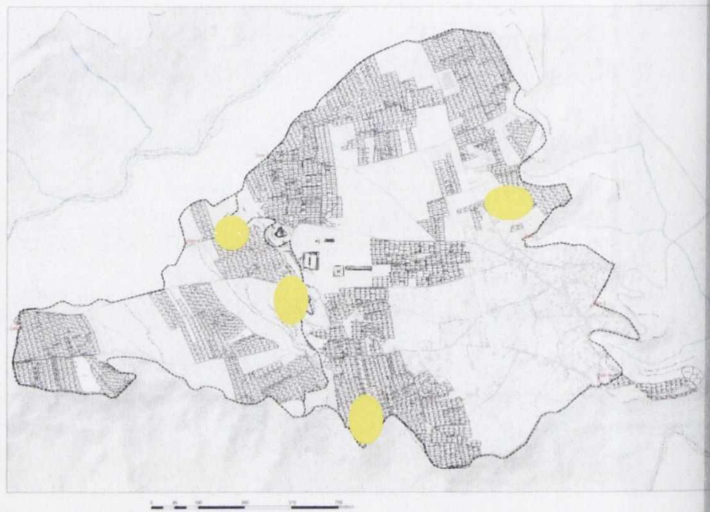


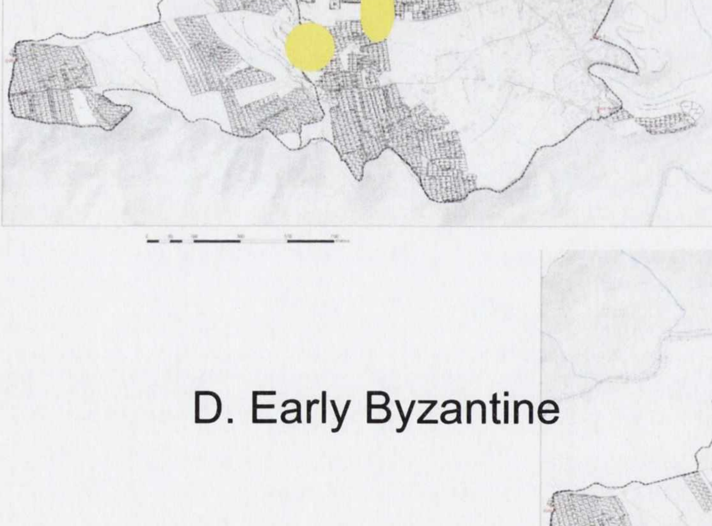
Table 5.6- Concentration Map- Cup Types (mostly non-SSF)



A. Hellenistic

B. Early Roman





C. Middle Roman

D. Early Byzantine

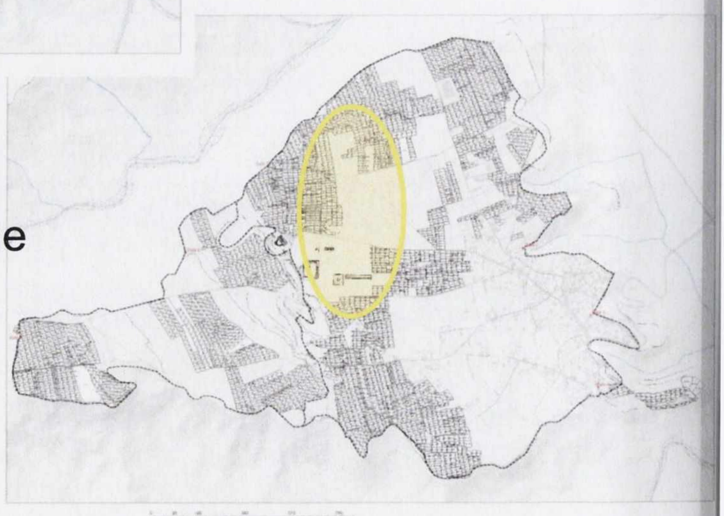
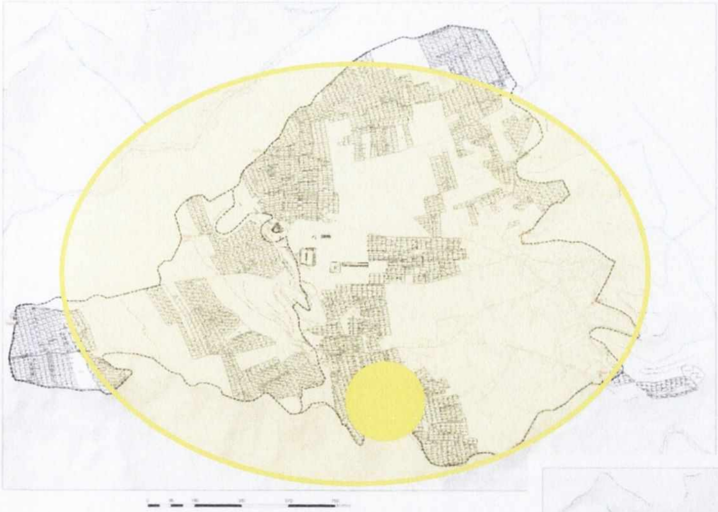
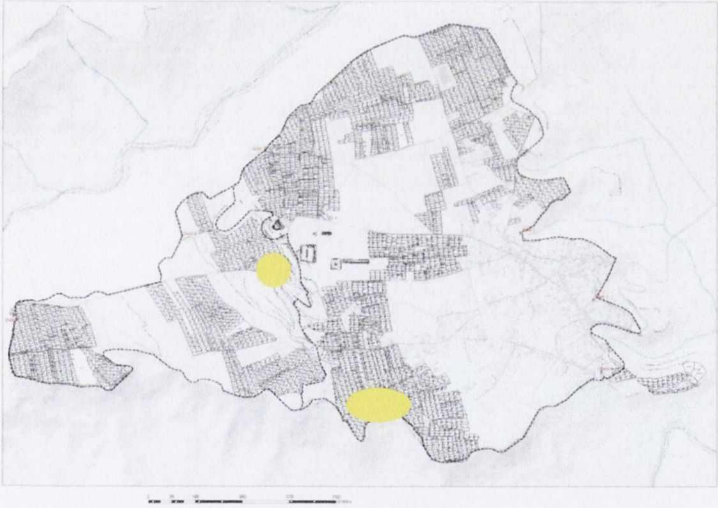


Table 5.7- Concentration Maps- Cooking Vessels



A. Hellenistic

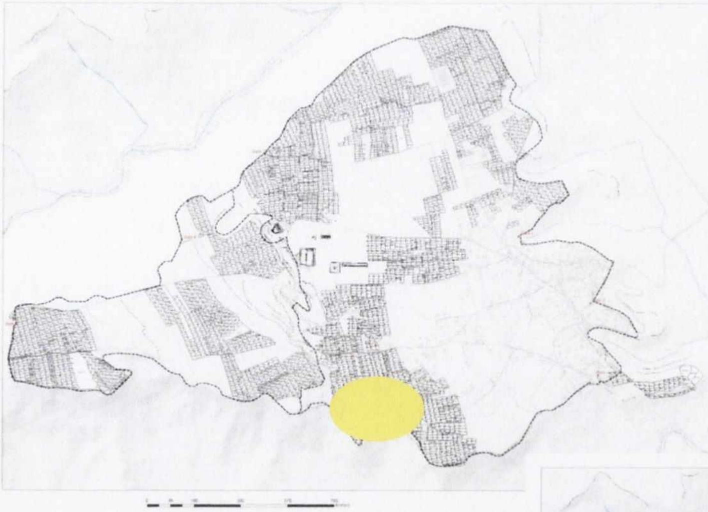
B. Early Roman



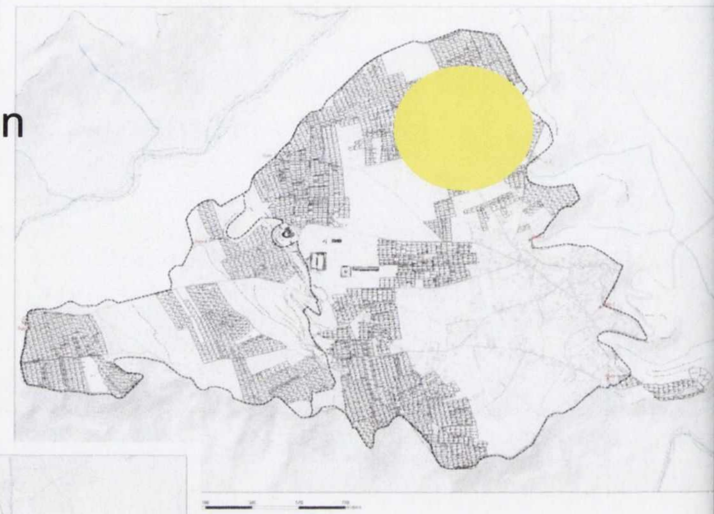
C. Middle Roman

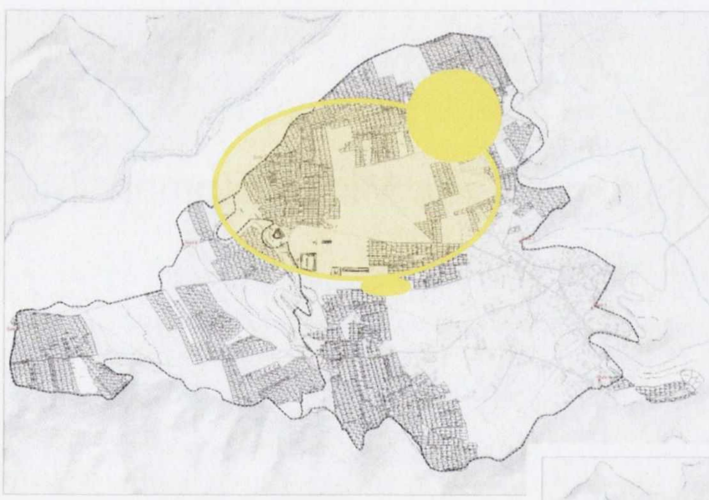
Table 5.8- Concentration Maps- Transport Vessels

A. Hellenistic



B. Early Roman





C. Middle Roman

D. Early Byzantine

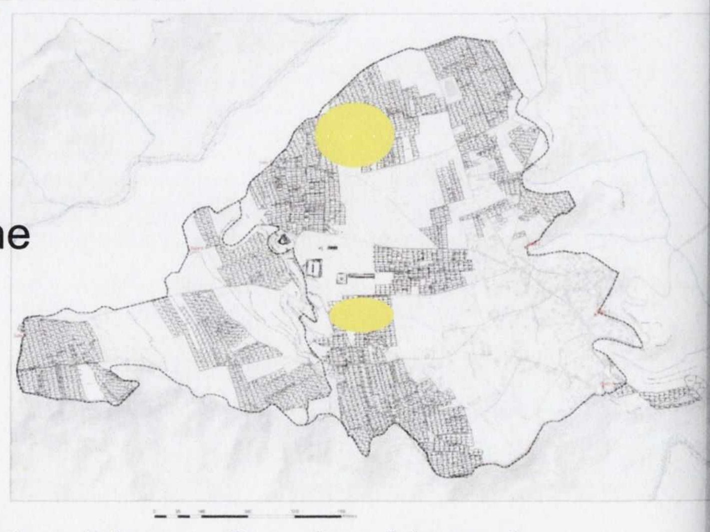
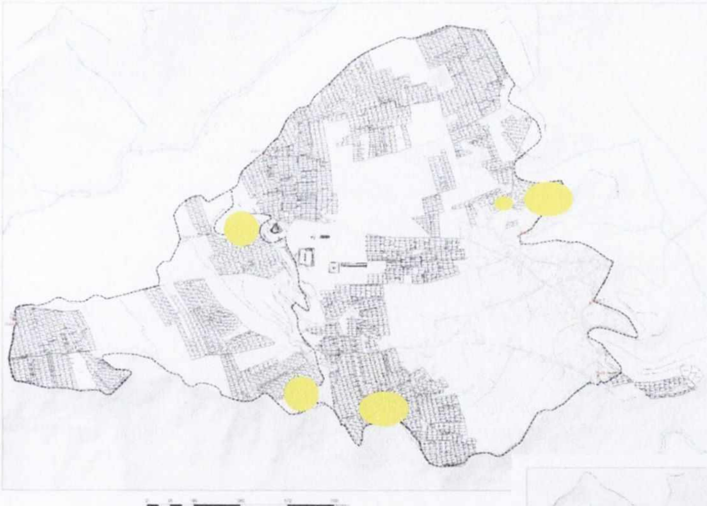
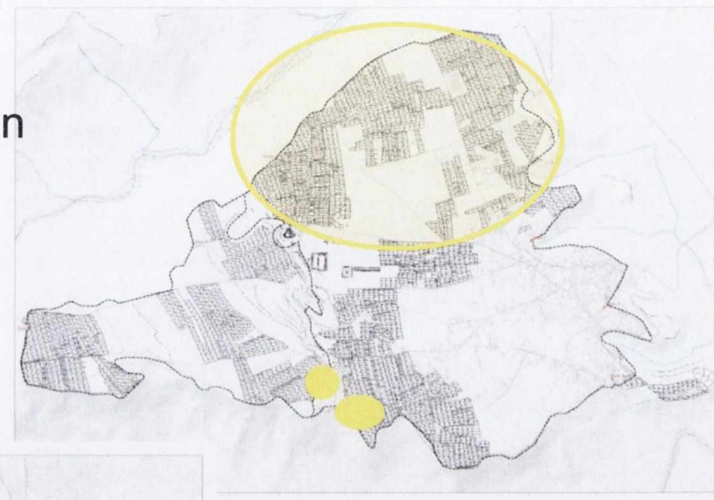


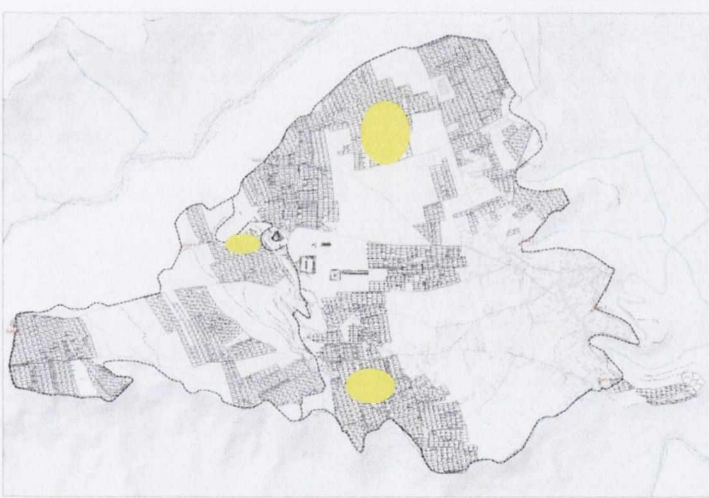
Table 5.9- Concentration Maps- Serving Vessels



A. Hellenistic

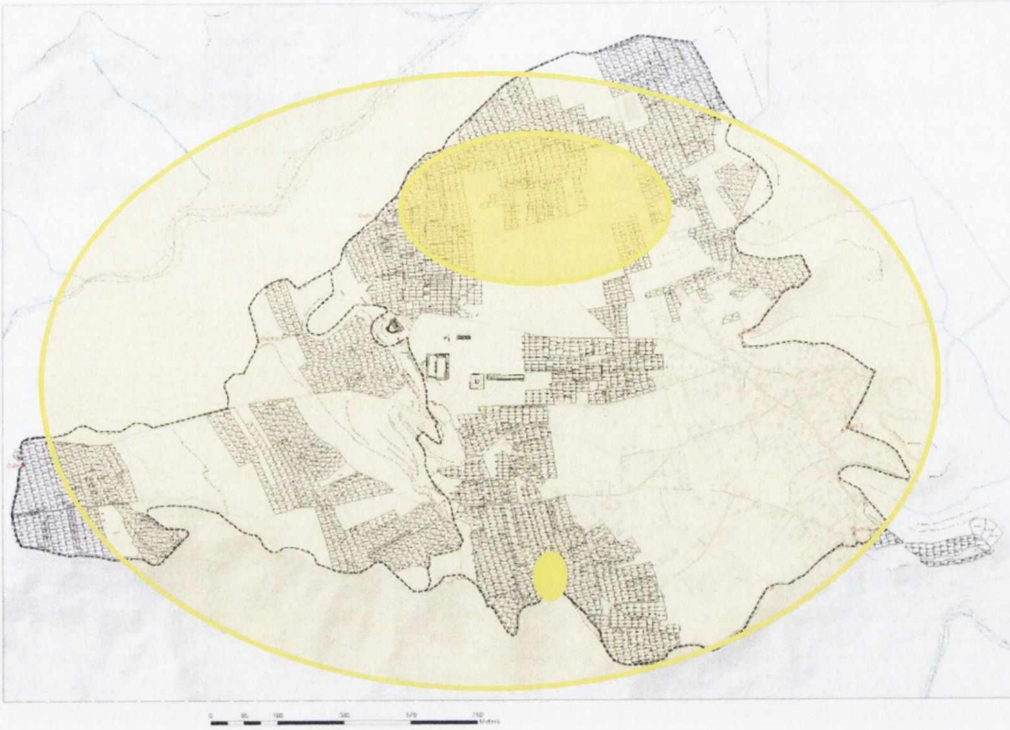
B. Early Roman



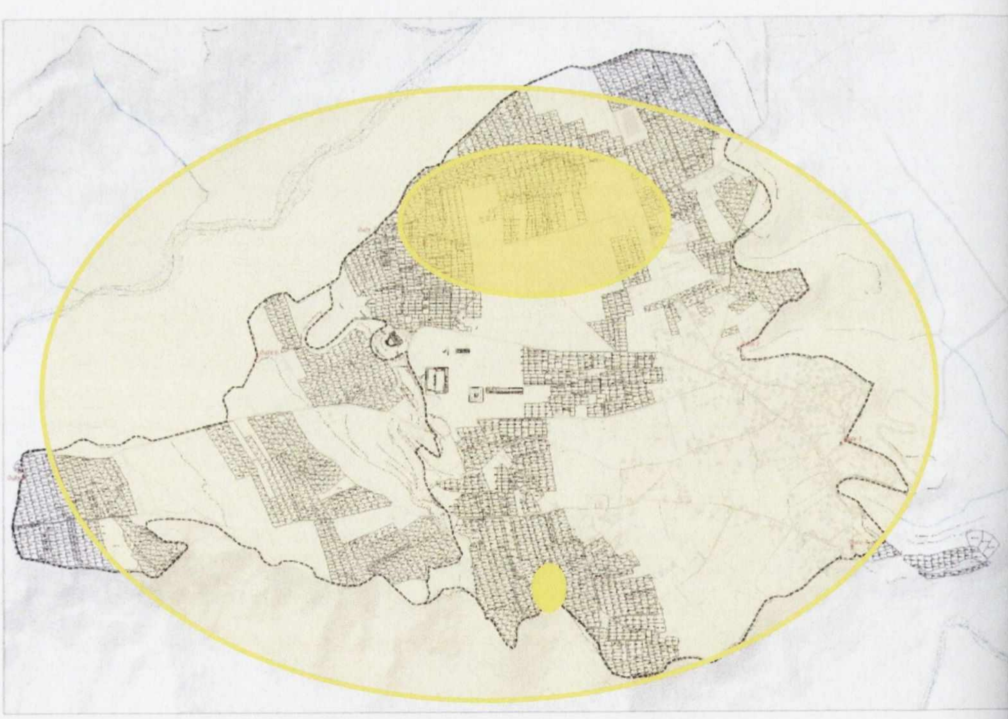


C. Middle Roman

Table 5.10- Concentration Maps- Utilitarian Vessels



A. Hellenistic



B. Early Roman

Table 5.11- Concentration Maps- Cosmetic Vessels

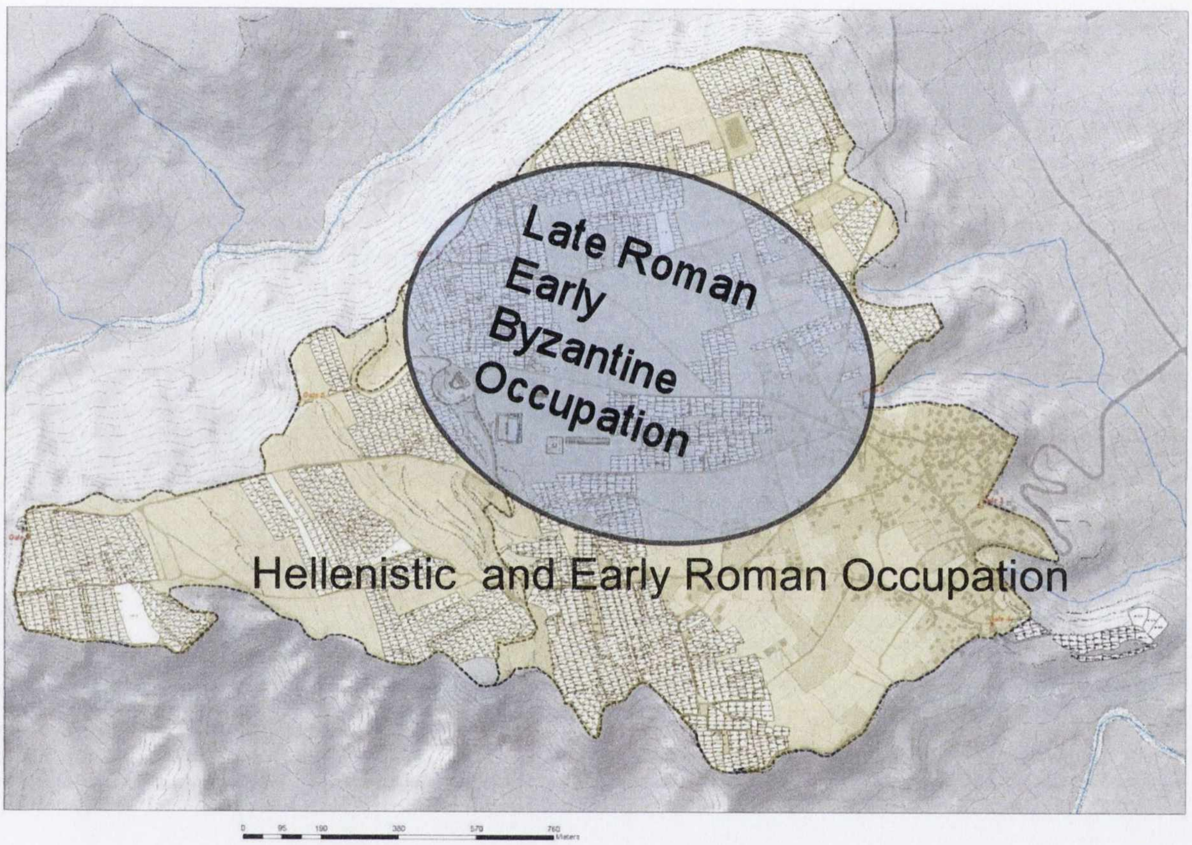


Table 5.12- Habitation and Occupation Phases at Sikyon

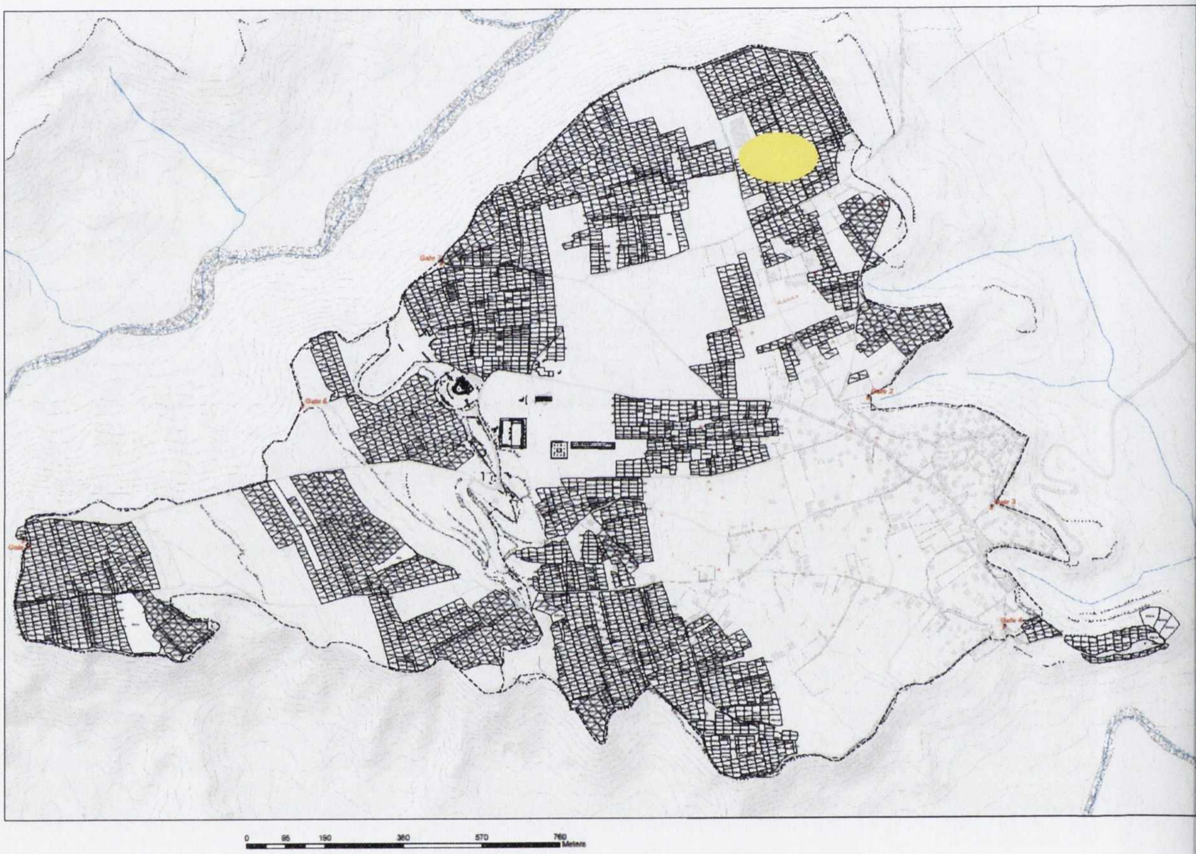


Table 5.13- Distribution Map- Metal Slag Concentration

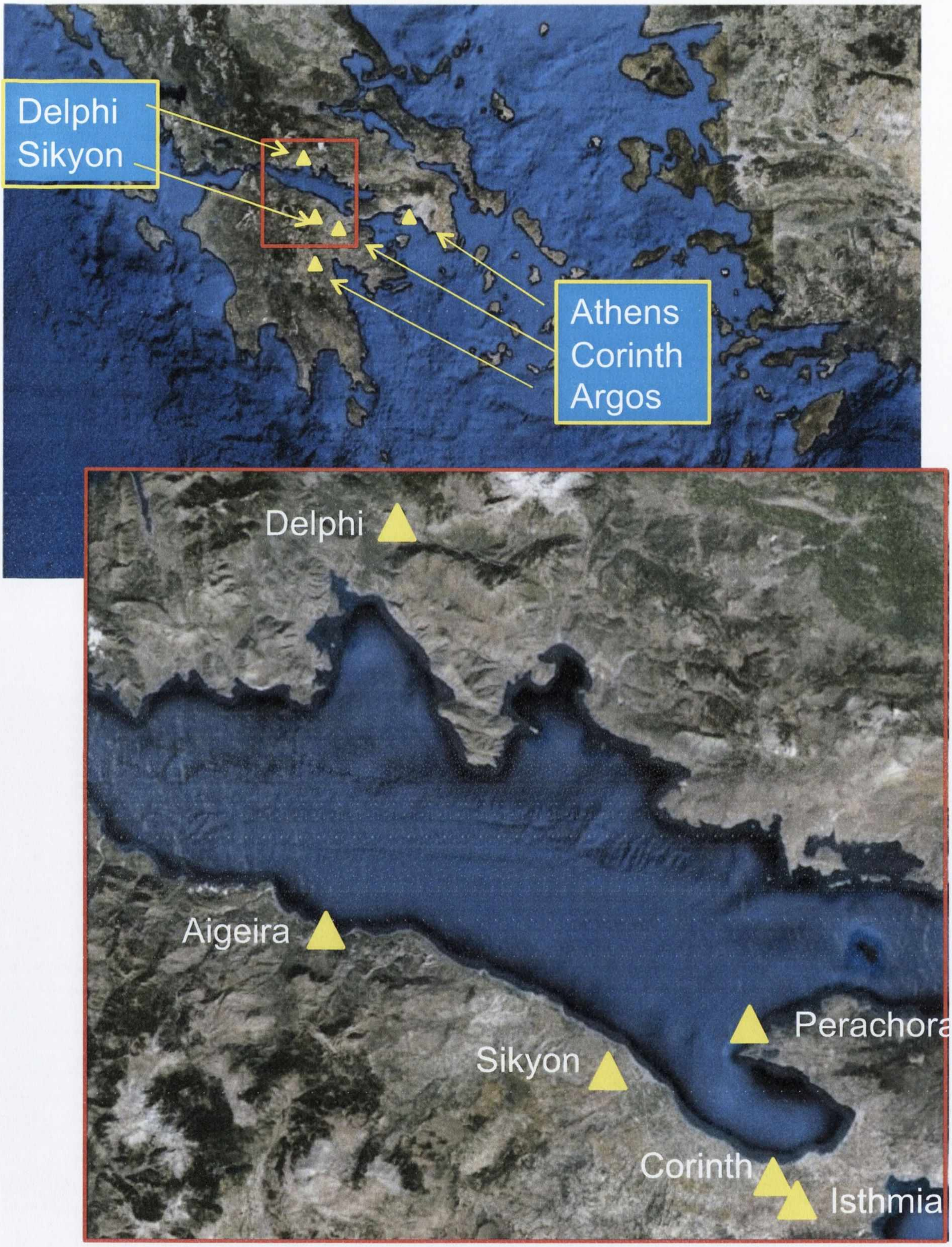


Figure I.1- Placing Sikyon

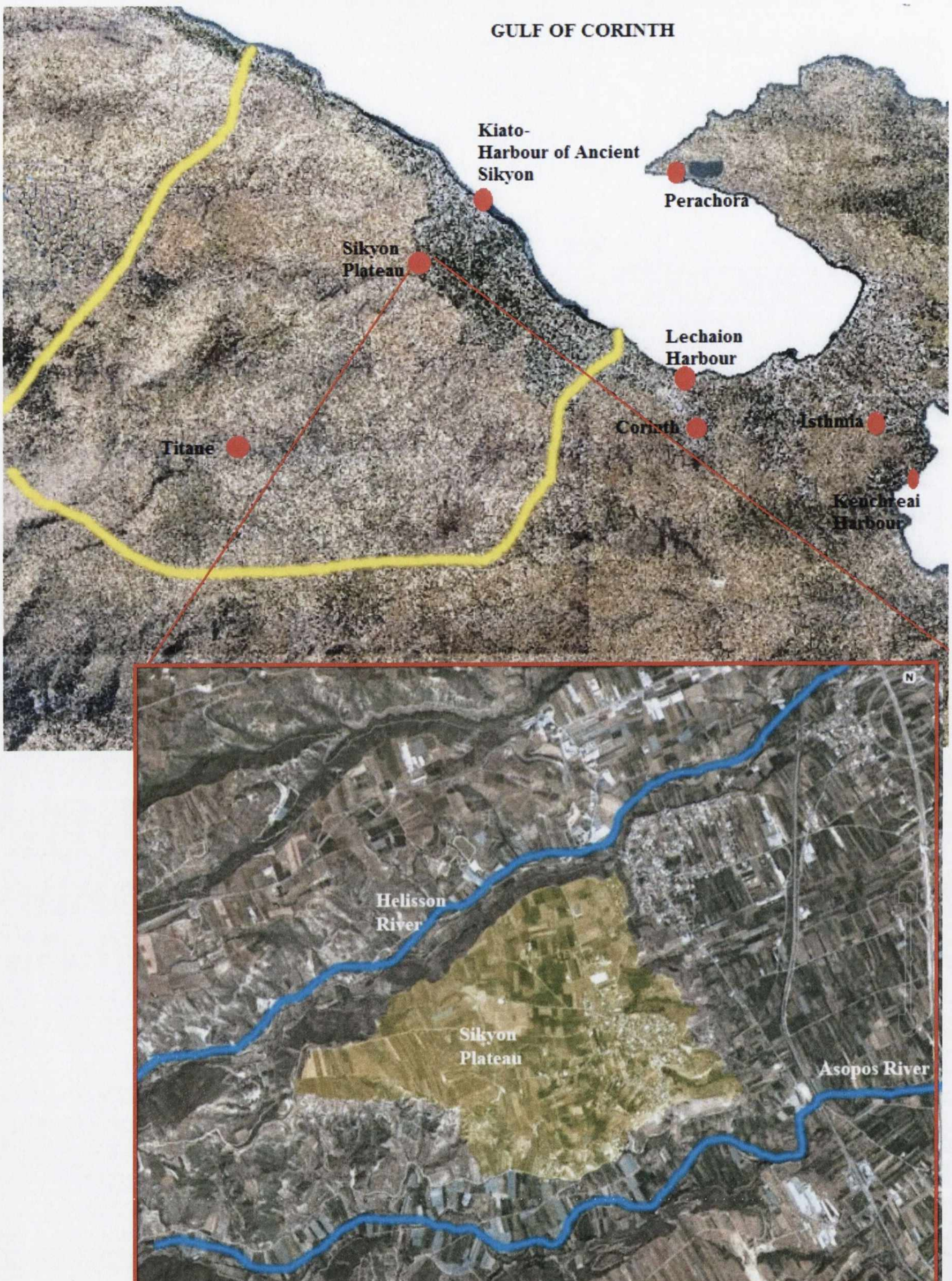


Figure I.2- Approximate Boundaries of the Sikyonia and the Sikyon Plateau

Fig. I.3- Topography of Sikyon

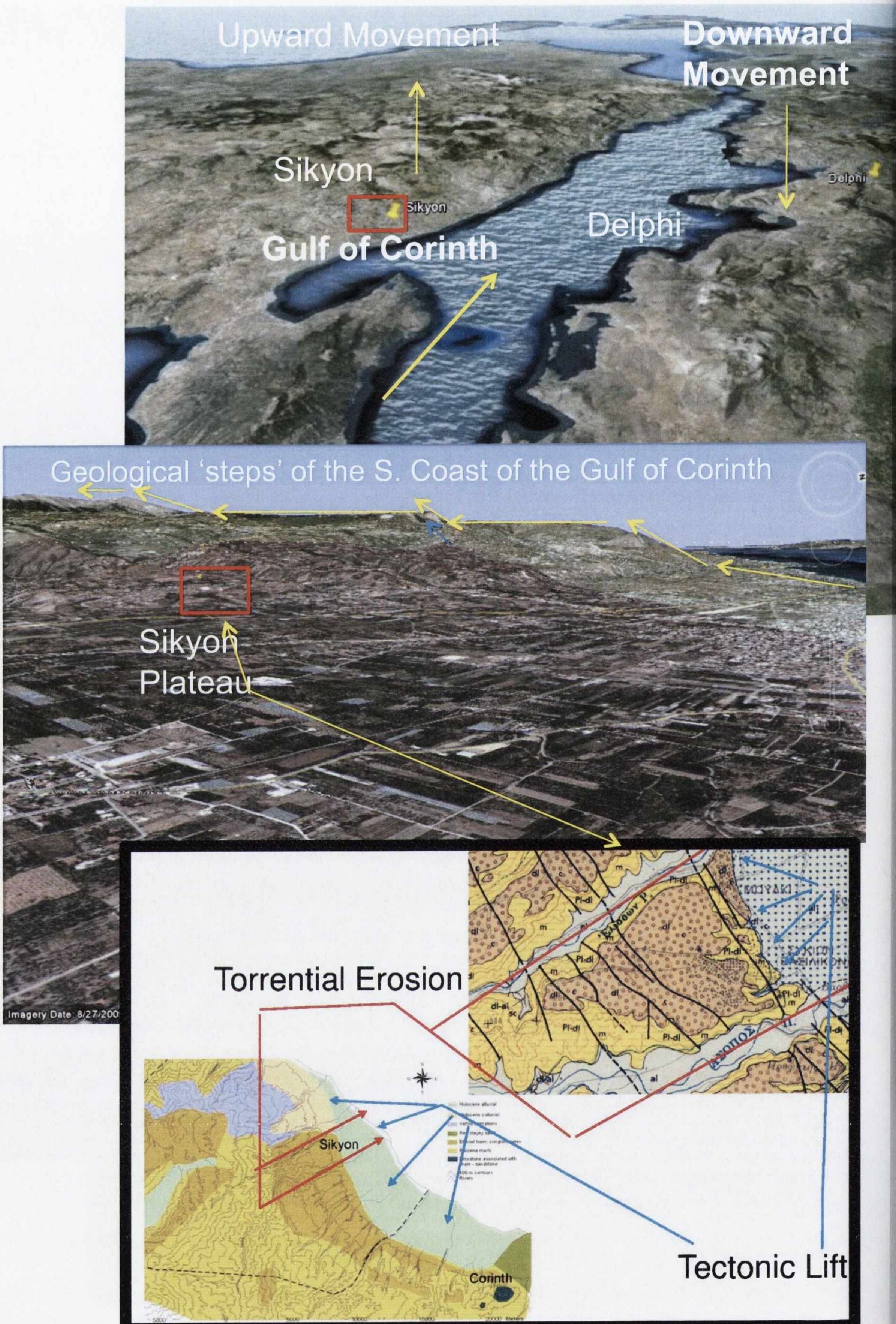


Fig I.1- Geology and Geomorphology of Sikyon

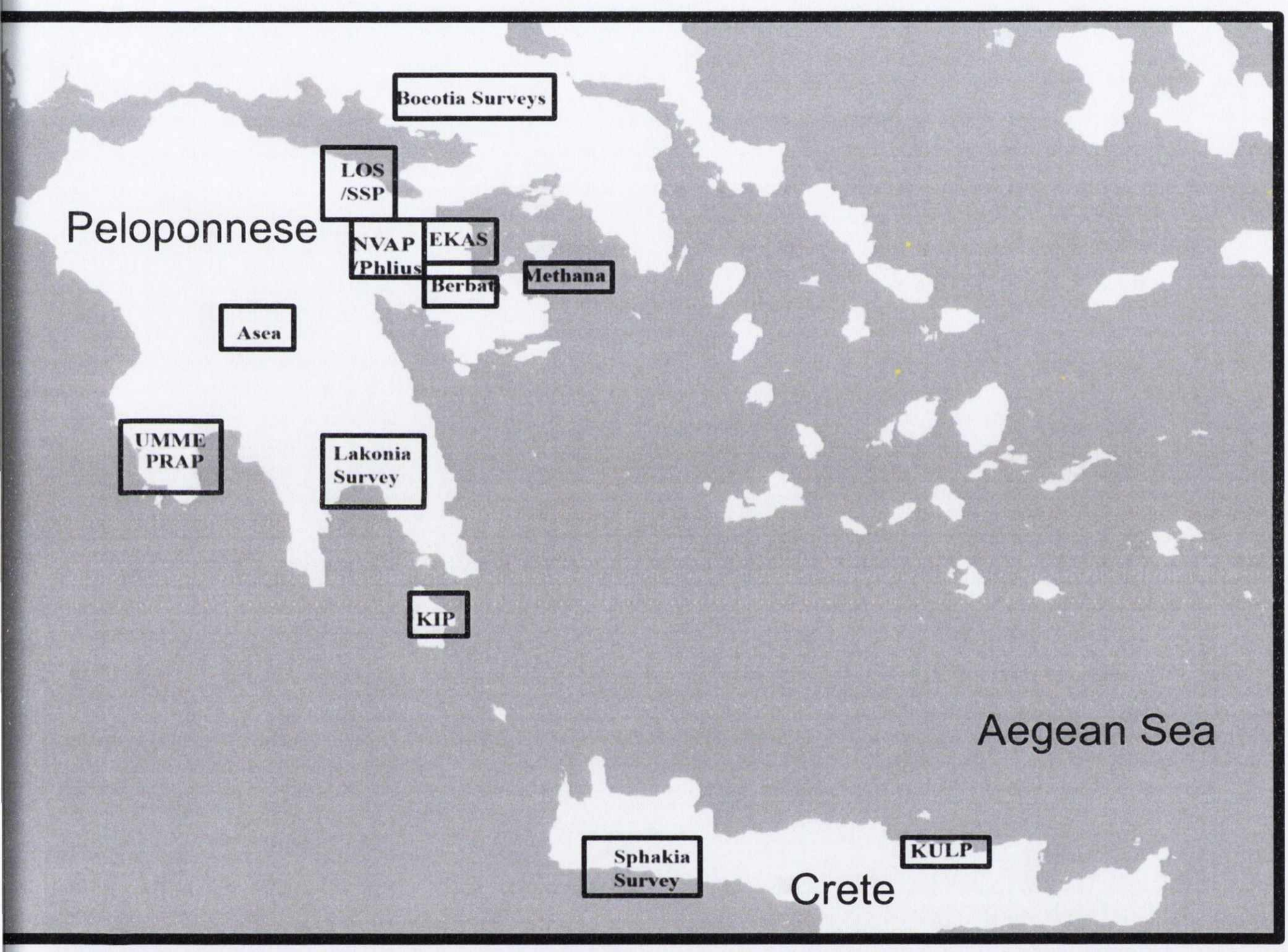


Fig 1.1- Maps of Surveys Discussed

Public Area of the Sikyon Plateau

Figure 1.2- Sikyon Plateau and Surveyable Areas

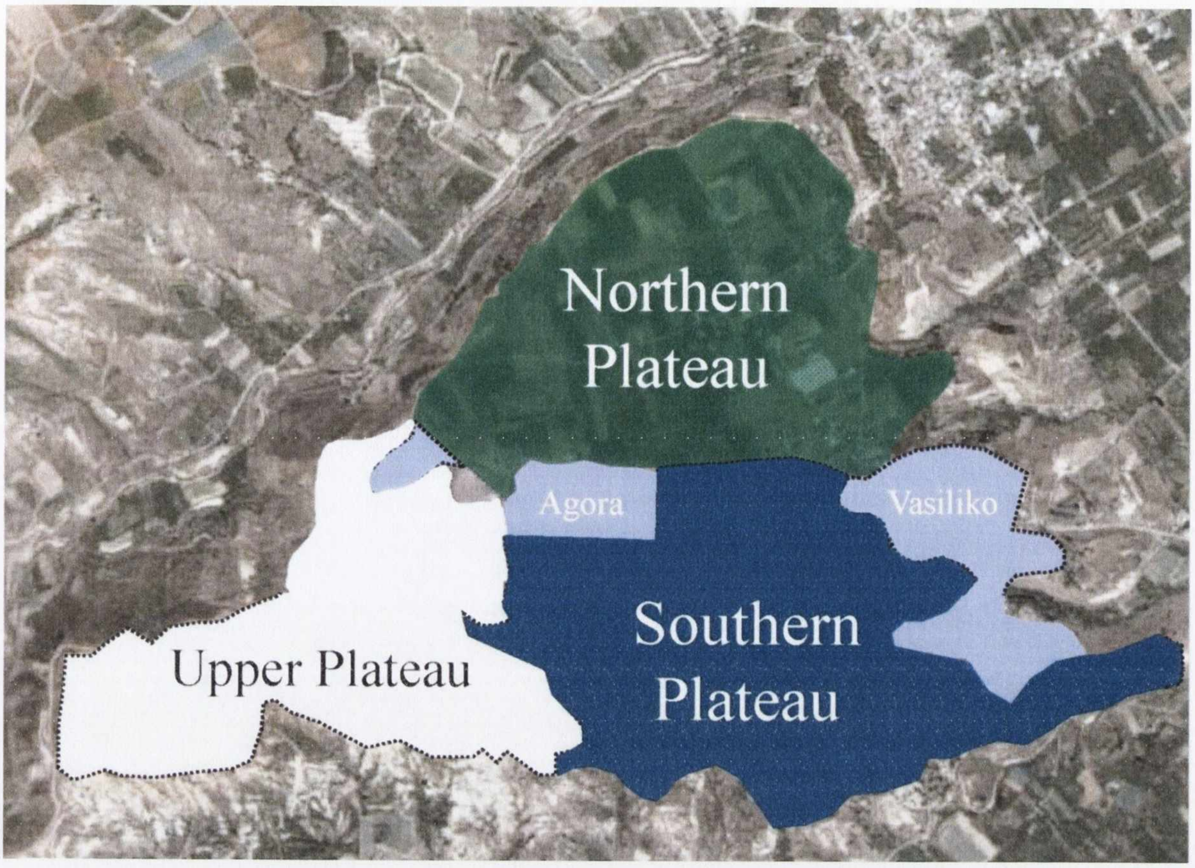


Figure 1.3- Sikyon Plateau and Surveyable Areas

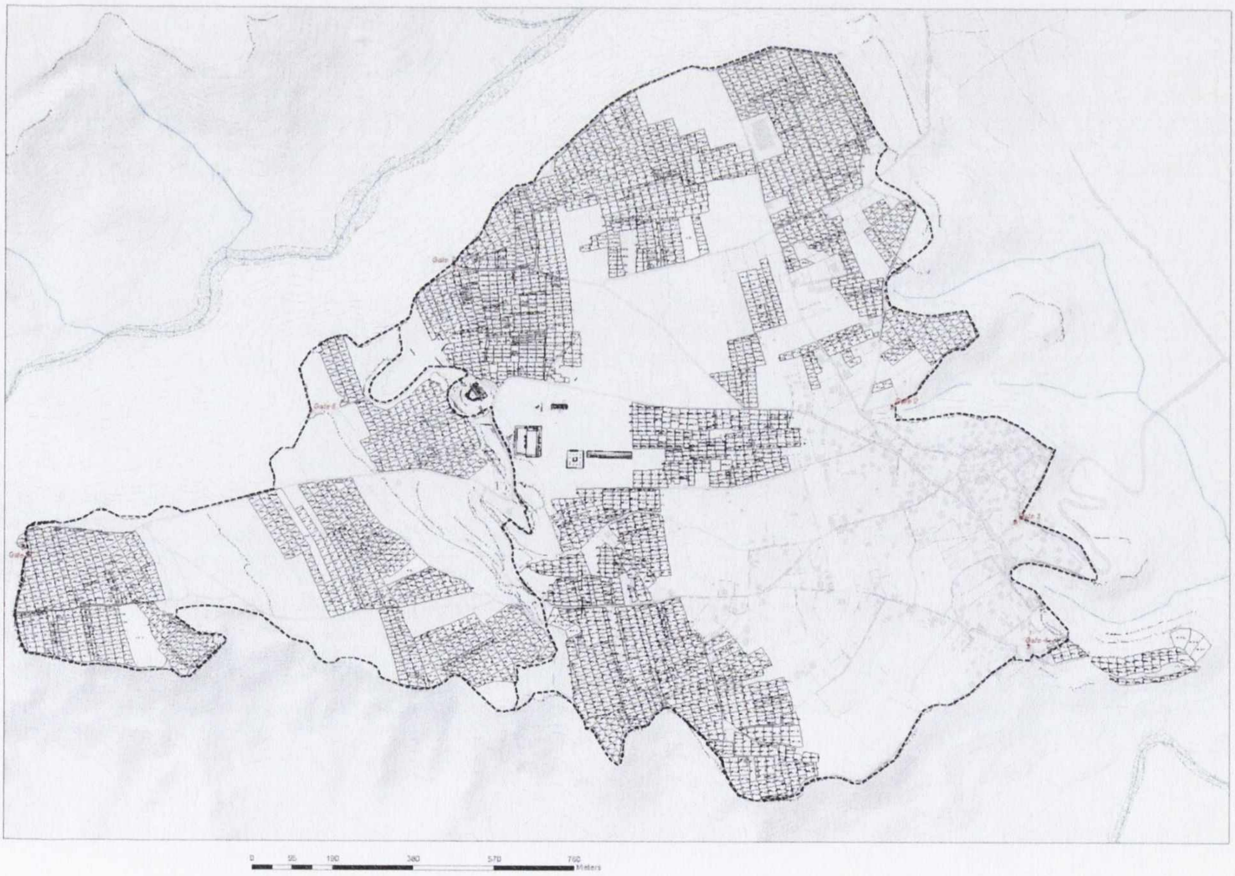


Figure 1.4- Tracts and Squares

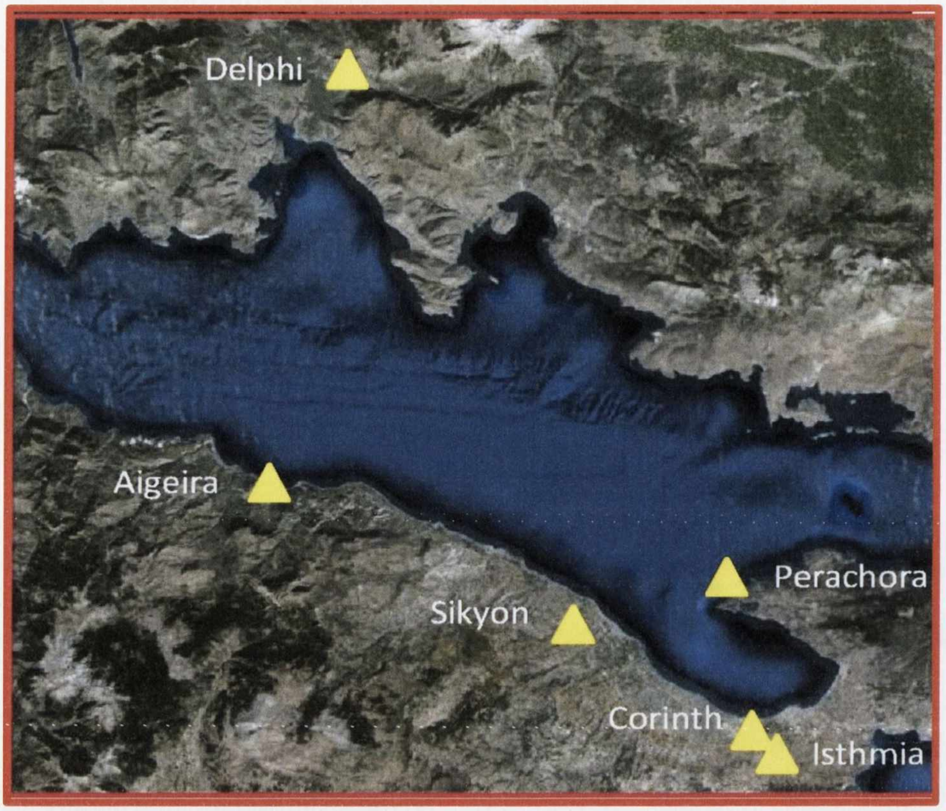


Figure 3.1- Area Map of Isthmia, Corinth, Perachora, Sikyon, Delphi

Figure 3.2- Heat-Damaged Sherds

Figure 3.3- Ag. Thomas clay bed and jug

Figure 3.4- Air-drying Ceramics on Aegina

Figure 3.5- Under-fired Ceramics with Discoloured Core

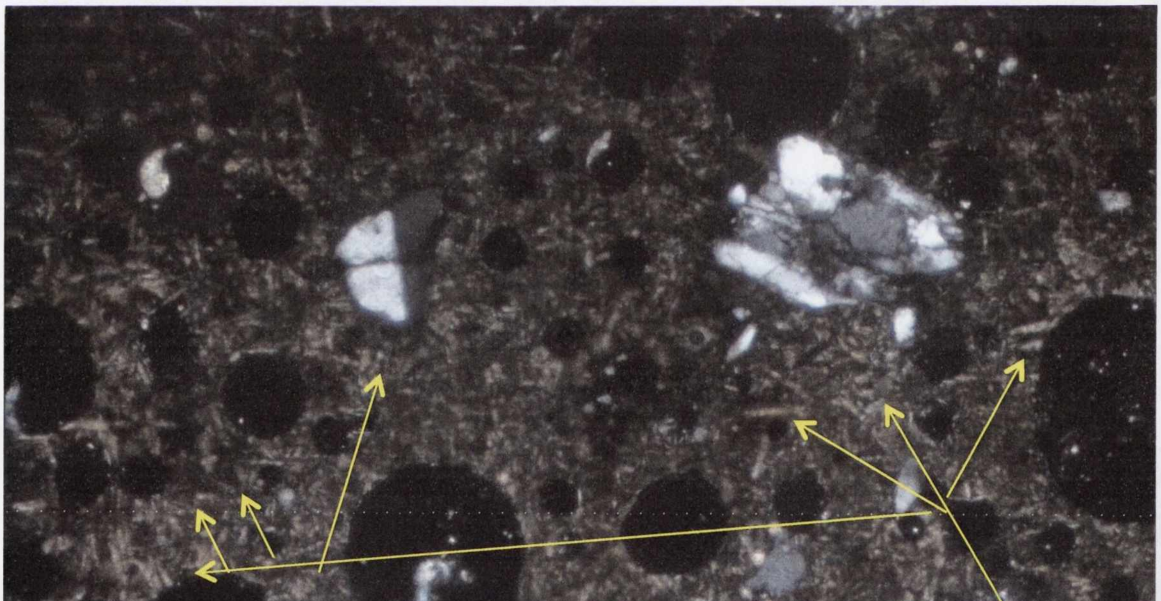


Figure 3.6-
High temperature needles (X100- Crossed-Polars) – Melilite

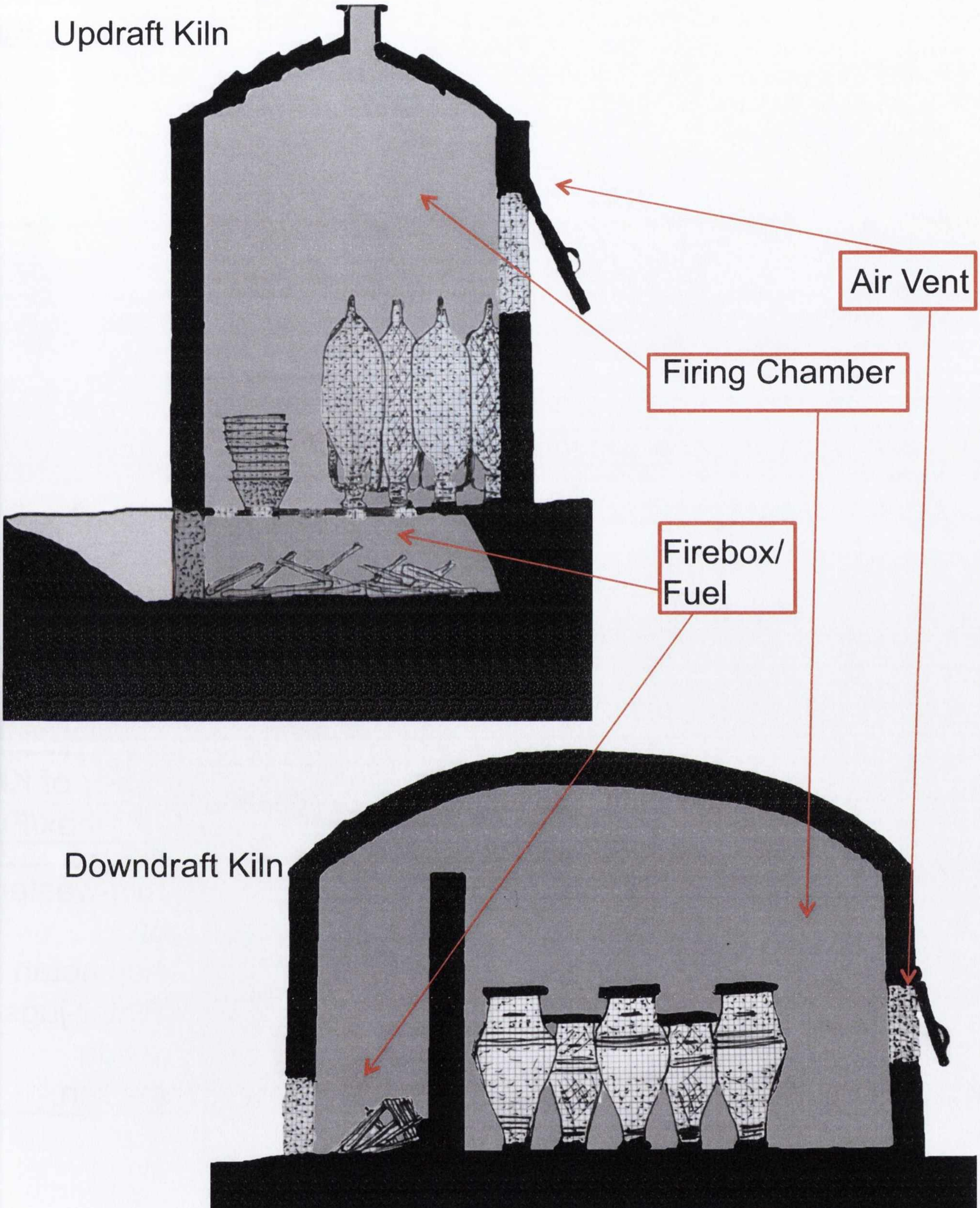


Figure 3.7- Downdraft and Updraft kilns

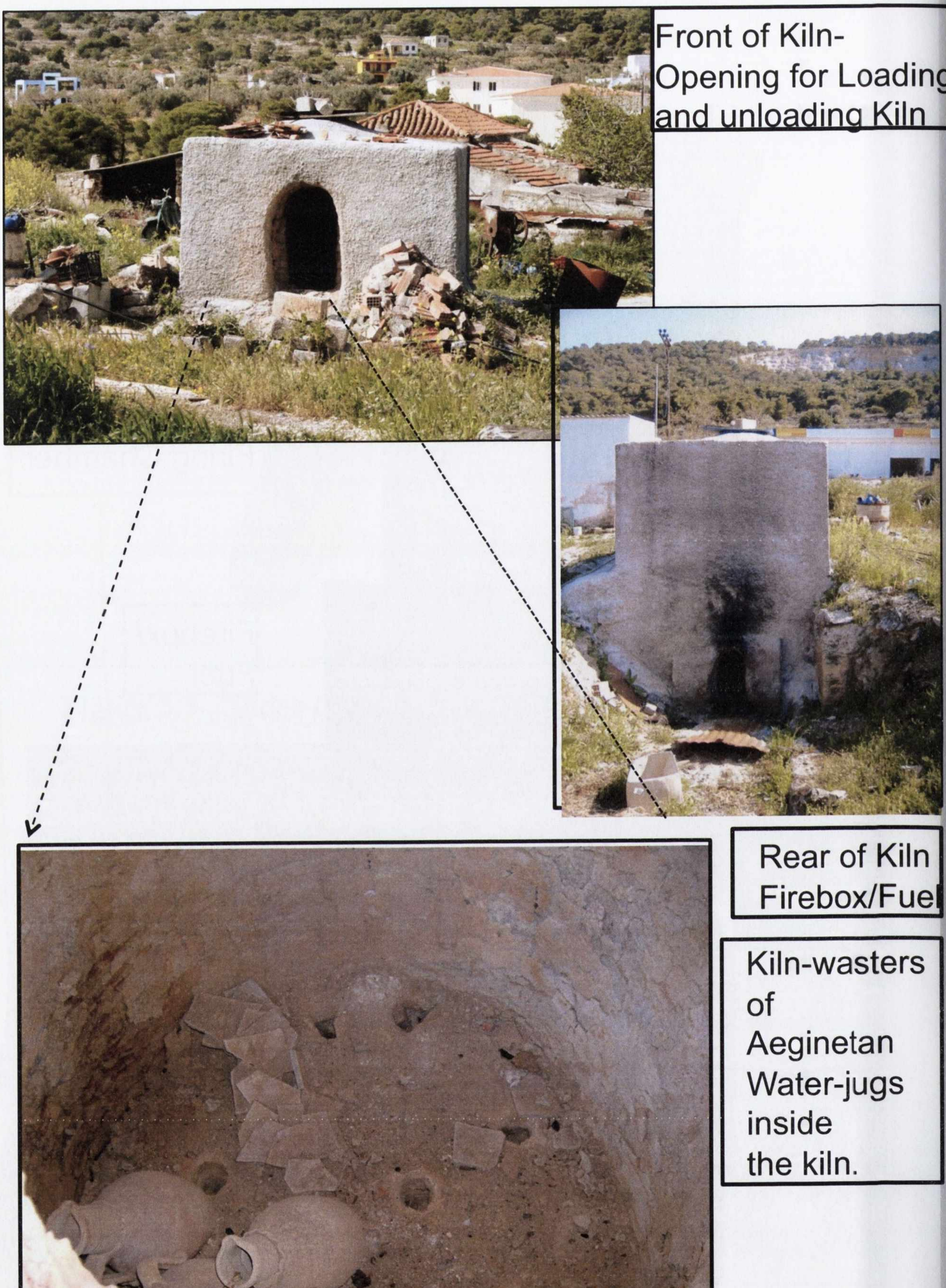


Figure 3.8- Modern Kiln-Wasters in Nektarios Garis' Updraft Kiln

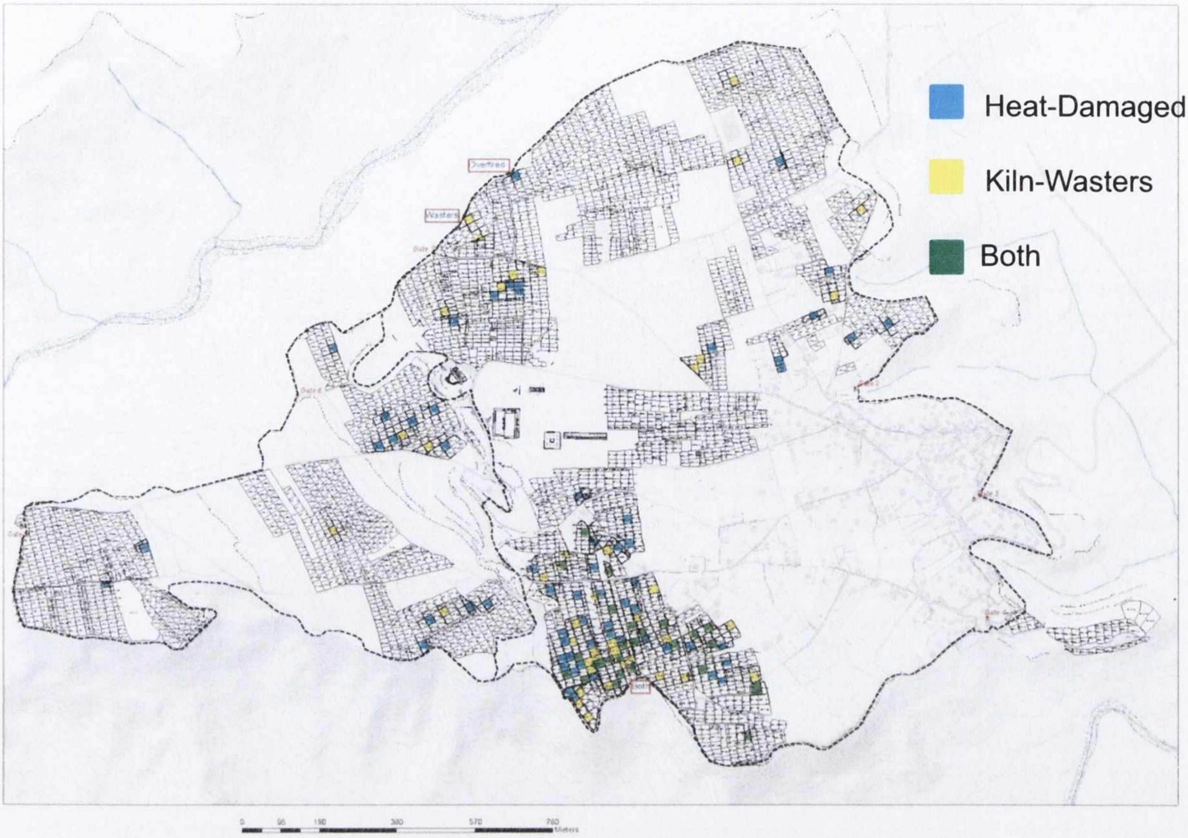
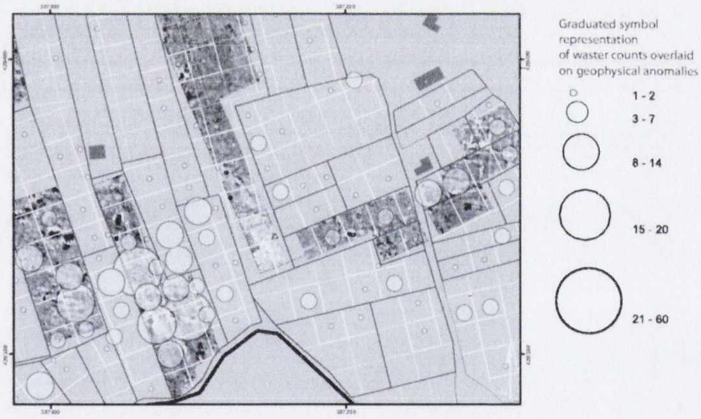


Figure 3.9- Map of Heat-Damaged Sherd Distributions



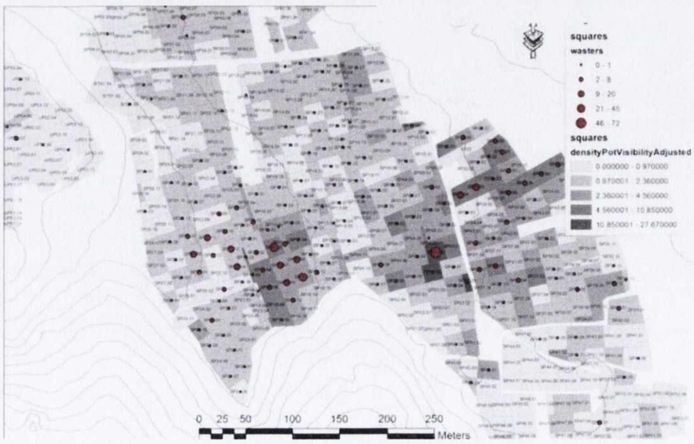


Figure 3.10-Waster Find Densities from SP

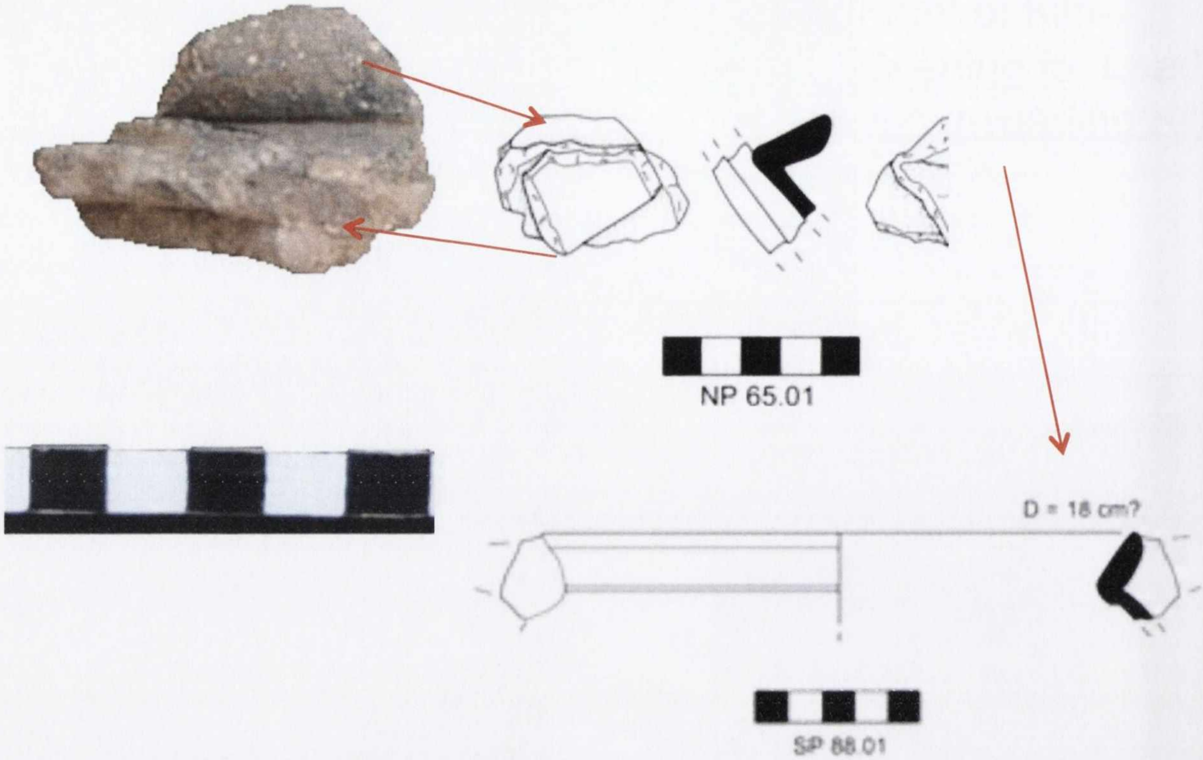


Figure 3.11- Early Byzantine kiln-waster

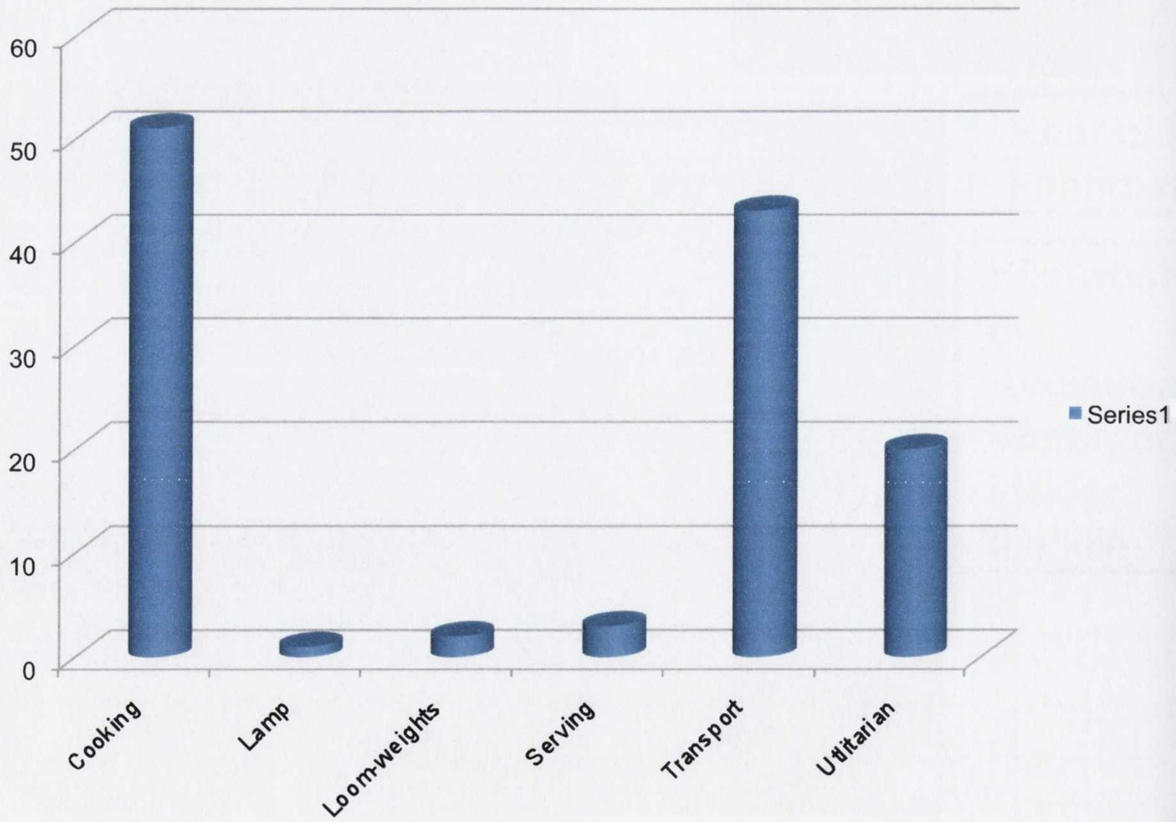


Figure 3.12- Graph of Heat-Damaged Functional Categories

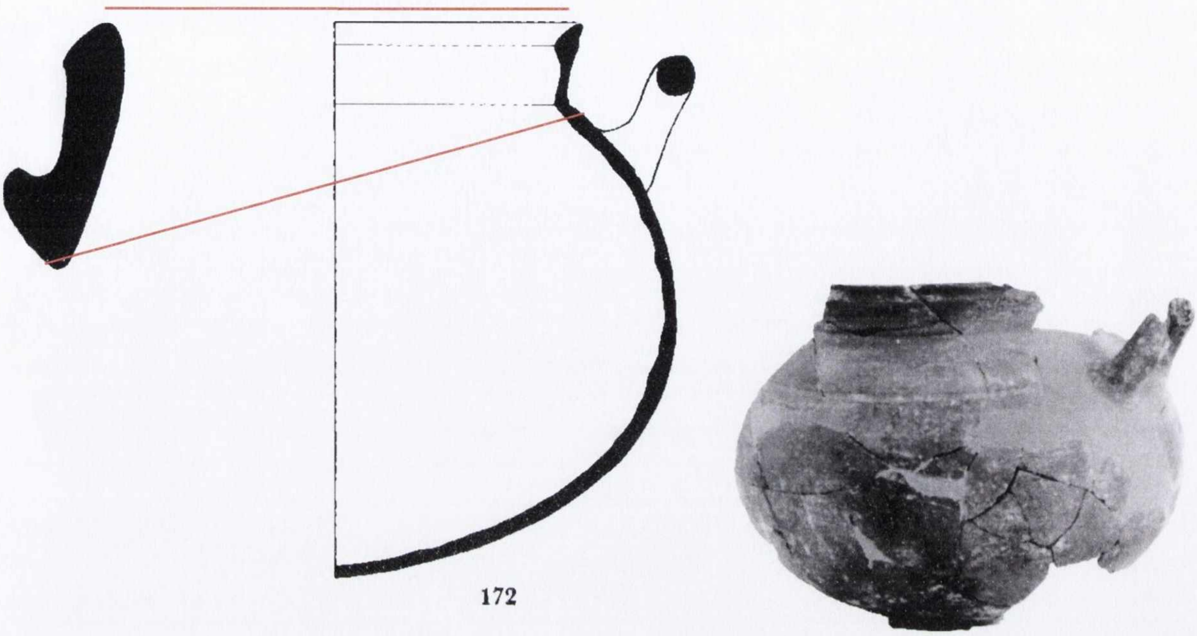


Figure 3.13- Stew Pot with Everted Rim

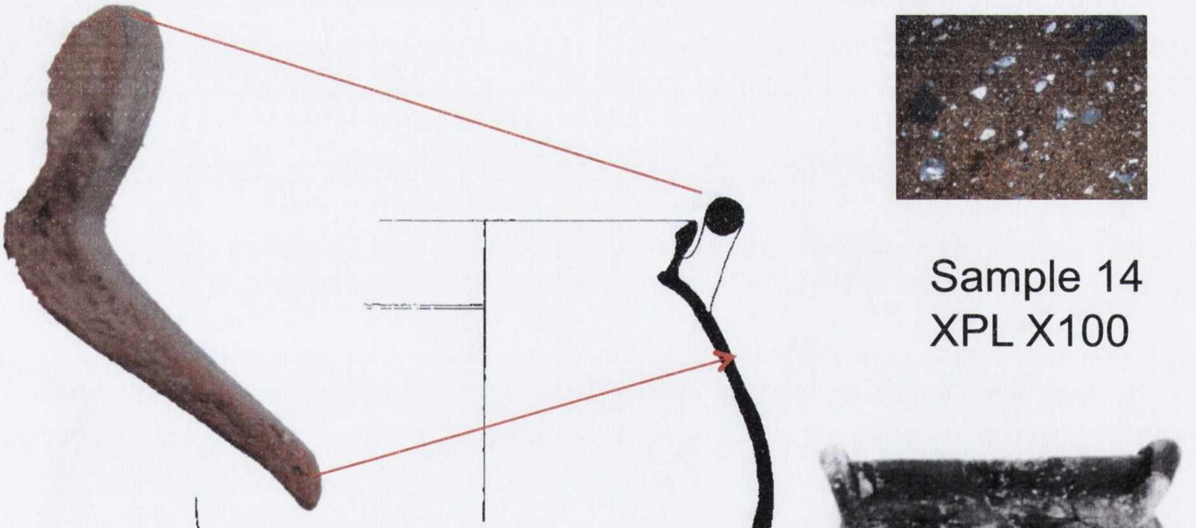


Figure 3.14- Chytra with Flanged Thickened Rim

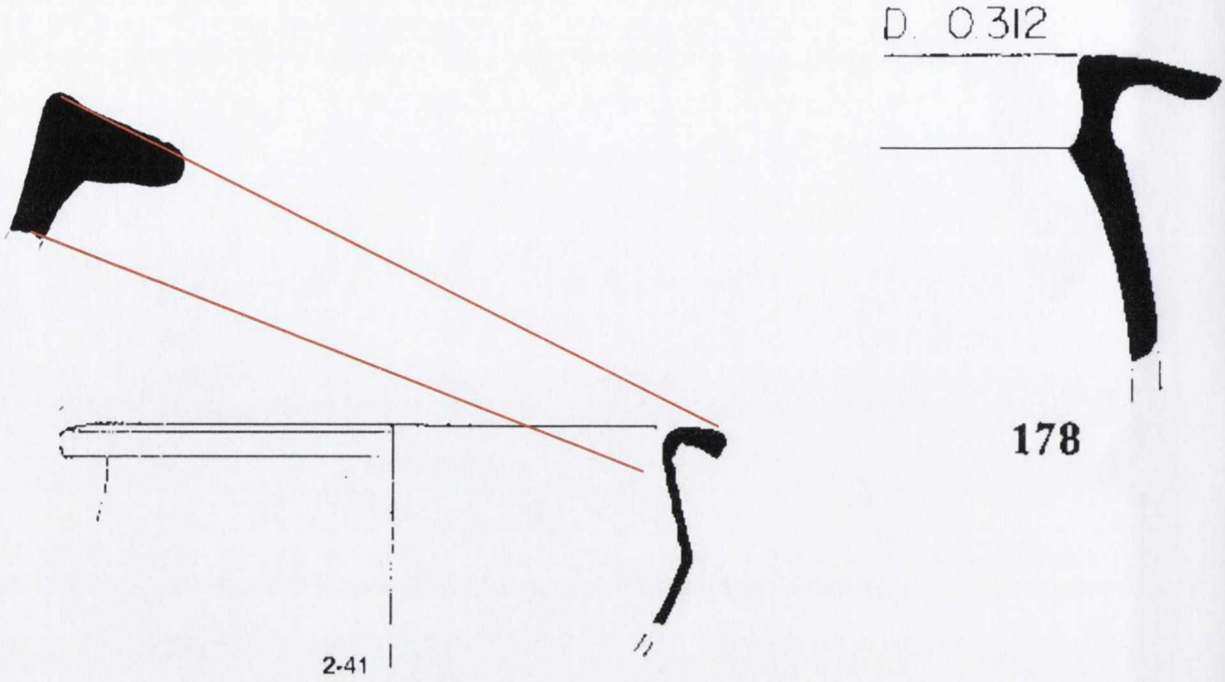
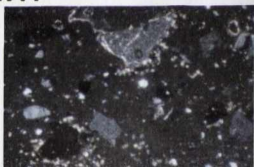


Figure 3.15- Stew Pot with Flat Horizontal Rim



Sample 25
XPL X100

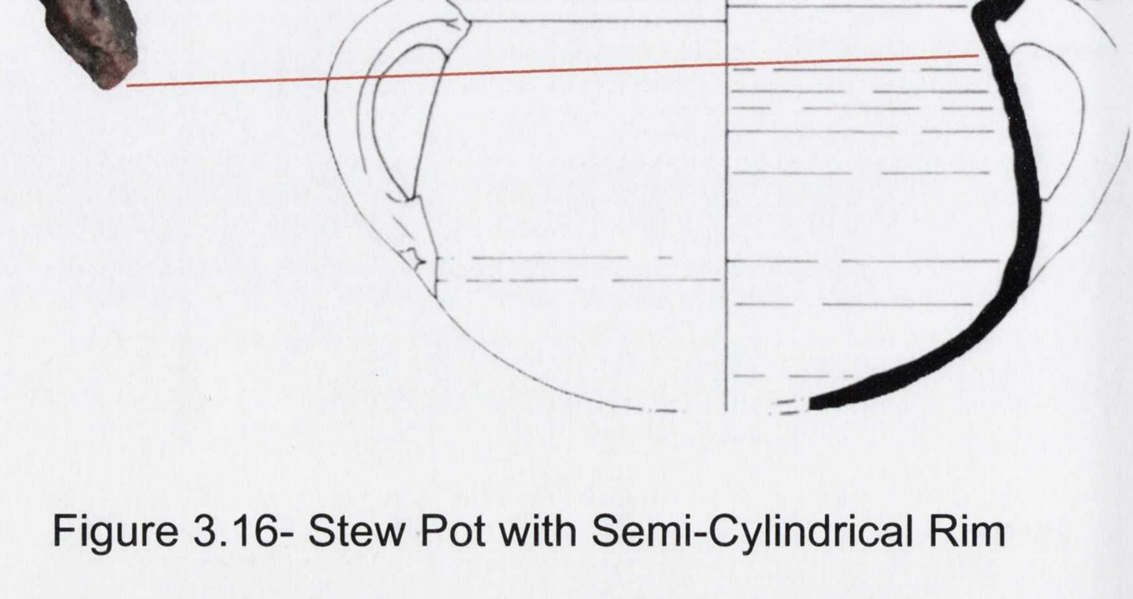


Figure 3.16- Stew Pot with Semi-Cylindrical Rim

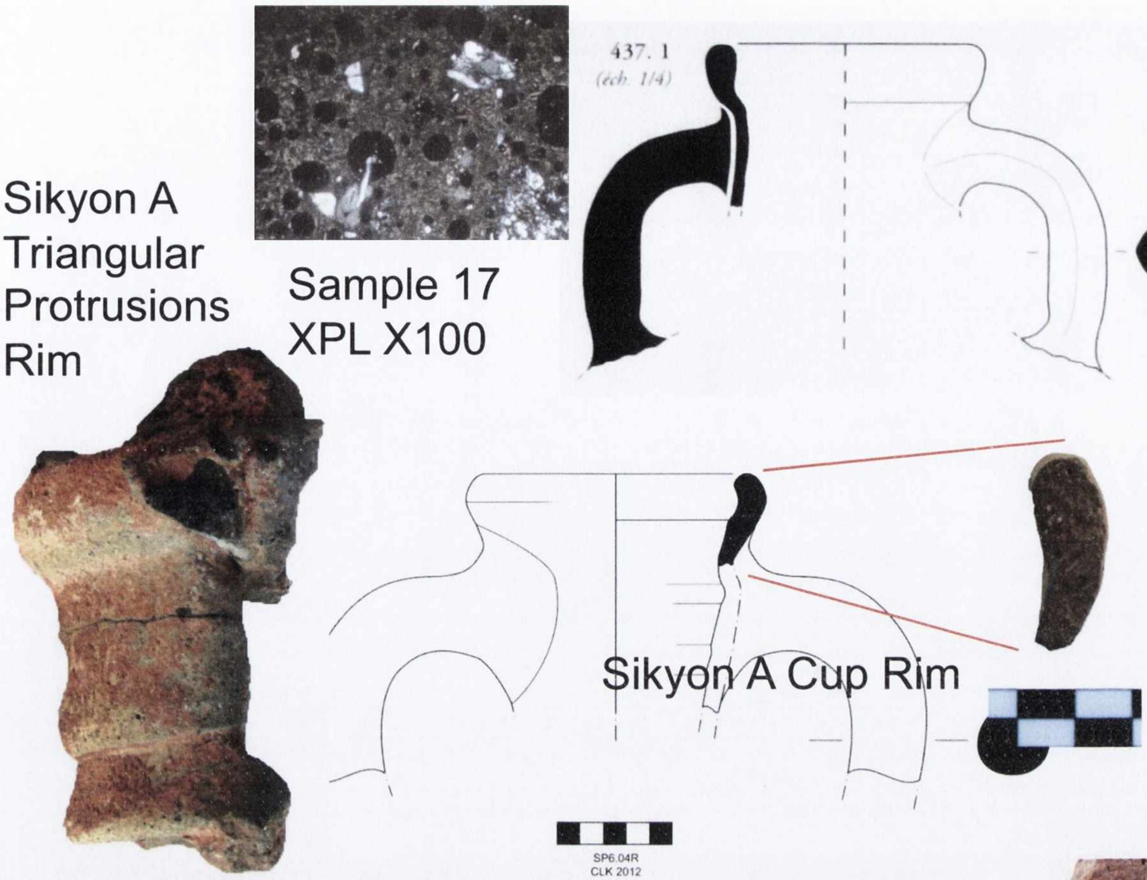


Figure 3.17- Sikyonian A Amphora Rims

Figure 3.18- Sikyon A Section Photo

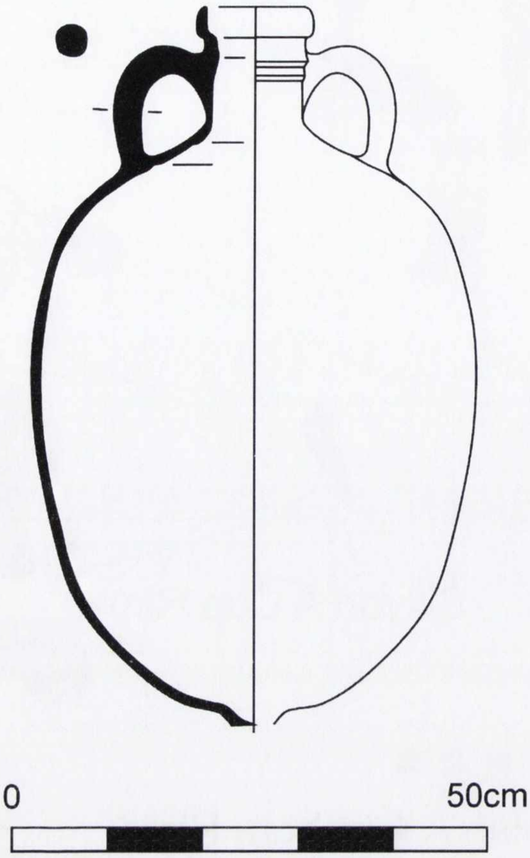


Figure 3.19a- Dressel 25

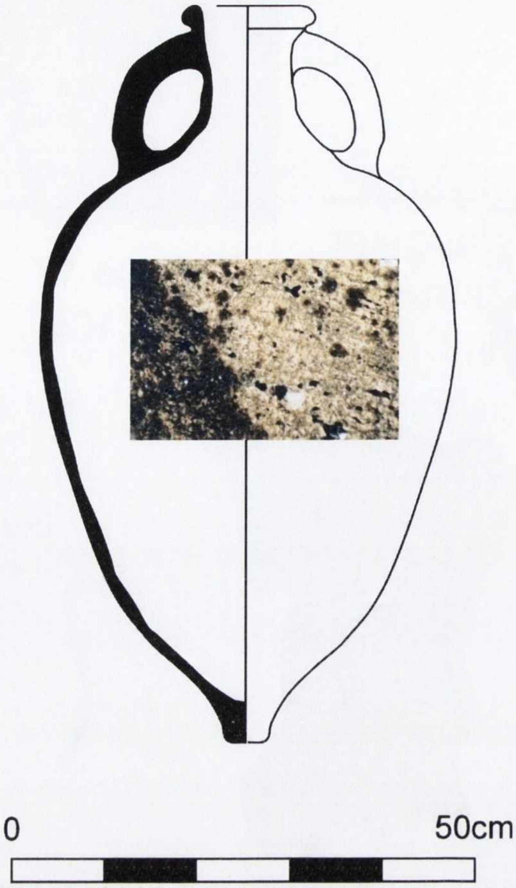


Figure 3.19b- Brindisi

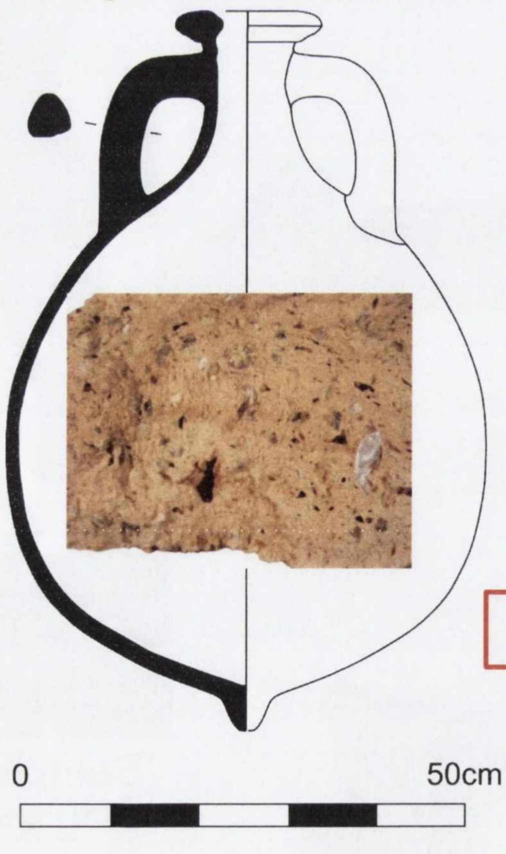


Figure 3.20- Dressel 20

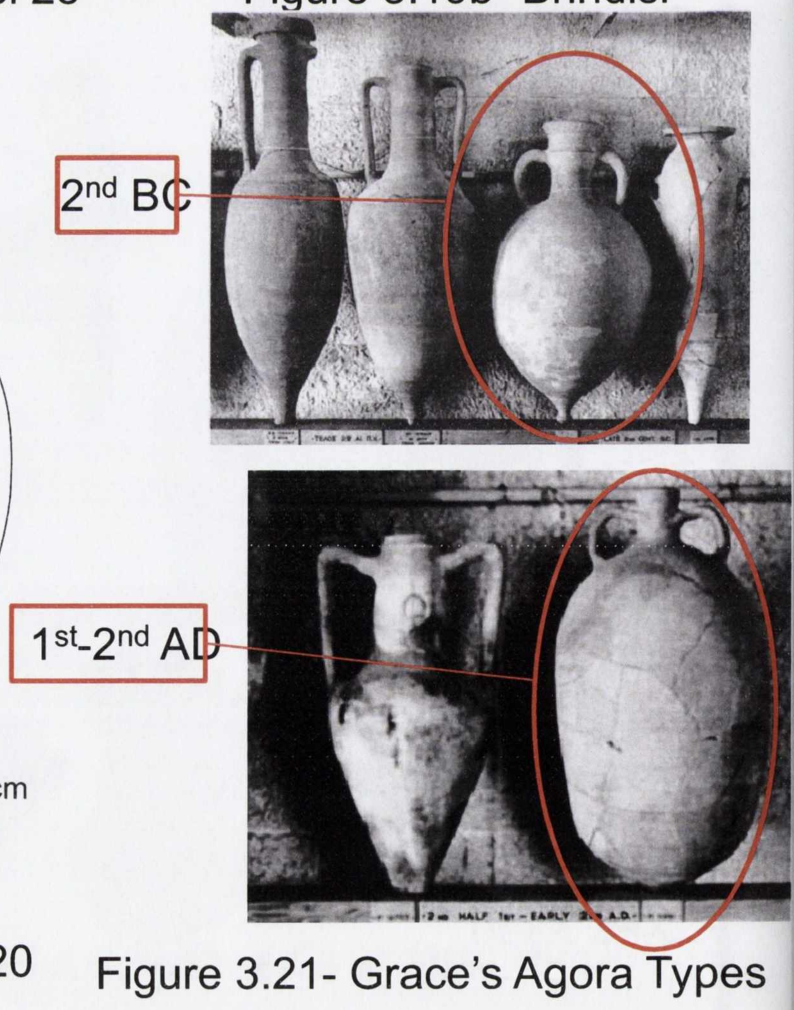


Figure 3.21- Grace's Agora Types

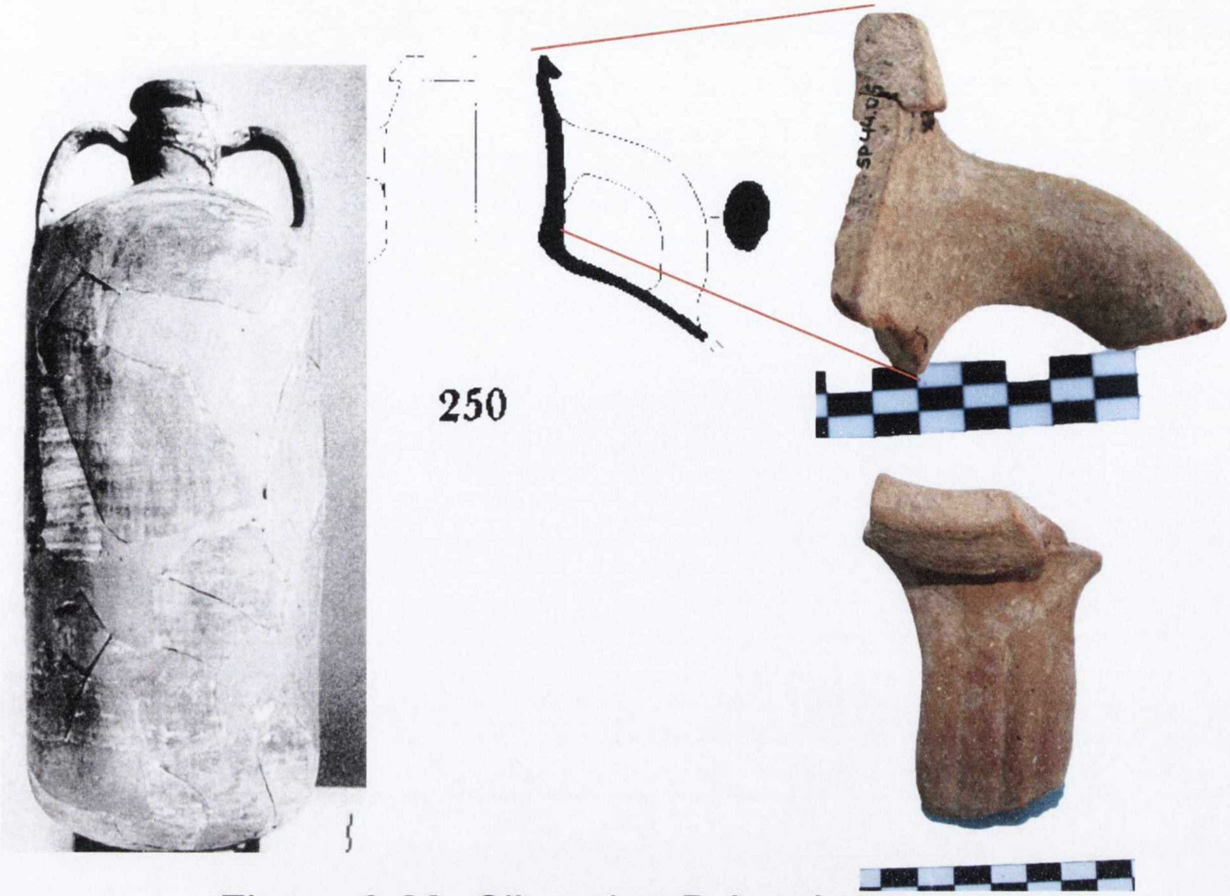


Figure 3.22- Sikyonian B Amphora

Figure 3.23- Pitcher with Ridged Base

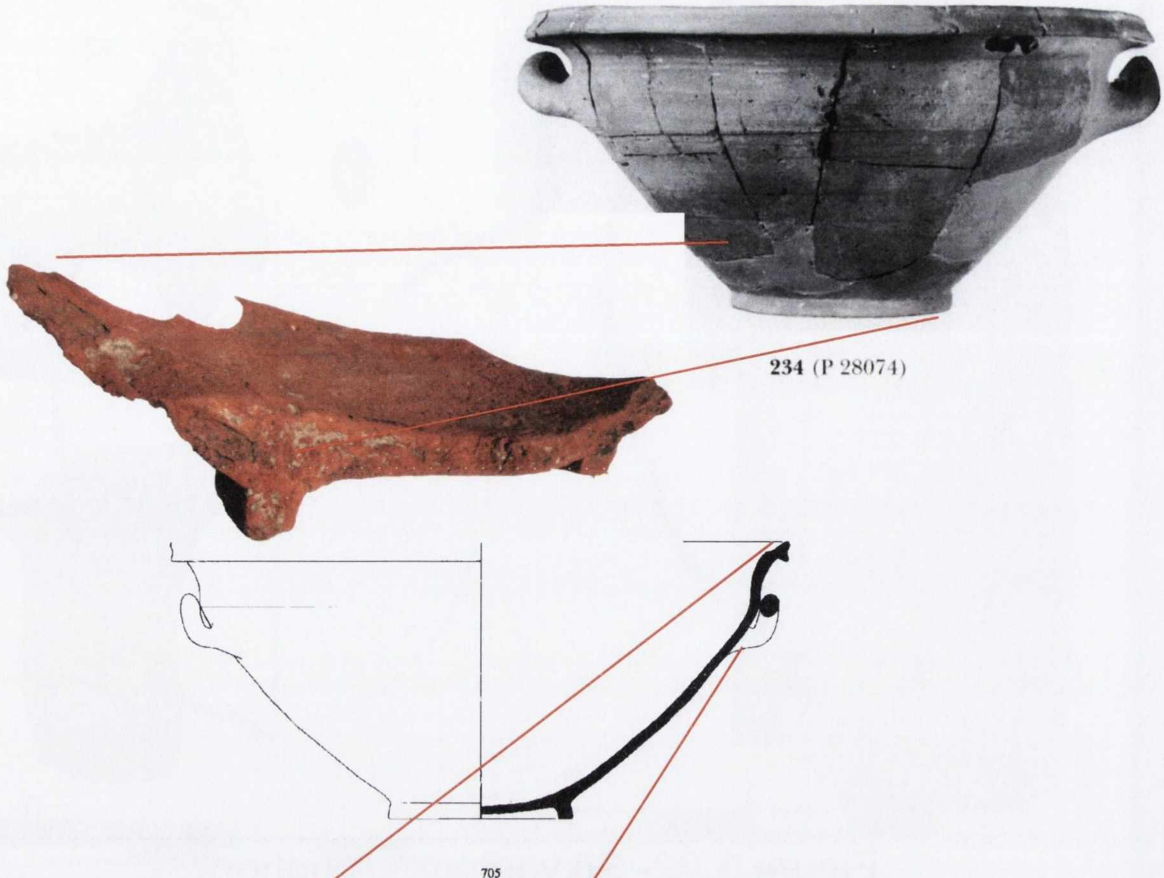
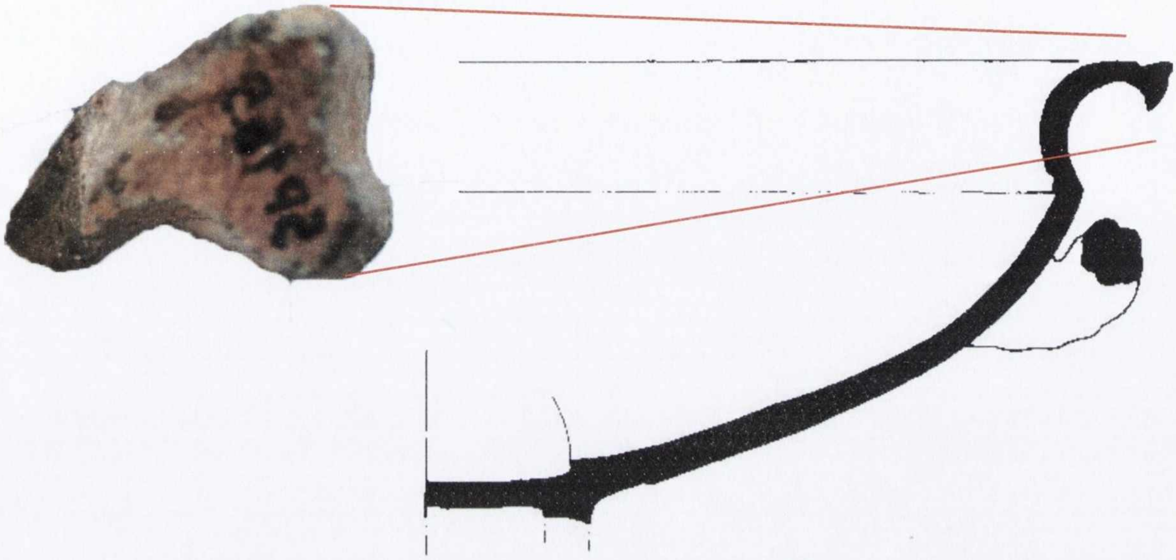


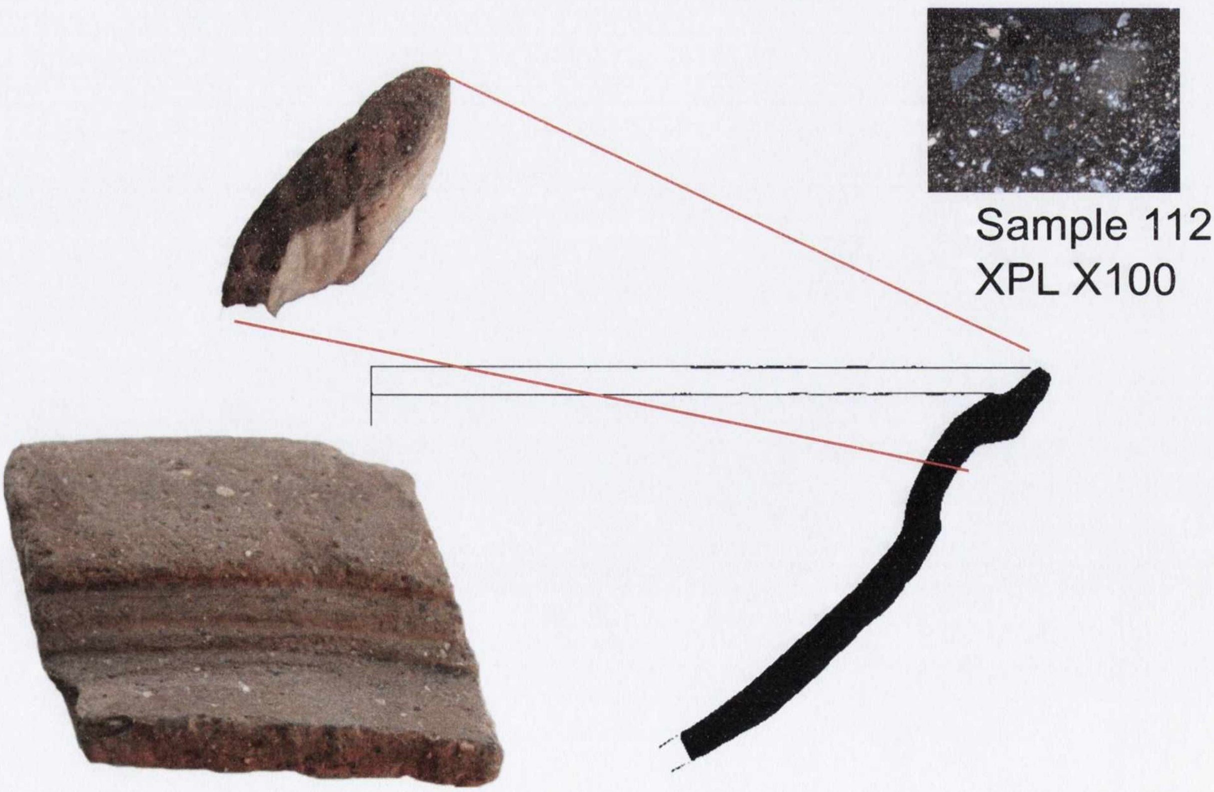
Figure 3.24- Bowl/Basin with Ring Foot

Figure 3.25- Krater with Overhanging Rim



261

Figure 3.26- Krater with Triangular Rim



262

Figure 3.27- Krater with High-Folded Rim

Figure 3.28- Lamp of Broneer type XVII and XVI

Figure 3.29- 4 Images of Kiln-Wasters

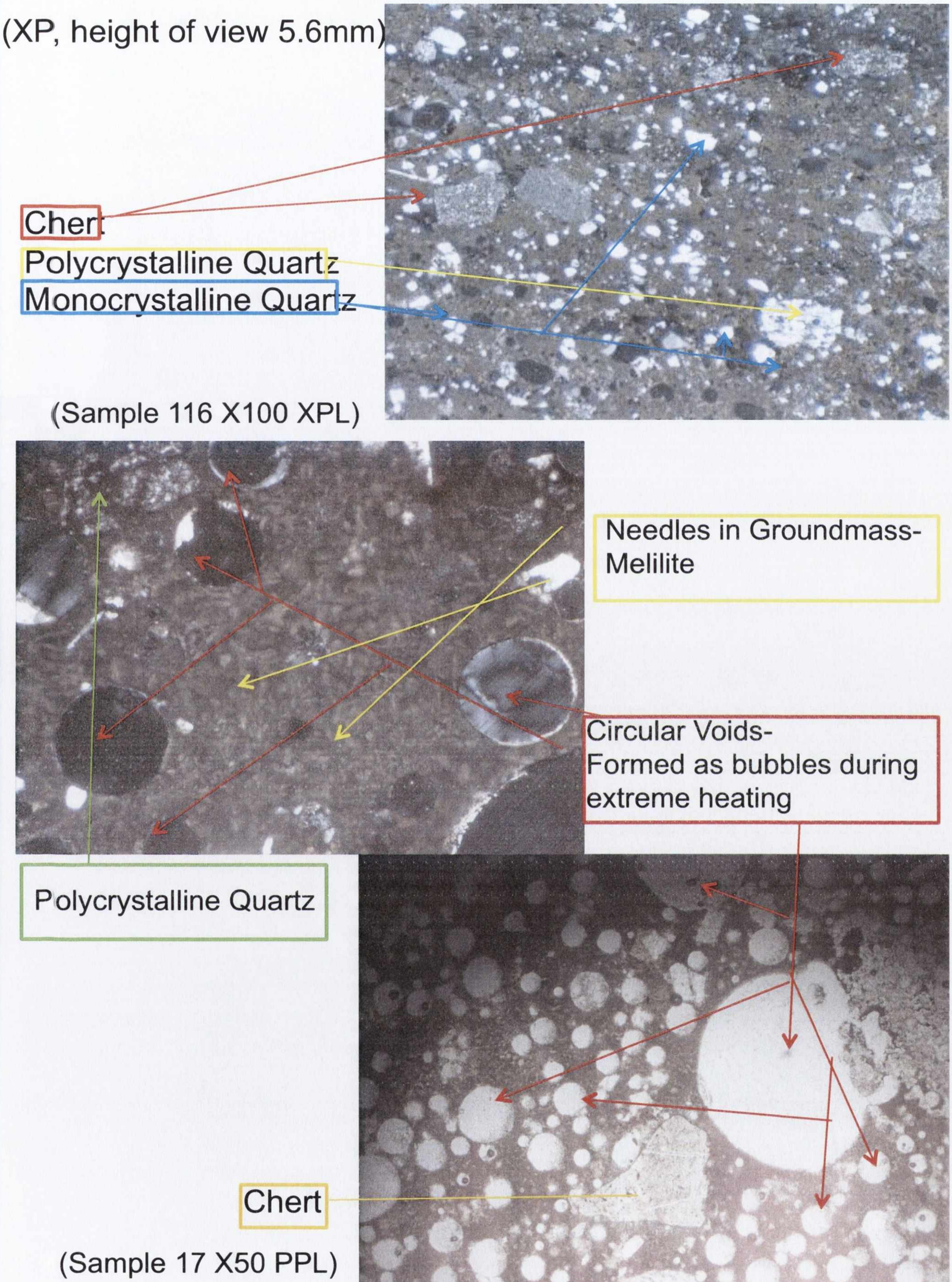


Figure 3.30-
Micrograms of Thin-sections of Kiln-Wasters in Sikyonian Silicate Fabric

Figure 3.30- Macroscopic Images of Sikyonian Silicate Fabric

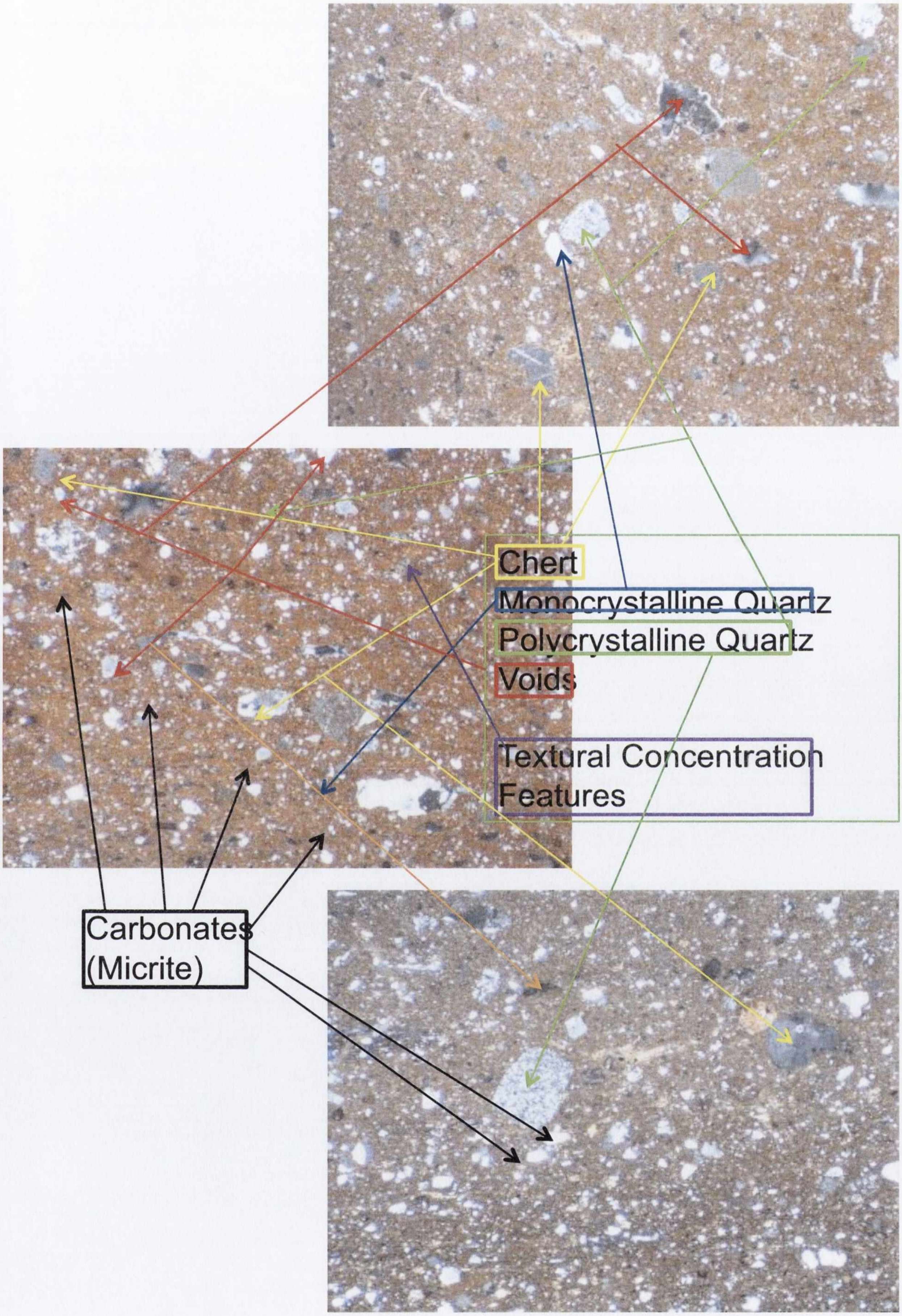


Figure 3.30- Microscopic Images of Sikyonian Silicate Fabric (XPL- Height of view 5.6mm)

Figure 3.31- Limestone Rich Calcareous Clays Below Plateau

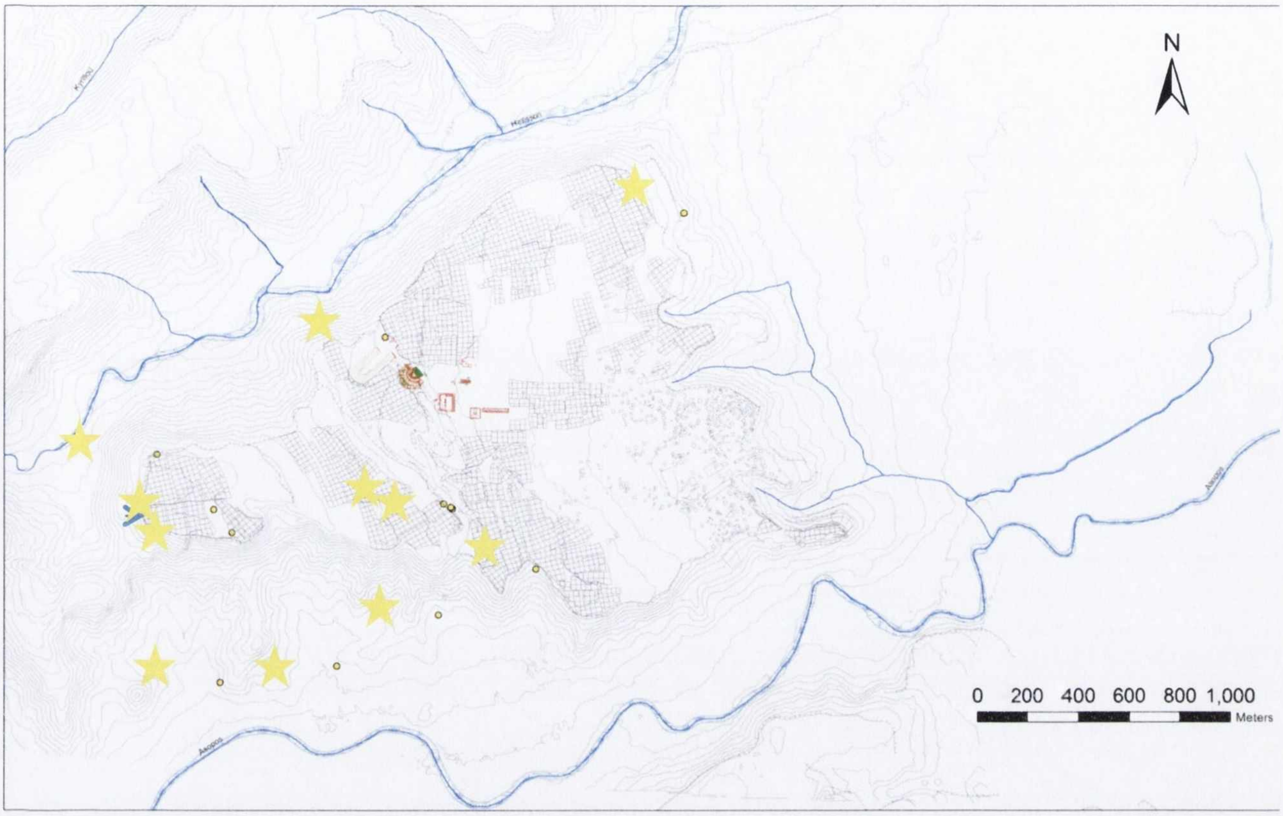
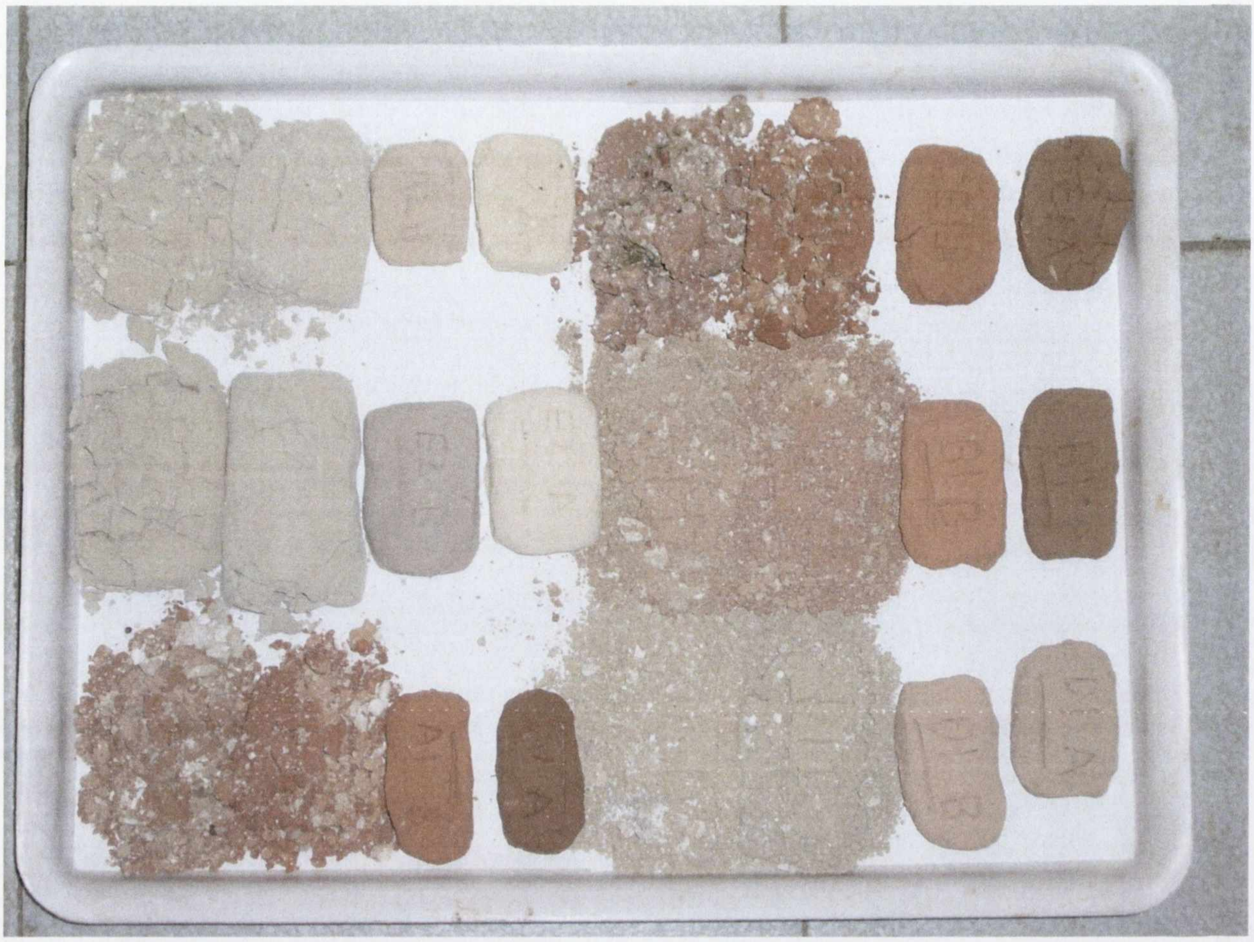
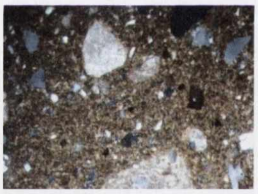


Figure 3.32-Map of Clay Sample Sites

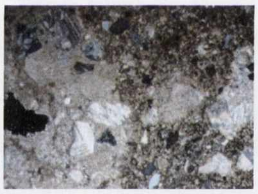
Figure 3.33- Sampling Clays



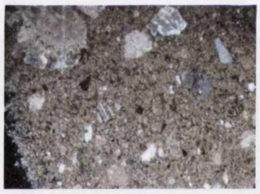


A1B X100 XPL

A2B X100 XPL



B1B X100 XPL



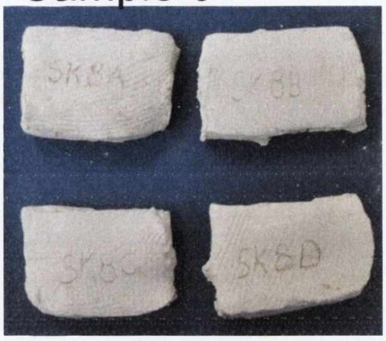
D1B X100 XPL

E1B X100 XPL

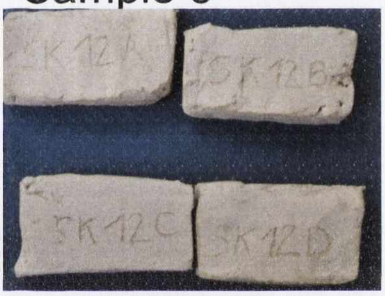
E2B X100 XPL

Figure 3.34- Thin Sections of Clay Samples

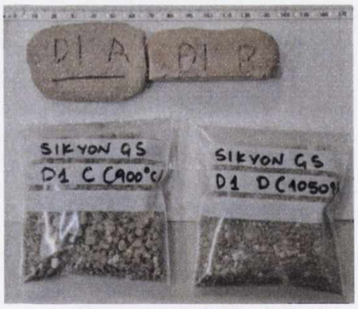
Sample 6



Sample 8



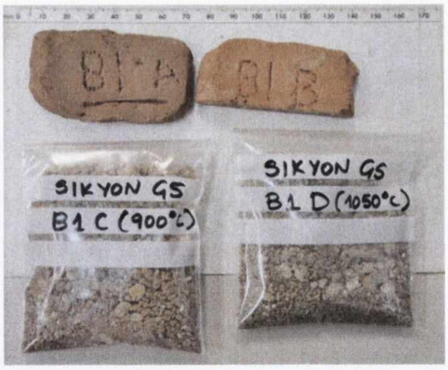
Sample 12



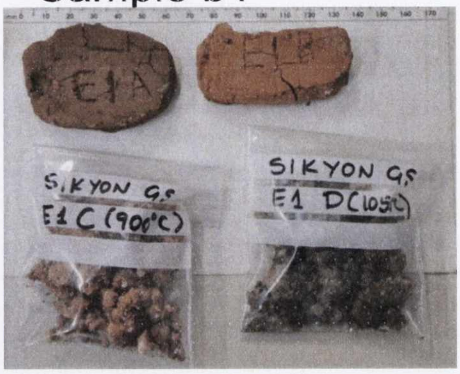
Sample d1

Sample E2

Figure 3.35-
Calcareous Clay Briquettes



Sample b1



Sample e1

Sample 10

Sample 11

Figure 3.36-
Terra Rossa Clay Briquettes

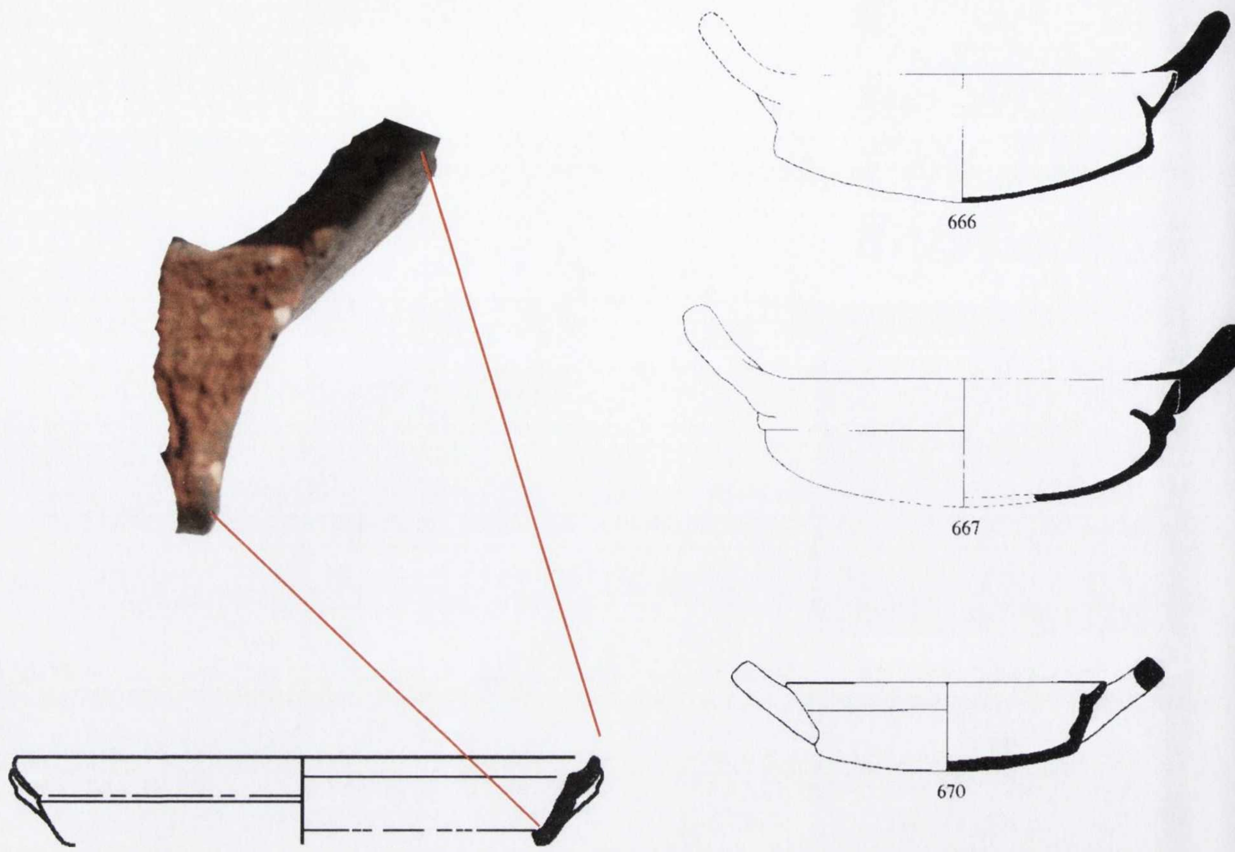


Figure 4.1- Casserole with Angled Rim and Straight Wall.

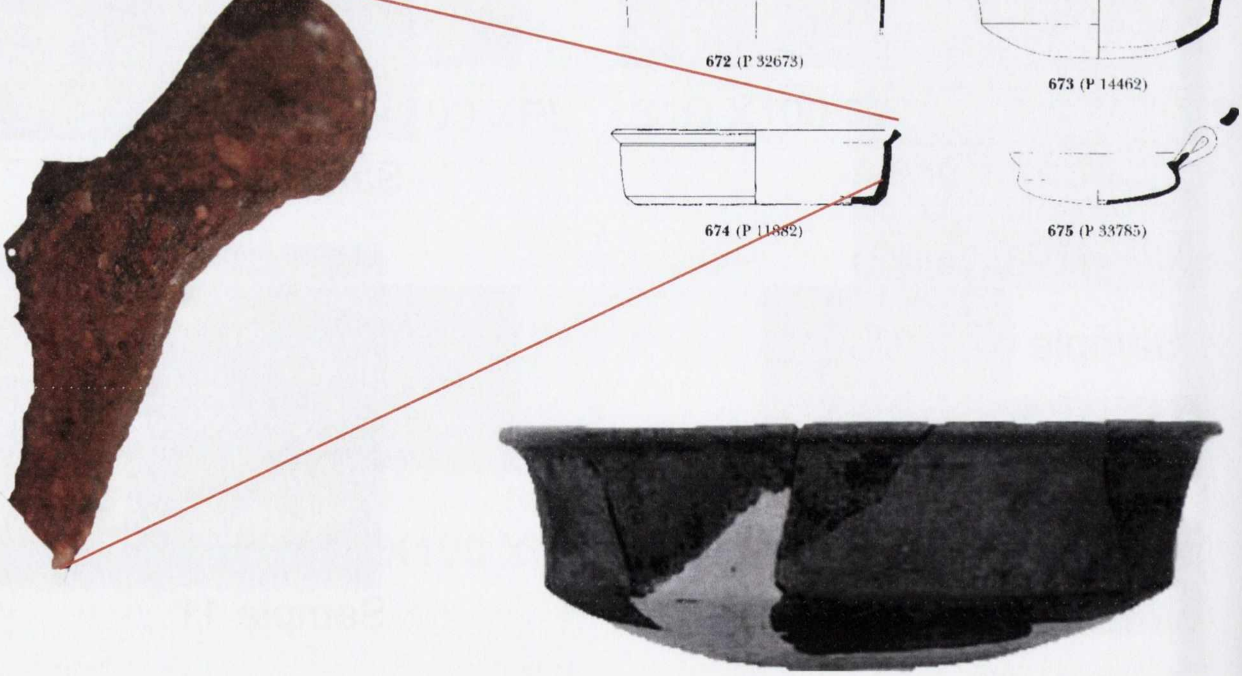


Figure 4.2- Casseroles with Short, Squared Rims (2-types).

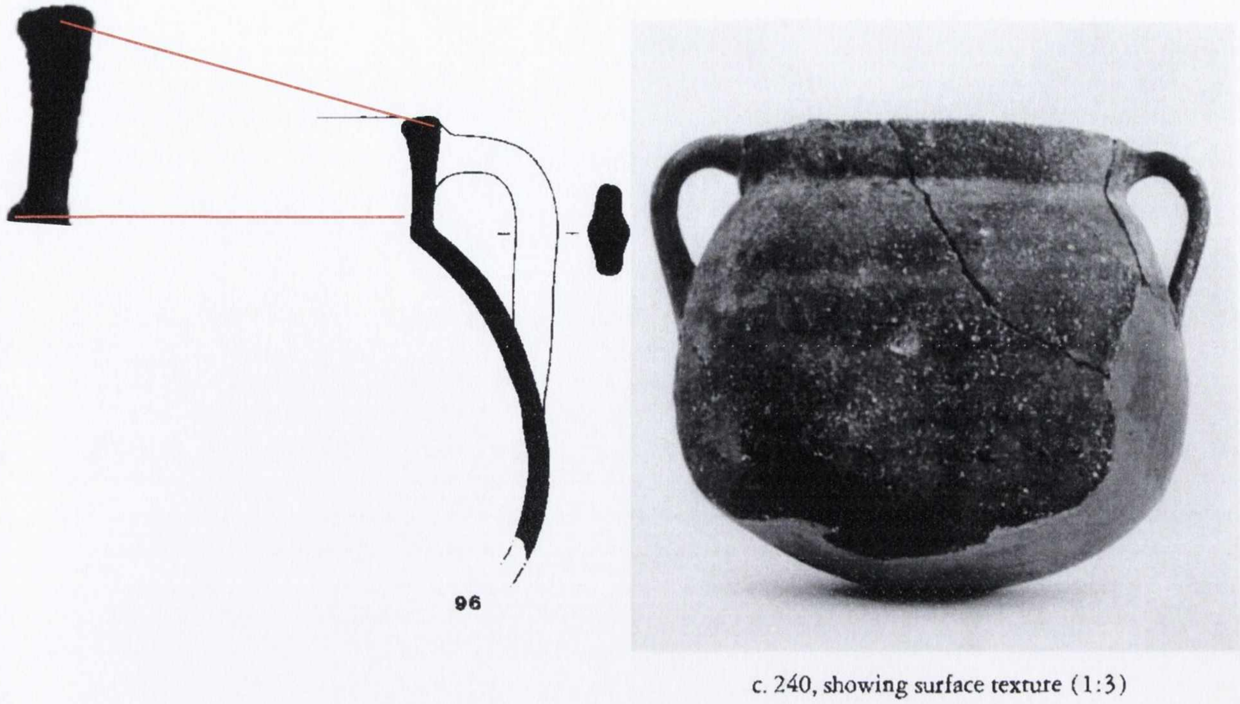


Figure 4.3- Globular Stew Pot with a High, Vertical Rim

Figure 4.4- Casserole with Strongly Everted Rim

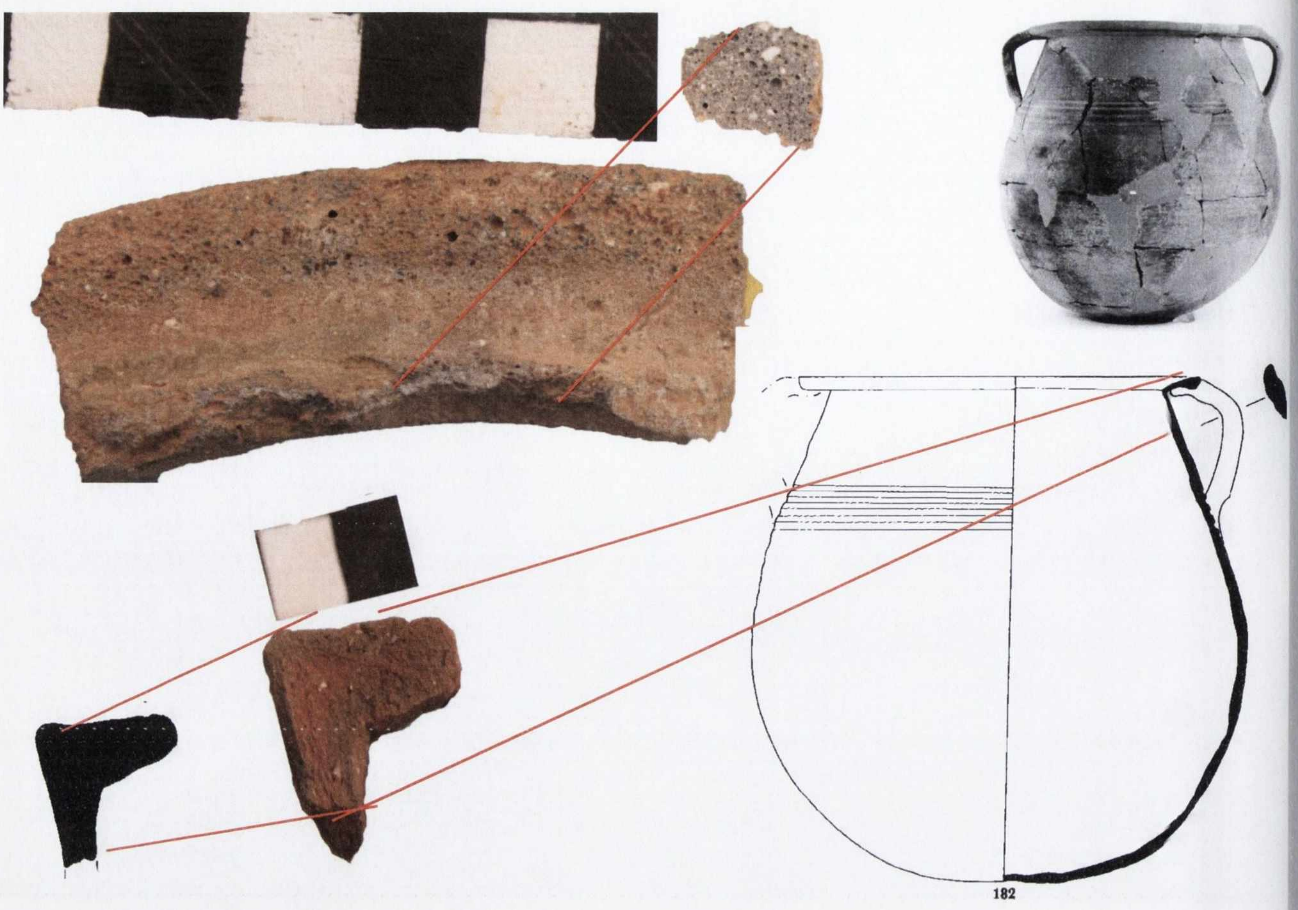


Figure 4.5- Stew Pot with Flat, Horizontal or Oblique rim

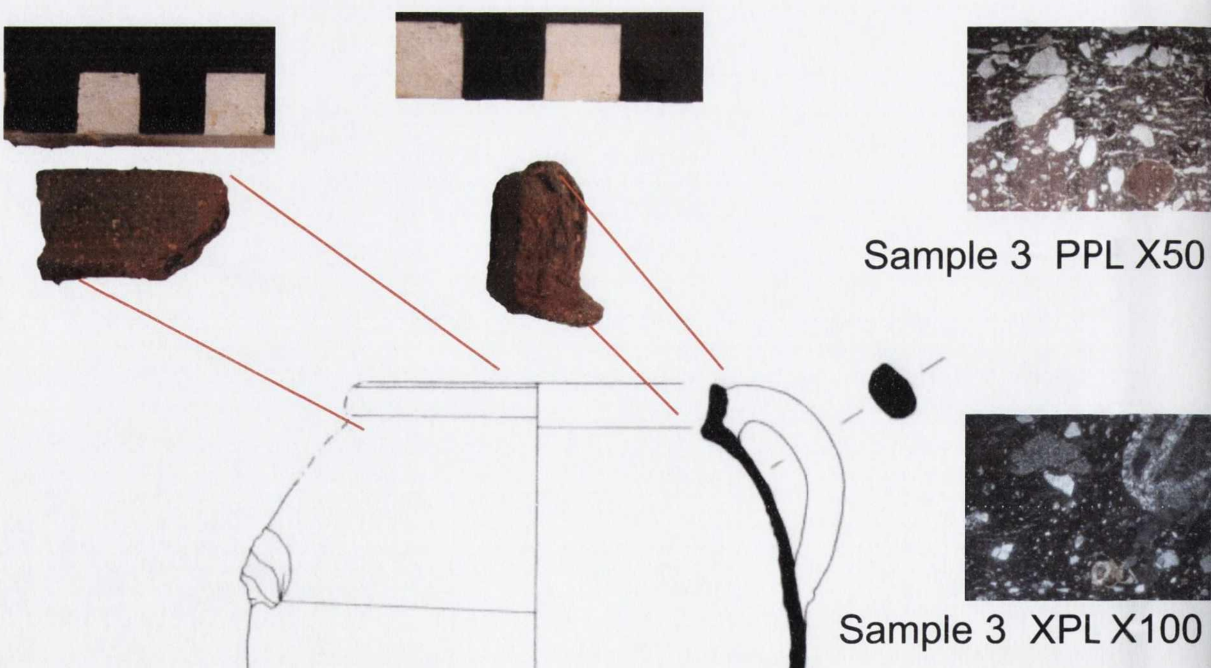


Figure 4.6-
Stew Pot with Short (plain rounded) Almost Vertical Rim

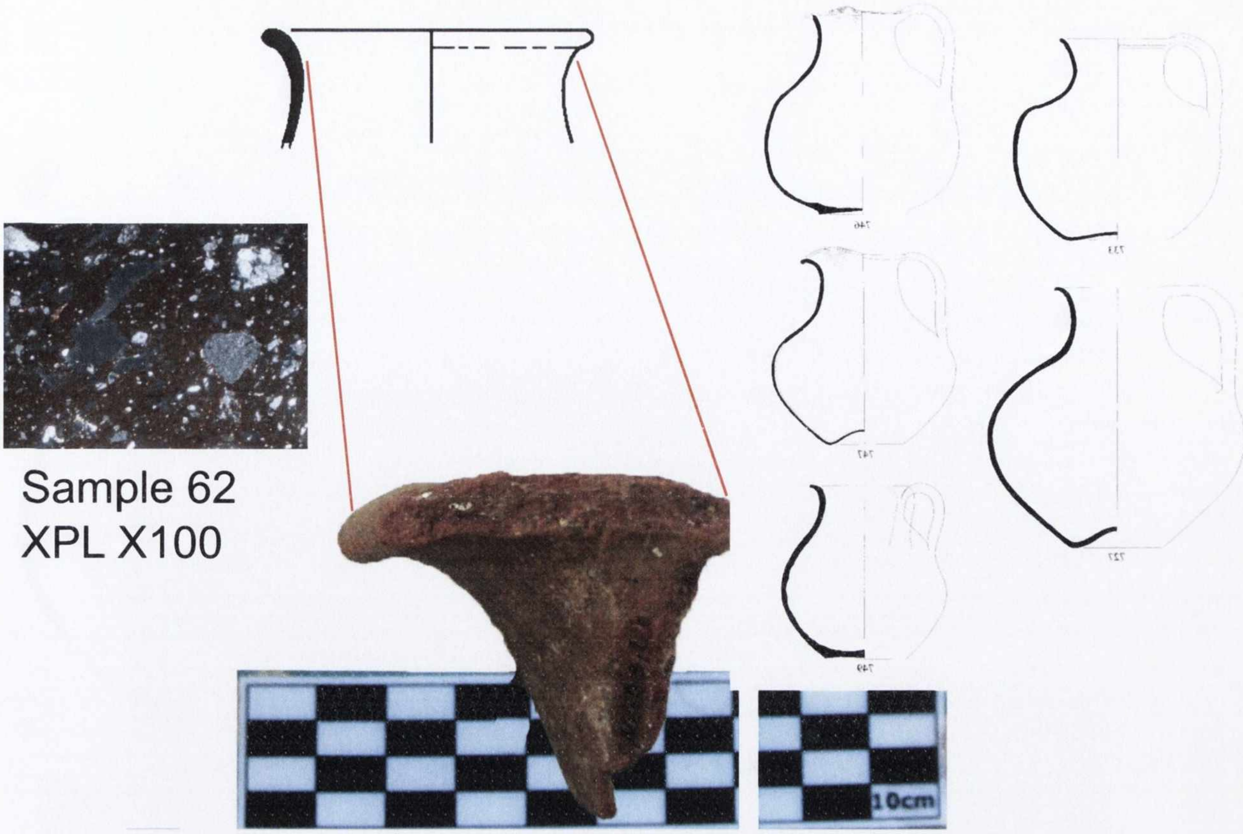
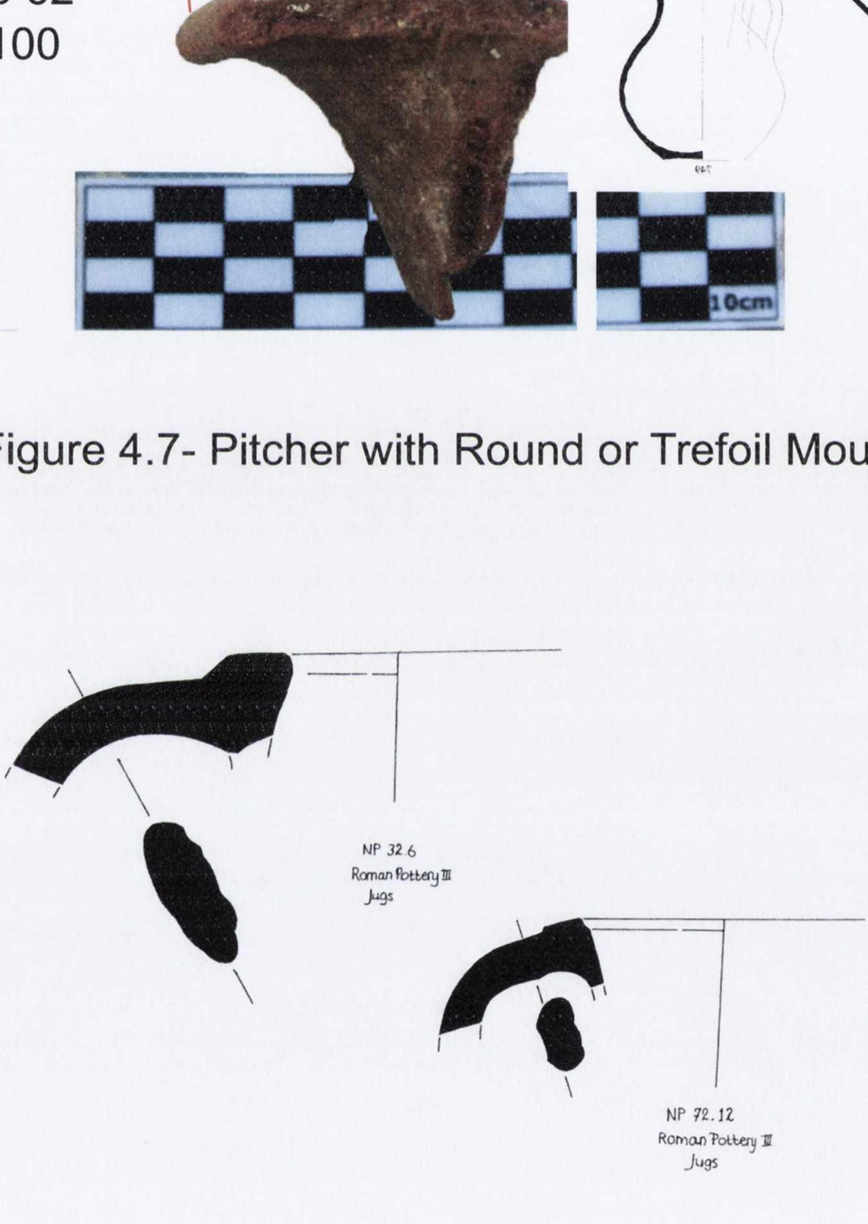


Figure 4.7- Pitcher with Round or Trefoil Mouth



(Shape otherwise the same as Figure 4.7)

Figure 4.8- Pitcher with Flat Horizontal Rim

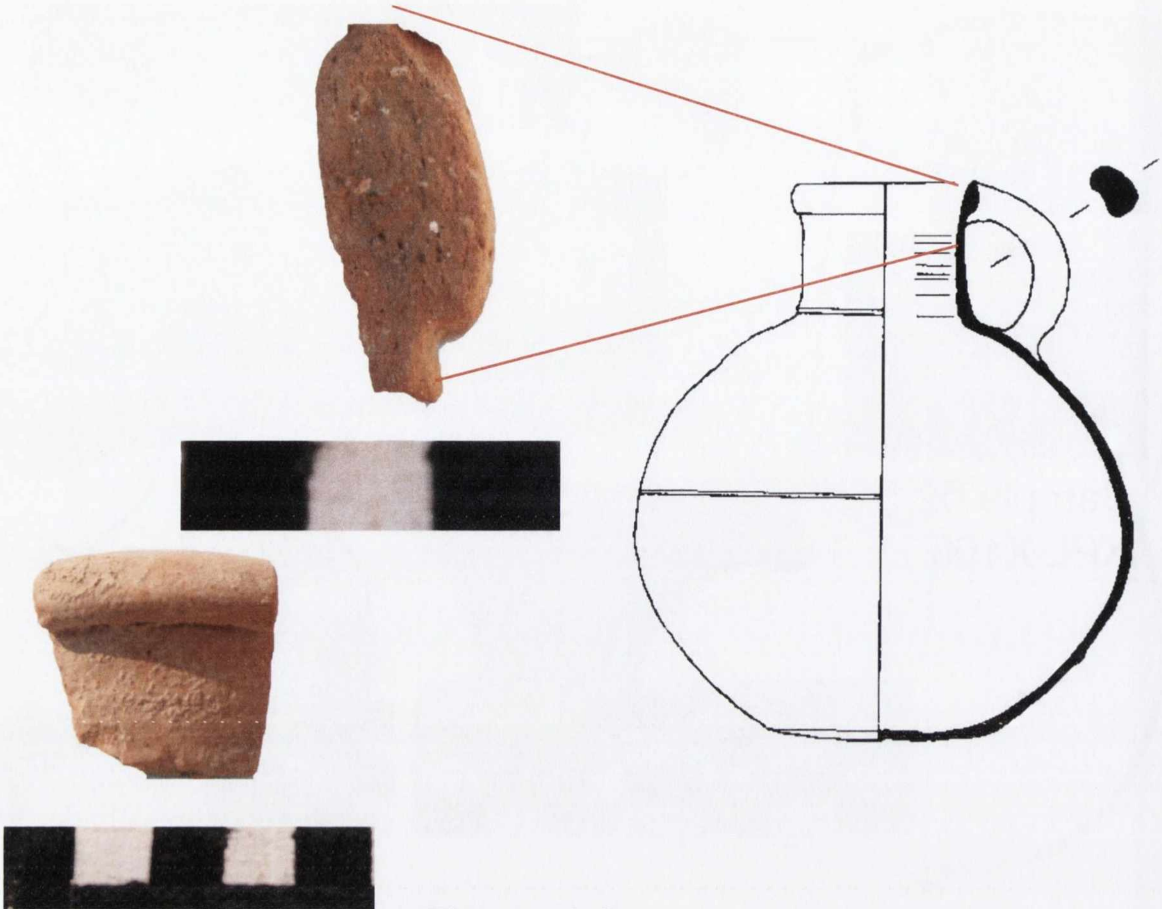


Figure 4.9 –
Pitcher with a Half-Round or Flattened Rim and Sturdy Handles

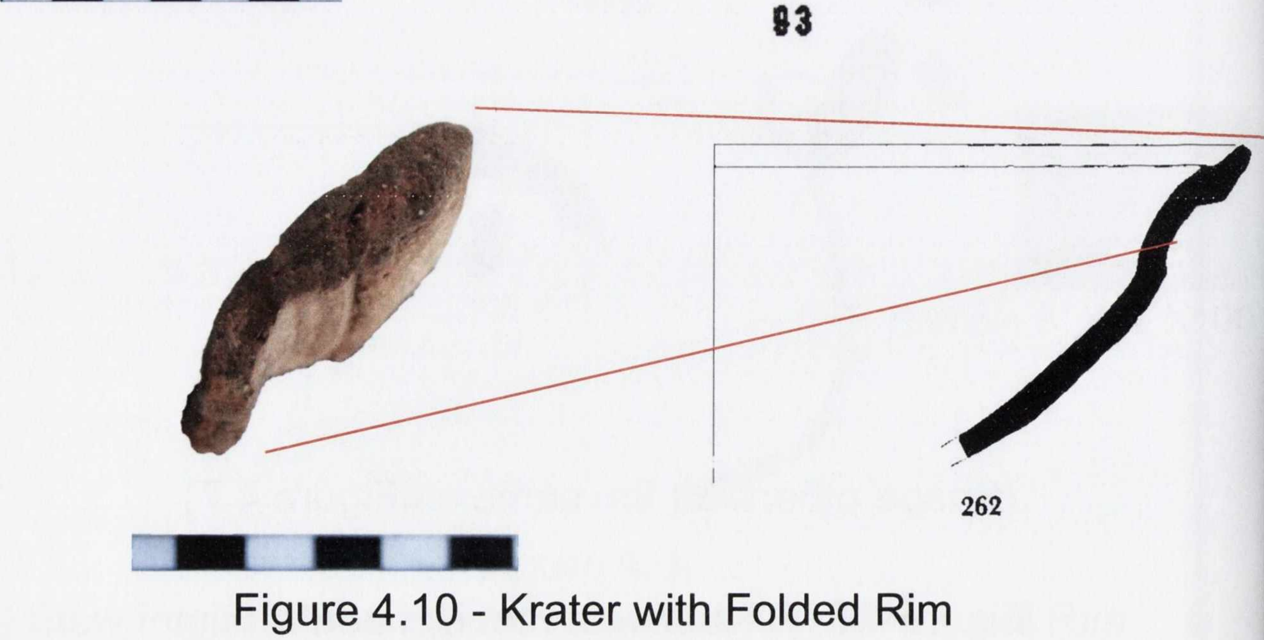


Figure 4.10 - Krater with Folded Rim

Figure 4.11 –
Krater with Deep Body and a High Flaring Rim with a Downturned Lip

Figure 4.12- Fusiform Unguentarium

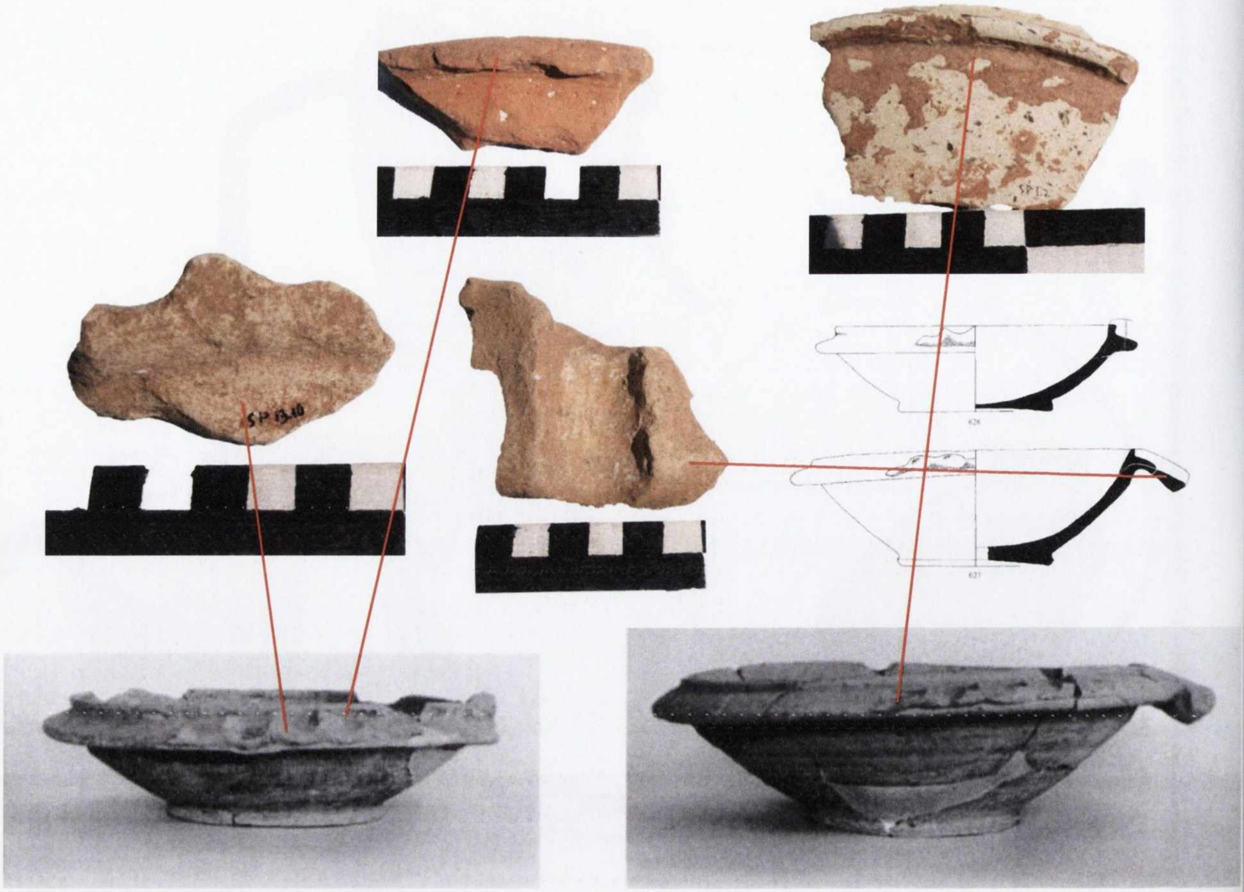


Figure 4.13 - Mortarium- Edwards' II Type

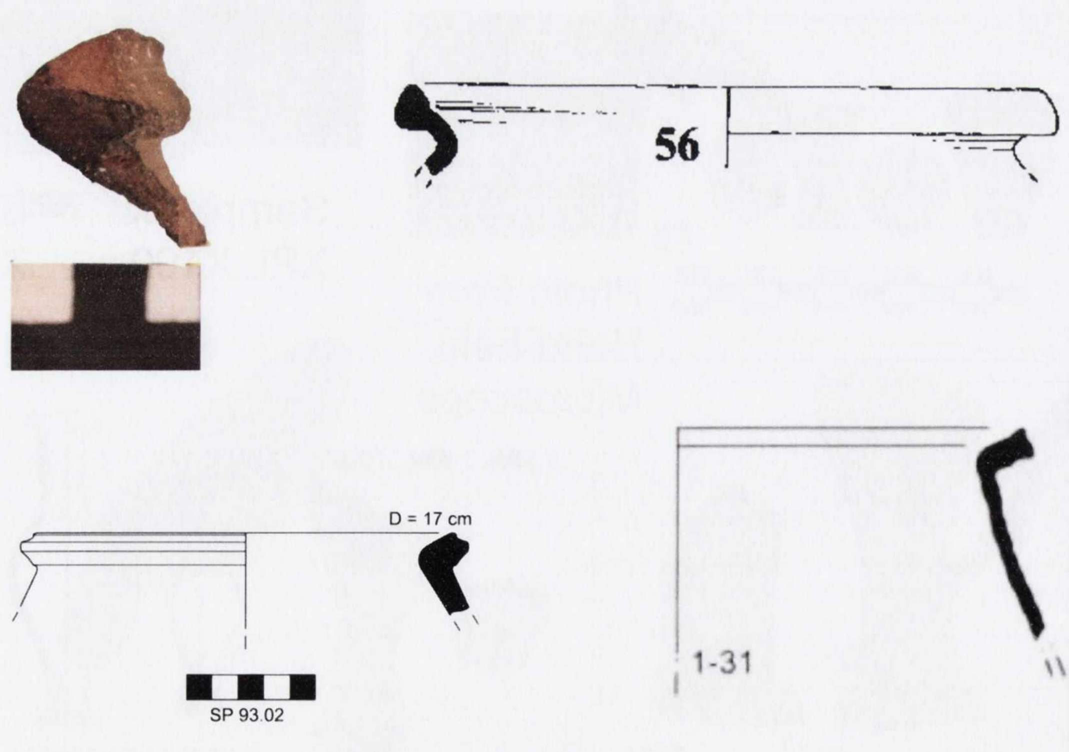


Figure 4.14-
Stew Pot and Casserole with Oblique Rectangular or Square Rim

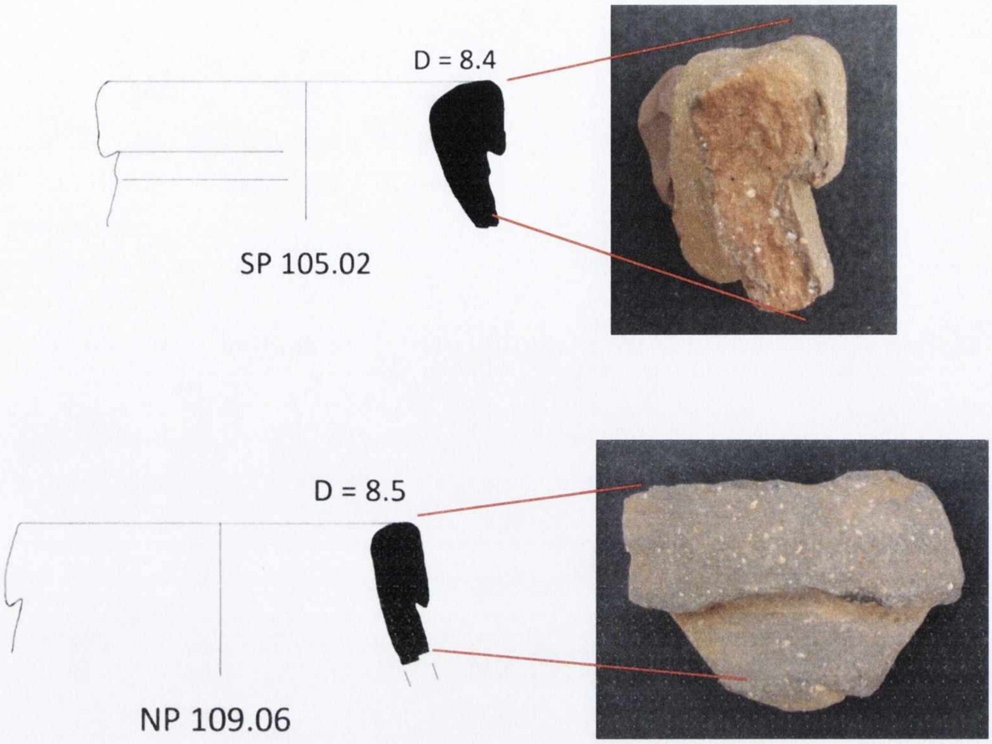


Figure 4.15 –
African (Keay 57, 61 and 62) Imitations in Local/Regional Fabric

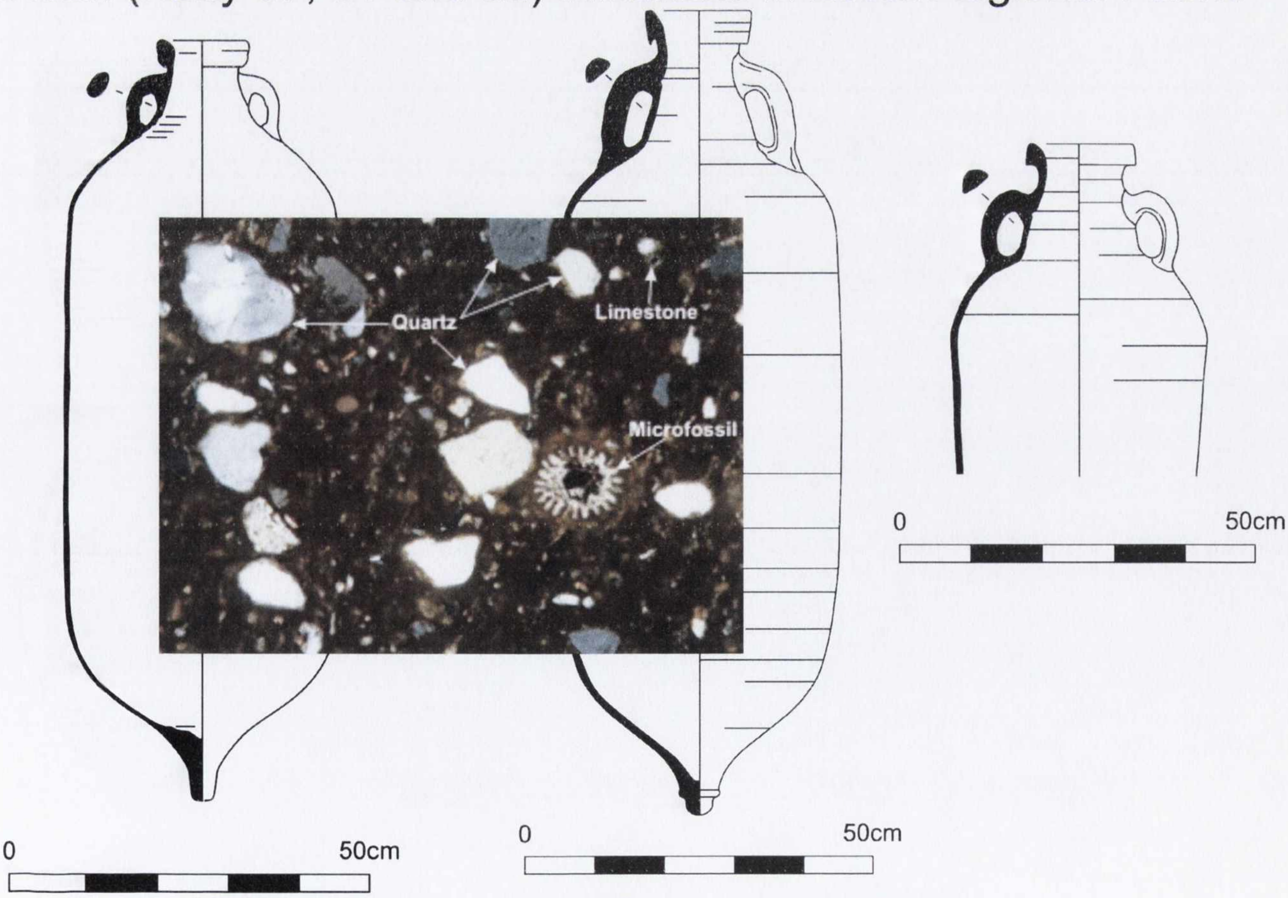


Figure 4.16 –Keay 57, 61 and 62 Types.

Figure 4.17- Late Roman Amphora 2

Figure 4.18 – Late Roman Amphora 1

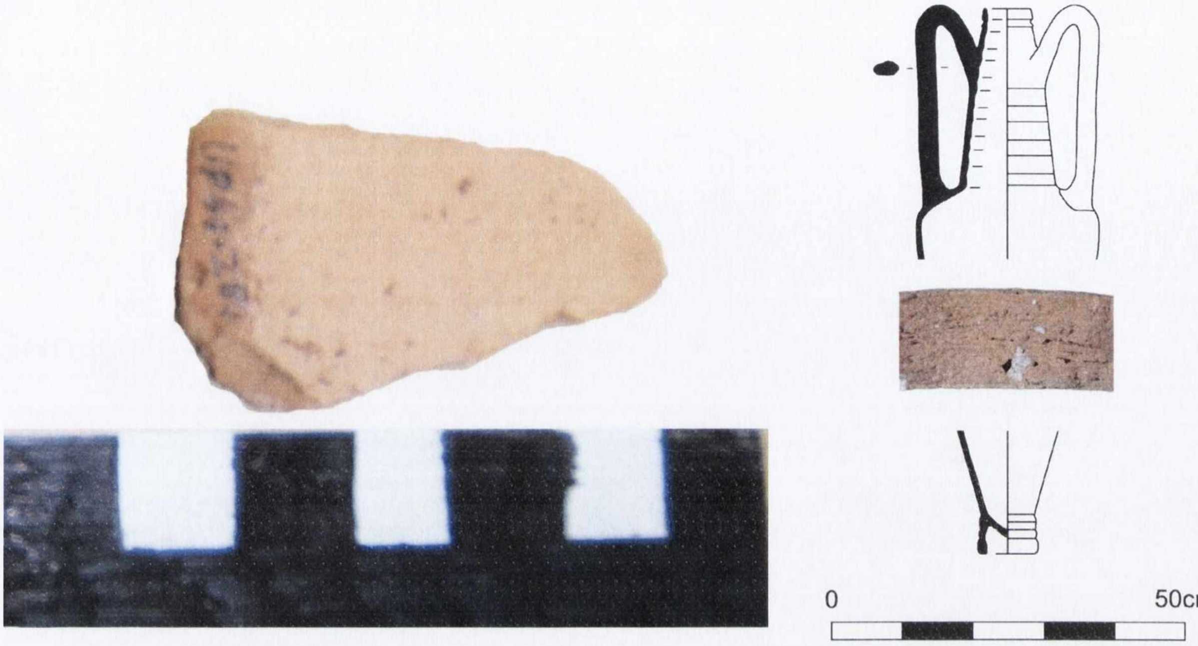


Figure 4.19- Niederbieber 77 Amphora

Figure 4.20 - Pitcher with Ring-rim

Figure 4.21 –
Bowl/Lekane with Heavy Horizontal Rim and Ridged Upper Surface

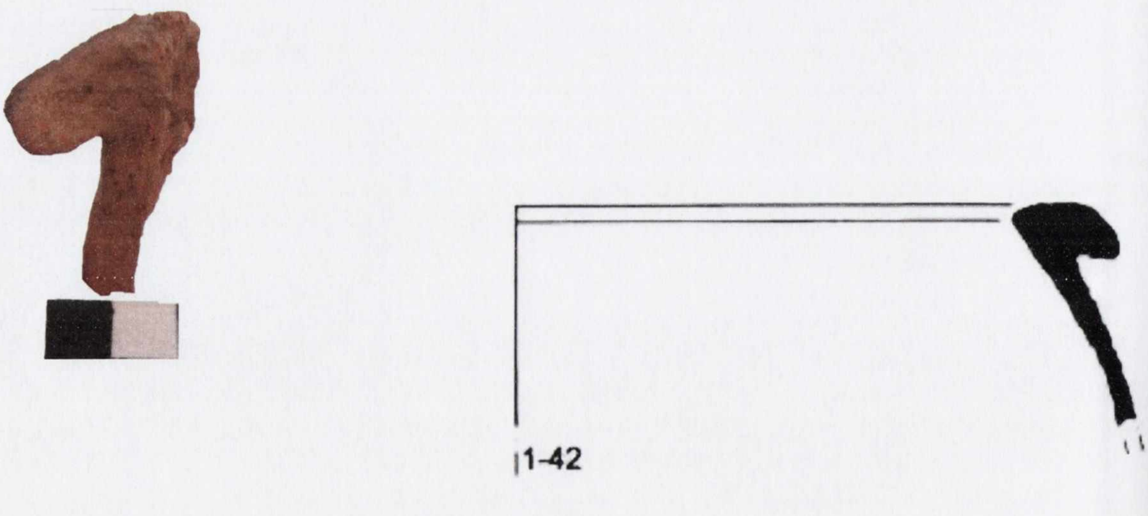


Figure 4.22 –
Basin/Lekane with In-Turned Upper Body and Heavy Everted Rim

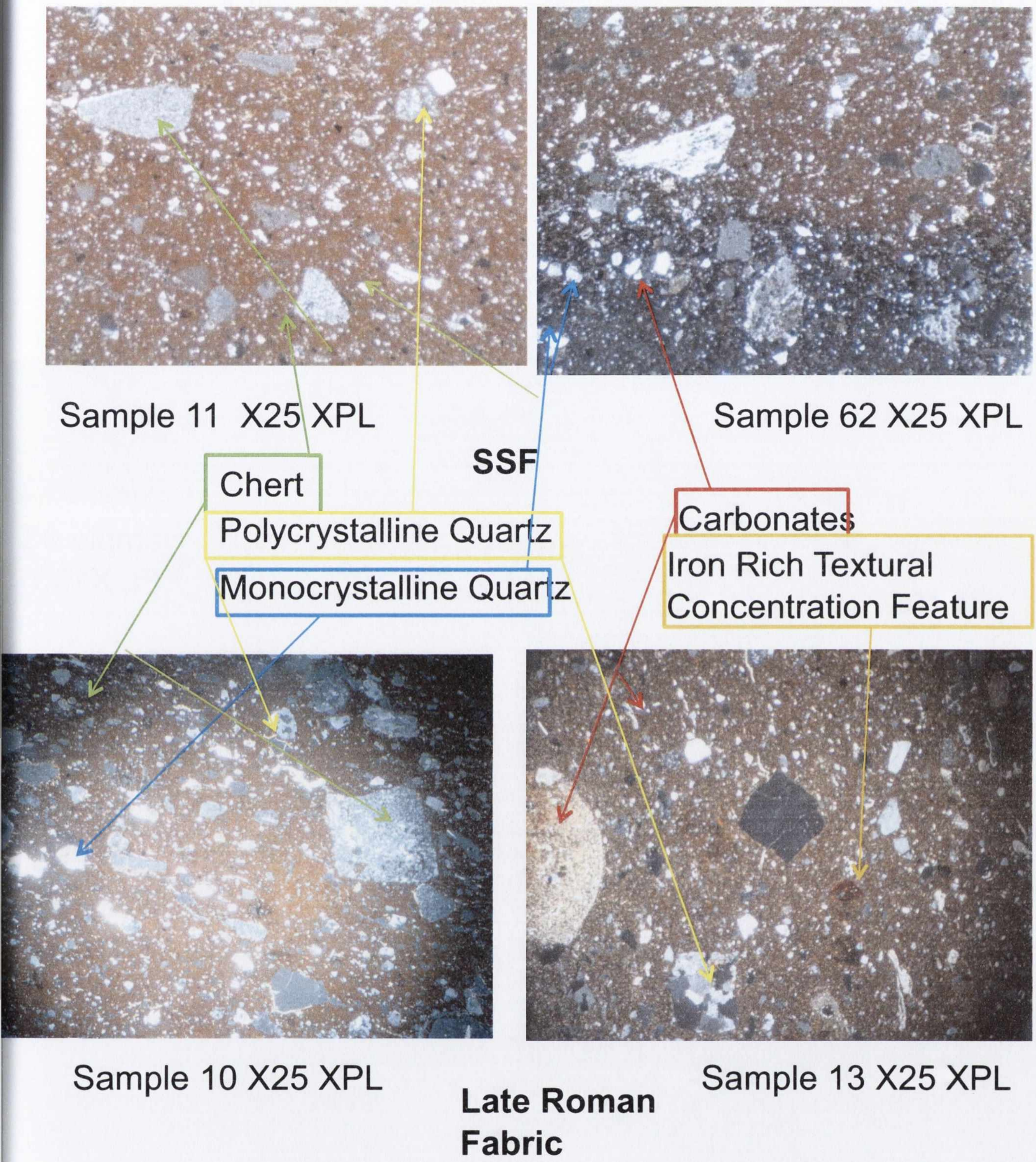
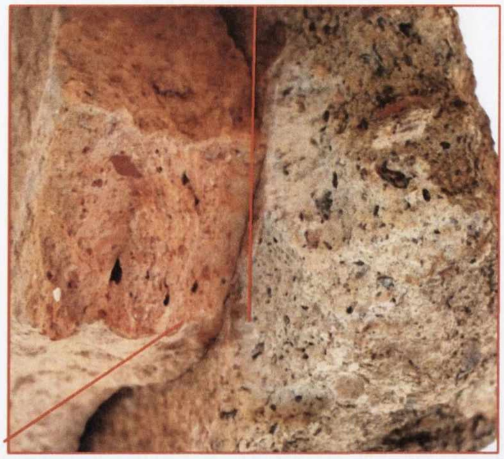
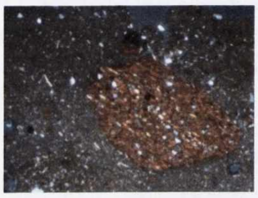


Figure 4.23- Photomicrographs-
Late Roman Thin-Sections and SSF Thin-Sections

Laconian Tile Fabric

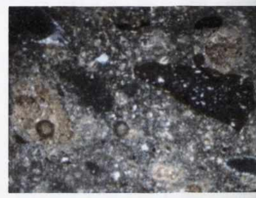


Corinthian Tile Fabric



Sample 7
XPL X100

Sample 9
XPL X100

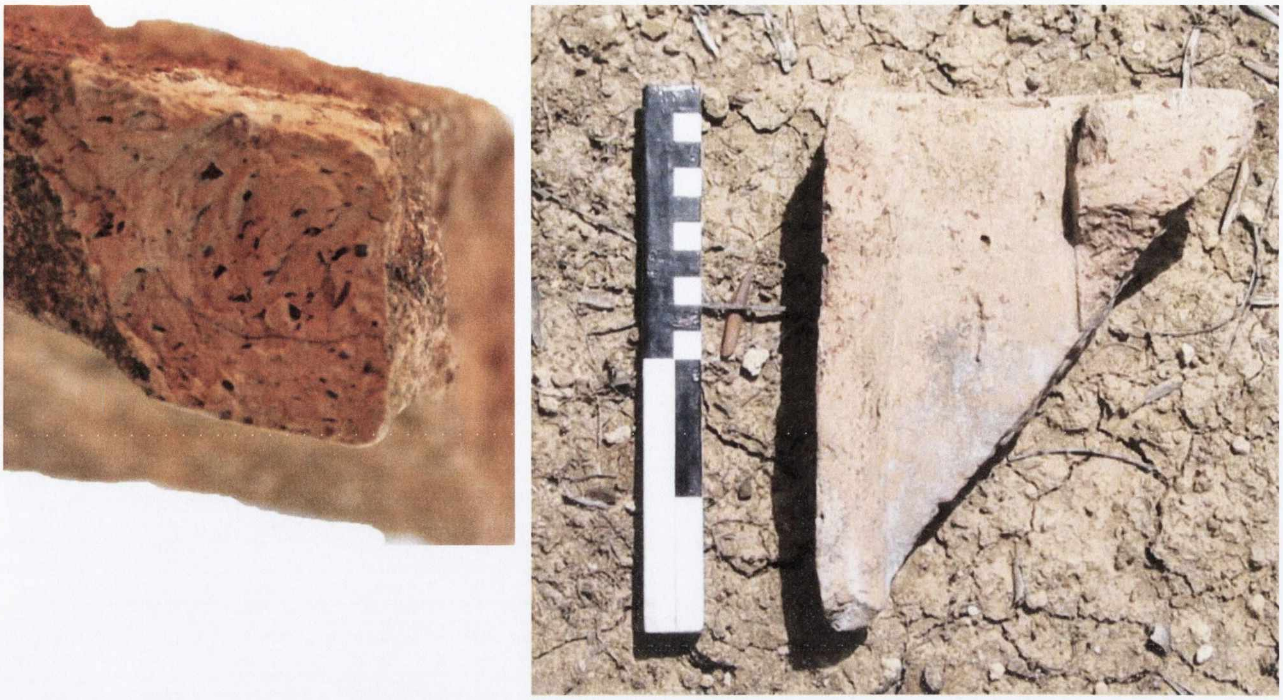


Sample 63
XPL X100

4.24- Images of Architectural Fabric Figure

(After Lolos 2011)

4.25- Corinthian Tile



(After Lolos 2011)

Figure 4.26- Laconian Tile

Figure 4.27- Late Roman Tile with Finger-grooves Around Edges

4.28- Map of Sikyonia with Bozika Area Highlighted

Figure 4.29 – Rhodian Amphora

Figure 4.30 – Knidian Amphora

Figure 4.31 – Corinthian B Amphora

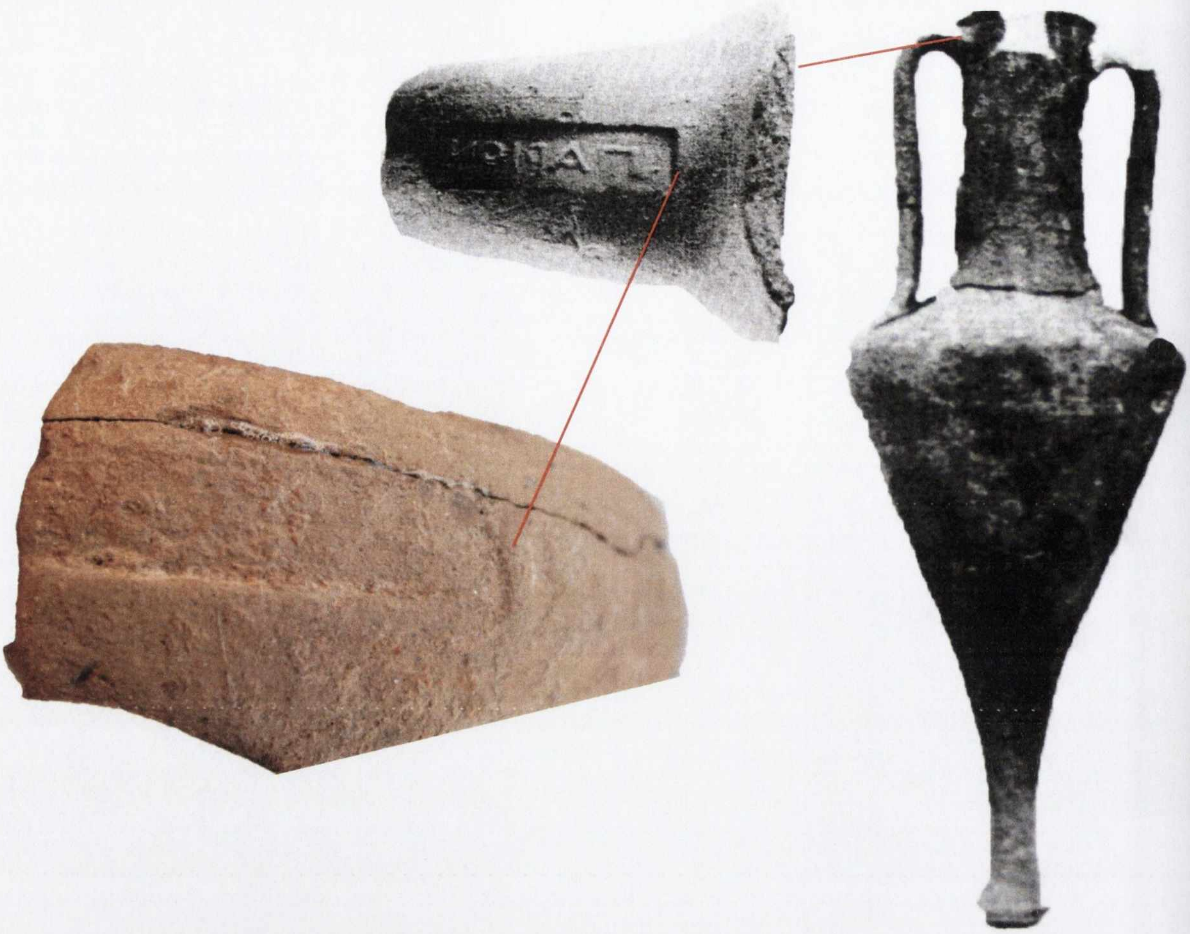


Figure 4.32 – Parian Amphora

Figure 4.33 –Early Greco-Italian Amphora

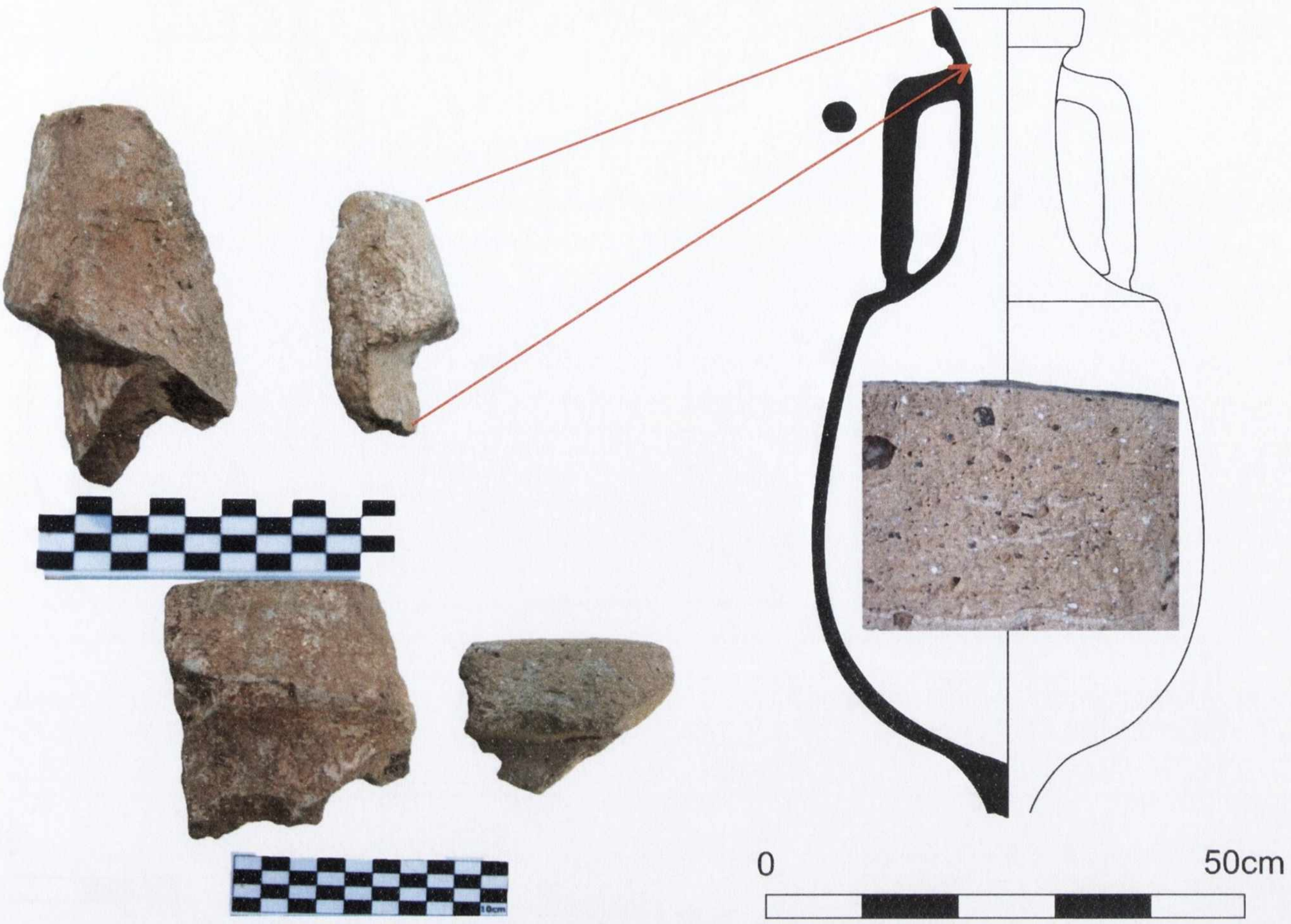


Figure 4.34 – Lamboglia 2 Amphora

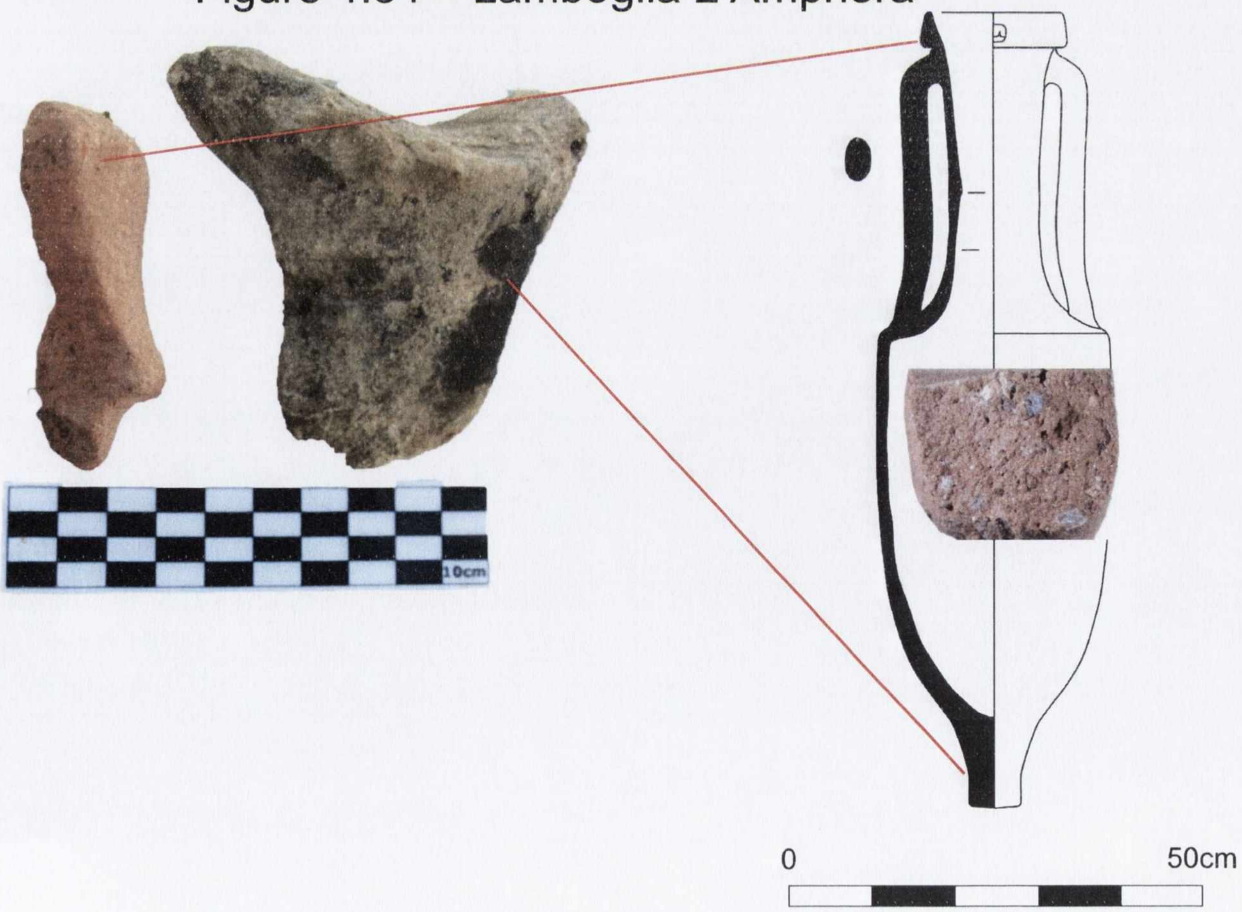


Figure 4.35 – Dressel 1 Amphora

Figure 4.36 – Brindisi Amphora

Figure 4.37 - Campanian/Dressel 2-4

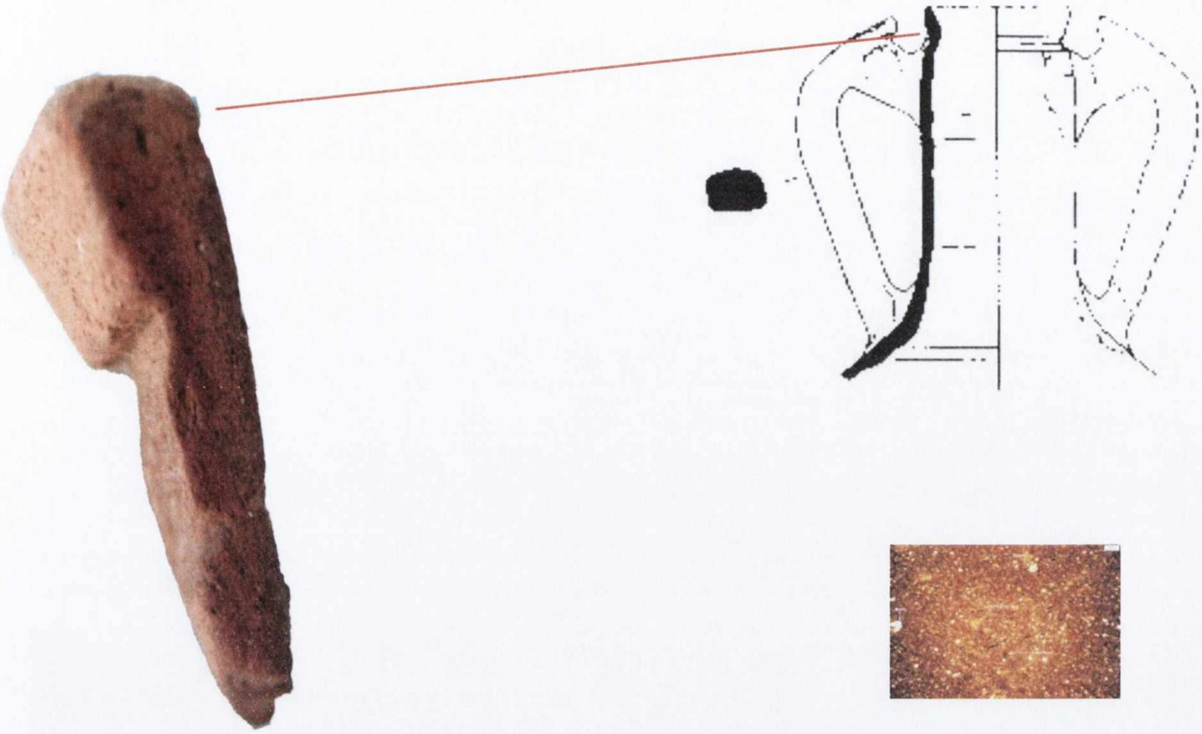


Figure 4.38 – Early /Middle Roman Rhodian Amphora

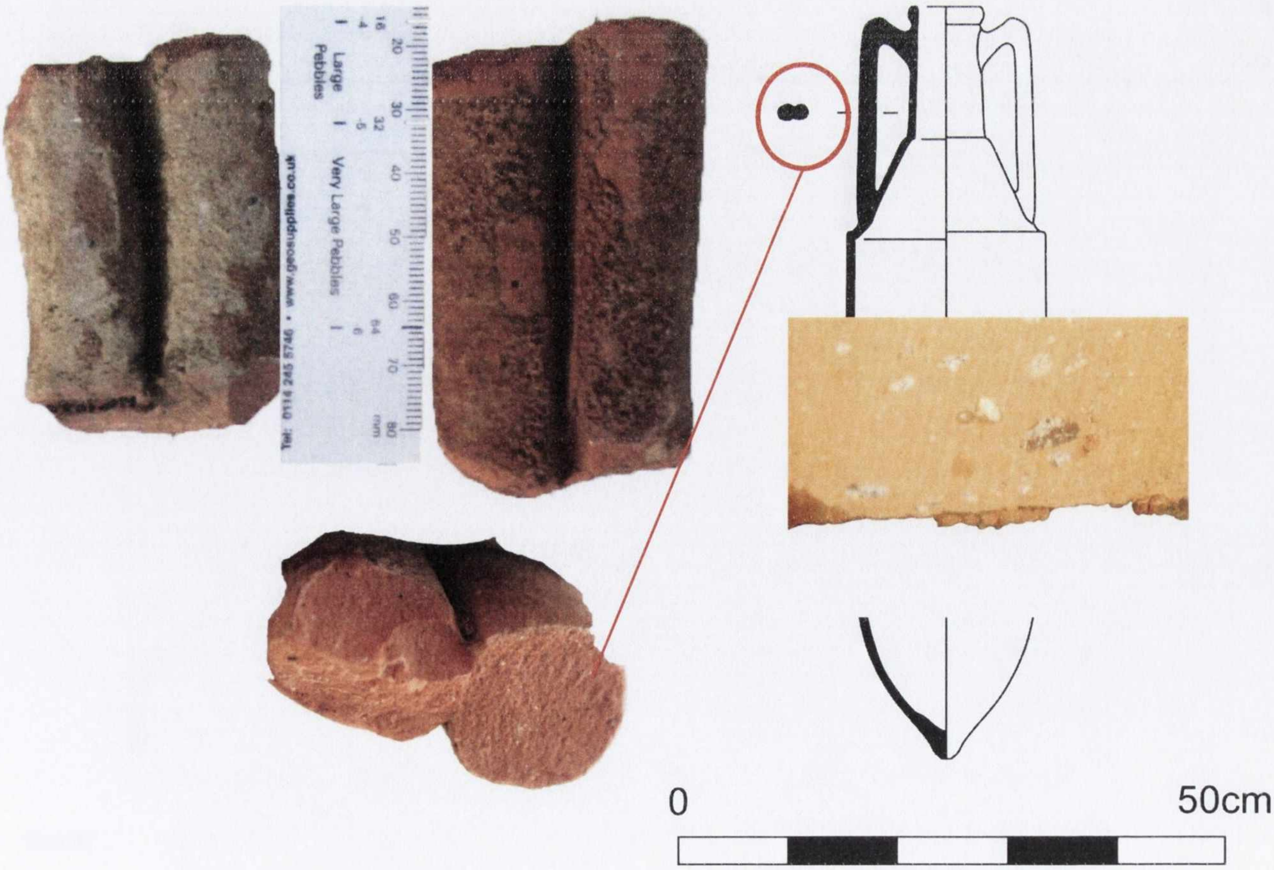


Figure 4.39 – Early Roman Koan Amphora

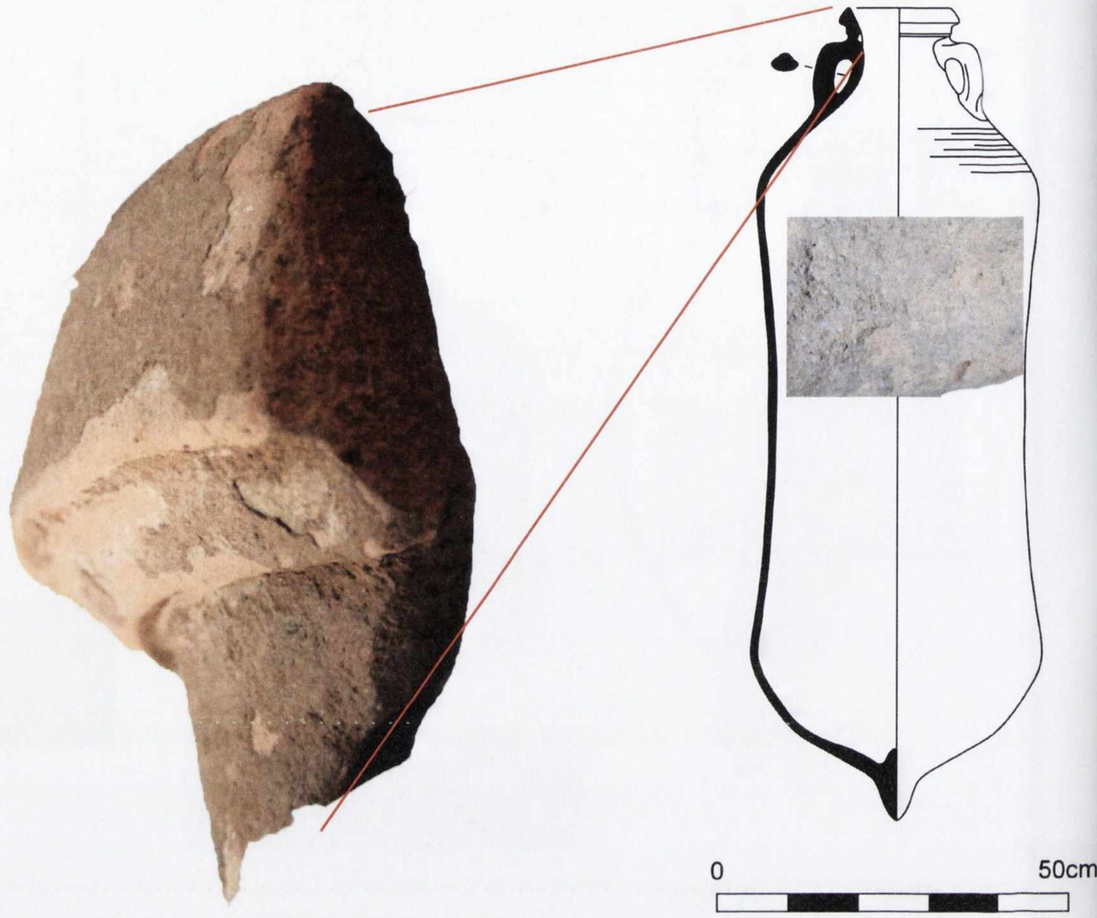
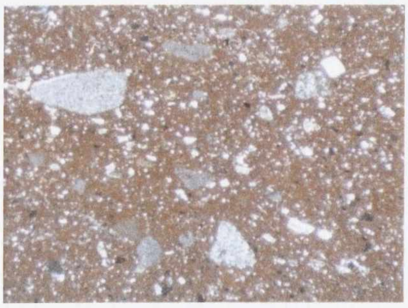


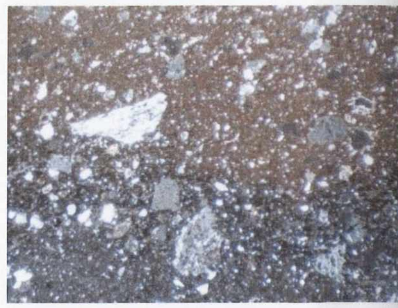
Figure 4.40 – Tripolitanian Type III Amphora

Figure 4.41 - Africana 2B Grande Amphora

Figure 4.42- Map with Possible Trade Routes Relating to Sikyon



Sample 11 X25 XPL



Sample 62 X25 XPL

Sample 74 X25 XPL

Sample 26 X50 PPL

Sample 116X100 XPL

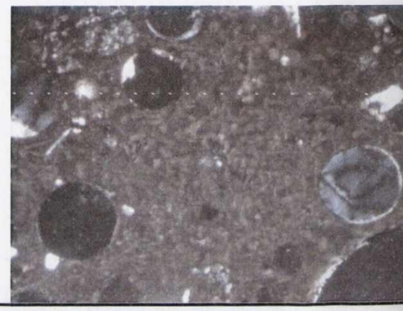
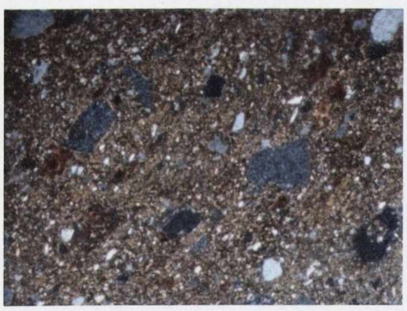
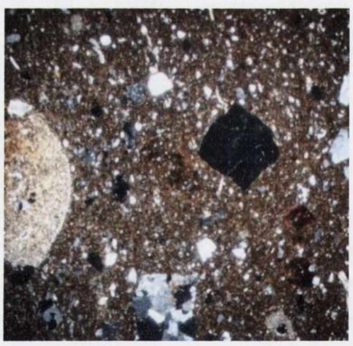


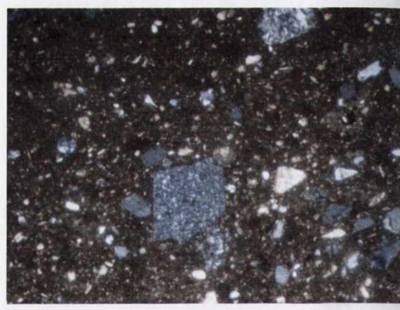
Figure 5.1- Subgroup 1a – Silicate Fabric



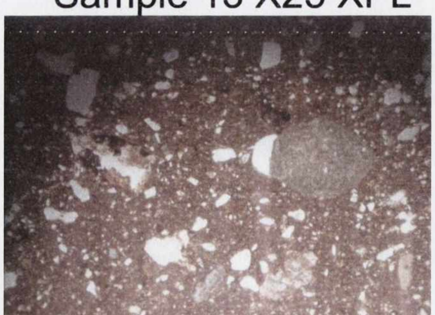
Sample 76 X100 XPL



Sample 13 X25 XPL



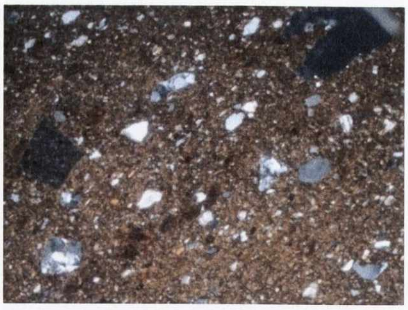
Sample 76a X100 XPL



Sample 13 X50 PPL

Figure 5.2- Subgroup 1b-
Silicate Fabric with Evidence of Clay Mixing

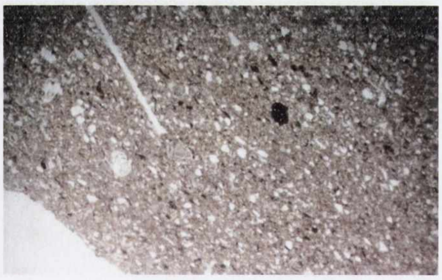
Sample 14 X50 PPL



Sample 14 X100 XPL

Sample 42 X25 XPL

Figure 5.3- Subgroup 1c- Medium Silicate



Sample 51 X50 PPL

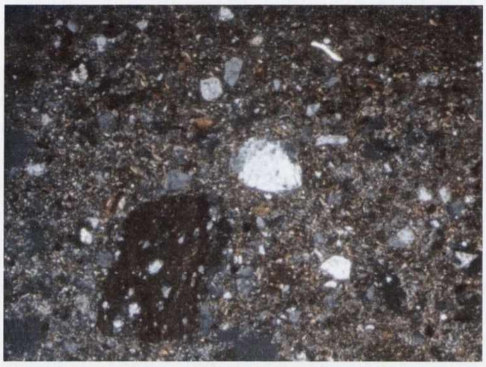
Sample 51 X25 XPL

Sample 51 X100 XPL

Figure 5.4- Subgroup 1d- Semi-fine Silicate

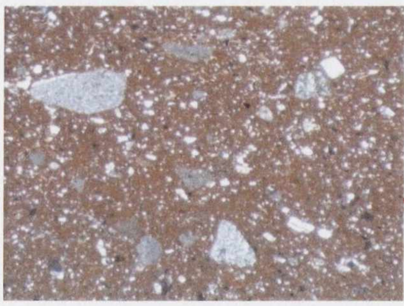
Sample 46
X100 XPL

Sample 73 X50 PPL



Sample 88 X100 XPL

Figure 5.5- Subgroup 1e– Silicate Fabric with Serpentine and Biotite

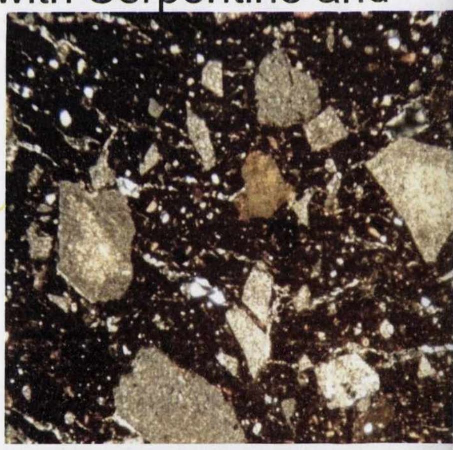


Sample 11 X25 XPL

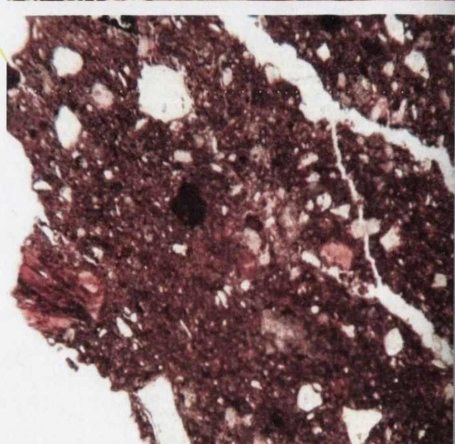
Sample 62 X25 XPL

Sikyonian

Corinthian



Graybehl 2010:
Figure 16: Chert, Micrite.
Crossed polars, x25.
Field of view is 3.8 mm.
Sample 20.



Graybehl 2010:
Figure 17: Quartz, clay pellets, micrite, fine biotite.
Plane polarized light, x100.
Field of view is 1.0 mm.
Sample 48.

Figure 5.6- SSF and CCF Side-by-Side

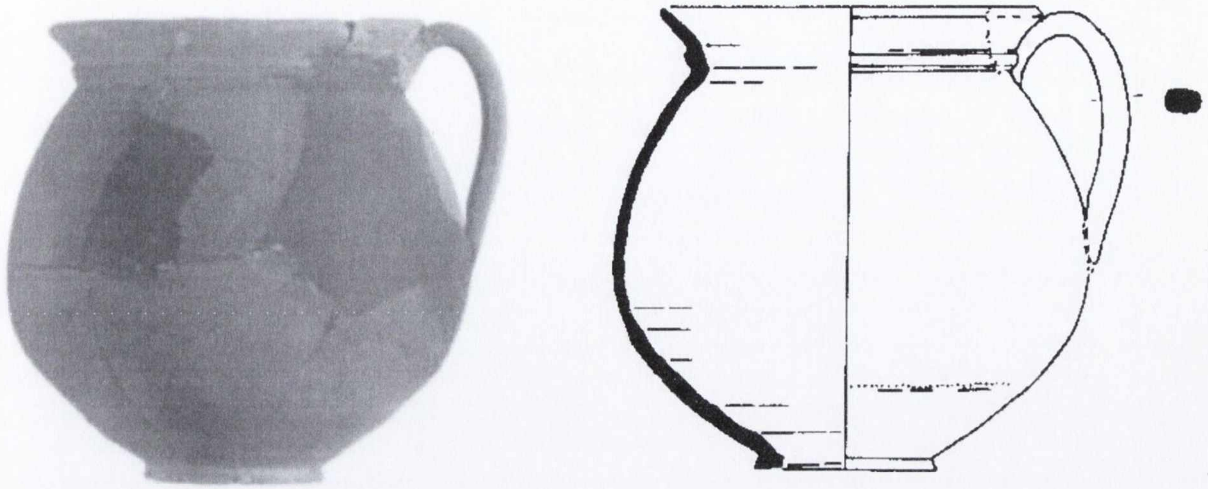
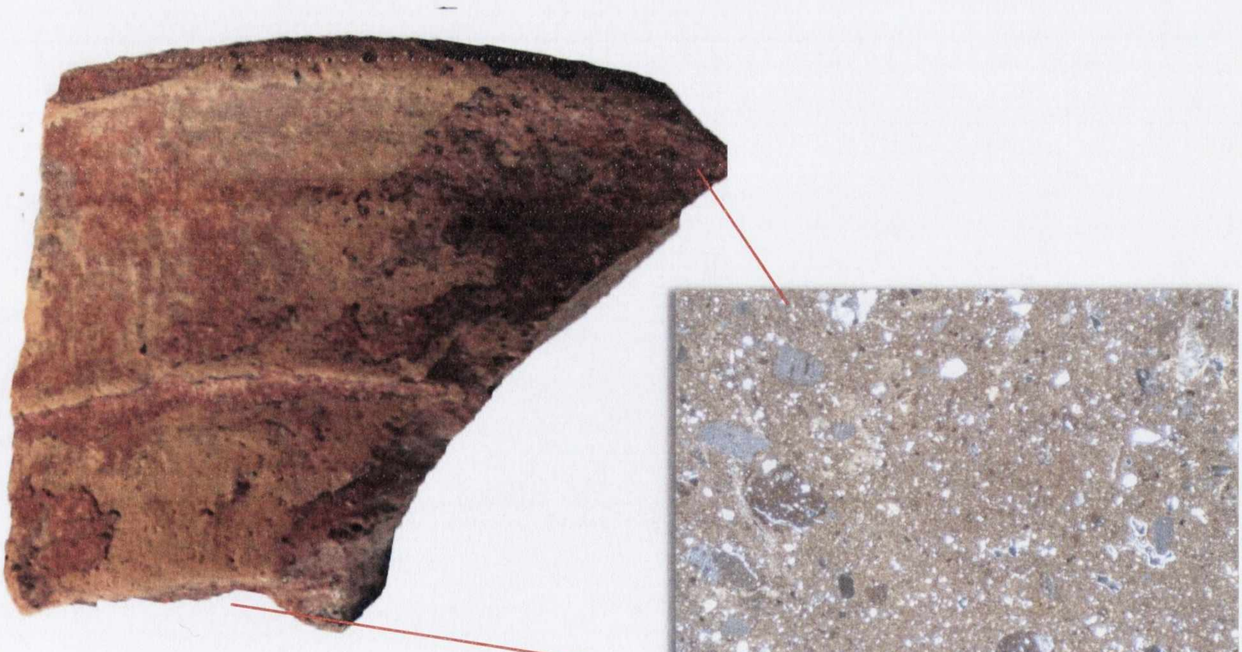


Figure 5.7- Image of Middle Roman Thin-Walled Cups



Sample 76a X25 XPL

Figure 5.8- Amphora with Stepped Triple-Ridged Neck

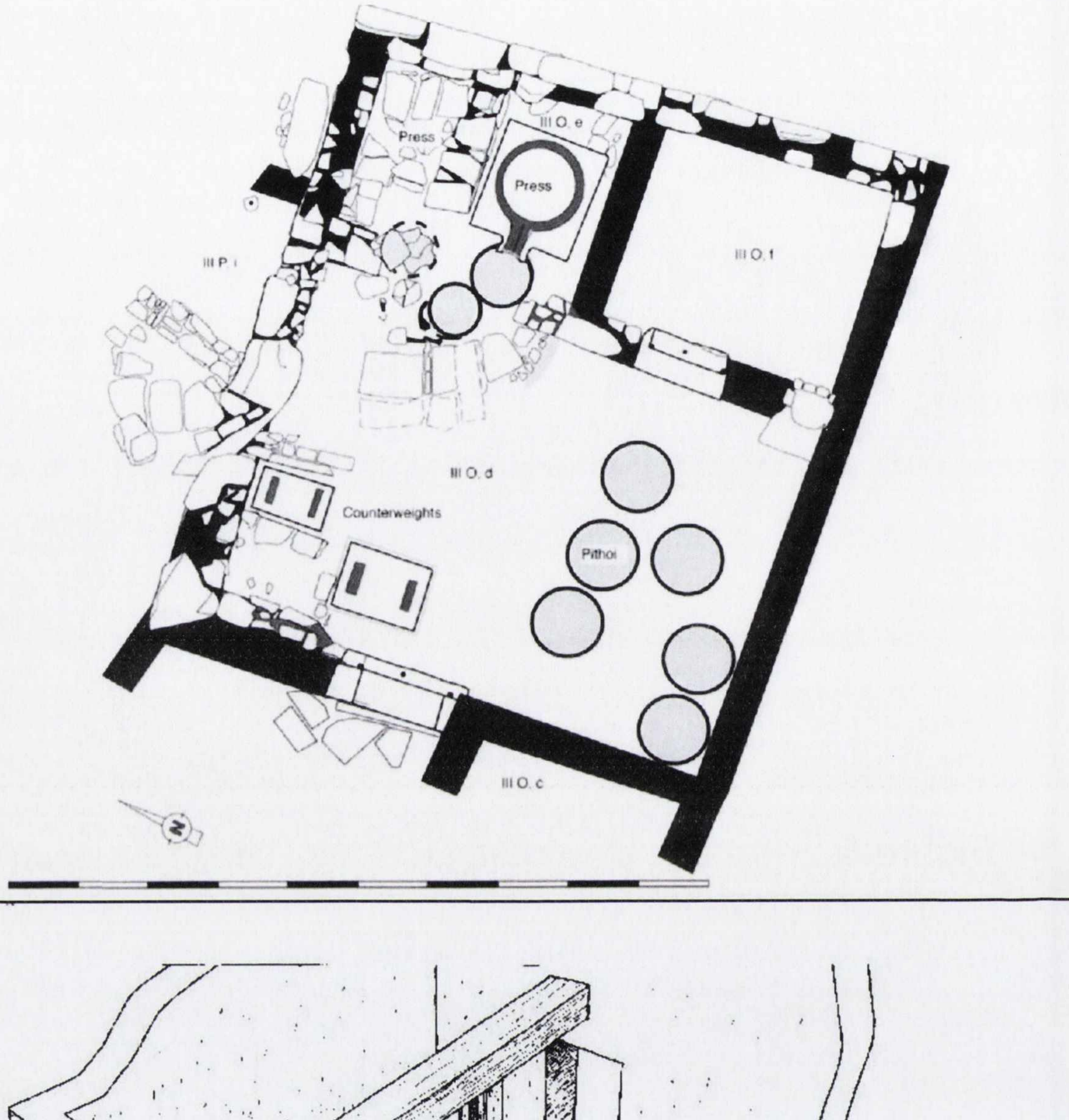


Figure 5.9- Perfume Pressing and Cooking Facility (Brun 2000)