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Handmade Burnished Ware at Teichos Dymaion: Pots, People and Technological Practice in Late Mycenaean Greece.

by:

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Abstract

The end of Late Bronze Age in Greece is recognised for its dynamism and shifting patterns of international connections between different regions of the Central and Eastern Mediterranean. Perhaps most significant for this period is the increasing evidence of contacts between Italy and its eastern neighbours. Mycenaean Achaea seems to have held a key role in this "Italian Connection".

A key element in understanding these mobilities is the appearance of handmade burnished ware (HBW) in Mainland Greece, Crete and Cyprus in the Late 13th-12th Century BCE, seemingly transplanted into areas using high quality wheelmade fineware. While it is now becoming widely accepted that the origin of this new class of pottery should be sought in Southern Italy, there is increasing evidence that HBW comprises a more diverse phenomenon.

This project looks at this pottery class and its diversity in the specific context of Teichos Dymaion, in Achaea, an important anchorage located at the first landfall for maritime traffic coming from Italy. Based on a chaîne opératoire approach and using thin section petrography to complement the visual assessment of the assemblage, it approaches HBW by the concept of pottery tradition, to produce a localised understanding of the pottery rooted in both technology and style.

The results reveal a HBW assemblage that shares a series of common practices distinctively different from the more canonical Mycenaean pottery, which it is suggested correspond to pottery traditions foreign to Achaea. Technological variability within this group, however, suggests a more diverse picture, hinting at evolving practices and perhaps at multiples groups of potters. The identification of a small group of imported Italian Impasto pottery, technologically closely related to the HBW material, seems to corroborate the Southern Italian origins of these technological practices, and reveals the important role of Teichos Dymaion in the Italo-Mycenaean relations.

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Introduction

For anyone invested in Greek archaeology, two words perhaps symbolise old and persistent ideas more than any others: 'Dark Ages'. Used as a concept to fill the gap between the end of the Mycenaean civilisation and the Geometric period (Dickinson 2006: 3), it is now mostly out of fashion. It is undeniable however, that it had a major influence on the archaeological thought on the fall of the Mycenaean civilisation. Narratives on the subject implied that the effects of this collapse were simply catastrophic, and most believed that it meant a complete and major break in continuity (Dickinson 2006: 5). It also implied that Greeks, in this period, were essentially isolated, and had no significant contact with the outside world (Tandy 1997: 7)

With the concept now abandoned, its associated imagery of a moribund, isolated Post-Palatial Greece is dissolving, and it is now accepted that the collapse of the Mycenaean palaces at the end of the Bronze Age (BA) did not meant the immediate and irreversible decline of Mycenaean culture. Instead it led the way to a transformed society, drawing on past symbols yet evolving in what turned out to be a period of unsuspected dynamism. It also became clear that it was not a period of isolation; simply, just as society itself was changing, so were Greece's connections to its neighbours.

At the junction of these two opposite visions of the end of the Bronze Age, lies a particular class of pottery: the Handmade Burnished Ware. A product of this time of change, it has for decades been part of the unfolding discussion on the demise of the Mycenaean palaces, and on the subsequent period. As such, the understanding of this pottery has mirrored the evolution of the archaeological understanding for the end of the Bronze Age. It is this pottery which will be the focus of this thesis.

Handmade Burnished Ware: definition and main hypotheses.

A long-debated phenomenon in Greek prehistory, Handmade Burnished Ware (henceforth HBW) is a type of pottery that appears at the end of the Bronze Age in Mycenaean Greece (Late Helladic III B2-III C, Mid-13th-12th century B.C.), a time that saw both the pinnacle and the collapse of Mycenaean palatial organisation (see Appendix 3 for maps of distribution of HBW in the Mediterranean). This particular class of pottery is recognised mainly from its striking difference from canonical Mycenaean pottery. While most Mycenaean wares are wheelmade,

well fired in kilns, and often have a very fine fabric and painted decoration, HBW presents some drastically different features. It is handmade, often by coiling, and has the appearance of being fired in open firing (bonfire). The HBW shape repertoire is varied, including tableware types, storage and transport vessels, and cooking pots, but does not fit in accepted Mycenaean typologies. It is usually, but not always, burnished. Decoration found on HBW is simple, often in the form of applied plastic features such as cordon imitating ropes or simple bands. HBW fabrics are usually coarser than those familiar from Mycenaean pottery, even for smaller shapes in the HBW repertoire, and are often characterised by grog tempering.

The possibilities offered by an in-depth study of HBW are manifold. Many relate to the historical context, looking at how HBW fits in the particular setting of the end of the Palatial period, and that of the Post-Palatial period and its renewed dynamism. Moreover, because of its assumed foreignness, the HBW is also a window on international relations during these later stages of the Late Helladic period. But HBW also relates to more abstract concepts. It allows insights into concepts of mobility and migration, and indeed the opposition of both. It also emerges as an ideal case study for addressing issues of cultural and technical hybridity, and technological interaction. Indeed, there are signs of gradual assimilation in terms of style between HBW and canonical Mycenaean pottery: soon after its appearance, typical Mycenaean shapes (such as cooking vessels) were incorporated into the shape repertoire of the HBW, and HBW elements (carinated cups, cordons on craters) were reproduced in the characteristic painted Mycenaean pottery tradition(s) (Kilian 2007, Romanos 2011).

Discovery and early interpretations of HBW

The crude nature of the HBW initially led archaeologists to mistakenly date it to the Early Bronze Age, until new deposits from Mycenae, Lefkandi, and Korakou forced archaeologists to reassess this assumption. The history of the identification of HBW as a Late Helladic feature was presented in a note published by French and Rutter in 1977 (French & Rutter 1977: 111-112). In 1965, E. French noticed a new deposit of HBW in the material from the 1964 excavation at Mycenae. Discussion with M. Popham the same year led to the realisation that the same ware was also present in Lefkandi (see Popham & Sackett 1968). Subsequently, scholars started to take note of other occurrences of the ware, but it was only in 1969 that French brought wider attention to it with a small note published in Archäologischer Anzeiger, identifying it as a LH IIIC phenomenon (French 1969). Rutter, who was invited to work on the LH IIIC material from Mycenae in 1972, became familiar with HBW, recognising it later at Korakou and leading to the first analytical study of this pottery in 1975 (French and Rutter 1977: 112, Rutter 1975). In

his study, Rutter suggested that this material was evidence of a foreign intrusion. Suggesting an origin in Romania or Bulgaria, Rutter hypothesised that it could be related to the events that led to the destructions of the palaces (Rutter 1975: 31-32). Rebuttal came swiftly, with Walberg suggesting in the following year that this material was more likely a local development by households adapting to changes in Mycenaean pottery production and distribution (Walberg 1976).

This first discussion on HBW is rooted in two simple, yet vital observations made by Rutter. These are that 1) HBW looked stylistically and technologically foreign to Mycenaean Greece, and that 2) it was, nonetheless, produced locally (Rutter 1975: 17). It is this contrasting reality of HBW that fuelled subsequent debate on its origin that continues to this day. While many hypotheses have been suggested, we can group them into three main categories:

- The foreign hypotheses, which can be subdivided according to the geographical area suggested as the origin of the HBW tradition;
- The local hypothesis, which argues for a local development of HBW in Greece;
- A hybrid model, which emphasise the complexity of the phenomenon and is open to draw ideas from both the first and the second categories.

The following sections will present the main arguments and actors for each category. Rather than being an extensive summary of every work addressing HBW, this section aims to give the reader a comprehensive and critical portrait of the variety of hypotheses suggested on this subject, and to present the most accepted interpretation at the time this thesis was written. An extensive, although now dated, presentation of studies on HBW can be found in Pilides' 1994 book *Handmade Burnished Ware of the Late Bronze Age Cyprus.*

Foreign hypotheses

If Rutter (1975) was the first to produce an extensive publication of excavated HBW material, the idea that this new pottery was an alien intrusion in Mycenaean Greece precedes his study. Indeed, Popham and Sackett were already in 1968 suggesting parallels between the Lefkandi HBW and Italy (Popham and Sackett 1968), and French pointed out similarities between the HBW at Mycenae and Trojan Coarse Ware in 1969 (French 1969). To this day, this model, suggesting a foreign origin, is the most widely accepted, although many have disagreed on the exact location of this origin, and continue to do so.

Rutter considered both possibilities but ultimately suggested something slightly different. While acknowledging the Trojan parallels, more specifically parallels with Troy VIIb Coarse Ware and

Knobbed Ware (Rutter 1975: 30-31), he claimed that Troy was not the origin, but rather a mirror phenomenon, and that the origin of both phenomena should be sought in Romania and Bulgaria. Furthermore, he hypothesised that, considering the chronological situation of the ware and its potential Northern origins, it could be the material remains of the intruders responsible for the series of destructions of LH IIIB2 (Rutter 1975: 31-32). This hypothesis would become widely accepted, influencing the names used to identify the ware, with "Barbarian Ware" (e.g. Catling and Catling 1981; Karageorghis 1986) and "Dorian Ware" (Kilian 1978: 314) being the most common[1], and others would later build hypotheses based on similar conclusions (see Kilian 1978). This model, while generally accepted at first, is now all but abandoned. Indeed, while plausible when the HBW is confined to LH IIIC layers, it became untenable as new material was discovered in layers preceding the destruction of the LH IIIB2-IIIC transition (Pilides 1994: 3), for example at Khania (Hallager 1983), or at Tiryns (Kilian 1981).

If Troy (see French 1969; Bloedow 1985; Jones 1986) and the Balkans (see Bouzek 1985; Bankoff et al. 1996) would continue to be sporadically cited as potential origins of the HBW pottery tradition, most scholars have turned west in their search, and it is now commonly recognised that its origin should be sought, in its entirety or in part, in Italy. As a detailed account of the Italo-Mycenaean connection can be found in Chapter 3 of this thesis, the following section will focus solely on elements that allowed this association to become the most accepted working hypothesis today.

As briefly mentioned above, it was Popham and Sackett (1968) who first suggested an Italian origin to HBW. Indeed, they considered that the carinated cup with high-swung strap handle found at Lefkandi to have close parallels in Italy, and Popham later used this newfound relation to suggest early contact between Euboea and Southern Italy, which would subsequently lead to the establishment of Euboean colonies on the Italian peninsula in later periods (Popham & Milburn 1971: 338; Popham 1983: 238; Pilides 1994: 2). While the latter claim may be farfetched, the observation made about the carinated cup took root and became central to the question of the Italian origin of the HBW. Also looking west, Deger-Jalktotzy (1977) suggested a broader relation of the HBW with Urnfield pottery, arguing it was part of broader Adriatic koine, a view wich foresees later discussions on the relations between the HBW and the so-called Urnfield bronzes.

Hallager (1983) later subscribed to Popham's ideas, suggesting a similar link between not only the carinated cup, but between all shape and features of the HBW from Khania and Sub-

1 For purposes of clarity, the use of the widely accepted "Handmade Burnished Ware" and its abbreviation, "HBW", will be preferred in this study, even if referring to work by authors using other terminology.

Apennine Italian parallels (Pilides 1994: 5). More importantly, she drew connections between the HBW, the wheel-made Grey Ware, and several other artefacts such as fibulae or Peschiera daggers, which she considered to be related to an Italo-Mycenaean connection, thus including the HBW into the wider discussion on the nature of the relations between the Aegean and Italy at the end of the Bronze Age (Hallager 1983: 115).

Many scholars followed suit, arguing along similar lines and using the same stylistic arguments (e.g. Rahmstorf 2003, 2011; Belardelli and Bettelli 2005; Eder and Jung 2005; Jung 2006; Kilian 2007; Stockhammer 2008; Jung and Mehofer 2013). Others added an analytical weight to this interpretation, showing, through petrographic analyses of Cretan, Cypriot, and Near Eastern assemblages, that HBW had technological similarities with Impasto pottery from Southern Italy, most evident in its use of grog for tempering (Boileau et al. 2010; D'Agata et al. 2014, Boileau et al. 2011), something that was also observed by Whitbread (1992) in his analysis of the Menelaion material, strengthening the argument for a Southern Italian origin of the HBW.

Local hypothesis

While much less popular, the hypothesis that argues for the local development of HBW was nonetheless one of the first rebuttals to Rutter's seminal paper. Indeed, Walberg wrote in 1976 a small response to Rutter, in which she argues that the HBW was most likely a local development following the destruction of the palaces in Greece and the resulting disturbances in the distribution of wheel-made pottery, a view that would later be supported by Sandars (1978) and Snodgrass (1983). S. Sherratt (1981) also supported a local origin for the HBW, although she did not think it had anything to do with the destruction of the palaces. Indeed, she refuted any causality between the two events, as HBW material was found in the destruction layers of Mycenae, indicating that the ware was present before the events leading to the aforementioned destruction (Sherratt 1981: 590). More importantly, she suggested that handmade pottery had always been part of the Mycenaean pottery repertoire, and that the new burnished finish of later period was a utilitarian addition (Sherratt 1981: 590-593).

The debate intensified in 1990, with the publication of a paper in JMA by Small which argued for the local development of HBW, in ways similar to Walberg (1976) before him. As pointed out by Rutter (1990: 3) in his response to Small, what separated this paper from earlier claims on the local origins of HBW is that the arguments are much more developed.

Not unlike Walberg (1976) or Sherratt (1981) before him, Small's approach to the problem is mostly economic. Relying on studies by van der Leeuw (1976) and Peacock (1982), he

considered that wheel-made pottery is the product of a specialised, workshop-based production, and that handmade pottery, in opposition, is produce in household settings, to be used by the household itself or destined for some form of market exchange (Small 1990: 8). As such, HBW, to him, falls into the latter. He argued that it is the constraints caused by the instability arising at the end of the Bronze Age, which he suggested created an increase in the amount of agricultural resources being diverted toward the palatial authorities, that force the "peasants" (sic) to produce buffer products meant to be traded as a way to counter this new economic reality (Small 1990: 17-19). HBW, to him, was one such buffer, traded on a very large network, including the large Mediterranean basin and the Balkans (Small 1990: 18-19, 1997: 226). He further suggests that subdivisions are hardly possible, as all handmade pottery is bound to look similar (Small 1990: 10, Small 1997: 224).

There are, however, several problems with Small's assessment, which also relate to the other claims supporting the idea of a local development of HBW. Indeed, the idea of a local origin for the HBW as presented by Small is in fact unsustainable in its historical context, while also being technologically incongruent with how we now understand the notions of craft tradition and pottery making. Rutter (1977) rapidly, and rightly, pointed out in his first response to Walberg (1976) that the production of fine and coarse Mycenaean wheelmade pottery does not show any sign of a reduction in the scale of production immediately before or after the collapse of the palaces. On the contrary, pottery from the LH IIIC period shows a greater degree of regional variation, and while it is true that these variations might be attributed to changes brought on by the collapse of the palatial polities, they do not indicate a breakdown of Mycenaean pottery production and distribution (Mountjoy 1986: 134, 1999: 13). The introduction of new handmade types of pottery in an already well supplied network of pottery exchange would therefore hardly help the Mycenaean so-called 'peasant' population to cope with economic hardship.

More importantly, there is at the basis of Small's arguments a misunderstanding of pottery production, and of craft traditions. Indeed, Small's hypothesis seems to be the result of an over simplistic view on handmade pottery. He considers that such pottery is bound to look similar, regardless of where or by whom it was produced, implying that it is simple to produce, and that it is a creatively sterile medium (Small 1997: 224). Of course, under such a paradigm, one could easily imagine the sudden emergence of a new handmade type of pottery. This vision, however, is incompatible with the accumulated knowledge on pottery production and craft traditions[2]. Ethnographic studies on pottery production in Sub-Saharan Africa have shown that the techniques used by the potters were in fact deeply culturally embedded, often passed

2 This will be discussed thoroughly in Chapter 1.

down from “master” to “apprentice” (Arnold 1985; Gallay and de Ceuninck 1998; Gosselain 2000; Mayor 2010: 6). Of course, these techniques can change or evolve, through multiple mechanisms, but the kind of drastic change required in the case of the HBW being suddenly produced in Mycenaean households is highly improbable; the introduction of a new pottery making technology that includes a) a change in the forming techniques used (wheel-made → coiling), and b) new clay recipes (e.g. the introduction of grog as a temper) is simply too great a change to be attributed to the local population, who were used to a completely different array of tools and techniques. There is no reason to believe that they would produce something of such drastic difference to what they were used to.

Hybrid model

Relatively new in the discussion on HBW, this model is, at its core, a recognition of the complexity of the phenomenon[3]. While Sherratt (1981) was the first to warn scholars about the danger of oversimplifying the HBW phenomenon early in the debate, it was Lis (2009) who first built a hypothesis acknowledging this complexity.

His model challenges the tendency to group all handmade and usually burnished pottery under one HBW category (Lis 2018: 140). This, he argues, is due to a failure to recognise Mycenaean non wheel-made pottery (Lis 2018: 140). He further denounces this naïve standpoint, stating that there cannot be a single or uniform group of handmade pottery, nor a single explanation to understand their genesis (Lis 2018: 146). As such, HBW, to him, is too limited a category for the variety of handmade material found east of Italy at the end of the Bronze Age (Lis 2009: 152-153).

As a response to this issue, he suggests three overarching groups (Lis 2009):

- Group 1: Handmade Burnished Ware (HBW);
- Group 2: West Anatolian handmade pottery;
- Group 3: Handmade Domestic Pottery (HDP).

His definition - and interpretation - of Group 1 (HBW) does not deviate from what most scholars agree on today. Pointing out typological similarities (see Jung 2006: 21-47), he adheres to the hypothesis supporting a Southern Italian origin for HBW, albeit produced locally. West Anatolian handmade pottery represents a group of pottery that is exclusive to Troy, including the Knobbed ware and Coarse ware previously cited as potentially linked to HBW (see above).

3 While the word “hybrid “might not be ideal, because of the increase use of the concept of hybridity in ceramic studies, it is, etymologically, justifiable, as this interpretative model draws from both the foreign and local models of interpretation.

However, he suggests there is no relation between those first two groups (Lis 2009: 155-156), despite their shared characteristics and similar appearance.

Most importantly, he created a new group of pottery, which he claims has previously been misidentified as HBW. This new group, labelled Handmade Domestic Pottery by Lis (2009) or EIA-related pottery in other publications (see Romanos 2011) share with HBW its handmade nature, but differs from it in several aspects. It is described as a functionally impoverished group, limited to storage and cooking vessels. Contrary to HBW, it can represent a substantial share of the total amount of pottery for a given period, and this proportion tends to gradually increase to a point where it overtakes wheel-made cooking vessels. Lis argues that it is widespread in Greece, notably found at Mitrou, Kalapodi, Tiryns, Mycenae, Aigeira, Frantzis, Pefkakia, Chania, Pylos, and possibly Nichoria (Lis 2018: 141-144). The most common shape is the collared jar, which is now widely associated with HDP, although Romanos (2011: 33) challenged this simple association in her study of the HBW material from Mycenae, particularly on chronological grounds.

Lis's subdivision of the HBW phenomenon is of interest, not least because it manages to reconcile, in a way, both the foreign influence and the local development models. Indeed, Lis argues that HDP most likely appeared as a reaction, at the household level, to increasing difficulties in acquiring wheel-made, workshop produced, cooking vessels in many parts of Greece during the Post-Palatial period (Lis 2009: 159, 2018: 147). He thus suggests that it developed locally in ways that are not dissimilar to that previously suggested by Small (1990). Many characteristics of what he considers HDP points toward this interpretation. Firstly, he associates the varying degree of the burnishing on certain vessels to experimentation on how to strengthen the fabric, something that could be expected from "people not experienced in making pottery on their own" (Lis 2009: 159). Moreover, while not identical, the HDP vessels are morphologically similar to traditional Mycenaean cooking vessels (Lis 2009: 159). Finally, he suggested HDP is related to the emergence of EIA handmade pottery, thus strengthening the claim it was developed locally, with minimal foreign influences (Lis 2009: 162-163).

While this model presents the same weaknesses pointed out for Small's hypothesis, it is nonetheless important. Indeed, it highlights the heterogeneity of the HBW phenomenon, and point out what "all these various hand-made pottery groups have in common: their appearances are highly localised, i.e. idiosyncratic, and they do not simultaneously affect an entire region, but only impact certain sites" (Lis 2018: 147). His model, however, still confines pottery to large typological categories, to be adopted or rejected. Even if he insists on the importance of the

local approach to pottery, these categories are, in the end, applied to a very large geographical area, thus "simplifying" the complexity and heterogeneity first acknowledged.

Current understanding

The discussion on HBW has more or less settled on a few key elements which constitute the common paradigms under which most scholars operate when referring to the ware. First, it is now generally accepted that the origin of the HBW pottery should be sought in Southern Italy. In this respect, many refer to the comprehensive comparative chronology build by Reinhard Jung (2006), and more generally to the depth of contact between Italy and Greece during the Bronze Age. Second, it is also accepted, as mentioned above, that the HBW is not imported, but produced locally. Finally, it is now clear that the warning concerning the complexity of the phenomenon has been heard, and many scholars now acknowledges the possibility for a diverse HBW pottery, although publications on the subject are still lacking.

The HBW of Teichos Dymaion: a local approach to an old problem.

Notwithstanding the current status quo and general consensus on the HBW question, there are a number of issues pertaining to the way HBW was studied which hinder the possibility of understand it in its totality. Most, ultimately, can be traced back to two main problems in the way archaeologists have studied pottery. The first concerns the tendency of clustering pottery in closed categories, or types, based on a series of attributes observed on pot sherds (Arnold 1985: 4-5). While these arbitrary units can be useful for building chronology, they also limit the understanding of a pottery type to the confine of its unit (Arnold 1985: 5). In the HBW debate, the issue is perhaps more evident, because the units are more limited. Moreover, they all relate to one, overarching unit: the HBW category itself. As a result, when faced with the possibility of a diversity within this class, the solution has not been to define the variability, but to remove the elements that no longer fit to create new units (e.g. the HDP category, Lis 2009, 2018). Overall, it has created a debate of opposing, monolithic views on HBW, on the grounds that it had to be understood as a single, united entity.

The second problem, related to the first, is the overreliance on style in the creation of these units. Style, as pointed out by Conkey and Hastorf (1990: 2) is unavoidable in archaeology, and there seems to be an understanding that it is a concept which has explanatory value (Conkey 1990: 6), and as such, that it can be used to infer whether a certain pottery type 'belongs' to a specific group of people. However, the equation of style, in pottery or elsewhere, with ethnicity is a

dangerous one (Sackett 1990). Going back to HBW, this overreliance on style for identification and interpretations meant that the true complexity of the phenomenon remained hidden beneath its most visible attributes. The resulting portrait is therefore somehow superficial.

In light of this, the solution suggested here, and which will be implemented for this project, is two-fold. First, tackling the issue of the monolithic approach to HBW, the scale of research and interpretation must be reduced, and focus must be put on understanding the phenomenon initially at the level of the individual site. From there, regional and then interregional claims can be made, but these are only possible if the foundations are strong. Accompanying this, and also answering the superficiality of previous research on the subject, I also claim that there is need for a change in the way HBW is approached as a material. In that respect the focus must be on technology and on the reconstruction of technical traditions, as a mean to fully understand the complexity of the phenomenon as it manifests itself at a particular site.

The project: aim, and objectives.

This project aims to implement these suggestions in its study of a previously unstudied assemblage of HBW from Teichos Dymaion, in western Achaea. Located on Cape Araxos, the site is a 'cyclopean' fortress built on a promontory at the junction of the Gulf of Patras and the Ionian Sea. Its long and continuous occupation yielded impressive quantities of Late Helladic III pottery. The presence of a coarse, handmade and burnished pottery was quickly noticed, and has since been identified as HBW. If first considered a marginal assemblage of limited size, a recent preliminary assessment of the material revealed that the numbers had been underestimated, and that it was potentially one of the largest HBW assemblage found to date.

Ultimately, the purpose of this project is to understand the general significance and origin(s) of the Handmade Burnished Ware and its makers through a programme of analysis on the Mycenaean assemblage of Teichos Dymaion. It will do so, however, on the local scale, trying first and foremost to define the phenomenon as it appear at Teichos Dymaion and, perhaps more generally, in Achaea.

More specifically, based on a chaîne opératoire approach and an informed social approach to technology, the project will address issues of social change and identity in Achaea immediately after the collapse of the Mycenaean palatial system. The aim is to:

- Reconstruct the chaîne opératoire of the production of the HBW, and compare it to other contemporary local wares;

- Determine whether the phenomenon is homogenous or if multiple different subgroups can be identified within the HBW assemblage, to better understand how production was organise for this pottery ware at Teichos Dymaion..

- Identify and expose, through an informed social approach on technology, the traditions(s) behind the HBW phenomenon and its makers, and how it interacted with the local traditions;

- Understand the significance and role of the HBW in the Achaean Context, and more specifically at Teichos Dyamion.

This important opportunity to investigate both the provenance and technology of this pottery, and to examine its production in the context of previous craft practice in the area, offers the possibility of illuminating processes of social and economic collapse, the mobility of populations and, indeed, technologies.

Theoretical and methodological approach.

The theoretical and methodological foundation of this research can be found in French ethnography, more precisely in its concept of chaîne opératoire. The chaîne opératoire is the "series of operations which brings a primary material from its natural state to a fabricated state" (Cresswell 1976). It is particularly useful to investigate technological traditions as it allows to look in great detail at each step of a craft practice, to differentiate between features that are purely stylistic, and others that are more culturally embedded, and to more easily compare different traditions. This approach is part of a broader paradigm which considers technological practices as a deeply social phenomenon (Lemmonier 1986, Pfaffenberger 1992). Thus, to investigate gesture, style, and craft traditions in such detail is to address directly questions of routinized practices, and indeed, of identity.

The analyses of the Late Bronze Age material (HBW and Mycenaean pottery) rely on an integrated analytical approach that includes:

- a visual assessment of the pottery assemblages

- thin section petrography.

It is only with the combination of these analytical techniques that the precision of reconstruction required by this approach can be obtained. Indeed, while the visual assessment of the pottery gives important information on morphology, decorations, and forming techniques, the

analytical programme will allow us to go further and investigate the choices of craftspeople concerning finishing techniques (surface treatments on the clay), clay recipes (choice of clays and inclusions) and firing of the vessels. Moreover, especially with thin section petrography, it will allow suggestion of provenance, an ongoing matter of discussion in the HBW debate.

The details of this methodology will be discussed further (Chapter 2), but first its theoretical foundations need to be presented and discussed in more detail (Chapter 1). In doing so, the motivation for the present approach will become clear, and allow for a better appreciation for the project itself. Chapter 3 will then move on to discuss the historical foundations of the present project, presenting the socio-political organisation and international relations of the Mycenaean polities at the end of the Palatial period and during the subsequent Post-Palatial period. This general discussion will then have its focus restricted to present the particular situation of Achaea and Teichos Dymaion in these periods (Chapter 4), before proceeding to a detailed presentation of its rich Pottery assemblage (Chapter 5).

Chapter 6 will then present the results of the analyses and classify them in a way which makes them useful for the particular approach of this research. The results will then serve to reassess the feasibility of the methodology, and following this discussion, the different pottery traditions of Teichos Dymaion will be presented (Chapter 7). Finally, the results will be discussed to interpret the HBW of Teichos Dymaion. Chapter 8 will examine the origin and identity of the makers of the HBW. It will then compare the HBW material of Teichos Dymaion with other known assemblages, motivating a discussion on co-habitation and hybridity. These interpretations will then be used to revisit the current interpretations on Teichos Dymaion itself, and its role in the so-called ‘Italian connection (Chapter 9).

Chapter 1. *Technology and ceramic studies: a theoretical background.*

1.1 Introduction

To answer the questions at hand, which address notions of technological tradition, identity, mobility, and hybridisation, it is essential to build a strong theoretical foundation. Such research, as materially grounded as it may be, is first and foremost centered around the rich discussions on technology and material culture that happened in the last few decades. Indeed, a whole range of scholars in social sciences, anthropology, and archaeology have debated what exactly technology is, as well as its place in past and present society (e.g.. Lemmonier 1986, Pfaffenberger 1992, Dobres 2000, Ingold 2011a, 2011b), not only addressing the meaning of technical and cultural actions, but also how these actions relate to the dialectic between individuals, or groups of individuals, and social structures.

Past discussions on technology have proceeded differently depending on which discipline or the academic tradition they emerged from. The most meaningful of these differences, albeit coming to similar conclusions, has to be the one between the discussions undertaken separately in the Anglo-Saxon world and by the French tradition of the "school of *technologie*" (Stark 1998: 1).

The present project being about ceramic technology, this chapter will explore how particular fields of study have integrated this discussion on technology and society, and will consider how the debate manifested itself in both the French and the Anglo-Saxon literature. First, it will review the history of the use of the concept of technology in the fields of archaeology and anthropology, starting from the 19th century until the 1980s. It will then explore how the concepts evolve from 1980s onward in the Anglo-Saxon literature. This will then be compared with the French approach to technology, before concluding with a presentation of the *chaîne opératoire*, a concept that will important to this project.

1.2 Technological studies and material culture in Anthropology and Archaeology.

To explore the history of technological studies, we need first to go back as far as the mid-1800s, to the dawn of modern archaeology and anthropology. Moreover, the discussion on technology alone would be inadequate, as it also relates to the more general consideration of material culture, and the value of the study of human agents. Thus, it needs to be extended to

include aspects of material culture studies, as well as some aspects of the discussions on the relationship between individuals and society. Only by doing so can we truly understand how technology came to be appreciated today not only as something that is profoundly entangled with society and people, but also something that is essential to the continuous reproduction of its social structures.

1.2.1 Technological and material culture studies in the early 20th century

Material culture, at the onset of the 20th century, was readily accepted as one of the foundations of anthropological research (Pfaffenberger 1992: 491, Stark 1998: 3). Through its study, and the related study of technology, anthropologists would classify societies in terms of evolutionary stages, based on the efficiency of their technologies (Lemmonier 1986: 149-150). This conceptualisation of craft and technology was also applied to archaeology. Indeed, material culture studies and technological studies have held a fundamental position within the archaeological practice since the late 18th century (Dobres 2010: 103). Archaeologists would study cultural evolution through morphological traits of material culture (Dobres 2010: 103), and identify social boundaries by studying formal variations of material culture across space and time (Stark 1998: 1).

However, material culture lost its popularity among anthropologists around 1920, with many preeminent scholars aggressively rejecting it as a valid field of study (Pfaffenberger 1992: 491, Stark 1998: 3, Ingold 2011a: 312-313). As pointed out by Pfaffenberger (1992: 491), researchers were increasingly concentrating on more intangible issues such as art, language, ceremonies, or more generally on social organisation. They considered the "obsessive concentration on minute descriptions of techniques and artifacts, and the tendency to study artifacts without regards for their social and cultural context" to be quite "out of fashion" (Wissler 1914: 447, in Pfaffenberger 1992: 491). As the goals of the discipline were changing (Stark 1998: 3), Malinowski (1935: 460) himself denounced the "purely technological enthusiasms" of some of his colleagues, labeling material culture studies as intellectually sterile. Moreover, most felt that they could easily and safely ignore technology, and the resulting material culture, because of how they envisioned its position and role within society. Indeed, even if this change in the anthropological discipline stems from the relativist critique of the evolutionary paradigm of technologically-driven progress of societies, both sides had in common one very important premise, that technology, and its resulting material culture, was external to the social sphere and to interpersonal relations (Ingold 2011a: 313). Relativist anthropologists would further state that not only is technology exterior to the social domains, but also that it had no influence on

the form of society itself, merely setting the limits and scope of human actions (Ingold 2011a: 313, emphasis by current author). Thus, having no signifcant incidence on culture and society, technology could be safely ignored by anthropologists, and its study was left to others (Ingold 2011a: 313). Consequently, until the middle of the 1980s, technological and material culture studies missed most of the theoretical discussions undertaken in anthropology (Ingold 2011a: 314, Pfaffenberger 1992: 492, see also Lemmonier 1986).

Naturally, this dismissal of material culture and technological studies did not affect archaeology, these being the very foundations of the discipline. Indeed, archaeologists have always remained involved with material culture, because it was essential for the construction of culture histories and regional chronologies (Stark 1998: 3). As Trigger pointed out, archaeology is the only social science that could not rely on direct evidence of cultural behaviour, but only on its material remains (Trigger 2006: 28-29). Thus, it has always depended "upon an understanding of the relationship between material and non-material aspects of culture and society: left with only the remnants of the former, [archaeologists] seek to use them to perceive and comprehend the latter" (Dietler and Herbich 1998: 233).

However, the understanding of technology, of its role, and of how it articulates itself with other aspects of social life in pre-modern societies barely changed until the second half of the 20th century. Although this lack of theoretical development could be explained by a dearth of interest for it in anthropology, it would be simplistic to infer that the latter is solely responsible for the stagnant position of archaeology toward technology. In fact, it has more to do with the degree to which the modern paradigm of technocentrism[4] influenced the dawn of the archaeological discipline, resulting in scholars projecting their modern vision of technological activities onto the past (Dobres 2000, Pfaffenberger 1992, Ingold 2011a).

1.2.2 Standard View of Technology and modern technocentrism

Pfaffenberger (1992) dubbed this paradigm the 'Standard View' of technology, as it is not unlike the so-called 'Standard View' of science, and because it influence most scholarly and popular thinking (Pfaffenberger 1992: 493). The 'Standard View' could be summarised in four main points:

First, it holds that necessity is the mother of all invention, and therefore, that technology

4 Not to be confused with the political ideology, which advocated that technology controls and ultimately protects the environment. While both are surely related, technocentrism here refers to the general paradigm which places technology at the centre of any attempt to discuss or understand social evolution.

and material culture are nothing but the achievement of Man [sic][5] harnessing nature (Pfaffenberger 1992: 494). The dichotomy between Nature and Culture is primordial to the 'Standard View' (see Ingold 2011a: 312-315).

Second, material culture is a "physical record of [a society's] characteristic survival adaptation", because function always precedes form. In other word, if an artifact is adopted by a group of people, it is first and foremost because it satisfies a specific need, and style is always second in this equation (Pfaffenberger 1992: 494).

Third, Man's technological achievements are built on previous technological innovations, giving a unilinear progression to technology. The evolution from simple stone tools to complex machines is inevitable, and each major development marked a revolution in Man's history, and thus "the ages of Man can be expressed in terms of technological stages, such as Stone Age, Bronze Age, Iron Age" (Pfaffenberger 1992: 494).

Finally, as Man built his culture(s) by adapting to Nature and progressively building his control over it, he reached a point of no-return at the dawn of the Industrial Revolution. Now living in an artificial world of machines, using homogeneous objects that spread across multiple cultures and societies, he "lost his authenticity as a cultural creature". Today, in the Age of Information, Man truly achieved control over Nature, but in the process, had to "gave himself over to a world ruled by instrumentalism and superficiality" (Pfaffenberger 1992: 494).

This paradigm and its consequential influence on technological studies was shaped by the technocentrism inherent to the so-called 'Machine Age' developed in the Industrial Revolution, which was projected onto the past (Dobres 2010: 11). This vision is still deeply rooted in the modern view of the world, and impacts how western societies represent and evaluate themselves and others. This is unsurprising, given the powerful role of technology in giving meaning to the modern world (Dobres 2000: 19).

More importantly, this paradigm influenced drastically the scholarly literature on technology and material culture, in the past and in the present. While central to western ideology of modernity, technology is considered, as previously mentioned, an element that is situated outside society when studied under the paradigm of the *Standard View of Technology*. It became an ideal by-pass, something that scholars could use to distance themselves from their subjects. After all, technology was considered rational and neutral, unaffected by human subjectivity. This

5 The use of the masculine is necessary to demonstrate the gender ideology of the Standard View of Technology (Pfaffenberger 19992: 494)

manifestation of the *Standard View* in scientific literature is called technological determinism, and could be described as:

> […] the view that technological discoveries and applications occur according to their own inner necessity, from laws that govern the physical and biological world, and that they, in turn, unilaterally affect social reality. From the perspective of technological determinism, human beings have few alternatives in their response to technology besides enthusiastic or resigned acceptance (Drygulski Wright 1987: 9)

Thus, technology was considered a mere tool to harness nature, a tool that was naturally bound to evolve as humans were using it. Humans, however, had no real choice in the matter. As such, to evaluate the degree of complexity of this tool that is technology was perceived as a perfect way to calculate levels of cultural evolution. Socially active individuals are the missing element in early technological studies, because they were considered a liability (Dobres 2000: 32-65).

This technological determinism also biased how scholars built their methodology and wrote their research questions. Indeed, modern obsession with optimisation and economy had, and still has, an important place in research, particularly in archaeology. These logical, materialistic conditions had to prevail over any social or cultural ones (Dobres 2000: 36). It also brought a particular style of writing that is still the norm today. In order to emphasise the importance of *things* and *technology*, and devalue the importance of individuals, researchers avoid direct links between the agents and the actions, by avoiding the third person and (over)using the passive tense (Dobres 2000: 30). They also developed a standardised way of writing, using "value-free" neutral terms, statistics, numeral-base descriptions and a "dictionary-like form of terminologies" (Dobres 2000: 30-31). These strategies do have advantages, and allow a discourse that can be understood by a larger body of scholars. However, the problem is that they often mean the obliteration of any consideration for the social and cultural aspects of technological endeavour.

1.2.3 Archaeology and technological studies

Archaeology was highly influence by this 'Standard view' paradigm in its way of thinking about technology and material culture, because the dawn of the discipline took place at the heart of the industrial era. Indeed, Archaeology and anthropology were developed in periods of European colonial expansion, and as such, of increasing contact and conflict with indigenous communities. These populations were often qualified as "primitive" or "child-like" by anthropologists, most likely in an attempt to justify their domination and exploitation by western powers. (Parkinson and Smith 1986: 1). Therefore, the fathers of archaeology were, without surprise, men of their

time (Dobres 2000: 16), building evolutionary scenarios that fit perfectly with the *Standard View of technology*, by projecting on the past the capitalist, colonialist, and imperialist milieu in which they evolved.

Because archaeologists studied technology, which was central to theory, building on evolution and complexity in past societies, under this paradigm of the *Standard View*, they incidentally worked with concepts that were taken for granted, privileging ideas of instrumentality, practicality, and rationality, over social, political, or symbolic explanations when interpreting and explaining technological behaviour (Dobres 2000: 10). This view, appropriate to understanding the modern capitalist mode of production, is inadequate when building models on ancient societies and their craft production (Dobres 2000: 10, Ingold 2011b: 294).

The situation remained mostly unchanged until the 1960s. Less interested in cultural evolution than their predecessors (Trigger 2006: 311), culture-historical archaeologists of the first half the 20th century rather focused on ethnicity, and on trying to trace back the origins of technologies and material traits through diffusionist or migration scenarios (Trigger 2006: 312). However, while conscious of the complexity of the archaeological record (Trigger 2006: 311), they never challenged the premises of the *Standard View*, and kept a markedly positivist approach to technological studies. Childe, for instance, viewed metallurgists as "proto-scientists", and their technological achievement as a first step toward modern rationality (Childe 1930). The idea of progress ultimately leading to what was their contemporaneity (i.e. modern European civilisation) was still very much underlying the archaeological discourse.

It is with the advent in the early 1960s of New Archaeology that technology and material culture, in some way, lost their places on the pedestal of the archaeological discipline. The first "self reflective theoretical revolution" in archaeology (Dobres and Robb 2000: 6), the New Archaeology, or processual archaeology, rejected the exclusively descriptive nature of material culture studies, and embarked on a more "theoretically productive" program (Stark 1998: 3). While this new generation of archaeologists, were interested in how people participated in culture and how they contributed to larger-scale social processes, they never investigated these individuals *per se* (Dobres and Hoffman 2000: 6). New Archaeology focused on "systems", and once again, individuals were relagated to a role of explanatory importance (Dobres and Hoffman 2000: 6). Just as before, individuals were still considered non-essential and non-reliable.

Processual archaeologists, as pointed out by Pfaffenberger (1992: 495), were trying to 'modernise' archaeology. Highly positivist in its views, New Archaeology was still putting forward an understanding of technology and artifacts that was fundamentally alligned with

the *Standard View*, even if it was not at its heart anymore (Pfaffenberger 1992: 495). Binford, in his revolutionary paper "Archaeology as Anthropology" (1962: 272), stated that culture was nothing but an "extrasomatic means of adaptation", with technology being the motor of this adaptation. In the end, whilst processual archaeology profoundly reshaped the discipline, opening the way for future generations to do things differently, it failed to change the premises that were inherent to the way the relationship between technology, material culture, and society, was perceived. It also, purposely, kept the human element out of the technological equation, something that will be heavily criticised by the post-processualist response that followed (see Hodder 1986: 7-9).

1.3 Toward a social approach to technology: the Anglo-Saxon response.

The last few decades have seen a renewed interest in technological studies from Anglo-Saxon anthropologists. As some scholars became aware of the fallacious nature of the link between technological "progress" and social complexity (Ingold 2011a: 312), they deconstructed the *Standard View* in order to open new avenues for the understanding of the relationship between agents, technical actions, and the perpetual reconstruction of social structures (see Ingold 2011a, 2011b; Pfaffenberger 1988, 1992).

The post-processualist response to processualism in archaeology mirrored this reaction to the *Standard View*. Indeed, many archaeologists argued for an abandonment of the positivist stance of the New Archaeology, emphasising the importance of the individual as an acting agent, and on technology as a social phenomenon (e.g. Ingold 1986; Barrett 1994, 2000; Dietler and Herbich 1998; Dobres 2000, 2010; Dobres and Hoffman 1994, 1999; Dobres and Robb 2000; Stark 1998). The following section will explore this reaction, first by briefly summarising both the anthropological and archaeological theories relevant to this project. To conclude, it will argue the relevance of technological studies through a discussion of the idea of *Habitus*, central to the post-processualist movement in archaeology.

1.3.1 Technology as a social practice

As scholars from anthropology (and other social sciences) re-engaged in the discussion on technology, their main objective was to challenge the view that technology and society are by any means external to one another (Ingold 2011a: 314). Rather, technology, they argue, is better seen as a "web of social and material dynamics that together contribute to the making and remaking of society" (Dobres and Hoffman 1999: 2). To some extent, Ingold (2011a:

314) is right when stating that the very use of the word "technology" is erroneous. Indeed, technology is an etymologically modern term that corresponds to what the *Standard View* implies. However, it does not represent this web-like view of technological activities. For this reason, Ingold's statement that there are no such things as technology in pre-modern societies is correct. Nevertheless, it is the established term, but an effort is necessary to understand it differently in order to comprehend the debate put forward in this section. The implications behind the ancient Greek word *Tekhnē* offer a great alternative for this purpose (Ingold 2011a, 2011b; Dobres 2010). Indeed, *Tekhnē* puts a "web-like emphasis on the *inseparability* of art, skill, craft, methods, knowledge, understanding and awareness" (Dobres 2010: 106, see also Ingold 2011b: 294-296). As such, it blurs the practical and the cultural, as technical endeavours are mediated through everyday practices *by* culture (Dobres 2010: 106).

The idea of a sociotechnical system put forward by Pfaffenberger (1992), following the work of Hughes (1979), is ideal to envision these slightly abstract concepts. A sociotechnical system is "a heterogeneous construction of multiple agents organised toward a particular direction, which is dictated by their actions, identity, and beliefs". More concretely, it links Technique, here understood as "the system of material resources, tools, operational sequences and skills, verbal and non-verbal knowledge, and specific modes of work coordination that come into play in the fabrication of material artifacts" (Pfaffenberger 1992: 497), with material culture and the coordination of labour. A sociotechnical system is sociogenic. Indeed, agents use existing social and cultural resources and adapt them to their he system", thus continuously reproducing, through their activities, their own social world from the structures surrounding them (Pfaffenberger 1992: 500; Giddens 1979). Because the constant building of the sociotechnical system is sociogenic, it also produces power, meaning, and goods. Moreover, this continuous act of building is constantly changing, as agents react to new perceived needs, which are negotiated via various social factors, thus replacing old systems with new ones (Pfaffenberger 1992: 502).

To summarise, technology is therefore not a manifestation of a society's adaption to external needs, to reformulate Binford's (1962) statement, but rather of "the various way men and women throughout time have *chosen* to pursue existence", through their unceasing renewal of *sociotechnical systems* (Basalla 1988, in Pfaffenberger 1992: 502).

1.3.2 Post-Processualism and Agency

As mentioned before in this chapter, post-processualism, while very diverse in its nature, had at his core a will to challenge the positivism underlying the New Archaeology. Of all of its theoretical descendants, not only is *agency* the one that has endured, but it also became

increasingly relevant to technological studies, with the works of scholars such as Barrett, Dobres and Hoffman, building on anthropological rethinking of the concept of individualism.

The origins of the agency theoretical movement in archaeology is generally traced back to the origins of comtemporary "practice theory", as discuss by Garfinkel, Giddens and Bourdieu, and their root in the work of Karl Marx (Dobres and Robb 2000: 5). As pointed out by Dobres and Robb (2000), most of the premises of practice theory[6] can be found in these two quotes from Marx (in Dobres and Robb 2000: 5):

> Men make their own history, but they do not make it just as they please, […] but under circumstances directly encountered, given and transmitted from the past (Marx 1963[1869]:15).
>
> As individuals express their life, so they are. What they are, therefore, coincides with their production, both with what they produce and with how they produce (Marx and Engels 1970: 42).

If there seems to be consensus on the origins of agency, it becomes much more confused when it comes to describing it. Indeed, agency is a "notoriously labile concept" (Dobres and Robb 2000: 8; Sewell 1992), which has received many different definitions (see table 1.1 in Dobres and Robb 2000: 9). It also been used as an excuse to go "beyond theory to do 'real' archaeology" (Dobres and Robb 2000: 3), or as a simple acknowledgment of the free will of the human agent (Barrett 2012). It is, however, far from being merely an escape from theoretical considerations, just as it is much more than the simple recognition of the importance of individuals and their free will.

While it does put back "people as the ontological starting point of concrete research on ancient technology" (Dobres 2010: 105), agents are not omniscient, practical and free-willed economizers, but socially embedded, imperfect and often impractical people (Dobres and Robb 2000: 4). Agency also addresses the question of the relationship between agents and structures, the former both existing within, and acting upon latter (Dobres and Robb 2000: 4). Barrett (2000) offers a good summary of what exactly is the concept of agency in archaeology. While agency has to be understood as a whole, it can be subdivided in four inter-related elements: *action, time, space, and agency* (the *acting* individual or group of individuals) (Barrett 2000: 61). They interact with each other as such:

6 Practice theory, especially as seen through the works of Bourdieu, will be discussed further in the next section (1.3.3).

> Action is the doing, the mobilisation of resources to have an effect. Action is situated in time not only because there is a period during which this doing occurs but also because it has a past, a place from whence it comes and from whence the resources necessary for that action are drawn. It has a future which is both implied in the intentions and desires manifest in the action and is realised in the outcomes arising from action through which pre-existing resources are reproduced and transformed. [...] Action is also situated at the place occupied over the period of its execution, a place to which resources are drawn and from which the consequences of that action reach out. And actions are embodied; they are the work of agents whose knowledgeability of their place in the world, and whose abilities in occupying the world, are expressed in actions which work both upon the world and upon the agent.[...] Those actions also make the agent and renew that agent's understanding of their place in the world. (Barrett 2000: 61-62).

This interaction between the agents and their environment (both natural and social) is similar to the way Pfaffenberger discuss *socio-technical systems*. Indeed, both emphasise a similar notion of interconnection that is essential to the understanding of technology and society put forward in this thesis. It is also unsurprising that both can be linked to an equally important theory: Practice theory.

1.3.3. Technology: Why bother? Practice Theory in technological studies

Practice theory, as discussed by Garfinkel (1984), Giddens (1979, 1984, in Barrett 2012: 150-152), and Bourdieu (1972), lies at the core of the concept of agency. As such, it opens new avenues for the investigation of technology, giving meaning to technical actions executed by skilled agents. Central to practice theory is the theorisation of concept of *habitus* by Bourdieu.

Habitus can be understood as:

> […] a system of predispositions that generate structures of practice and representation which 'regulate' actions, without simply being obedient to rules; that is oriented toward a goal, without doing so consciously; and that collectively orchestrates activities, without being the product of an organisational force (Bourdieu 1972: 256, translation Proulx 2014,).

Practice, thus, emerges from the relations between a certain situation, and the *habitus* of the agents[7] involved, "the latter acting as a matrix of perceptions and actions based on predispositions defined by social factors and past experiences" (translation Proulx 2014, from Bourdieu 1972:

7 Agents are central to the concept of *Habitus.* However, *agent* does not refer exclusively to individuals, but can also mean collectives, groups, or social movements. This allows a multi-scale understanding of practice (Dobres 2000: 133).

261). The *habitus* sets the way people go about with their lives. However, it does not do so as a set of rules that dictates their actions, nor as a conscious set of predispositions that can be bent at will (Bourdieu 1972: 261, 272, 284-285; Dobres 2000: 137).

For this reason, *Habitus* can seem paradoxical with agency, as it appears to dictate the way humans act upon the world. *Habitus*, after all, is the reason why human actions seem to be "coded" (Dobres 2000: 137). However, *habitus* is not simply a "mécanistes" theory that implies scripted actions over which the human agents have little or no control (Bourdieu 1972: 261). In fact, the human body, as Gosden (1994) described it, is the "nexus" of *habitus*, because it is the source and the medium for "expressing and contesting everyday routines of social and physical action" (Dobres 2000: 137). *Habitus* does not force agents toward a certain direction. As pointed out by Dietler and Herbich (1998: 247), it is not about rules, and does not predetermine actions. Rather, it gives a certain latitude of actions to the agents, through which they act and shape their social world, in a permanent process of becoming (Dietler and Herbich 1998: 247).

As such, *habitu*s has two effects. First, it provides an "unconscious harmonisation of social life [that become one's] second nature" (Gosden 1994: 119). It gives agents "trust in the fabric of social activities and the object world that comprise the course and circumstances of their daily lives" (Cohen 1987: 302). Secondly, it helps to explain why the material traces of archaeological cultures present distinct patterning of traditions (Dobres 2000: 138). It also compels agents toward sameness, and "it locates the reciprocal causality of agency and structure in time and space, because they are both materially constituted" (Hodder 1987).

Technology, when studied under the scope of Bourdieu's theory of practice, is thus not only a fully social phenomenon, but it also contributes to the social reproduction of structures, and to cultural change. It is through agents that technological practices are materialised to reproduce and maintain society (Dobres 2000: 148), and it is through these technological practices that agents challenge and contest cultural paradigms and the very same tradition they work to build (Dobres 2000: 148). As such, Ingold (2011a: 318) is right to say that "the very practice of a technique is itself a statement of identity".

Indeed, through unfolding *habitus*, technological actions become means of expressions of identity and difference (Dobres 2000: 139), because "technical gestures, skill competence and knowledge are all performed in the context of traditions, normative values, and consensual expectations about how one should proceed" (Dobres 2000: 138). Technical choices made by people, *guided by the habitus*, are dynamic strategies of identity and difference (Lemmonier 1993, emphasis by the present author). To go back to Pfaffenberger's ideas (1992), the *habitus*

allows multiple agents in a given society to reconstruct and adapt the *sociotechnical system* in an apparent cohesion. The implications for archaeology are substantial, as the theory of practice reconfirmed the importance of technology and material culture to address questions of traditions and identity in past societies.

1.4 French ethnoarchaeology and the chaîne opératoire approach in ceramic studies

As mentioned earlier in this chapter, the debate on technological and material culture studies did not happen in the same form in the French traditions that it did in the Anglo-Saxon world. Indeed, the idea that technical actions and the resulting material culture are fully cultural phenomenon, and that they could reveal social structures and belief systems if studied appropriately, has been appreciated for several decades now, as French-speaking scholars built new methodologies on the basis laid by the fundamental works of Mauss (1936) and Leroi-Gourhan (1943, 1945). As English-language publications by Lemonnier, and English reviews of the French literature started appearing in the 1980s and 1990s (Stark 1987: 6-7), just as the Anglo-Saxon tradition was having its discussion on technology, it created a bridge between the two traditions that allowed a deep rethinking of how to practically approach technological studies. This following section shall briefly explain the foundations of the French school of *technologie*, with at his core the *chaîne opératoire* approach. Then, following a brief summary of how these debates on technology influenced ceramics studies, the section will end by exploring how the c*haîne opératoire* approach is advocated by many French scholars as ideal for an informed and integrated study of ancient pottery.

1.4.1 An archaeology of techniques

As the New Archaeology was revolutionising how archaeology was undertaken in the English-speaking world, an equally important shift happened in French archaeology. This shift, involving from a union of ethnology and archaeology, led to important developments in the archaeology of techniques (Stark 1998: 5). As French ethnography has a long tradition of describing technical actions in great detail (Lemmonier 1986: 149-150), in the works of Leroi-Gourhan (1943, 1945) and Mauss (1968(1936)) that served as the foundations for this change.

Indeed, Mauss truly created the foundations for any ethnology of techniques (Lemmonier 1986: 150) in his *Techniques du Corps* (1936), in which he defines *technique* as any effective traditional act. To him, a technique involves actions, 'tools' (including the human body), and knowledge, a definition not so different from the one put forward by Pfaffenberger (1992). Leroi-Gourhan

brought a notion of time and space in the debate, as an advocate of the *comparative approach.* More importantly, he challenged the idea of hierarchy of technical stages. Rather, to him a "technical ensemble" was only relevant for the study of the society to whom it belonged (Leroi-Gourhan 1943, 1945, in Lemmonier 1986: 150). To investigate these "technical ensembles", which could be related to Pfaffenberger's *sociotechnical systems*, he created a theoretical framework of capital importance to both ethnologists and archaeologists interested in the study of techniques and technical traditions: the *chaîne opératoire*.

Described by Cresswell (1976: 6) as "a series of operations which brings a primary material from its natural state to a fabricated state", the *chaîne opératoire*, or *operational sequence* in some publications, bring together materials, humans, gestures, tools, and knowledge in a single analytical method (Martinón-Torres 2002: 33). More than a simple linear analysis of how an object was made, it takes into consideration the *whole* context of production, and investigates the myriad of choices that were made, or not, during the making of an object (Sillar and Tite 2000: 4). Overall, the *chaîne opératoire* concerns itself with the reconstruction of the technological system(s) of a given time and place (Sellet 1993: 106), considering the multiple elements involved in craft practices, including: the environmental and technical constraints, economic considerations, social and political organisations, and ideological or belief system of the people involved in the practices (Sillar and Tite 2000:4). In turn, it allows for a clear patterning between technical acts and the social world of those involved in their reproductions (Dobres 1999: 124).

As proven by years of ethnographic studies, it is in fact *technological traditions* that are transmitted among human groups, and distinct *chaîne opératoires* mean that they in fact represent different traditions, or variability within them (Ard 2013: 367-368, Roux 2010). A tradition, in French ethnology, is more than a mere set of conventions. Tradition can be seen as a local definition of "what is possible" and "what is not" within a specific context, such definitions being embodied by individuals through practice, tacitly shared, and most often non-explicit (Gosselain and Livingstone Smith 2005). This definition, however, is somehow static, as traditions also must also take into account the interrelations individuals have with each other throughout their life, that continuously affect their "way of doing", be it consciously or not. It cannot be detached from the strategies underlying these interactions, and from the construction of one's identity (Gosselain and Livingstone Smith 2005). To go further with this idea, traditions could also be described as the manifestation of *habitus*, through which communities define their identity, building and rebuilding *sociotechnical systems.*

It is precisely because *chaînes opératoires* reveal technological *traditions*, by exploring all elements constituting technical activities, that it allows such detailed analyses of technical differences and similarities between different social groups, and within a social group. As a consequence, the c*haîne opératoire* is theoretically ideal for a less polarised approach to identity that open possibilities for the investigation of otherwise elusive concepts, such as hybridisation, cultural contact, and reciprocal or non-reciprocal exchange of technological knowledge.

1.4.2 Ceramics studies and the chaîne opératoire approach

While the *chaîne opératoire* approach is not limited to pottery, this project certainly is. As such, it would be appropriate at this point to review the notions that have been discussed so far in the specific context of ceramic studies, to understand how the c*haîne opératoire* became one of its staples.

Pottery always had a privileged position in archaeology, due to its nature. Indeed, when fired, clay is very durable and will most likely survive millennia when buried. Moreover, the abundance of the material is such that it rapidly became the main material for the construction of archaeological narrative. Ceramics thus became central to the construction of typologies, used for relative chronology and for defining cultural boundaries (Rye 1981: 2; Orton and Hughes 2013: 81).

The focus of ceramic studies remained unchanged until the 1960s. The book "Ceramics and Man" (1965), edited by Matson from the conference of the same name, exemplifies perfectly this shift. Indeed, many authors in that volume presented papers that represented what would become of the discipline in the following years. The most significant of these changes was the rise of what Matson called "ceramic ecology", which focused on the context in which pottery was produced (Pritchard and van der Leeuw 1984: 5; Matson 1965). Many were also interested in the technological aspects of pottery making, and in the provenance of particular pottery style (Orton and Hughes 2013: 153). However, most of the papers on these subjects were coloured by the positivism inherent in the New Archaeology that was rising at the same moment, and in general, "Ceramics and Man" lacks focus on the cultural aspects of pottery making (van der Leeuw 1984: 715).

As for other fields of the archaeological discipline, things changed in the 1980s, as archaeologists studying ceramics reacted against the materialism and determinism that were dominant in the previous two decades. Two main points emerged from this reaction. First, it became

clear that no matter what the natural or technical constraints were, there was always another alternative for the potters than the ones ceramicists would have privileged. Indeed, the idea that potters are in any way limited in their actions by the material they work with comes from a misunderstanding of the material itself. Ceramics are in fact very tolerant to change in clay or other raw materials, and any potter could make the same vessels using multiple clays and inclusions (Rye 1981, Gosselain and Livingstone Smith 2005: 39). Second, which alternative is chosen depends in fact on a multitude of factors, both natural and cultural (van der Leeuw 1984: 716). To go back to practice theory, it is through their *habitus* that the agents making or using the pottery will determine which are relevant and which are not. This gave rise to an increasing interest in technological reconstruction (eg. Rye 1981). Indeed, as variation in ceramics was now recognised as a fully cultural phenomenon, studying this very same variation opened new horizons for ceramic studies.

This type of ceramic study became especially dominant in France and other French-speaking countries, where the ties between ethnological and archaeological research on ceramics allowed a deeper understanding of the mechanisms behind technological choices and technical traditions. Because availability of material, environmental constraints, or the technical function of vessels cannot in themselves explain technological behaviours, archaeologists turned to ethnography to seek the reason behind the patterning of groups of pottery. Gosselain and Livingstone Smith (1995: 147) presented the three main directions in ceramic studies in French research literature as follows:

1) Evaluating technical variability at each stage of the manufacturing process;

2) Assessing the reasons underlying this technical variability;

3) Developing analytical methods allowing the reconstruction of technical procedures from archaeological pottery.

Research in the last two decades has revealed many important points about traditional pottery production. First, that potters "do not act randomly, but navigate throughout a narrow channel of culturally defined and shared practice" (Gosselain and Livingstone Smith 2005: 41). Indeed, while not bound by any external constraints to act in a certain way, their "choices" are limited by what they *perceive* as possible. Often, traditional potters will only know of one way to proceed, as it is to them, the only safe way (Gosselain and Livingstone Smith 2005: 40-41, Day 2004). Secondly, even if environmental and techno-functional restraints sometimes have an effect on the potter's perception of the "safe way" to proceed, his actions are however mostly defined by his or her belonging to a certain tradition (Gosselain and Livingstone Smith 2005: 40-41).

Thirdly, the study of the variability in traditions is fundamental to understand the relations between social groups, to define communities of practice, or, when the variation is diachronic, to understand how traditions changed through time (Roux 2010: 7). Finally, the last few decades of research have privileged the *chaîne opératoire* as an ideal analytical tool to investigate technological traditions (starting, we could argue, with Rye's *Pottery Technology. Principles and Reconstruction*, in 1981). Indeed, because of the nature of pottery , many possible technical actions are, in effect, equivalent in terms of results, allowing potters to achieve similar results with seemingly different actions (Gosselain 2000: 190). This flexibility of actions is also true for the selection of raw materials (clay and inclusions) and their preparation. In light of this flexibility allowed in the production of pottery, each of the choices made by potters, reflected in the different stages of the *chaîne opératoire*, is to be considered first and foremost related to culturally defined craft traditions. The identification of the different stages of the a *chaîne opératoire* is thus a valid method for defining pottery traditions.

1.5 Conclusion

A recent book published by Valentine Roux in 2016, *Des céramiques et des hommes*[8], shows how, to this date, the *chaîne opératoire* approach is still favoured when looking at ceramic technology with the objective of identifying technical traditions. What this recent publication also demonstrates, however, is the inherent difficulties of such an approach when looking at archaeological material. Indeed, to identify and interpret *chaîne opératoires* is not an easy task (Roux 2016: 165). It requires a rigorous methodology, that is built on the rich literature on pottery manufacture that has been accumulated in the fields of archaeology and ethnography.

The present chapter was intended to build the theoretical foundation that will support this project in its claims and interpretations. Because of the nature of the discussion, it was left purposefully abstract, and unengaged with the material reality of the project at hand. This reality includes the concerns raised in the paragraph above, namely 1) the difficulties in looking at *chaînes opératoires* in archaeology, and 2) the importance of having a solid methodology to address such difficulties. The first concern shall be discussed in more details later in this thesis (see chapter 7). The second, however, will be tackled immediately in the following chapter, which aims to define the methodology for the present study.

8 This book, very much in line with Rye's seminal publication *Pottery Technology* (1981), has been recently translated to English, and was published by Springer in 2019 under the name *Ceramics and Society*. This English version, however, was not available when this thesis was being written, and all reference to Roux' book will be from the original French text.

Chapter 2. *A theoretically informed methodology*

2.1 Introduction

The previous chapter introduced the theoretical background which constitutes the basis of this research. It is important to build upon this foundation with an analytical programme that bridges these theoretical concerns with the material reality of this project, and that would address its aim effectively, to investigate the origin(s) and production of HBW, and its relation to local pottery traditions. This entails developing an approach that emphasises the reconstruction of the production technology of this seemingly foreign pottery, allowing for a richer and more meaningful discussion. Indeed, addressing the pottery assemblage from a technological angle encourages the identification of pottery traditions, which in turns relates to the notions of identity. It also facilitates the identification of differences and similarities between the HBW from Teichos Dymaion and the contemporary Late Helladic Mycenaean wares beyond aesthetic criteria, consequently enabling discussions on cultural and technological interaction.

To achieve this, it is necessary to select an analytical technique that allows the investigation of aspects of pottery technology that are impossible to address through a visual assessment of the material. Moreover, because this project aims to investigate the pottery traditions *at* Teichos Dymaion, it is also necessary that this technique facilitates an assessment of the provenance of the pottery, notably for the differentiation between local and imported pottery. As such, analysis by thin section petrography of the ceramics was considered most suitable, as it provides insight not only into the source of raw materials, but also into different phases of the production process, from the choice and manipulation of raw materials through forming to the firing of the finished product identified as ideal, as it can indeed address all the above questions.

The following chapter presents the methodology which resulted from these considerations. The first section details the analytical programme. The second section presents how the results from the visual assessment and the petrographic analyses will be combined in an attempt to reconstruct the different pottery traditions at Teichos Dymaion, based on the *Chaîne Opératoire* approach. The final section will conclude this chapter with a presentation of the methodology behind the selection of samples for thin section petrography, as the selection of samples is crucial to the success of the research.

2.2 Overview of the analyses

This research relies on the integration of a macroscopic visual assessment of the pottery from the selected trenches and of a microscopic study of a selected number of samples using thin section ceramic petrography.

While the first step obviously informs the second, especially for the selection of samples, it is not limited solely to this purpose. Indeed, the visual assessment of the material is as important as the petrographic analysis for the reconstruction of the *chaînes opératoires* of the different pottery traditions at Teichos Dymaion (Figure 2.1).

The technological focus and *chaîne opératoire* approach brought forth by this research are by no mean novelties. Rather, they build upon a rich literature in Aegean archaeology of similarly constructed ceramic studies. Particularly in the last decade, many researches on ceramics in Early and Middle Bronze Age contexts have been conducted using a similar approach, and some recent publications are most relevant to the present project.

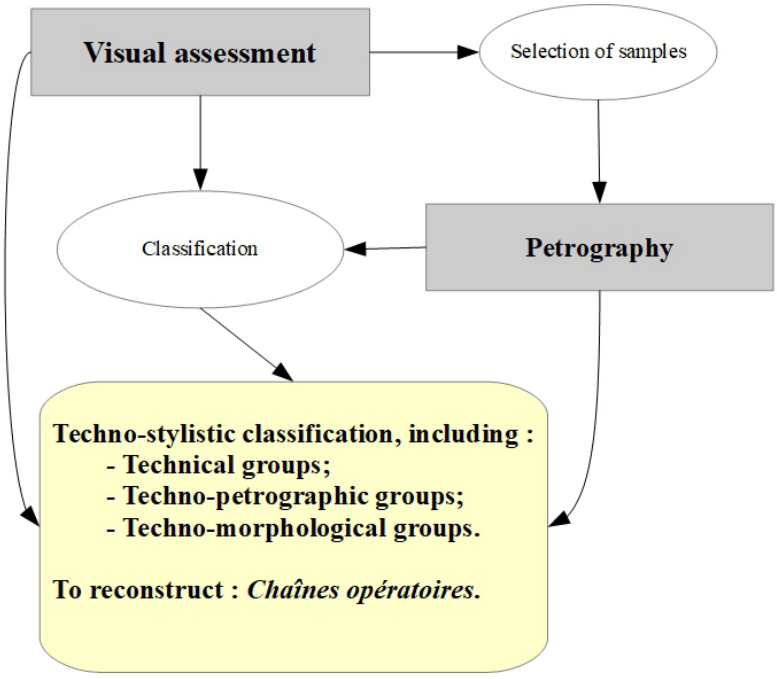


Figure 2.1 Organisation of the analyses for the study of the pottery assemblage at Teichos Dymaion

Hildtich's work on pottery standardization using the case of the Minoan conical cup, for instance, make use of the *chaîne opératoire* as a means to relate the discussion to questions of technological choices and interactions between craft specialists (Hilditch 2014). Her reconstruction of pottery technology thus allowed her to move past the physical markers of standardization to address

more complex questions about craft practices (Hilditch 2014: 34).

Also relevant for the methodology suggested here, the work by Choleva (2018) is a comprehensive example of the possibilities of the a technologically focused approach focusing on reconstruction of *chaînes opératoires*. Indeed, her work on the introduction of the wheel in Central Greece during the Early Bronze Age period is enlightening on processes of technological transmissions and is innovative in its way of qualifying the impact of new techniques on craft behaviours and culturally imbedded technological practices. Perhaps more importantly, it provides invaluable insights for the identification of macro-traces.

Perhaps closest to the objectives of this research are the publications on Early and Middle Minoan ceramics at Phaistos by Mentesana, Todaro, and colleagues (see Mentesana 2014, 2016, Mentesana *et al.* 2016, Todaro 2016, 2017, 2018). While Todaro's work on "multi-layered" vessels is a great example of the application of the *chaîne opératoire* approach using visual identification of technological features (Todaro 2016, 2017, 2018), it is the work by Mentesana (2014, 2016) on technological change during the transition from the Final Neolithic to the Early Minoan period, which is of particular interest here. In a recent publication (Mentesana *et al.* 2016: 490-491), it is made clear the clear picture of the pottery variety and technological continuity and discontinuity for this particular period at Phaistos was made possible by the combined use of visual identification of macro-traces of technological actions with multiple analytical techniques, including thin section petrography. These publications on ceramic technology at Phaistos are relevant for a number of reasons. First, they are built on similar theoretical bases as previously presented in chapter 1 of the present thesis. Moreover, Mentesana et al. (2016) uses a similar, albeit more complete, analytical program than the one suggested for this project. More importantly, however, is the fact that both Todaro and Mentesana focus on the local scale in their technological assessments. As such, their work demonstrates quite eloquently the strength of the present approach. In addition, mirroring what Hilditch and colleagues recommended in their work on 'Anatolianising' pottery from Thebes during the EH II period (Hilditch *et al.* 2008), it encourages work focusing on a local understanding of pottery diversity.

However, most examples mentioned have in common access to complete or reconstructed profiles or, as in the case of Hilditch's study of Minoan conical cups (Hilditch 2014), complete vessels. Teichos Dymaion is, in that respect, more limited. Indeed, the material studied in this research is very fragmentary, and contains no complete vessels, and very few full profiles. This will be discussed in more detail in Chapter 5. This different reality had to be taken into account, and ultimately weighed heavily in the decisions concerning not only the selection of analytical

program for this project, but also for the selection of how the resulting data would be processed.

2.2.1 Visual assessment

The visual assessment of the assemblage from Teichos Dymaion consisted of a macroscopic study of both the technological and stylistic aspects of the pottery. This first element of the analytical programme was completed in the storerooms, as the pottery was mostly unsorted, bagged by context or πασα, with canonical Mycenaean pottery and potential HBW stored together, apart from some sherds already identified by Gazis. In addition, a few Grey Ware sherds were also identified by Gazis. Thus, with the anticipation that more of the latter two categories might be identified, the visual assessment began with the study of the bagged pottery, with the objective of producing a preliminary grouping following these general categories (see Chapter 5).

2.2.1.1 Identifying forming techniques and *chaîne opératoire* in practice

As previously mentioned, HBW and Mycenaean wares are fundamentally different. Indeed, canonical Mycenaean pottery is wheelmade, often slipped and painted, and uses highly calcareous clays. The fabrics are generally fine, at least compare to HBW, and well fired. The HBW, on the other hand, is handmade and often coarse. It is mostly burnished, and when decorated, it mostly bears applied plastic decoration such as simple bands or rope-like cordons. Firing temperature and atmosphere varies, but HBW is generally poorly fired compared to Mycenaean standards. While these differences give the two wares a distinctive appearance which in some circumstances might be enough to rapidly separate the two groups, the fragmentary nature of the assemblage makes it difficult, and rather ill advised, to proceed with such a simple approach. Indeed, small, undecorated and unburnished sherds of HBW can be deceptively similar to coarse Mycenaean pottery. Considering this, a grouping that focuses on the technological particularities of each ware was deemed more appropriate. This approach, however, made possible a confusion between the Grey Ware (usually fine and wheelmade) and the fine Mycenaean pottery and therefore the appearance of the different wares could not be completely ignored during the analysis. Nevertheless, it was decided to give priority to the identification of primary forming techniques as the main criterion to attribute sherds to one category or the other, especially in the early stages of the visual assessment; adjustment would be made if needed in later steps.

The identification of forming techniques does not require any specialised equipment (Rye 1981: 58) and can be done using solely macroscopic means (e.g Choleva 2018, Todaro 2016, 2017).

Indeed, because of the nature of the clay material, specific actions or sequences of actions taken by the potter will leave specific traces of forming, or *attributes* (Rye 1981: 58), on the vessel, which can then be used by archaeologists to determine what were those actions (Rye 1981: 58). However, this very nature of the clay can also make the identification of forming techniques a difficult undertaking. Indeed, traces that would allow for the identification of a particular technique can be obliterated by the execution of subsequent actions (Roux 2016: 165). As such, the understanding of the "operational sequence", or *chaîne opératoire,* of a vessel or of a type of vessel is sometime essential to an accurate interpretation of specific attributes (Rye 1981: 58). Another issue that can make the identification of forming techniques difficult lies in the polysemic nature of some of the attributes: not only can a particular attribute be indicative of more than one technique or action, it is also possible for one particular technique to create different attributes (Roux 2016: 165).

The precise and complete identification of forming techniques therefore requires specific conditions, namely 1) a large enough study collection, including complete vessels or profiles, and 2) suitable standards to compare that collection to, such as an experimental set of material (Rye 1981: 60). With the challenging nature of the assemblage, however, such conditions were not fulfilled in the case of this present study. Only two complete profiles of HBW were identified (see chapter 5). Moreover, as is the case for most archaeological assemblages, there are no standards to base the interpretations of observed attributes on, nor are there any comparable studies on similar material to be used instead.

This, however, did not prevent the use of forming techniques as a way to create meaningful categories. Indeed, the complete reconstruction of the *chaîne opératoire*, as described by Rye (1981) and Roux (2016), goes beyond what was required at this stage of the macroscopic analysis, and a simpler approach which allowed the identification of broad forming techniques groups proved sufficient.

2.2.1.2 The visual assessment explained

In the first step of the visual assessment, aimed at differentiating canonical Mycenaean pottery and potential HBW, three attributes were selected from the list presented in Rye's *Pottery Technology* (1981: 58-62), which were also complemented using the more recent *Des céramiques et des hommes* by Roux (2016: 165-253):

1) *Selective breakage*. Vessels will break in certain ways, according to a number of factors: shape, variation in wall thickness, stresses produced by forming (Rye 1981: 59). A

repeated pattern of selective breakage in a given assemblage can be informative of the way the vessels were shaped. Two variables are to be observed: orientation of breakage (random or preferred), and profile of breakage (straight, U-shaped, or bevelled) (Roux 2016: 187).

2) *Surface markings*. Correspond to markings left by any given operations executed during the shaping of a vessel (Rye 1981:59). Focusing mostly on the general appearance of coarse grains, or more importantly, the microtopography and striations visible on the vessel surfaces, these markings can give essential information on the forming of that vessel (Roux 2016: 187-192).
3) *Relief*. Characterisation of the relief of a vessel's wall gives information on the type of pressure that was applied during its shaping (Roux 2016: 182). This includes the study of the *variation of wall thickness* described by Rye (1981: 60), which, based on its regularity or irregularity, can hint to the forming techniques used, but also the study of the topography of the profile (see Roux 2016: 182-184, and figure 2.8), as well as of the depressions and protrusions found on its surfaces (Roux 2016: 183-187).

In addition to these three attributes, the *preferred orientation of inclusions* was also taken into account but could not be systematically studied due to the nature of the assemblage and its preservation.

The second step of the visual assessment was directly related to the first one and comprised a verification and refinement of the first technological grouping. As previously mentioned, an approach based on technological considerations might impede the differentiation of rather separate wheelmade pottery groups. Therefore, based on previous research on Mycenaean pottery, Grey Ware, and HBW, the initial grouping of sherds based on technological features were refined and modified, with special focus put on the differentiation between Grey Ware and fine Mycenaean pottery, and between plain coarse Mycenaean and plain HBW. While this step was much more subjective than the preceding one, it allowed the grouping of sherds that bore certain attributes shared by two categories due to an overlapping set of technological attributes, or to a limited set of attributes due to issues of conservation or fragmentation. More importantly, for the purposes of this research, it allowed the division between pottery groups which could be considered 'Mycenaean' and those accepted as being not part of the common Mycenaean repertoire, specifically HBW and Grey Ware pottery.

The final step of the visual assessment was an in-depth study of each group thus created. It includes two stages, looking at different aspects of the different groups. The first stage aimed at supplementing the information recorded initially on technology, precising the analysis on

forming techniques when possible, but also looking at aspects of pottery technology that were overlooked in previous steps. This included a more in depth recording of the different surface treatments, but also an estimation of firing methods, temperatures, and atmospheres based on simple visual indicators such as vitrification, colour, and core/margin differentiation (see Rye 1981: 110-122). The aim of this supplementary work was to refine the initial grouping, to determine if subgroups existed, and to contribute to a more complete reconstruction of the *chaîne opératoire* of each group. Secondly, pottery fabrics[9] were examined, as a preliminary stage to the more detailed examination by petrographic analysis. However, accurate observation and characterisation of fabrics in hand specimens can present multiple difficulties, and often requires training and ample experience with the material (Whitbread 2017: 217-218). As such, this initial look at the fabrics was mostly used to inform the sampling strategy, and limited itself to recording 1) the abundance of inclusions, and 2) the types of inclusions readily observable.

The second stage of this final step focused on typology and style, and aimed at characterising the assemblage in ways that would make it comparable to other published works on Mycenaean pottery (e.g. Mountjoy 1986, 1999, Vitale 2006) and on HBW (Rutter 1990, Jung 2006, Kilian 2007, Romanos 2011). Both groups were thus studied and described typologically. The methods and results of this part of the analysis can be found in Chapter 5, as it was also used to create an overview of the pottery from Teichos Dymaion. Additional data on rim types and on the style and manufacture of decorative elements was also collected for the HBW material, using Romanos's comprehensive catalogue of typological and stylistic features (Romanos 2011).

2.2.3 Thin section petrography

The selection of an analytical technique must be done knowingly, with consideration to 1) the aim and objectives of the project, and 2) the possibility for meaningful comparison with published work. For this project, ceramic petrography (or thin section petrography) was selected. This particular technique is common in Aegean archaeology (Day and Kilikoglou 2001: 115, see also Hillditch 2016 for a recent survey), and recent researches in Achaea provide meaningful sets of comparative material (e.g. Rathossi 2005, Iliopoulos and Xanthopoulou 2017), although still somewhat limited when compared to more externsively researched regions of the Mediterranean. The following section will introduce this analytical technique in more detail, describe its methodology, and finally, explain how material was selected for sampling prior to analysis.

9 For this research, the term 'fabric' refers to the "arrangement, size, shape, frequency, and composition of components of the ceramic material" (Whitbread 1989: 127)

2.2.3.1 A versatile analytical technique

Thin section petrography is a "compositional analysis" which addresses the composition of archaeological ceramics. More specifically, ceramic petrography does so by visually associating specific mineralogical textures with their minerals, and when possible, with the rocks or types of sediments the minerals derived from. As such, it differs from X-Ray Diffraction, which identify the mineral composition of crystalline material, or from the different geochemical techniques which look at elemental signature. With the use of a polarizing light microscope, petrography mostly focuses on the inclusions, voids and clay matrix of a ceramic, but can also provide useful information on surface finishes or decoration (Whitbread 1989: 130, Quinn 2013: 4-7). The clay particles themselves are too small for the magnifying capacity of the microscope (Quinn 2013: 93), but the matrix can still be characterised in such a way where it informs on the nature of the clay and the firing conditions. (Whitbread 1986, 1989: 133)

Ceramic petrography, in short, is a visual description of the raw materials which constitute pottery. In doing so, it allows, primarily, for the grouping of ceramics which share common compositional features into coherent units (Whitbread 2001a). These groups can in turn inform on other aspects of pottery production.

Firstly, they can help to address pottery production and craft practices. Indeed, while ceramic petrography draws most of its methodology from natural sciences, their respective object of study differs greatly, as ceramics are, by definition, man-made and culturally significant (Whitbread 1989: 130). As such, even if the materials within these archaeological ceramics are natural, their presence is not necessarily the result of natural processes, but can also be the result of human *actions*, and therefore, of human *choices*. In light of the discussion on technology found in chapter 1, it means that more profound and abstract concepts can be approached with this analytical technique (Whitbread 1989: 129-130). It has been an important constituent of works on the reconstruction of *chaînes opératoires* and craft traditions (see Roux and Courty 2005, 2007, Boileau 2007, Ard 2013, Hilditch *et al.* 2008, Hilditch *et al.* 2012, Roux 2016, Mentesana 2016, Mentesana *et al.* 2016). This can in turn lead to meaningful discussions on identity (e.g. Day *et al.* 2006), technological resilience (e.g. Day *et al.* 2006, Mentesana *et al.* 2016), technological transfer (e.g. Müller *et al.* 2015), and technological hybridity, all concepts that are central for this project.

Ultimately, this grouping can also provide insights into provenance. Indeed, ceramic petrography has often been conducted for the purpose of determining provenance of pottery. The geological composition of a particular group of pottery can be linked with a particular geology, which, when

combined with the archaeological and geological data, can help to determine its geographical origin. This information can also be determined, or complemented, with the previously obtained technological information, as similar technological practices in different petrographic groups can be related to each other, and subsequently, to other petrographic studies. At this stage, the existence of comparative data is however crucial (Quinn 2013: 128).

2.2.3.2 Ceramic petrography explained

As mentioned above, thin section petrography is, essentially, a technique that allows the grouping of ceramics, based on a visual characterisation of pottery fabrics. For this, it relies on the study of three elements which constitute all ceramics: clay matrix, inclusions. and voids.

The clay matrix corresponds to the clay mass surrounding the other components of the ceramic. However, it does not refer to the clay particles, as defined geologically, but to all particles that are too small to be observed using a polarizing microscope. This definition also means that the study of the clay matrix is limited in the specific context of ceramic petrography. Nevertheless, it is still possible to characterise it in terms of colour, homogeneity, presence/frequency of microcrystalline calcite, or birefringence. These characteristics can be used to interpret clay selection, clay mixing, or firing practices (Whitbread 1989: 133, Quinn 2013: 39-44).

Inclusions are particulate bodies within the clay matrix, and are the most distinctive components in a ceramic thin-section (Quinn 2013: 44). They are central to the characterisation and description of pottery fabrics, and are used to interpret tempering practices and provenance. Inclusions can be aplastic or plastic (Quinn 2013: 53), the former being more common than the latter. While dominated by minerals and rock fragments, aplastic inclusions appear in a wide variety of types, including organic matter, microfossils, or grog (Quinn 2013: 47). Plastic inclusions are mostly composed of unfired clay-rich features, the most common of which are pellets (Whitbread 1986: 84). Inclusions either relate to their natural presence within the clay deposits, or to a conscious addition to the clay body by the potter. This distinction is crucial to the study of ceramic petrography. Tempering (i.e. the voluntary addition of inclusions to clay in the process of making pottery) and clay mixing (i.e the combination of different clays to obtain the desired composition prior to the shaping stage, such as is observed in twentieth century jar production in Thrapsano, Crete, see Voyatzoglou 1976) are important elements of pottery technology, and their recognition is essential to the reconstruction of the *chaîne opératoire* of a particular group of archaeological ceramics. Provenance studies also rely on the accurate identification of natural inclusions, as temper may hinder the localisation of a clay source.

The last components of a ceramic thin section, voids, correspond to pores present within the fired clay body. While they influence or determine many physical properties of ceramic, they are often subordinate to clay matrix or inclusions for thin section grouping and description. They are nonetheless useful to better understand pottery technology, especially forming, drying, and firing practices. Voids are introduced within the clay body at various stages of pottery making. Their shape, size, orientation, and frequency are recorded to determine their origin, and to further characterise pottery fabrics.

As mentioned above, grouping is central to thin section petrography, and as such is often the first stage of petrographic analyses. This stage of the analysis refers to a visual sorting of thin sections into meaningful groups that will eventually constitute the different pottery *fabrics* of an assemblage. While it is effectively a subjective endeavour, in the sense that it first relies on a qualitative characterisation of each sample, more details are gradually introduced to further define the groups. Indeed, the latter will change as the analysis goes forward and as the petrographer grows more familiar with the material. They will, however, remain the most important analytical units, later to be described and used for interpretation.

Grouping can be done independently of archaeological data (Quinn 2013: 79), and is based on compositional differences and similarities between the thin sections: those with minimal or no differences will be grouped together, and others that differs greatly will constitute separate groups. This can also be done in correlation with other archaeological grouping, and the present project also considered the different ware groups (Mycenaean pottery, HBW, and Grey ware) and typological groups for this stage of the petrographic analysis. Groups, or fabrics, can often be further subdivided based on compositional or technological differences, but caution is needed when doing so. Ultimately, thin sections all possess a unique composition of inclusions, voids, and clay matrix (Quinn 2013: 76); they could all be considered their own unique fabric if the criteria for grouping are too exclusive. It is thus important to determine the criteria which make such subdivisions relevant in the specific context of a research. Quinn (2013: 77) suggest *subfabrics* should be used to identifiy samples that show a very similar composition to the main group, but with a definite, and clear cut, difference, and that this division should not be made by choosing an arbitrary point on a spectrum of variation. This is, in the present case, considered too rigid for the reality of the assemblage being studied, and it is argued that such variations can be better understood using *subfabrics* as a tool to define certain tendencies that are believed to have real archaeological meanings within a main, coherent fabric (see Chapter 6, fabric 1). Finally, it is possible to have thin sections that are compositionally on their own, due to sampling or to a real rarity of its fabric. Those are referred to as *loners* (Quinn 2013: 79).

Once the grouping finalised, each fabric and subfabric is to be described. This step is doubly important. Firstly, it defines the different fabrics "using text, specialist terminology and to some extent numbers" (Quinn 2013: 79) and makes them usable for interpretation. Secondly, by creating textual description of each fabric, they become references that can then be used by other scholars for comparison with their own fabrics. This adds to the growing corpus of petrographic analyses, given that the descriptions are done in a way which allow comparisons, and accompanied by adequate photomicrographs.

This requires a certain degree of standardisation. For that purpose, petrography of ceramic material draws upon the methodology of sedimentology and sedimentary petrography, in particular to describe inclusions, while also using soil micromorphology for the description of the clay matrix and voids (Whitbread 1989: 128-129). Just like grouping, the description of thin section ceramic material does not rely on quantitative methods, and therefore cannot translate into statistical manipulation. This approach, however, is adaptable, and makes it "possible to characterise anything that is encountered down the microscope, even if it cannot be identified or understood" (Quinn 2013: 79).

If many descriptive systems exist, Ian Whitbread's system, published in 1989, is probably the most thorough, as it was the first to include elements of soil micromorphology, and in so doing, the first to describe the clay matrix and the voids, in addition to the actual plastic and aplastic inclusions (see Whitbread 1989). This project uses the Whitbread Descriptive system, although its constituents are reorganised to better fit the tripartite terminology used to describe the composition of a ceramic thin section and presented above (Matrix/Inclusion/Voids). An example of this system, as it used in the present project, can be found in Quinn 2013: 80-101 and appendices 1-2).

2.3 Integration

While both the macroscopic and microscopic analyses, on their own, might form the basis of a fruitful discussion on the HBW phenomenon at Teichos Dymaion, they are complementary forms of data and are far more powerful in combination. The following section describes the principles and methodology behind the integration of the two levels of analysis into a single dataset, that would 1) unify them under a common language, and 2) be adapted to the particular objectives of this project, and to the questions it raises.

2.3.1 Building a technology-oriented portrait of the assemblage

To answer the specific questions of the present project, the assembly of a combined data set needs to be oriented toward a discussion on the *chaînes opératoires* of the different pottery groups, and more generally, on craft practices in the specific context of pottery manufacture. It must allow a comprehensive discussion on technology which *includes* provenance rather than focus on one aspect at the time. Considering the fragmentary nature of this archaeological assemblage discussed above in section 2.2, however, and consequently of the information on technology it could provide, it was essential to find an alternative to the very detailed descriptions of *chaînes opératoires* that are routine in ethnographic accounts (Roux 2010: 7).

An approach which answers those requirements was found in the work of Roux and Courty, more specifically in the way they classified their pottery assemblages by *chaînes opératoires* while addressing the limitation of archaeology (Roux and Courty 2007, Roux 2010, Roux 2016 Roux 2017). This techno-stylistic approach[10] is a classification system (figure 2.2) for pottery assemblages on three levels that includes the three main aspects of ceramic study, fabrics, technology, and style, and allows for their simultaneous study (Ard 2013: 372). It possesses an intrinsic hierarchy, scaling aspects of pottery manufacture in order or importance for the identification and characterisation of craft traditions (Roux 2016: 257).

2.3.2 The techno-stylistic classification system

This system involves three stages of classification. The first stage aims to sort the pottery into technical groups, while the second divides those technical groups into techno-petrographic groups. The last stage, in this method, returns to the more familiar typological way of dealing with ceramics, and looks at shapes and stylistic features to create techno-morphological groups within the techno-petrographic groups (Roux 2016: 257). Each level of analysis thus depends on the previous one, building a hierarchy of features that can easily be translated into a dendrogram (Figure 2.3).

2.3.2.1 Classification of technical groups

The first stage of this approach is an initial macroscopic classification of the pottery assemblage by technical group according to their forming techniques and surface treatments. For the present project, it corresponds, in part, to the first step of the visual assessment described above (figure 2.4). This initial sorting is done by observing the macro-traces left by the different technical gestures performed during the forming of the vessel (Roux and Courty

10 The original name, in French, is *approche techno-stylistique*. The name and the description of the approach was translated to English by Ard (2013).

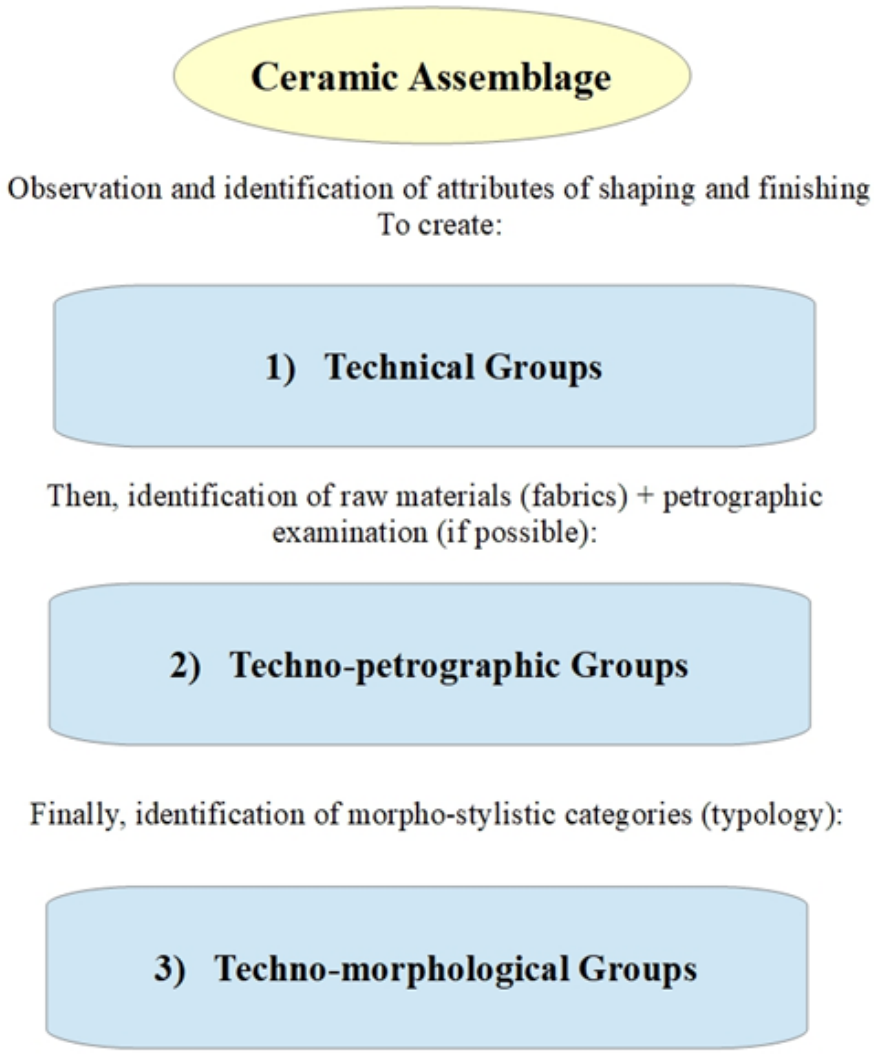


Figure 2.2: Techno-stylistic hierarchised classification method, after Ard (2013: 372)

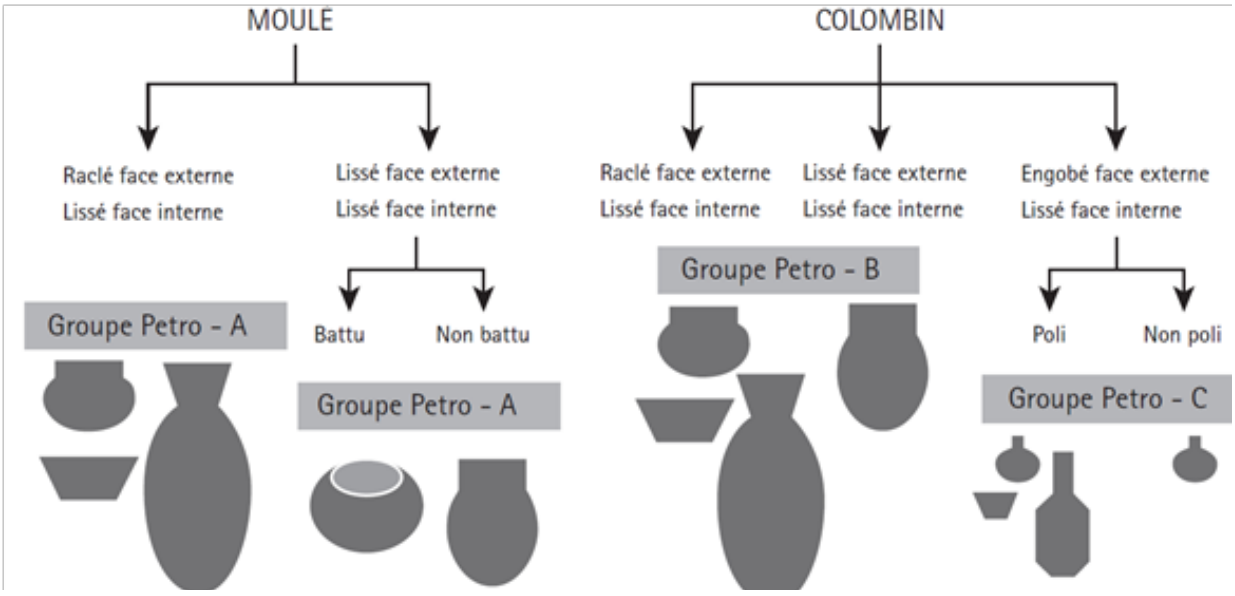


Figure 2.3: Techno-stylistic dendrogram (Roux 2010: 8)

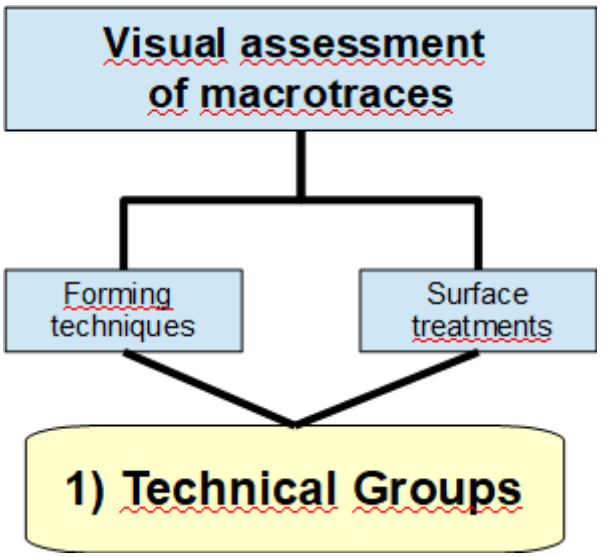


Figure 2.4 Stage 1, Identification of technical groups

2007: 158, Roux 2016: 258-259). The traces are then compared to reference material, either physical or published (for a general guide, see. Rye 1981; for an example with a more specific focus, see Choleva 2018), to assist in their interpretation. This initial classification is aimed at highlighting any differences between the individual sherds that constitute an assemblage. As such, it is highly probable for this preliminary grouping to be over-divided. It is essential, to remedy this, to then organise the different groups by technical family, creating a "hierarchised technical tree", resulting in the identification of outlines of *chaînes opératoires* (Roux 2016: 259-260).

This method implies the study of every sherd. Indeed, the creation of meaningful groups necessitates an appropriate sample size. However, not all sherds in an assemblage bear macro-traces that allow a positive identification of a particular technical gesture or a forming technique. Potters often hide such traces (Roux 2016: 261) and it may be necessary to revisit the initial grouping as the study progresses.

2.3.2.2 Classification of techno-petrographic groups

Each technical group is then defined petrographically[11], first to characterise their clay source, but also to discuss other technical aspects that were impossible to address in the first stage, namely clay preparation and firing practices (Roux and Courty 2007: 158-159). It is important to note that, due to the way this classification system works, the same "techno-petrographic" groups, which can be related to the fabrics identified during the petrographic analysis, can be identified in more than one technical group (figure 2.5).

The methodology described by Roux (2016: 267) for this classification is simple, and involves mostly macroscopic characterisation of the pottery fabrics, assisted by the use of a low magnification stereo microscope. In her approach, thin section petrography as described above in section 2.2 is used mainly to confirm the initial grouping. This approach allows all sherds, in theory, to be studied and sorted.

11 The *techno-petrographic groups* described here are not to be confused with the *fabric groups* described above in section 2.2.3. The latter may be included in the former, but they are, in essence, two distinct unit of analysis.

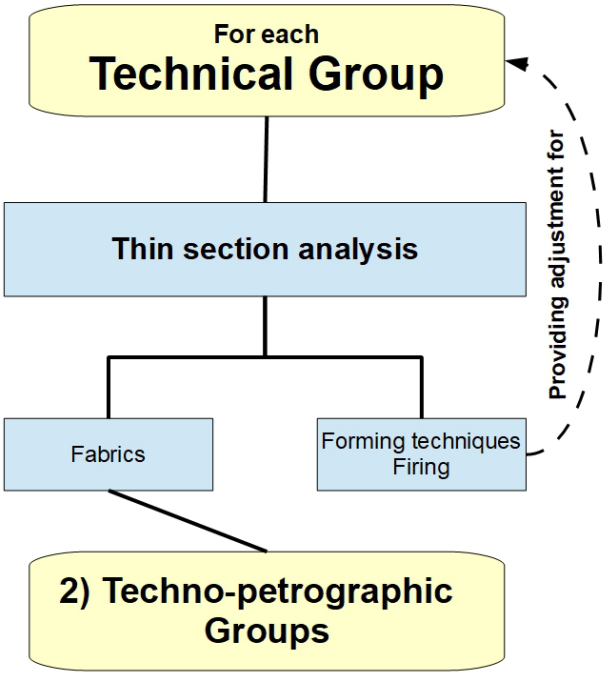


Figure 2.5 Stage 2, Identification of techno-petrographic groups

For this project, the methodology was slightly altered, and it was decided to use thin section petrography not simply as a complement, but as the basis for the techno-petrographic classification stage. This was due, in part, to the preservation of the pottery material at Teichos Dymaion. Indeed, many sherds are covered, partly or completely, by a calcareous deposit, which hinders any attempt to visually assess the fabric without the examination of fresh breaks. As such, the final techno-petrographic classification was carried out using exclusively the results from the thin section analysis, as the assemblage did not otherwise allow for a detailed macroscopic analysis of fabrics. This was mitigated with a sampling strategy (see section 2.4) that was representative of the whole assemblage.

2.3.2.3 Classification of techno-morphological groups

Following the techno-petrographic classification, all sherds and vessels are finally examined for their morpho-stylistic features. This corresponds to what is normally examined first in a traditional typological approach to ceramic study, and to the second part of the macroscopic visual assessment described above in section 2.2. This stage is placed at the end of the three-level classification, as it is important to determine if the same shapes or decorative elements appear in different fabrics, or even in different technical groups. As such, it uses the typological data collected during the visual assessment (presented in Chapter 5) to analysis each techno-petrographic group individually (figure 2.6).

2.3.3 Integration: conclusion

This approach to the integration and classification of analytical data is not revolutionary. It does not bring drastic change in the field of ceramic studies, and as mentioned above, all three aspects it focuses on (technology, fabrics and style) have been studied for decades, individually or together. However, what is innovative in its application to HBW studies is the way it forces a reorganisation of the collected data in a way that not only encourages a holistic approach

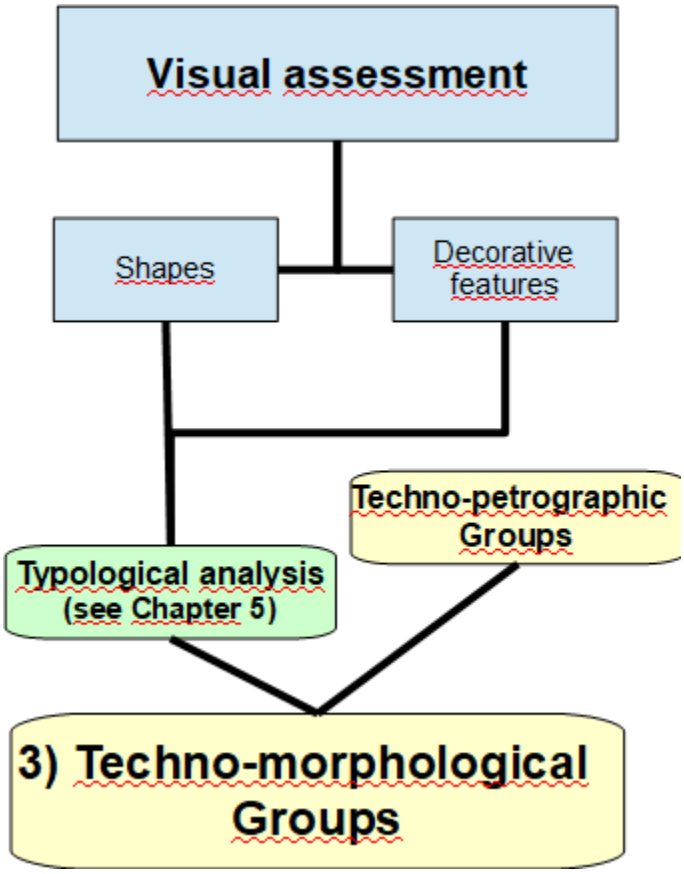


Figure 2.6: Stage 3, Identification of techno-morphological groups

to ceramics, but also a rethinking of the order of priority given to each element normally constituting the study of a pottery assemblage.

For the present research. the result of this classification system (illustrated above in figure 2.2) is simply a reorganisation of the analytical data in a way which addresses the particular objectives of the project, by putting the emphasis first and foremost on a true understanding of the pottery diversity at Teichos Dymaion, which in turn highlights the *local* character of the assemblage based on its material reality rather than solely on comparisons with other assemblages.

2.4 An appropriate sampling strategy

Sampling must take into consideration not only the strengths and limitations of the analytical technique(s) to be applied, but also the questions and types of interpretations involved in the research programme. For this project, it was thus necessary that the sampling process was not only adapted for thin section petrography, but also to the subsequent interpretation of that data, as described above in section 2.3.

The sampling strategy therefore had three underlying concerns. The first was to cover all technical groups. However, as the questions raised by this project focus heavily on the HBW portion of the assemblage, technical groups of handmade pottery were given priority, accounting for a larger proportion of the samples. The second concern was chronological, and meant that all stratigraphic units have been covered, to allow temporal trends to be investigated. Finally, the last concern was spatial, and all known trenches that yielded HBW material were sampled.

The resulting sampling is illustrated in table 2.1. The explanation behind the grouping of πασες and for the overwhelming proportion of material from trench ΓΓ can be found in chapter 5, and

the presentation of the chronology of Teichos Dymaion can be found in chapter 4 and 5.

The selection of the samples themselves within those contexts was however not random, but rather made use of the results from the visual assessment of the 1) technology, 2) fabrics, and 3) typology of the material. Moreover, for the HBW material, special attention was given to ensure that all the variety of surface treatments were represented in the selected samples, as the varying degrees of burnishing, or indeed the absence of burnishing, has been used to create meaningful subdivisions in recent studies on the diversity within the HBW phenomenon (see Lis 2009, 2018).

Πασες (ΓΓ)	HBW or related	Mycenaean
13th-14th	23	11
15th-16th	52	17
17th-19th	58	19
20th-21st	14	13
Other trenches	26	0
Total	173	60

Table 2.1: Samples for thin section petrography

2.5 Conclusion

The methodology presented above is ultimately simple. It relies on an analytical programme which includes a macroscopic visual assessment of the assemblage, and a microscopic analysis of a selected number of sherds through thin section ceramic petrography, creating a versatile dataset that includes information on technology, typology, and on the composition of the different pottery fabrics. This dataset was organised in way which is appropriate to tackle the specific aim and objectives of this research. The techno-morphological approach developed by Roux and Courty (2007) was deemed ideal for this purpose.

The results from these analyses, and their subsequent rearrangement into a tripartite tree-like classification described in section 2.3, will be presented in chapters 5 and 6 of this thesis. The next chapter, however, will present the historical context in which the HBW phenomenon appeared, and indeed flourished, introducing the end of the Palatial period, the so-called Mycenaean “collapse”, and the Post-Palatial period in mainland Greece.

Chapter 3. *Of Palaces and routes: Mycenaean Greece during the Palatial and Post-Palatial period*

3.1 Introduction

While it is not the central aim of this thesis to engage with and critique the discussions over the origins and nature of the Mycenaean polities, it is important to consider historical foundations of the period of study, just as the theoretical basis was outlined in chapter 1. Thus, the present chapter takes a step back from the specificity of this research to consider the Mycenaean polities of the Late Helladic period.

Ultimately, this chapter aims at contextualising the HBW phenomenon. As such, this chapter will focus on the so-called 'full maturity' period, peaking during the LH IIIB period (de Fidio 2008: 91, Shelmerdine and Bennet 2008: 289), and the subsequent collapse and LH IIIC Post-Palatial period.

As such, the present chapter starts with a brief presentation of palatial society, looking specifically at its socio-political organisation, and paying special attention to how craft practices were manifested during the LH IIIB period. It will then move to a brief discussion on the collapse of the Mycenaean palaces, and a presentation of changes this brought. Finally, because of their importance for the understanding of the HBW phenomenon, the chapter will conclude by looking more specifically at international trade, and at the particular case of the relations between Greece and Italy at the during the LH IIIB and LH IIIC periods.

3.2 Mycenaean polities: the 'Full Palatial' period.

The last centuries of the Bronze Age saw the crystallisation of the Mycenaean society in the Aegean world. Indeed, by the LH III period, the early Mycenaeans centres that were in competition during the Late Helladic I and II periods would give rise to polities capable of gathering and distributing resources, organising labour for large-scale public projects, sustaining specialised industries, and taking part in a wide network of international exchange (Shermeldine and Bennet 2008), perhaps best represented by the palaces and their megaron-style architecture, at their peak during the LH IIIB period (de Fidio 2008: 91).

The many studies and discussion that concern themselves with Mycenaean polities[12] frequently revolve around a series of recurring and defining elements. In addition to the aforementioned palaces, these often include Linear B tablets, the king-like figure of the *wanax*, and, to archaeologists, the fine painted pottery.

The present chapter addresses, in one way or another, all of those strong symbols of the 'Mycenaean world', in an attempt to produce a concise presentation of the palatial polities of the Aegean, as they appeared at the peak of their development.

3.2.1 Palatial administration: models and interpretations.

Until the early years of the 21st century, there was but little challenge to the general consensus that the palatial powers were to be understood as centralising bureaucratic entities organised toward the control and redistribution of resources (Voutsaki and Killen 2001: 6, Dickinson 2006: 35). This interpretation, however, did not rest solely on the material remains of the different Mycenaean polities, but also on an anthropologically aware discussion involving both these remains and the written records present in some of the Mycenaean palaces: the Linear B tablets.

Indeed, since its decipherment in the early 1950's by Ventris and Chadwick (Ventris and Chadwick 1953, 1956 Chadwick 1958), Linear B has been central to the discussion on palatial administration. The information that can be obtained from those tablets is often impossible to obtain through other means and is thus a valuable complement to archaeological endeavours. However, this information is not a complete narrative, only covering some aspects of Mycenaean economy (Bennet 1984: 64), and is constrained to a limited chronological window: the destruction by fire of the palaces which led to the preservation of these clay documents (Bennet 1984: 64, 2017: 30).

The fragmentary and selective nature and the temporal limitations of the information contained in the Linear B tablets, while useful, is but a glimpse into the political organisation behind the so-called Mycenaean state. Moreover, Linear B tablets have not been found at every palatial centre, nor were they found in equal quantity in each palace where they have been identified (Bennet 2017: 31); it would be a mistake to assume uniformity between palaces based on this limited information.

As such, the incomplete yet useful nature of these administrative documents gave rise to a rich

12 As pointed by Shelmerdine and Bennet (2008: 289), Polity is a more neutral term, and will be preferred in this thesis.

discussion, revolving around the combination (or sometimes opposition) of written evidence, archaeological data, and anthropological models. For decades, one model, drawn from the works of Polanyi, dominated archaeological interpretation: *redistribution*. It however often works hand in hand with an approach to Aegean palaces which essentially sees them as smaller versions of the large palatial complexes of the Near East.

3.2.1.1 Redistribution and centralisation: the extent of palatial control.

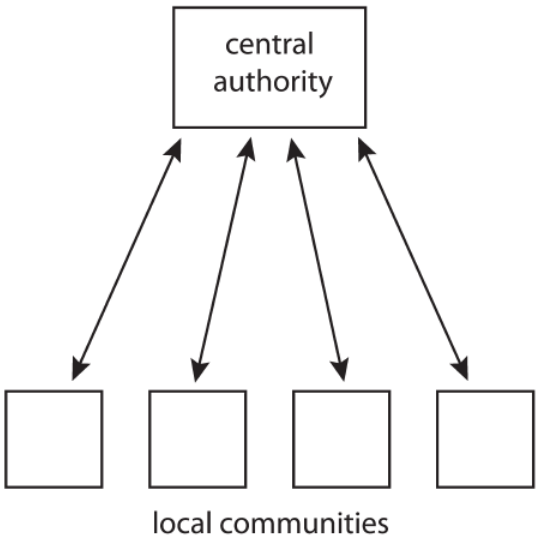


Figure 3.1 Simplified representation of redistribution (from Nakassis et al. 2011)

In what could be argued as the 'standard' interpretation of Mycenaean administration, the role of the palaces is one that is central and dominant (Killen 2008:180), positioned at the top of a well organised hierarchy (Shelmerdine 2006: 3). The Linear B records detailed transactions concerning three main variables: resources, processes, and people (Shelmerdine 2006: 3). The records are however limited, and only mention activities in which the palace had interests. As such, the Linear B tablets do not cover the whole spectrum of activities taking place in the territory over which the palace ruled (Halstead 1992: 58).

Sherlmerdine (2006: 4) nevertheless argues that the existing tablets allows for the identification of five areas over which the palaces exerted their control:

1) The control of land and its attribution;
2) The requisition of goods;
3) The imposition of military or non-military obligations;
4) The control over certain industrial resources (goods, people and processes alike);
5) The redistribution of finished goods.

In 1957, M.I. Finley argued that the control over the mechanism behind this system was very much akin to the redistributive economies of the Near Eastern palatial complexes, a view which is mirrored in Renfrew's *The Emergence of Civilization* (1972: 296-7). Redistribution (figure 3.1) has since been frequently referred to as a key concept explaining the inner working of Mycenaean economy (Nakassis *et al.* 2011: 177). It can be defined, conceptually, as the pooling

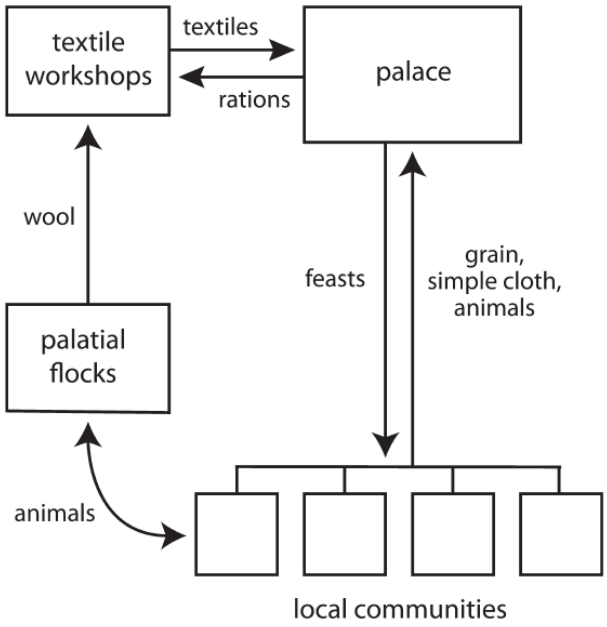


Figure 3.2 Redistribution in palatial context (from Naklassis et al. 2011)

of all resources from a group, often under one hand or figure, and the subsequent divisions of the collected resources to the members of the group (Sahlins 1972: 169-172). Underlying this redistributive interpretation, therefore, there lies the suggestion that the palace's influence was not only important, but omnipresent in all aspects of the economy, and that all products of that economy were redirected to the palatial centre to be redistributed.

There is evidence acting in favour of such an interpretation. One is arguably the *ta-ra-si-ja* system, found in the Jn tablets series at Pylos. These tablets deal mostly with bronzeworking, but also with textile and the production of chariots. They attest the distribution by the palace authorities of primary resources to specialised workers. It is then assumed that the workers had to return finished goods to the palace. A similar system is attested at Mycenae and Knossos for textile production (Rougemont 2009: 110). Rougemont (2009: 110) suggests that it is indicative of a form of control over industrial activities, where resources are pooled to support specialised craft industries (figure 3.2).

However, like Halstead (1992), Rougemont believes that this control only concerned certain specific categories of material. There is indeed an imbalance in the Linear B records which suggests that palaces were deeply involved in some aspects of the economic life of its territories, while almost indifferent to others (Halstead 1992, Halstead 1999, Dickinson 1994; 81-84). Moreover, it is not always easy to identify what is supposed to be under palatial control (Voutsaki and Killen 2001; 3). This raises uncertainty toward Finley's model and its subsequent re-uses and reinterpretations, calling for readjustments regarding the extent of the redistributive aspects of Mycenaean economy. In the last few decades, alternative models have emerged. Some work 'from within', adjusting existing interpretations based on redistribution to what is perceived as more complex or not entirely fitting, while other are more radical, turning their back on the traditional views on Mycenaean palaces.

In order to work through these important points, two aspects will be discussed. The first involves

an exploration of the rise of another Polanyian concept, *reciprocity,* as an alternative, or at least as a complement, to the standard concept of centralising and redistributing palaces (Nakassis *et al.* 2011, Galaty *et al.* 2011, Galaty *et al.* 2016, Pullen 2016, Voutsaki 2016). Secondly, stepping back from what is essentially a Polanyian discussion, we will move to examine Sherratt's suggestion, based on hillforts and trade control (Sherratt 2001).

3.2.1.2 *Redistribution* and *Reciprocity*: opposition and reconciliation.

While discussing the impact of the redistribution-led discourse on Mycenaean economy, Sjöberg (1995: 19) raised her concern over the fact that it had led to a marginalisation of the more decentralised aspects of Late Bronze Age life and society. This in turn led to an overly substantivist portrait of the Mycenaean polities (Sjöberg 1995: 21), which arguably was well fitted to the information contained in the Linear B tablets and to what was observed from the excavated palaces (Sjöberg 1995: 23). However, as mentioned above, this reality is much different, and not all aspect of economy can be understood following the *redistribution* model.

The problem, de Fidio (2001) argues, is theoretical. Indeed, the danger of using a single anthropological model to understand a whole society lies in its difficulty in adapting to the reality and particularism of the archaeological record (de Fidio 2001: 17, Voutsaki and Killen 2001: 10). It does not allow for the notion of variant, or of synchronous economic mechanisms.

The critiques by Sjöjberg (1995) and de Fidio (2001) were echoed in more recent discussions. Indeed, redistribution, both as a mean to explain ancient economy and as a model to understand social change and the emergence of palatial centrality, has recently been critiqued (see Nakassis et al. 2011; Galaty et al. 2016; Voutsaki 2016) for its incapacity to fully grasp the whole of the Mycenaean economy (Voutsaki 2016: 70-71). While some aspects of the Mycenaean economy are indeed reminiscent of a redistributive system, such as the ta-ra-si-ja system described above (Rougemont 2009:110), it fails to acknowledge the apparent complexity of the Mycenaean socio-economic environment. This is not to deny that aspects of the economy were redistributive. On the contrary, many aspects of the Mycenaean administration of work, labour, and resources seem to operate in a more or less redistributive way. However, as mentioned by Nakassis et al. (2011), it would be misleading and inaccurate to qualify the whole of the Mycenaean economy as such. Polanyi himself never intended the concept of redistribution to explain the emergence of hierarchy and social complexity (Polanyi 1968: 150).

An interesting alternative to discuss social complexity in the Mycenaean period could be *reciprocity*. Recently discussed in a discussion and debate led by Nakassis *et al.* in JMA 29.1

(2016: 61-132), it allows an engagement with the aspects of Mycenaean economy that a purely redistributive model cannot explain.

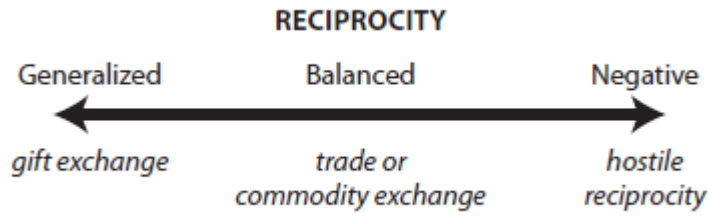


Figure 3.3 Sahlins's continuum of reciprocities (from Pullen 2016, Sahlins 1972)

Reciprocity generally refers to a system of exchange between two parties (figure 3.3), an "institutionalised pattern of symmetry" (Polanyi 1968: 10). It is not, as a model, mutually exclusive with redistribution, and it is entirely possible to have a society who operates within a socio-economical system that includes aspects of both concepts. Indeed, both rely on completely different sets of social relations (Sahlins 1972: 170). Redistribution is a communal affair, relating to Polanyi's centricity, and complementing a sense of social unity. Reciprocity is a duality, more akin to Polanyi's symmetry, a relation of actions and reaction between two parties (Sahlins 1972: 170-171, Polanyi 1968: 10). However, Sahlins considered both models to ultimately merge. Indeed, he describes redistribution, or pooling, as an organisation of reciprocities, and argues for the importance of reciprocity in the emergence of complex redistributive systems (Sahlins 1972: 170).

Reciprocity is theoretically interesting because it allows an understanding of the Mycenaean social life as "a continuous flow of things, people and loyalties in all directions, which in turn, "reveal the principles structuring social life" (Voutsaki 2016: 73). It is based on *interactions*; between people, and between people and their things, which in turn ground this deeply theoretical discourse in a material and, most importantly, human setting.

One set of activities, central to social life in the Aegean during the Bronze Age, is of particular interest to understand how reciprocity could have unfolded in Mycenaean social interactions. This refers to *feasting*, or the communal sharing of food and drinks for a specific purpose or occasions that serve in the creation and maintenance of social relationships (Hayden 2001: 28). Feasting, as it is manifested in Aegean, has been thoroughly discussed in the literature (see Halstead and Barrett 2004, Hitchcock *et al.* 2008, Mee and Renard 2007 , Wright 2004, Dietler 2006 , 2010, Dietler and Hayden 2001), and is considered central to the understanding of Mycenaean economy, but also the maintenance of social hierarchy and power (Pullen 2016: 80). Reciprocity, Pullen (2016: 79) argues, is crucial to understand the mechanisms behind this.

Indeed, considered by many as inherent to a redistributive economy (see figure 3.2), feasting is in fact more related to hospitality and gift, and to the manipulation of gift-debt and host-guest mechanisms leading to the creation of unequal social relations (Pullen 2010: 84).By creating a situation where it is impossible for guests to reciprocate and reimburse their gift-debt in any satisfying way, the host is able to transform the debts into social and political power, which in turn cements or improves his standing (Pullen 2016: 84) (figure 3.4). This is crucial: such a system, while certainly happening between the palace (i.e. the *wanax)* and its subordinates, is not in any ways limited to it. It thus allows for the existence of social and economic relationships *beyond* the reach of the palaces. As such, from the possibilities offered by this reciprocal understanding of the feasts, it allows for the existence of alternative economic activities taking place outside of palatial control, but still within the range of the social relations that makes a Mycenaean polity.

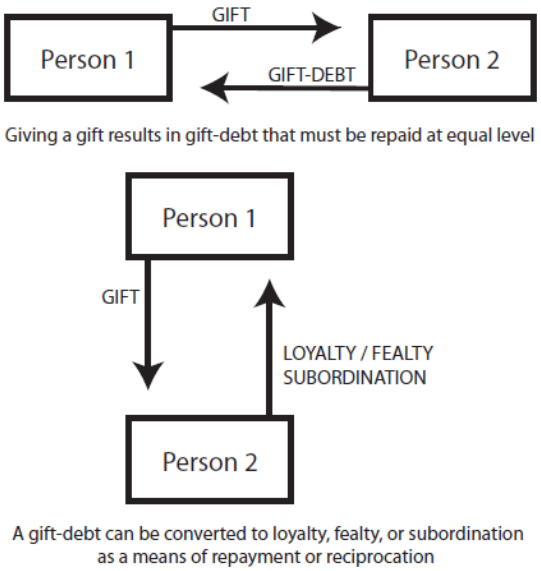


Figure 3.4 Gift-debt mechanism (from Pullen 2016)

It is important to stress that, as any model, reciprocity cannot explain the entirety of the emergence and operation of social, political, and economic systems of the Mycenaeans polities. Indeed, there is a risk with models of overlooking historical specificities that concerned specific periods or regions of the Mycenaean world (Voutsaki and Killen 2001: 10). They may, unconsciously, lead authors to dismiss important elements, or patterns, that would not fit, or rather, are hidden by a model-based approach. When these dismissed elements are considered for what they are, however, they may reveal overlooked but accurate views on the roles, functions, and significance of the Mycenaean palaces.

3.2.1.3 An eye-opening alternative: the Hillfort comparison.

In a paper published in 2001, Sherratt points out what she considers obvious concerning the palatial phenomenon as it manifests itself in Mycenaean Greece: the superficial, "shallow-rooted" nature of the palaces themselves, and the fact that they all seem to disappear simultaneously (Sherratt 2001: 214). From this, she presents an alternative model which does not rely on Polanyian interpretations, but rather on what she sees as the material realities of the

palaces.

This model will be presented here, as the proposition it brings forth is not only interesting, but also useful to understand the rise of the HBW phenomenon from the end of the Palatial period onwards. This is not, however, a total rejection of the more 'standard', reciprocity- and redistribution-based models of the palatial administration and economy(ies). Rather, this section aims to present a point of view which could not emerge from a strong adherence to such models, but which is nonetheless useful for complementing the portrait, and even, in some cases, for replacing some aspects of this portrait.

In addition to the 'shallow-rooted' nature and simultaneous demise of the palaces, Sherratt sheds light on what could be perceived as an abnormal degree of uniformity between the different palatial entities, one that would be easy to explain if they were one political entity, but rather strange as it is very clear that most palaces are in fact independent from each other. This uniformity suggests the importance of the superficial image it projected of palatial power, and ultimately, their insecurity (Sherratt 2001: 214-215).

From this, Sherratt suggests a model which rejects the more traditional, thalassocratic models, as well as those based on a substantivist viewpoint (see Sherratt 2001: 216-221 for her reasoning concerning both categories). This new model, she argues, is grounded in the fact that the Mycenaean palaces are 1) disappointingly small, and 2) very different from their Near-Eastern or Cretan counterparts (Sherratt 2001: 225). It is based on a completely different analogy, this time with the Hallstatt hillforts of Iron Age Northern Europe (Sherratt 2001: 226).

This is based on a few similarities between the Mycenaean palaces and the Iron Age hillforts, but not necessarily in their features, and certainly not from any degree of filiality between both phenomena. Rather, it is based on similarities in how they both occupy territory, and act upon it. The common characteristics thus revealed includes 1) a easily defensible position and 2) a location situated over or by a significant trade route, denoting an interest in control over the circulation of goods on a given territory. In the case of the Mycenaean polities, it also included a common cultural 'kit' applied to the palaces and its activities in such a way that anyone looking would automatically recognise the authority in charge (Sherratt 2001: 226).

This proposed role for the palaces, one of control over trade, as opposed to one of accumulation and redistribution of surplus, sheds a new light on the managerial records. Indeed, while surplus might have been accumulated, redistributed, and involved in the production of specialised goods to be added in the network of exchange goods, Sherratt suggests that the role of this

administrative control might have been one, fittingly, of supervision; the rest, while certainly of interest to the palatial powers, was most likely subordinate to this main role (Sherratt 2001: 230-232).

Also central to Sherratt's case is the idea that there is, underlying the bureaucracy implied by the Linear B records, the true backbone of the Mycenaean palatial entities, which is a client-based Warrior society (Sherratt 2001: 229, 238). Interestingly, to understand the inner working of this warrior elite, it is easier to go back to the plea for reciprocity described in the preceding section. Indeed, many elements that are part of the so-called cultural 'kit' associated with Mycenaean palaces and palatial activities are indicative of communal drinking and eating, such as the Megaron, or the frescoes depicting scenes of hunting and chariots. Feasting, as seen above, can be used for manipulating and creating social relationships, through the mechanisms of hospitality, gift-giving, and gift-debt (Hayden 2001, Pullen 2010). It is as such easy to imagine the Palatial elites cultivated a clientele and relations of subordination or debt *through* an informed and skilful used of communal feasting (Sherratt 2001: 229). It is not farfetched to assume they used surplus collected through their administrated, recorded supervision of the territory for those feasts (Sherratt 2001: 231, Bendall 2004: 112-124, 2008: 78-80).

So, instead of highly centralised, redistributive entities, Mycenaean palaces should instead be seen as the physical seat of power of warrior elite who established themselves over a certain territory geared towards the control of the movement of goods. Administrative records, through their accounts of taxation, distribution, and overall, management of surplus, resources, land, and people, may in fact hide a strict supervision from a palace aimed to better command trade and the movement of goods over its territory. This warrior elite maintained and created the relations which justify their position through communal feasting, and, it is worth adding, at the top of this elite, seated at the palace, is this kingly figure mentioned in the Linear B tablets: the Wanax. This elite also makes use of a set of easily distinguishable features, which, symbolically, *make* the palace, especially to any external observer.

This portrait is interesting because, while it rejects views that monolithically engage with Polanyian and substantivist, or thalassocratic and Near-Eastern influenced models, it allows some of their constituents to exist *within* a model which also addresses the evidence concerning the shallow, trade-oriented nature of the Mycenaean palace. As such, redistribution exists, but most likely as a result of the palatial efforts to control movement of goods over their territory, which explains why some aspects of the economy are left unattended. Reciprocity also exists, and is mostly seen, archaeologically, in the communal acts of eating and drinking used to

maintain and create relationships which support the palatial elites. Moreover, it most likely exists outside of palatial relations, and may be useful as a means to understand the many layers of the Mycenaean society, trade, and economy. Finally, the similarities between the Mycenaean palaces and the Near-Eastern or, more importantly, the Cretan palaces are also important: not, however, because the Mycenaean palaces are necessarily to be understood as smaller versions of these palatial complexes, but because they use a cultural 'kit' replicating the *idea* of a palace, and that idea probably comes from the closest example, Crete. More importantly, this model enables an understanding of the motivation behind the emergence of the Mycenaean palaces and their position in the international trade, beyond simply relying on diffusionism or substantivism. It also allows a better understanding of the 'Collapse', and of the subsequent partial recovery in the Post-Palatial period. Both of these will be addressed in section 3.3 below, and their relationship with Sherratt's model will be developed further.

3.2.2 Craft Production in Mycenaean polities: precisions.

Before moving on to the Post-Palatial period, it would be worth, as this research concerns itself with questions of manufacture of pottery vessels, to review some important information relative to craft production during the Palatial period.

Interestingly, a wide variety of professions are listed in the Linear B tablets, with varying levels of administrative attention devoted to them (Shelmerdine 2008: 142). Three crafts are most cited in the tablets: textiles, the production of perfumed oil, and bronze working (Shelmerdine 2008: 142-143). The Bronze workers, in particular, were previously discussed above for their involvement in the *ta-ra-si-ja* system. Having now discussed Sherratt's model, this inequality may be understood as representative of the interests the palatial elites had over some of the production in relation to their involvement in trade. As such, the very rare mentions of workers involved in craft that must have taken a great importance for the society as a whole, such as bakers, for instance (Shelmerdine 2008: 144), is potentially explained by their own unimportance within the trade networks upon with the palaces were acting.

There is, however, no denying that craft specialisation was not confined to those professions most often cited in the Tablets. Indeed, there are indications of other crafts easily characterised as large scale, specialised production. It is also worth remembering that the Linear B records are by no means complete, and while they may reflect the reality of the Palace in which they are found, they cannot be consider fully representative of all palaces. One such craft which is not well understood using written records is pottery production. Archaeologically, however, it is

certainly the most typical Mycenaean cultural marker, and must be explored more thoroughly.

3.2.2.1 Pottery production and the palaces

Pottery consumption by Mycenaean palaces is estimated to have been considerable. For instance, at Pylos, the number of vessels used every year is estimated at ca.12000 vessels (Whitelaw 2001: 62), and as such, questions are raised concerning the procurement strategies of the palaces in the absence of evidence from the Linear B tablets. This fact has been used by Whitelaw (2001: 77-79) to suggest that it is probably due to the fact that production was not organised by the palaces themselves, but rather, that the pottery was provided by external, non-palatial workshops.

Some pottery traditions indeed seem to exist and thrive outside of palatial control. A good example can be observed on Aegina, where distinct pottery traditions occur synchronously in LBA (Gilstrap *et al.* 2016: 507). These traditions, however, precede the existence of the Mycenaean palaces, and seem to be the continuation of craft practices in place since at least the Early Bronze Age. (Gauss and Kiriatzi 2011, Burke *et al.* 2016). This is similar to what was suggested by Parkinson and Cherry (2010: 45) for stone tools production in Messenia, where obsidian production continued during the LBA outside of palatial control.

There is, however, evidence beyond texts to suggest palatial involvement in pottery production (Knappett 2001: 82-84, 94). They may relate, for instance, to the size and importance of the production. An example of that may be observed in the large craft installation found at Kontopigado. Indeed, Gilstrap *et al.*(2016) discuss a large pottery workshop where vessels of different types, and with slightly varying raw materials, were produced at the same location, and fired in a similar way. This, they suggest, may have been indicative of an "*attached* workshop", with assigned potters who needed to produce a large range of vessel types. This picture is reinforced by the fact that this particular workshop is part of the largest craft installation of the Mycenaean world, which may be related to flax production (Kaza-Papageorgiou *et al.*, 2011, Kaza-Papageorgiou and Kardamaki, 2012), which is, according to Linear B tablets, often overseen by the palaces (Killen 1984, Chadwick 1988), and that it is in viewing distance of the most probable location for a palace, the Acropolis of Athens. Moreover, there is not, at Kontopigado, the same historical depth of craft traditions as the one observed for Aegina (Gilstrap *et al.* 2016: 506-507). This constitutes a good case for a pottery production that was deliberately set up by palatial authorities.

The cases of Aegina and Kontopigado indicate that both pottery production models, one where

direct involvement of a palatial authority is required, and one which exists outside this reality but rather relates to a long, local history of pottery production, had a role in the Mycenaean economy. Facing this possible discrepancy between different polities concerning craft production, it becomes clear that generalisation based on rigid models may not work; models, instead, should allow flexibility, and approaches to Mycenaean political, social, and economical administration should lean toward localised understandings.

3.3 Collapse and continuity: the Post-Palatial period.

By the end of the LH IIIB2 period, the palaces and their administration, collapse. This arguably dramatic episode involves a few interesting elements. First, it is, as mentioned by Sherratt (2001), more or less simultaneous throughout the Mycenaean world. Moreover, it involves physical and extensive destruction at the palaces themselves, not simply the disappearance of their administrative system. More importantly, it is interesting to note that what looks at first like a large scale, deep reaching and violent series of destructions is in fact relatively 'superficial'. Indeed, it mostly concerned the upper echelons of the Mycenaean polities, and while there is indication of significant movement of population, the collapses of the palaces is almost immediately followed by a recovery leading to a thriving Post-Palatial period, which displays multiple signs of continuity with the period prior to this abrupt, destructive episode.

3.3.1 Understanding the Collapse: a brief summary

Multiple causes have been suggested to explain the destruction of the palaces and the related collapse of the Mycenaean palatial polities. Most can be grouped into three main categories:

1) External threats;
2) Environmental disturbances;
3) Internal trouble.

The first, raising external threats and invasions as the main cause of the destruction of the palaces, has dominated the discourse on the collapse (Dickinson 2006: 47). These have been suggested to involve two invading menaces: the Dorians, and the so-called Sea People. The Dorian invasion was argued to involve a movement of population from the North wishing

to replace the ruling Mycenaeans, and is deeply rooted in post-Mycenaean myths (see, for supporting voices, Schweitzer 1971:10, Snodgrass 1971, Desborough 1972, Hooker 1976, Chadwick 1976). It was at first materially supported by the presence of HBW, then referred to as 'Barbarian ware' (Rutter 1975), but has seen been refuted. The so-called, and rather illusive, Sea People have also been suggested as an external factor for the collapse, either as a direct threat involved in the destruction themselves (Hood 1979), or as an indirect one involved in disturbing the status quo (Kilian 1988).

The second category concerns all explanation which involves the use of natural catastrophes, disasters, or changes, a trend that is popular in collapse theory beyond that of the Mycenaean example (Middleton 2010: 118). For the present case, it includes mention of violent earthquakes (Papadopoulos 1996, Drews 1996: 4, Nur and Cline 2000), droughts (Carpenter 1966, Bryson *et al.* 1974, Stiebing 1980), and in more general terms, any environmental changes on which the Mycenaeans failed to act and adapt (Sandars 1978: 21, Weus 1982, Neumann 1993, Dickinson 1994).

The last category is quite diverse and includes troubles that stem from within the Mycenaean world. One often cited internal cause for the collapse is the economic and administrative decline of the palatial system. This is interpreted as an inevitable consequence of the overstretching and overcentralising palaces, creating too much pressure on themselves and ultimately causing their own demise (Hooker 1982, Renfrew 1989: 133-134, Muhly 1992). This category, however, also includes explanation relating to increasing competition (Tainter 1988) or warfare between the different Mycenaean states (Mylonas 1966, Hooker 1976: 177). There are indeed indications that warfare may not have been unusual (Palmer 1961, Deger-Jalkotzy 1999: 124, Driessen 1999). It also is compatible with Sherratt's (2001) hypothesis that, as the palaces drew their legitimacy and power from their involvement in trade and the general movement of goods, the sudden obsolescence or by-pass of the trade routes upon which they were laid may have been the leading cause in their ultimate demise.

It might seem unlikely that the collapses of multiple Mycenaean polities were the result of a single event or cause (Shelmerdine 2001: 376, Dickinson 2006: 43-56, Middleton 2010: 52). Rather, the answer to the ongoing discussion concerning the fall of the Mycenaean palatial administrations is more likely to be multi-valent. While it is probable that the main factors were internal, with the overstretching of the administration and economic changes being the most likely candidates, it is equally possible that other elements were involved (Middleton 2010: 119), and that, ultimately, it is to be looked at case by case. This is the best avenue thus far, as

it offers a wide range of possibilities, while staying away from questionable interpretations of Mycenaean society, and from later Greek myths and modern archaeological ones (Middleton 2010: 119).

Returning to Sherratt's hillfort model, this multicausal view involving administrative *and* economic problems makes good sense. If control over trade routes was one of the main *raison d'être* of the palaces, disturbance to their exploitation could have had a catastrophic impact. In addition, as the attributes of power displayed by the Mycenaean palaces were arguably superficial, and with the so-called centralising administration only concerned with selected aspects of the economy relating to the palaces' involvement in trade, it is probable that these elements would have indeed completely collapsed following the demise of the elites. However, because of the superficiality of the palatial apparatus, Sherratt suggests the collapse may have been one of equal superficiality, something she refers to as a 'cardboard' collapse (Sherratt 2001: 234). In turn, this limited extent of the demise of the Mycenaean administration may have eased the subsequent recovery leading into the dynamic Post-Palatial period.

3.3.2 Fall and Recovery: the Post-Palatial period.

Dickinson (2009: 11) is right to suggest that the expression 'Post-Palatial' is deceptive, and biases our understanding of this most important, and indeed dynamic, period. Stretching over 100-150 years, its duration is in fact very similar to that of the apogee of the Palatial period (Dickinson 2009: 11). A such, while it is true that it is of considerable importance for the unfolding of the end of the Bronze Age, it must be not be confined to the role of explaining the transition to the Iron Age, but rather understood as a unique and dynamic period.

Scholars have approached the Post Palatial period from multiple angles. While some preferred to discuss the more traumatic and declining aspects of this period (e.g. Maran 2006, 2015, Dickinson 2006, 2009), others have instead emphasised its novel aspects and dynamism, portraying a recovering Aegean region (e.g. Rutter 1992, Eder 2006).

This section will discuss both positions. Indeed, both are valid in their own way, and more representative of choices from the author's point of view than of historical reality, as both discourses complement each other to create a portrait of a dynamic, yet changing and uncertain time following the demise of the palaces. First, the changes occurring at the political and social level will be briefly described. Then, a particular focus will be given to what is happening in regard to material culture and craft production during this period.

3.3.2.1 Old and new: the nature of social changes in the Post-Palatial period.

It is now clear, after decades of research and discussion, that the collapse did not leave the 'Mycenaean' society, for lack of a less politically charged term, in a shape from which it could not recover and rebuild itself (Dickinson 2006: 60). It is, in fact, probable that some levels of society felt very little effect from the demise of the palaces, as they may have not been too involved with their administration to begin with. Nevertheless, for others, the consequences must have been felt much more heavily, requiring more serious adaptation in the times immediately following the destruction.

In that regard, there are signs of organised efforts at recovery at several sites. At Tiryns, this effort was accompanied by what appears to be the re-establishment of a *wanax*-like figure of authority (Maran 2001: 120-121). This hints at the emergence a new class of ruler, or elites, establishing themselves after the collapse, most likely filling the void left by the demise of the previous palatial powers, in a push for social advancement. This, however, was most likely balanced by a significant levelling of the social hierarchy (Kilian 1988). These new rulers would have faced two challenges (Maran 2006: 143): one of proving their legitimacy to hold the position held by a now defunct ruling class, and another, related, of proving their individual worth, as the social hierarchy, being smaller, must have been significantly more competitive (Dickinson 2006: 61).

It is probable that, for the issue of proving their legitimacy, these new rulers would have turned to the most obvious solution: the old symbols of powers. Indeed, there are indications that the new ruling class used ideological paraphernalia which was creating a link between them and the former ruling class, in an attempt to justify their position as their *successors* (Maran 2001: 117-118, Maran 2006: 127, Maran 2015: 283-284). This recycled symbolic behaviour, however, was simplified, and not as ceremonially charged as it was at the time of the *wanaktes* (Dickinson 2009: 16-17). New symbols also emerged, amongst which was an enhanced importance for warrior ideology, as seen by the increasing numbers of 'warrior tombs' in the LH IIIC period (see Deger-Jalkotzy 2006). This may relate to the second challenge concerning personal worth, and denotes the overall precarious nature of this new ruling class's position (Dickinson 2009: 17-18).

This new elite also had to deal with a world that was shifting. There are indeed indications that populations were moving, internationally across the Mediterranean (Dickinson 2006: 62-63), but also 'locally' in Greece and more generally. Some sites are abandoned, such as Zygouries, Berbati, Prosymna, Orchomenos, Eutresis, Ayios Stephanos, and Pylos, while

others, including Teichos Dymaion, Korakou, Lefkandi, Tiryns, and Mycenae thrive after the destructions (Mountjoy 1993: 212). Accordingly, some regions, such as western Achaea (see chapter 4), show sign of increased development, and indeed of a flourishing economy, showing that some may have actually gained from the collapse. Undoubtedly, in light of this, it would be correct to qualify this period as one of increased mobility (Dickinson 2006: 66-67). This mobility, however, is not only geographical, but is also hierarchical, as suggested above with the appearances of new elites ascending to new positions of powers left unoccupied after the collapse.

This overall portrait for the Post-Palatial period, with its new network of social relations, its focus on warrior ideology, and re-use of old symbols of power is not dissimilar to Sherratt's suggestion concerning the true, 'stripped-down' nature of the preceding Palatial period. Following her model, it can be argued that what this new elite was doing is not in fact too different from what the old, complex and hierarchised Mycenaean elites were themselves doing, albeit in a simplified, less centralised fashion. Trade does not stop, and most likely, the new ruling class emerges, once again, in an attempt to seize control of segments of this wide network expanding across the Mediterranean; the central Aegean region cementing relations with Crete and Cyprus, and the western Peloponnese with Italy and the central Mediterranean. This may have been the very motor behind the recovery (Sherratt 1982: 187-188).

3.3.2.2 Material Culture and craft production: some comments.

Material culture, in some respects, is extremely similar and unchanged in regard to the preceding Palatial period (Dickinson 2006: 72). In other aspects, however, it is much different. This is the case with two classes of artefact of particular interest for the present research: metal and pottery. Indeed, while completely new types and styles appears for the former, the latter is marked by an explosion of regionalism, culminating in the LH IIIC middle period (Mountjoy 1993: 24, Mountjoy 1999).

There are, in the LH IIIC period, major changes in the types of bronze artefacts in circulation. New styles appear, often referred to as a new metallurgical *koine*, or as the 'Urnfield' bronzes (Jung and Mehofer 2013: 175, see also Eder and Jung 2005, Jung 2007, Jung *et al.* 2011). Central to this phenomenon is a new set of weaponry with at its core a type of sword rapidly becoming the staple of the new warrior society of LH IIIC: the Naue II sword. While these appear before the collapse, they are most common in the Post-Palatial period, and are often cited as indicative of increasing contact with Italy and Central Europe (Jung and Mehofer 2013: 176-175). Other

types are associated with this particular connection, such as the violin-bow (or fiddle bow) fibulae (Papadopoulos and Kontorli-Papadopoulou 2000, Dickinson 2006, Jung and Mehofer 2013), and the pertosa daggers (Papadopoulos and Kontorli-Papadopoulou 2000). While these new metal types seem to have become important for the new groups of elites emerging in the Post-Palatial period, the implications of the presence of these seemingly foreign shapes in Mycenaean Greece, may equally denote imported exotica, or indeed the movement of people, if they are produced locally by itinerant metalworkers or migrants. These issues will be addressed in more detail in section 3.4, chapter 4, and much later, in chapter 8, as ultimately, they link closely with issues over the production and consumption of HBW.

Turning, then to post-palatial pottery, even excluding HBW which appeared in the Aegean in LH IIIB2, there are major developments in pottery production. One such development concerns the marked increase in regional styles of pottery (Sherratt 1980, Rutter 1992: 65-67, Mountjoy 1993: 90, 1999: 134). Although this regionalism is more pronounced in LH IIIC Middle (Rutter 1992: 66), the phenomenon seems well underway in LH IIIC early (see Jung 2007: 213, with Achaean singularities in LH IIIC early). Fittingly, and contrary to what was suggested by Small (1990, 1997), there is no decline of production in pottery associated with the Post-Palatial period. Rather, it seems that pottery production was one of those facets of the Mycenaean economy which was, in this period, animated by a renewed dynamism brought forth by the fragmentation of the old polities.

3.4 Aegean relations during the Late Bronze Age: trade, exchange, and connectivity.

Trade, connectivity and interactions are doubly central to this research. In a more general way, they are so because they relate to how the palatial authorities asserted their power, at least in the model which has been argued for above. Understanding the nature, mechanism, and extent of the different relations maintained and exploited by the different Mycenaean polities, at least for the periods and regions this research concerns itself with, is therefore essential. More specifically, however, they are central because the material of main interest to this research, the HBW from Teichos Dymaion, is itself considered the product of these international connections of the Late Bronze Age.

This section will discuss briefly the trade and maritime contacts of LBA Greece, specifically their development, and the conditions under which they operated, with a focus on Italo-Mycenaean relations. The so-called 'Italian connection' is believed to be a key element for the understanding

of the HBW phenomenon in Greece, and post-palatial trade networks more broadly. As such, this section will present a brief chronological portrait for the Italo-Mycenaean contacts, and some remarks on their material manifestations. It will conclude with a brief commentary on the nature and significance of the Italo-Mycenaean connection.

3.4.1 Generalities: a brief introduction to Late Helladic trade.

The intensity, reach, and nature of Mycenaean trade has been the subject of much debate, perhaps best represented by two dichotomies. The first opposes 'maximalist' (Cline 2007, 2009) and 'minimalist' (Snodgrass 1991, Manning and Hullin 2005, Blake 2008, Parkinson 2010) views and concerns the scale and extent of the Mycenaean international relations. The second relates to the nature of the relations, contrasting diplomatic and commercial intents as motors of trading ventures. The two are often related, and it seems 'minimalists' often argue for the former, diplomatic intent, while the 'maximalists' argue for a model in which merchants, led by entrepreneurial and commercial goals, are at the forefront (Tartaron 2013: 23-25).

While there is very limited textual (i.e. Linear B) references to international trade (Tartaron 2013: 24), the relations between the Mycenaean polities and their neighbours are undeniable, regardless of their scale or nature. Indeed, while the Cretan polities were the main recipient of most imports until the LH IIIA period, things started to shift afterward, and by the LH IIIB, Mainland Greece seems to have supplanted Crete for the control of Maritime trade networks with the Eastern Mediterranean (Cline 1994, 2007: 192, fig 17.2), and objects of Cypriot, Egyptian, or Levantine origins are found in increased proportion in Mycenaean territories (Tartaron 2013: 21). The Argive region, in particular, seems to have held a particularly central role in the trade with the Levant, as suggested by a recent study of a group of Canaanite jars from Tiryns (Day *et al.* in press). Reflecting this, Mycenaean pottery is more routinely found in Cyprus, Egypt or the Levant for the same period (Tartaron 2013: 21).

While limited, this imported material is certainly, as Cline (2007: 199) argued, the only extant evidence of the Mycenaean trade network available, and while it may not be possible to truly assess the scale of interactions it presupposes, it can be the basis for a meaningful discussion on its nature. For this, it is necessary, however, to look past the material records found in the Mycenaean palaces.

Most of the evidence referred to above, tangible and visible in the archaeological records, refers to pottery or other finished goods. However, one main component of LBA trade seems left out from this picture. Indeed, contemporary shipwrecks suggest there was an important but mostly

invisible trade of raw material, with metal being central (Bass 1997). In the model described above where Palaces are nodes of power, involved in limited centralised craft activities but aiming to profit from trade (see section 3.2.1.3, Sherratt 2001), it is most likely that palatial authorities sought to monopolise trade in such high-value commodities (Bennett 2008). Diplomatic trade with the East related to Mycenaean participation in gift exchange between members of 'international elites', as suggested by many written sources from the Near-East or Egypt, cannot be ruled out of the range of possibilities, especially if one accepts the identification of 'Ahhiyawa', found in the Hittite texts, as a Mycenaean polity (Dickinson 2006: 26-29). This mode of exchange, however, is harder to reconcile with the evidence. Indeed, excluding the uncertain case of the Hittite records, the Mycenaean polities are not mentioned in any other Near-Eastern or Egyptian documents; if there was a group of rich aristocrats exchanging gifts and letters on an international web of contacts, it seems the rulers of the Mycenaeans polities were outside its inner circle (Sandars 1985: 184, Voutsaki 2001: 212, Sherratt 2001: 217-218). On the other hand, on account of the centralising capabilities, but also simply the limited interests of the palaces, it is unlikely they monopolised trade *itself*, and as such, the model allows for the existence of merchants, perhaps involved in the trade of more utilitarian goods such as pottery (Tartaron 2013: 27).

This picture, as is often the case, is at neither end of the two alternatives described above, but rather in the middle ground where contacts, especially with the East, may have been more important than that suggested by the material evidence, and where both palatial agents and individuals with no relation to the palaces may have been involved in international trade.

This picture is only valid for the 'Full Palatial' period, and already in the crisis years leading to the collapse, disturbances are noted in the trade with the Eastern Mediterranean regions. Indeed, there is a marked reduction in LH IIIB2 of exported Mycenaean pottery found in the East (Tartaron 2013: 20). At the same time, there seems to be a shortage of certain raw material, as indicated by the rationing of Bronze in the Linear B tablets at Pylos (Chadwick 1994: 140-141). This in turn may indicate a perturbed trade with Cyprus and beyond. While it may be that the routes were made irrelevant by internal strife in the Near Eastern Polities themselves (Sherratt 2001), it is also possible that the Mycenaean traders may have been purposefully excluded from the network, perhaps because of a Hittite embargo (Cline 1991, 1994: 68-74, 2007: 197, Sherratt and Crouwel 1987: 345).

Nevertheless, this reduction in trade does not imply a diminished importance for maritime relations in the coming Post-Palatial period, but simply a shift (Tartaron 2013: 22). Indeed,

trade with the East still existed, although in a less intensive and almost certainly non-diplomatic version (Dickinson 2006: 204-205). Moreover, new types of metal objects, such as a the 'Urnifield' bronzes mentioned above, seems to indicate invigorated trade with the West, and more precisely, with the Central Mediterranean and peninsular Italy. New Trade routes seem to replace old ones (Figure 3.5), and some regions previously 'peripheral' in the overall international trade network, such as Achaea, appear to profit from the situation (see Chapter 4). Overall, Maritime contacts are still as important, in terms of frequency and significance for elite affirmation, in the Post-Palatial period, but with a shift of focus to another region. If Cyprus (Maran 2004) and Crete (Moaschos 2009) are perhaps of capital importance for understanding the instigation and mechanism of trade in this period, it is the rising importance of the relations with the West, and more specifically Southern Italy, which is central to this research.

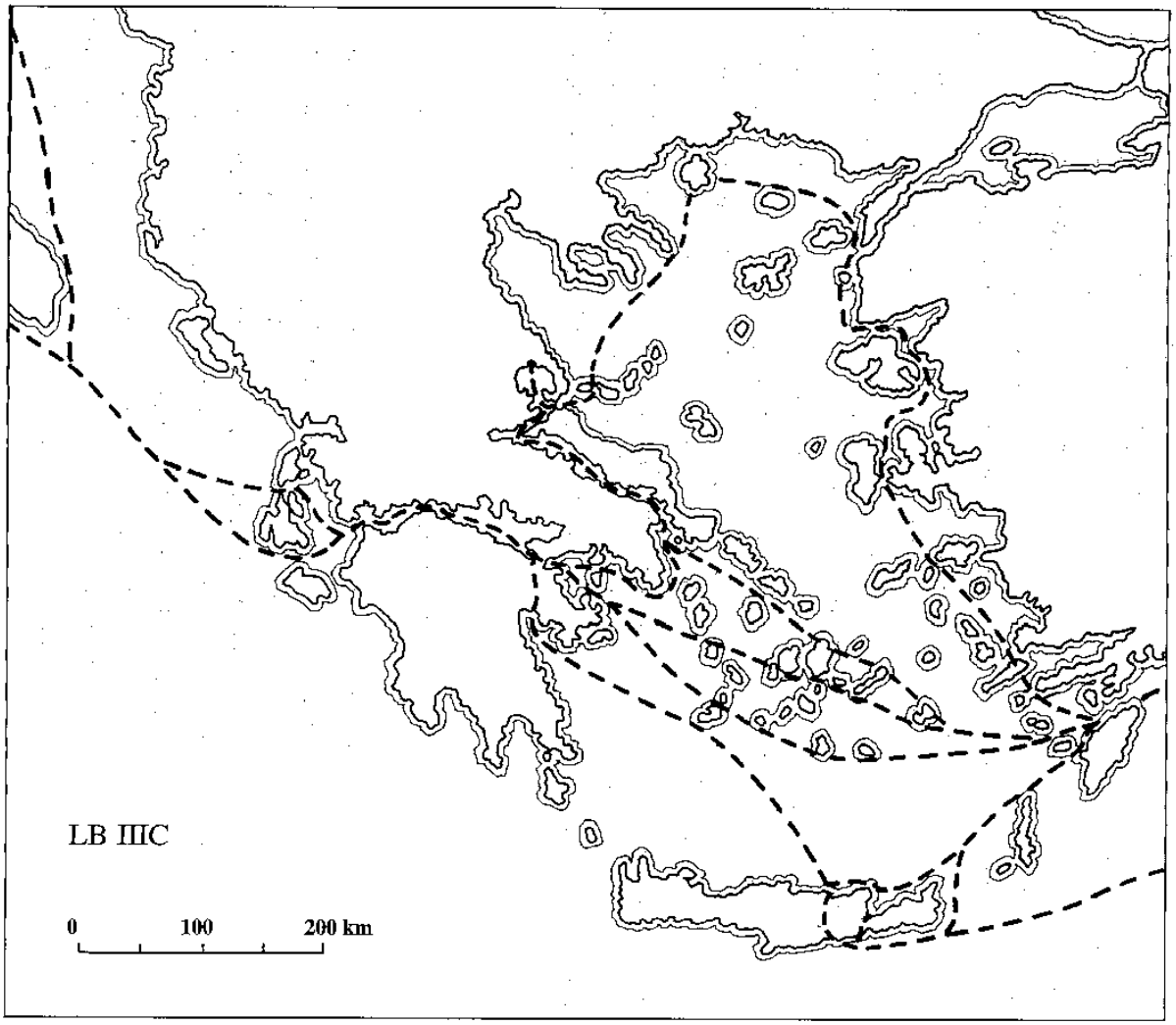


Figure 3.5 Map of maritime routes in LH IIIC (from Sherratt 2001)

3.4.2 The Italo-Mycenaean connection

Contacts between Italy and continental Greece, despite their importance for understanding the post-palatial Mediterranean relations, are not in any way a new phenomenon for the period following the collapse, nor indeed is this period the peak of intensity for this relationship between the Aegean and the West. In fact, as made clear by Iacono (2019), proximity between Greece and Italy, or the whole of the Adriatic, has encouraged encounters and contacts as far back as the beginning of the Bronze Age. Moreover, while often overlooked as less glamorous, because seemingly less high status, than the trade with the East, it nevertheless seems Mycenaean contacts with Italy have always been an active part of their trade or exchange relations, as already pointed out more than three decades ago in a paper by Bietti-Sestieri (1988, see also Vagnetti 1982).

This section will explore these elements. It will first summarise the chronology of this often overlooked but nonetheless important connection, arguably spanning from the very onset of the Late Helladic period until the very end of the Bronze Age. It will also explore its archaeological visibility, and based on current interpretations, its nature.

3.4.2.1 Chronology of early encounters.

Apulia Cultures	Southern Italy	Mainland Greece
Protoapennine	MBA1	LH I
		LH II A
Apennine	MBA2	LH II B
	MBA3	LH III A1
		LH III A2
Subapennine	RBA1	LH III B1
		LH III B2
		Trans. LH III B2-C
	RBA2	LH III C early
Protovillanovan	FBA1	LH III C middle
	FBA2	LH IIIC late
		Submycenaean

Table 3.1 Chronological correspondence between the Aegean and Italy during the Late Helladic period (after Jung 2006 and Iacono 2019).

The date of Mycenaean contacts with Italy relies mainly on pottery evidence, dated relatively, and based on well-established Aegean typologies. The dates thus obtained refer inevitably to periods valid for Greece (i.e. Early, Middle, and Late Helladic/Minoan periods). These periods, however, do not correspond to the chronological system in use for the Italian peninsula. As such, it is necessary to rely on radiocarbon dates and work on Italo-Mycenaean synchronisms (Jung 2006) in order to obtain relatively precise correlations (table 3.1). To stay

consistent with the rest of the chapter, and indeed of the thesis, the Aegean chronology will be preferred in this section, even if authors cited use the Italian chronology.

While there are indications of maritime movements in the Adriatic region during the Neolithic (Iacono 2019: 53-59), the first confirmed trace of contact between the Adriatic region dates to the EH II and III periods, in terms of Aegean chronology. These early encounters between Greece and the areas surrounding the Adriatic seas are materialised in the presence of the so-called Cetina pottery in Western Greece. Indeed, originating from Dalmatia, the Cetina culture saw a spread during late EH II and early EH III, reaching not only Greece, but also the much closer Italian coasts (Maran 1998, 2007); its thus most likely through this Adriatic connection that Greece and Italy first came into contact, at least on a scale which would leave material evidence.

There seems to be a hiatus of regular exchanges during the Middle Helladic period. While sherds of possible MH dates have been brought up as evidence of continued relations (Castellana 2000, Vianello 2005), these are contested due to the continuity of the pottery types identified (the most characteristic being the matt-painted and the Grey Minyan pottery) into LH periods (Alberti and Bettelli 2005: 547, Iacono 2019: 97), and exchange between these areas seems negligible for this particular period.

It is the subsequent LH I and II periods that are most often considered by scholars as the true beginning of the Italo-Mycenaean relations (Bietti-Sestieri 1988, Vagnetti 1993, Bettelli 2002, Alberti and Bettelli 2005, Iacono 2017, 2019). It can be accepted that, prior to the rise to pre-eminence of the Mycenaean palatial polities, there was an East/West divide in the Aegean contacts, in which Crete still held control over most of the eastward interactions (Cline 1997, Iaconno 2019). This in turns seems to have made Southern Italy the focus of most 'direct' interactions led by Mycenaean seafarers (Iacono 2019: 99). While the hot spot for contacts seems to be, for this period, the South Tyrrhenian sea area, including the coast and the islands (Iacono 2019: 98), the scale and extent of interaction during these early stages of Mycenaeans encounters with the West seems to have had a great regional variability (Iacono 2019: 101).

3.4.2.2 Late Helladic III encounters: the Palatial and Post-Palatial period.

Material evidence shows that contacts continued uninterrupted into the Palatial period, reaching their peak in LH IIIA-B1 (Blake 2008: 5). While there is an overall continuity with what was happening in the previous periods in terms of segmentation of Southern Italy in multiple regions of contacts, the LH IIIA period is nevertheless characterised by an intensification of

contacts which reveals itself in regions of Southern Italy previously of lesser importance. While the Aeolian islands of the Tyrrhenian sea are still an important region of contacts, there seems to be a shift south, with Sicily, and most importantly the site of Thapsos, taking a central role (Alberti 2007, Iacono 2019: 102). Indeed, the site delivered 38 vessels of Mycenaean types, most of Peloponnesian origin (Jones *et al.* 2014). Sicily is not the only area with increasing evidence for Mycenaean encounters, as sites in Apulia, in particular Scoglio del Tonno, are important for Italo-Mycenaean relations (Hallager 1985: 85, Iacono 2019: 105-106). Apulia also includes some of the earliest examples of some of the hallmarks of the Italo-Mycenaean contacts, namely: 1) locally produced Aegean-style pottery, referred to as Italo-Mycenaean, and 2) Italian-style pottery made using Mycenaean technical know-how. Indeed, the site of Roca includes the first instance of locally produced pottery of Mycenaean style and technology, a cup which, interestingly, displays features of both Mycenaean *and* Minoan origins (Iacono 2019: 107). It is also in this LH IIIA period that the first instances of Grey Ware are noted; in Apulia, at Porto Perone, but also in Calabria, at the site of Broglio di Tresbisacce in the plain of Sybaris (Belardelli 1994). This particular ware is often considered as a result of technological transmission between Mycenaean and Italian potters (Vagnetti 1999, Borgna and Levi 2015). In short, the LH IIIA period displays rich contacts between Italy and mainland Greece, and technological 'hybridisation' that hints at the physical presence of Mycenaeans *in* Apulia. This will be discussed further below.

While some trends continue during the later stages of the Palatial period in Greece, in LH IIIB, there also some significant changes. The intensity of contacts is maintained in settlement context, with Apulia taking now a central place in this. At the site of Roca, there are indications that the focus for this period is very much on open vessels used in contexts of consumption, perhaps feasting (Iacono 2015). There is also an increase of locally produced Aegean-style pottery, which will supplant imports by the end of this period (Jones *et al.* 2002: 171). Contrasting this, imports of Aegean pottery in funerary contexts seem to stop (Iacono 2019: 127-128). Regarding other regions, it seems Sicily's role is diminished, while interactions with the Aeolian islands seem to be maintained (Holloway 1992: 41).

By the LH IIIB2-IIIC period, during the crisis years leading to the collapse and the subsequent Post-Palatial period, the changes and shifts which began in the early LH IIIB period are more defined. Local production of Italo-Mycenaean pottery in the Italian peninsula becomes well-established (Blake 2008: 5, Iacono 2019: 148-149, see also Jones et al. 2014). Sicily and the area of the Tyrrhenian sea and the Aeolian islands have now significantly declined in importance in these Italo-Mycenaean contacts, while Apulia and Calabria, which were rising

in importance in LH IIIA, are now well established (Iacono 2019: 152-153). It is also for this period that we record most of the evidence that could indicate an Italian 'presence' in Greece. Indeed, the period immediately preceding the collapse, and the following Post-Palatial period, are the peak of the locally produced HBW presence in Greece. As seen in the introduction, there is a growing consensus that this phenomenon is indeed related to these Italo-Mycenaean interactions. Moreover, this pottery is often recorded with a much smaller, but nonetheless significant presence of Grey Ware, more safely identified as of Italian production (Belardelli and Bettelli 2005).

Finally, the scale of interaction declines from LH IIIC Middle onward (Blake 2008: 5, Iacono 2019: 171), as major socio-cultural changes are happening in Southern Italy (Iacono 2019: 161-168). The continuity of contacts between Italy and Mainland Greece is however undeniable. Aegean types continue to be found, especially in Apulia, albeit in smaller quantities (Iaconno 2019: 169-170). The maintained importance of the 'Urnfield' bronzes (Blake 2008: 6) and persisting HBW presence in Greece is further indication that the link is not severed.

At this point, it is also necessary to mention another region of intensified interactions during the Palatial period: Sardinia. However, this portion of the relations between East and West has been so far left aside because there is increasing evidence to suggest that trade with Sardinia may not be related to what is happening between Southern Italy and Mainland Greece (Ridgway 2006: 304-305). Indeed, contacts between Sardinia and the Aegean seem to precede the LH IIIC period. Moreover, while Southern Italy seems to display affinities with the Peloponnese, contacts in Sardinia seems to have involved different actors. Pottery found at Kommos, in Crete, and at Pyla-*Kokkinokremos* and Maa-*Palaeokastro*, in Cyprus have been identified as Sardinian Nuragic vessels, and subsequent analysis proved that they were not produced locally, but imported (for Kommos, see Watrous *et al.* 1998, for Pyla-*Kokkynokremos* and Maa-*Palaeokastro,* see Karageorghis 2011, Fragnoli and Levi 2011). This Sardinian presence in the Aegean and Cyprus is shown by the presence of by the presence of Aegean transport stirrup jars and Cypriot pithoi at Antigori (Jones and Day 1987). It has been suggested that this particular phenomenon may have been related to the metal trade, linking two islands central to the Mediterranean copper trade, Cyprus and Sardinia, via Crete and the harbour of Kommos (Watrous *et al.* 1998: 339-340).

3.4.2.3 Comments on the modes of interaction.

Having explored above the mechanisms often used to explain trade in palatial and

post-palatial Greece, in particular in relation to its Eastern focus, it would be appropriate to do the same for the Italo-Mycenaean relations. There is, however, a lack of research in that regard on the Mycenaean side of the connection, and while efforts have been made to better understand the relation from an Aegean point of view (e.g. Borgna and Cassola-Guida 2005, Eder and Jung 2005, Ridgway 2006, Jung and Mehofer 2013), much research was focused on the necessary, but perhaps less interpretative task of understanding the chronology of the phenomenon (e.g. Alberti and Bettelli 2005, Jung 2005, 2006, 2007). The HBW phenomenon is still very superficially understood, with recent research mostly aiming at questioning its origins and dividing it further into new typological subgroups (e.g. Lis 2009, 2018).

On the other side of the connection, however, the last decade has seen numerous studies which engaged not only with the temporality and materiality of the Italo-Mycenaean connection, but also with its more social and political aspects, discussing modes of interaction (Iacono 2015, 2016, 2017, 2019, see also Eder and Jung 2005: 491-493), mobility of technological practices (Jones *et al.* 2014, Borgna and Levi 2015), and the local effects of international relations (Iacono 2015, 2016, 2019, Semerari 2017). These offer insight into the mechanisms through which Mycenaeans engage with their western partners.

What transpires most clearly from these publications is the apparent diversity of interactions, best represented by the presence in Italy of both imported and locally produced Aegean pottery. It seems to imply that, among the Aegean seafarers, some may have been permanently or temporarily based on Italian land (Iacono 2019: 202). Moreover, the technological transfer implied by some Italo-Mycenaean so-called 'hybrid' wares (Dolii and Grey Ware, for instance) is simply too intricate and complex to be the result of limited, short-term contacts (Borgna and Levi 2015); and instead must have been the result of a long-term presence of Mycenaeans potters in Italy, and perhaps of their integration into Italian communities (Iacono 2019: 202-203).

What is also clear is that relations, with a local Mycenaean population or overseas representatives, seems to have relied heavily on reciprocity and hospitality (Eder and Jung 2005: 491-493). Feasting, for instance, was central at Roca (Iacono 2015: 272-275). This model for Italo-Mycenaean interactions is particularly interesting. Reciprocal relations, as discussed above in section 3.2.1.2, focus on individual relations. These are maintained through reciprocal gift/debt relations, in this particular case probably performed in contexts of hospitality and feasting. The model thus encourages *small*, but *continuous* relations, and *initiative* from individuals within the Mycenaean polities. palaces, in this particular context and for the period in which they are

relevant, and whichever elites replace them during the Post-Palatial period, do not need to be involved directly, as they will profit from these individual enterprises by their position on major trade nodes anyway (see above, section 3.2.1.3).

These numerous, individually led relations seem to have had important social impacts (Iacono 2015: 275). Indeed, Iacono (2016: 130-132) argued that they led to increased social inequality, giving certain individuals the capabilities to themselves take the lead for trade ventures into Greece. This may be materially reflected in the appearance of Italian or Italian-style pottery east of Italy, throughout the Mediterranean in the last stages of the Aegean Bronze Age. However, as mentioned above, this part of the portrait is still misunderstood, and the context in which both groups are moving across the Ionian and Adriatic Seas may differ greatly. This thesis, hopefully, will contribute to shed light on the situation.

3.5 Concluding remarks.

This chapter had the ambitious objective of giving an account of the end of the Bronze Age in Greece, both in terms of its socio-political organisation, and its relations with its Mediterranean neighbours. Addressing the Palatial period, the collapse, and the Post-Palatial period, it covers a wide range of subjects, and it would be appropriate to summarise some of its most important elements which were discussed.

- Regarding the nature of the palaces, it has been demonstrated that the Mycenaean economy is multi-levelled and encompasses aspects of *redistributive* economy and activities in the which palaces had little or no role.
- It seems, however, that behind these limited redistributive attributes, *reciprocity*, especially enacted through conspicuous acts of hospitality and feasting, was also very much central to the socio-political life of the Mycenaean polities. It also seems to have played a role in the unfolding of trade relations between the Aegean and Italy.
- Moreover, while the palatial authorities were certainly involved in economic and social control, these were probably subordinate to the true foundation of the palaces, which was territorial control over important trade nodes
- Trade, during the ‘Full Palatial’ period, reflects this reality. Indeed, it is unlikely that the palaces had a monopolising control over it. As such, while well positioned to be involved, as it seems to have been the case for metal trade with the East, ‘non-palatial’ individuals were probably also implicated as well. What was truly important for the

palaces was that their position allowed them to *profit* from whatever form of trading was taking place, simply by taking full advantage of their *location* on specific nodes of the trade network.

This portrait changed after the collapse, which brought the destruction of the palaces and the demise of their administrative functions, however deep they reached. With the old system now defunct, new elites took over, and new regions rose to pre-eminence while others became significantly less important.

- While these new elites exploit symbols of power from the old palatial system, they also display new ones that are definite novelties for the Post-Palatial period. This new symbolic seems to focus on a new 'warrior' ideal, perhaps mirroring a renewed importance in martial capabilities for the Post-Palatial elites. This new warrior elite arise with a new type of weaponry belonging to new '*koine* metallurgica' becoming increasingly popular from LH IIIB2 onward, most likely arriving through contacts with the Central Mediterranean regions: the 'Urnfield' bronzes.
- Fittingly, there seems to be a new focus on trade with Italy for this period, following a marked decrease in eastward relations. Indeed, while this 'Italian connection' has its origin much earlier, in LH I, and in fact peaks in terms of *intensity* of contacts at the end of the Palatial period in LH IIIB1-B2, it seem to reach a heighten *significance*, at least on the Mycenaean side, during the Post-Palatial period. Relations with Southern Italy, in particular, appear crucial.

In this new reality for the Post-Palatial Mycenaean polities, in which contacts with Italy are central, but still somehow poorly understood in terms of their manifestation in Greece, Achaea appears pivotal. In particular, Teichos Dymaion, the focus of the present research, appears to have held a privileged position regarding trade with Southern Italy. The next chapter will thus conclude this historical *mise-en-place,* by focusing on Achaea and Teichos Dymaion.

Chapter 4. *Looking West: comments on Mycenaean Achaea and Teichos Dymaion.*

4.1 Introduction

With this research's focus on the local scale, it is necessary to restrict the focus of this historical background and discuss more closely the site and region that are relevant. As such, this chapter discusses the Mycenaean region of Achaea, in which is situated the site of Teichos Dymaion, the focus of this thesis. While moving on from the purposely generic discussion of the previous chapter, it however builds on it, and the general model presented or overall interpretations that were made remain valid. They are however looked at from the perspective of Achaea, and thus adapted to fit its regional idiosyncrasies.

Following a geographical introduction to Achaea, there follows an account of archaeological evidence for its changing role and importance from the Palatial to the Post-Palatial periods. The chapter then concludes with a presentation of existing evidence for the coastal citadel of Teichos Dymaion.

4.2 Late Helladic Achaea: the Palatial and Post-Palatial periods.

Achaea is located in the north-western Peloponnese (figure 4.1). It is dominated, topographically, by three mountain ranges: Chelmos, Panachaicon, and Erymanthos. While these mountains can make land access to the region more complex, Achaea has ample access to seaways, with the gulfs of Patras and Corinth to the North, and both the Ionian and Adriatic seas to the west (Papadopoulos 1979: 21-23).

The region is often divided by scholars into multiple subunits (Papadopoulos 1979, van den Berg 2018: 183). The present thesis uses the divisions presented in the recent work of van der Berg (2018: 183-184) as its basis (Figure 4.2), which develops those suggested in Papadopoulos' seminal book on Mycenaean Achaea (Papadopoulos 1979). Only three, however, are relevant to the present project. From East to West, they are:

1) Eastern Achaea, bordered by Corinthia to the East, the Panachaicon Massif to the West, and the Chelmos mountains to the South.

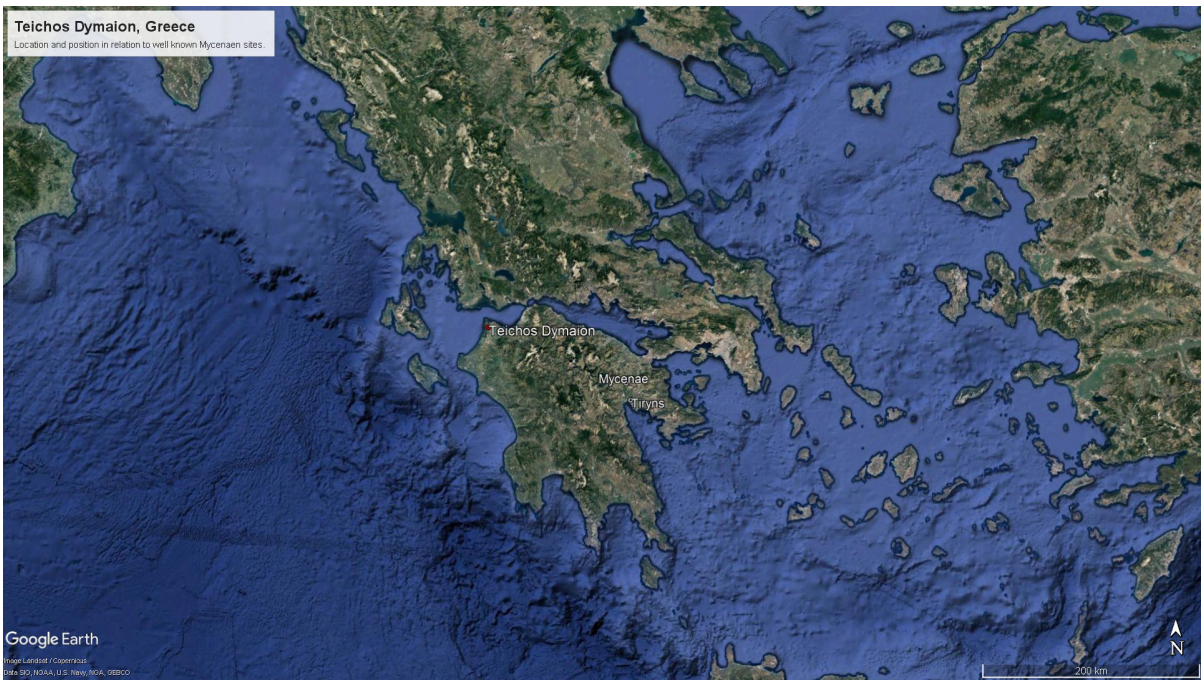


Figure 4.1 Teichos Dymaion, Greece. Geographical location.

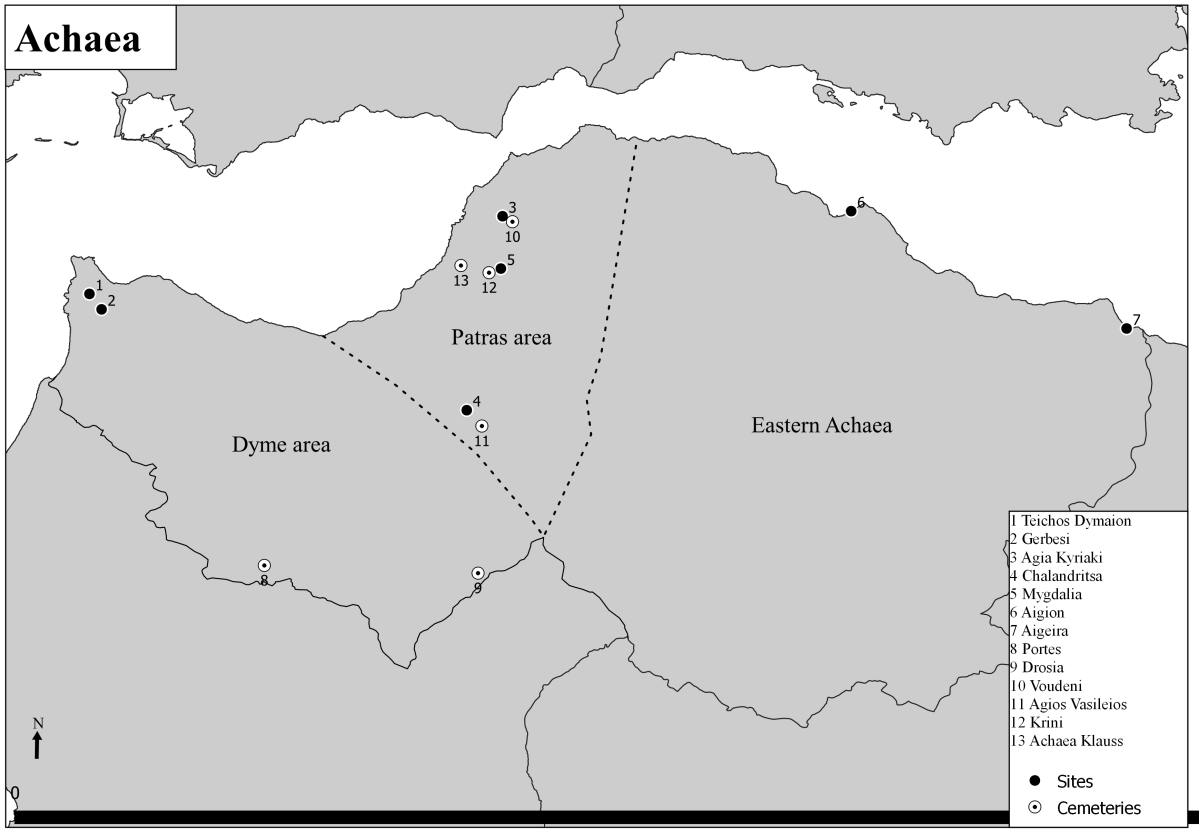


Figure 4.2 Achaea. Regions and sites mentionned in the text

2) The Patras region, between the Peiros river to the west and the Panachaicon Massif to the East.
3) The Dyme region, with the Araxos promontory and the entrance to the Gulf of Patras at its north-western point, the Peiros river to the East, the Erymanthos Massif to the South-East, and the region of Elis at its southern border.

These divisions are necessary, not only because of the area covered by the boundaries of modern Achaea, but also because there has been doubt concerning the cultural unity of the region during the Late Bronze Age (Papadopoulos 1979). Indeed, it has been suggested (Moschos 2009: 345-346) that eastern Achaea might have more to do with the neighbouring region of Corinthia than with western Achaea (i.e. the Patras and Dyme areas together). Papadopoulos (1995) eventually revised his position, as there are still significant similarities between western and eastern Achaea, notable in pottery style (see chapter 5). This is especially true for the later LH IIIC period, during which a strong Western Mainland *Koine* is observable in the pottery from the region (Mountjoy 1999: 54-55), although it is important to note that there seems to be an overall confusion regarding reference to *koinai* in the literature on Western Greek pottery of the Late Bronze Age and Early Iron Age (van den Berg 2018: 118). The picture is clear enough, however, to show that, while there might have been political divisions between the West and the East in Achaea, there were not, culturally, isolated from each other. They most likely shared a series of traits and traditions, and their material culture is best understood if looked at jointly, especially in the later post-palatial phases.

4.2.1 Achaea during the Palatial period.

The extent of what is known about Achaea is, as always for archaeology, limited by the number of excavated sites in the region, and the existence of related publications. As things stand, there are marked differences between the amount of work carried out in the region, compared to the heavily researched Argolid, for instance. Moreover, while numerous sites have been identified, the archaeological landscape is dominated by tombs (Moschos 2007: 14, Giannopoulos 2008: 17, Rizio 2010: 11). Few actual settlements have been found or excavated, and of those, many still await publication (van den Berg 2018: 186). From the data available, however, it seems clear that Achaea developed a cohesive identity from the very onset of the Mycenaean period, and that by the LH IIIA period, it already displayed a strong western character (Moschos 2009).

Although the region seems to have peaked after the collapse, and it was previously believed that settlements prior to this event were scarce (Mountjoy 1999: 402), there is nevertheless evidence

that already during the Palatial period, the region was widely inhabited (Papadopoulos 1979: 183). There is indeed an important number of sites and cemeteries in the region that includes material indicative of an occupation during the Palatial Period, mostly located to the west of the region (figure 4.2).

The Dyme area includes most notably Teichos Dymaion (Gazis 2017) and Gerbesi, as well as many cemeteries, with Portes (Moschos 2000) and Drosia being the most impressive examples (van den Berg 2018: 187). Some tombs are clearly of higher status than other (Moschos 2009: 350-351), hinting at a social hierarchy similar to what was observed for other regions such as the Argolid or Messenia.

The Patras region has yielded even more evidence for palatial occupation, including Agia Kyriaki and its associated cemetery, Voudeni (Kolonas 1998, 2008, Moschos 2007); Chalandritsa (Soura 2017) and its cemetery, Agios Vasileios (Aktypi 2017); and Mygdalia (Papazoglou-Manioudaki and Paschalidis 2017), although the occupation sequence for the Palatial period is still unclear. Two additional cemeteries, Krini (Papadopoulos 1979: 278, Papazoglou-Manioudaki 1994) and Achaea Klauss (Paschalidis and McGeorge 2009) are also worth mentioning.

On the contrary, the evidence for significant occupation during the Palatial period in eastern Achaea is much scarcer. While the settlement and cemetery at Aigion (Papadopoulos 1976) are noteworty, the other major site for the region, Aigeira, has only yielded material dating to the LH I-II and the Post-Palatial periods (Deger-Jalkotzy 2003), so far leaving a gap for the Palatial period in between (van den Berg 2018: 187).

In addition to the number of sites hinting at the already vibrant character of Achaea in the Palatial period in relation to its population and occupation of the territory, there are also elements indicating the existence of a developed social hierarchy. The most conspicuous example is certainly the construction of the cyclopean walls at Teichos Dymaion in the LH IIIB period (Gazis 2017: 468), suggesting the presence in Achaea of some form of ruling elites capable of gathering the necessary resources and manpower to undertake such projects. To this, we might add all the large tholoi and chamber tombs scattered in the many cemeteries of Achaea.

There is also an indication of well-established trade networks for this period. Indeed, material from the eastern Mediterranean has been identified in the Patras area (van den Berg 2018: 196-197), and a number of Argive and Cretan vessels have been found in a number of tombs for the LH IIIB period (Moschos 2009a: 350). This seems to be only true, however, for western areas, as no such imports were found in eastern Achaea. In her thesis, van den Berg (2018:

198) suggests this might be because the goods arrived from the Cretan network, by sea, thus effectively bypassing eastern Achaea. This makes much sense, and would also explain, if only partly, the other imbalances between the West and the East of the region during the Palatial period.

4.2.1.1 Achaea during the Palatial period: comments.

These numerous sites with Palatial occupation, their large scale construction projects reflecting coordinated actions and some form of commanding authority, and also developed trade networks, prompt questions regarding the shape and form of Achaean authority during the Palatial period. It would be tempting to simply apply the general model discussed in chapter 3 and assume the presence of a *wanax* in Achaea, at least for its western parts, but there are no material indications that such position, and the associated complex administration, existed in the region (Arena 2015: 14). This position, however, is mostly supported by an absence of evidence. It would be appropriate at this point to briefly review the issue before formulating any new positions or interpretations.

At the heart of the question is a simple, important fact: no palace has so far been identified in Achaea, and as such, no seat of power to host a *wanax*-like figure, and everything else associated with the palatial system described in Chapter 3. While Teichos Dymaion had previously been suggested for the role due to its fortified, cyclopean walls (Bintliff 1977, Papadopulos 1979), there are in fact no palatial structures within the citadel (Gazis 2017). Patras is now often cited as a good candidate (Eder 2007: 98, 2009: 33, Moschos 2007: 9), but as the most likely location for such an important site would be under the castle of Patras, the suggestion is but speculation.

Even though the current ambiguous situation might simply be a result of archaeological invisibility, as the possibility of a still unknown palace under the castle of Patras suggests, it might also be that the Achaean region cannot be understood with the same paradigm as the major palatial centres. In other words, it is entirely possible that Achaea is not a ‘palatial polity’.

The issue, raised and discussed by Arena (2015), is grounded in the ongoing debate over whether the so-called ‘peripheries’ of the Mycenaean world were subjugated to a main palatial centre, or if they existed, with perhaps a less complex social structure, outside of the authority of the Mycenaean ‘core’ (Arena 2015: 1-2). What defines the ‘core’ here is not a specific geographical region, although the Argolid is often referred as such, but rather, it consists of all major centres which have significant evidence of palatial administration (i.e. a palace and Linear B tablets). In opposition, the ‘peripheries’ are those territories located outside the core which display

Mycenaean traits, possibly evidence of a certain 'elite' class, but bear no evidence for a palace and its associated system (Arena 2015: 2-4). Achaea, based on what has been said above, falls into this second category.

While missing the physical structures indicating the presence of *wanaktes*, this situation does not necessarily mean Achaea was dependent on any of the major palatial centres (Arena 2015: 8). Indeed, as demonstrated above, there are many indications for the presence of an elite class in the region, and it is most likely that some (or few) were the actual ruling entities of Achaea (Arena 2015: 22).

Arena further suggests that, instead of relying on a relation of subjugation to explain the different administrative complexity, the situation might be characterised by competition between elites: Achaea and its elites were at a disadvantage *vis-à-vis* the major centres, suggesting that they were simply the 'loser' of the pre-palatial competition for power and control(Arena 2015: 31-34). They were nonetheless Mycenaean; simply, they did not operate at the same administrative level because no *wanax* had taken full control of the region (Arena 2015: 35-36). The fact that the region seems to have flourished considerably following the collapse of the palace seems to be further evidence that they were not dependent, but simply less preeminent than the major centres in the Palatial period (Arena 2015: 30-31). Going back to the hillfort model suggested by Sherratt (2001), this proposal makes sense. Indeed, shifting trade networks that might have disturbed the major palatial centres dominating in LH IIIB might have in turn been profitable for other regions, such as Achaea.

The suggestion that there is no *wanax* in Achaea is thus, in light of the current state of knowledge for the region, acceptable. The situation is however not the result of a subjugation of the region to any of the other major palatial centres, but rather, following Arena's arguments and the implications from Sherratt's model, a sign that Achaea simply could not compete at the same level as those centres did. It may be that the latters acted as 'bottlenecks' (Arena 2015: 31, for definition of 'bottleneck', see Earle *et al.* 2015), isolating Achaea and constricting the opportunities for its elites to rise to their level of administrative and hierarchical complexity. It is important to stress, however, that further research may make this interpretation obsolete. What is certain is that following the collapse, something significant changed, and impressive dynamism and prosperity is clear in Achaea. The following section explores this in a presentation of Post-Palatial period.

4.2.2 Post-Palatial Achaea

By the LH IIIC period, Achaeans' cultural and social traits were rapidly changing, acquiring an even more local character and in turn establishing the region at the core of this emerging Western Mycenaean *koine* (Mountjoy 1999: 404, Moschos 2002, 2009: 346). It is not, however, a sign that it did not suffer from the same crisis and collapse affecting the major palatial centres.

Indeed, to the west, Teichos Dymaion was destroyed, likely by fire (Gazis 2007), as were Agia Kyriaki and Pagona of the Patras region (Moschos 2009: 347). Pottery found in the destruction layers at Pagona suggest the destruction took place in the transitional LH IIIB2-IIIC period, a date corroborated by the pottery at Teichos Dymaion (see chapter 5 of the present thesis). This particular episode was however not recorded in every site in Achaea. Indeed, Chalandritsa did not suffer any destruction at this period (Moschos 2002: 17-18), and, while the chronology is far more uncertain, that also seems to be the case for Mygdalia (Giannopoulos 2008: 46-48). The crisis also affected eastern Achaea, with destruction recorded at Aigion (Giannopoulos 2008: 80).

Destructions aside, the consequences of the collapse were not as heavy for Achaea as they were for the major palatial centres (Moschos 2002: 32, Eder 2006: 557), and already during the very same period, there were increasing signs of dynamism and growth for the region. No drop of population is recorded (Moschos 2009: 348), and except for Aigion (Giannopoulos 2008: 80), all sites that suffered destruction were almost immediately reoccupied (van den Berg 2018: 188). In addition, new sites emerged, most notably Aigeira, at the easternmost point of Achaea, which was reoccupied in LH IIIC (Papadopoulos 2017: 412). This settlement then rises in significance, often being compared to Teichos Dymaion because of its LH IIIC Middle fortification and its usable harbour, making the site one of the important centres on the Gulf of Corinth.

The conditions were so favourable that it is suggested that Achaea in fact received refugees from other Mycenaean polities. However, this interpretation relies on the presence of pottery from other regions, especially from the Argolid (Mastrokostas 1965: 135, Papadopoulos 1979: pl. 95g, Moschos 2009: 348), and as such, must be considered carefully, as the vessels could equally be the result of exchange. It is nonetheless true that the conditions were invigorating, as indicated by an emergence of a new, or at least more visible, class of elites, and reinforced by thriving contacts regarding intranational and international trade.

4.2.2.1 Emerging elites: new and old symbols of power.

As argued in Chapter 3, the Post-Palatial period saw the emergence of a new class of elite, filling the gap left by the demise of the palatial system. While there might have been no gap to fill in Achaea, there is still evidence hinting at the emergence of a new class of elite, or at the very least the transformation and reinforcement of previously established one. Whichever it was, it was through two contrasting sets of conspicuous actions.

First, there was from these new Achaean elites a conscious and voluntary continuation of selected palatial practices and symbols borrowed, most likely, from the Argive model (Moschos 2009: 349). It is argued by Moschos (2009: 349, footnote 22) that this form of emulation, short-lived as it would rapidly be replaced by new symbols of power, must not be understood as an attempt to establish a new palatial administration, but rather as a conservative attempt at representing power through means that appealed to social memory of what authority should look like.

The second set of characteristics, which would eventually supplant the first in importance and visibility, is not borrowed, but rather a true Post-Palatial novelty. Indeed, a new warrior ideology, mostly visible through the presence of so-called warrior tombs, emerges and becomes central to the expression of power throughout the LH IIIC period. Achaea, with its numerous warrior burials (Deger-Jalkotzy 2006), seems to have been central to the phenomenon.

From the contents recorded from the burials, it is clear that, alongside the warrior ideology, there seems to have also been a particular interest in the acquisition and demonstration of exotic items. Three regions seem to have been particularly favoured: Crete, Cyprus, and most importantly, Italy. While the latter, and to a certain extent the other two as well, have been discussed above, it would be appropriate to review some of the examples, specifically from the warrior tombs.

4.2.1.2 Warrior tombs in Achaea.

Cemeteries of western Achaea are particularly rich in warrior burirals (Papazoglou-Manioudaki 1994, Papadopoulos 1999, Kolonas 2000, 2001, Deger-Jalkotzy 2006, Eder 2006), making the region most remarkable for the Post-Palatial period. These graves are characterised by warrior-like paraphernalia such as daggers and spearheads, the latter often of Italian typology (Moschos 2009: 350), and perhaps more importantly, Naue II swords, indicating the increasing place taken by the so-called 'Urnfield bronzes' and the '*koine* metallurgica' for ostentatious displays of status in this period.

Items relating to international trade are however not limited to weaponry. Indeed, Italian shapes of razors (Moschos 2009: 350, Eder and Jung 2005: 490, Eder 2006: 558) and multiple other types of ornaments attributed to similar origins were also identified within these burials (Eder and Jung 2005: 490). This implies strong relations, or at least a will from the buried or burying individuals to imply strong relations, with the central Mediterranean and Italy.

However, just as these tombs did not contain exclusively items evoking warrior attributes, they also contain more diversity in relation to trade networks. More significant is perhaps the pottery from the Argolid and Crete found in some of the tombs. For instance, there are Cretan stirrup jars found at Portes (Kolonas 2001: 261), and Argive examples in Patras' Germanou street burial (Papazoglou-Manioudaki 1993: 211-212). Cypriot relations are also a possibility, with one potential vessel identified at Portes (Kolonas 2001: 261).

These relations, especially on the western, Italian front, are reflected in settlement finds, most notably at Teichos Dymaion, where bronzes of Italian or 'Urnfield' typology were identified (Papadopoulos and Kontorli-Papadopoulou 2000, Eder and Jung 2005). The site also includes a significant number of HBW and GW sherds, which are central to this thesis.

4.2.2.3 A profitable situation: Achaean international connections following the Collapse.

This focus on imported luxury items observed in funerary practices, corroborated by finds from settlements, denotes two important elements concerning Achaea. First is the necessity for the Achaean elite to display their status, perhaps because it was newly acquired, through ostentatious demonstration of riches, probably in an effort to consolidate their position. The second element is perhaps more interesting for our understanding of the new-found role of Achaea on an international level. Indeed, following the collapse, it seems Achaea found a central role in the trade networks between East and West. This appears to have been manifested as a two-steps process.

The first step involved a situation, during and immediately after the crisis leading to the collapse, where Achaea was involved in a network most likely led by Cretans, following familiar trade routes along the Peloponnese coast, but establishing new connections (Moschos 2009: 373-374). It is unlikely that Achaeans, at this point, were actively involved, in the sense that they were not the leading force for this trade relation. However, they certainly facilitated the continuation of trade, and as such, profited from it, through their participation and added prestige, just as other major centres did during the Palatial period (see Sherratt 2001 on the control of transport nodes).

Following this first stage, there was a change of focus for Achaea, as the region seems to fully invest itself in a fructuous relation with Italy. Indeed, Achaeans were likely the best qualified, and geographically situated, to create strong relations across the Ionian and Adriatic seas (Papadopoulos 1979: 182). As seen above in section 4.2.2.1, and in chapter 3, the archaeological records from Achaea and from Southern Italy do support such a connection. At this point, however, it was most likely that Achaeans were playing a central role, perhaps involved in the so-called *'koine* metallurgica' (Eder and Jung 2005: 487, Deger-Jalkotzy 2006: 169, Moschos 2009: 377). This role is better understood when looking at the situation in Southern Italy itself, more particularly in Apulia. The relations between Achaea and Italy seems to have been at its strongest in Apulia, more specifically at the sites of Rochavecchia and Punta Meliso (Gazis 2017: 465). What this region also has, is a particular situation which interestingly mirrors that of Achaea, being the nearest region of the peninsula for the sea crossing. Moreover, it has been suggested that sites in Apulia were similarly involved in the *'koine* metallurgica', acting as a trade node toward which metal coming from (or through) Northern Italy was directed, potentially to be used in the making of the 'Urnfield' bronzes (Jung *et al.* 2011). While it remains uncertain whether the making of these increasingly important types of metal objects was taking place in Southern Italy, the increased contact with Northern Italy is nonetheless real (Iacono 2016: 133), just as are the ones with Achaea. This symbiotic relation between the two regions, perhaps reinforced through events of reciprocal hospitality and feasting as described in chapter 3, seems to strengthen the portrait of Achaea as an increasingly relevant actor in international trade. Evidence for feasting activities in Teichos Dymaion will be further discussed in Chapters 8 and 9.

To summarise, for both stages described above, the privileged role of Achaea in the Post-Palatial trade networks can be related to two pre-existing conditions which favoured its emergence as a major player in long-distance connections and maritime transportation. The first is more obvious and relates to the location of the region as a natural point of contact between Greece and the central Mediterranean region, including Italy. The second condition relates more intrinsically to Achaea's socio-political environment, and to the necessity for its elites to display their position perhaps newly acquired, through ostentatious demonstration of riches and exotica, probably as an effort of consolidation (Moschos 2009: 383). However, as Moschos (2009: 383) rightly points out, it would be erroneous to give all the credit for the increasing importance of trade relations solely to the Achaean elites. It would not explain the depth of interaction, especially concerning craft production. Still, their role must not be downplayed, and is perhaps best understood through one of their most conspicuous displays of authority: Teichos Dymaion.

Figure 4.3 Teichos Dyamion in its immediate environement.

4.3 Teichos Dymaion: a citadel on the Ionian sea.

Teichos Dymaion is located in the Dyme area of western Achaea (figure 4.3). It is built on a promontory, Cape Araxos, on the southern tip of the Mavra Vouni hills (Papadopoulos 1979: 24, 2017: 420-421). The ideal character of the location of Teichos Dymaion is determined by its strategic position between the Pappas lagoon to the North, and the Prokopos lagoon to the South-West, giving the site an edge for the exploitation of the surrounding ample marine and land resources, but also for trade and exchange with the Central Mediterranean region, being the first available landfall for any vessel coming from Southern Italy (Gazis 2017: 463). However, to fully grasp the advantages the lagoons offered Teichos Dymaion, one has to consider the condition of its the surrounding landscape in the past. Indeed, geological and geomorphological data suggest that the sea was in fact much closer to the site during the Bronze Age (Avramidis *et al.* 2010, Kontopoulos 1998: 247-258,). As such, the Pappas lagoon would have effectively been an enclosed, protected bay on the Gulf of Patras, reaching almost up to Teichos Dymaiuon itself, and offering shallow but safe anchorage for seafaring vessels. The same was probably true for the Prokopos lagoon, but would not have been as well-protected from the sea, and probably too rocky for anchorage. It nevertheless meant that Teichos Dymaion's South side had direct passage to the Ionian sea.

Turning to the site itself, it is, despite a long occupation in both prehistory and history, most

remarkable for its Bronze Age cyclopean walls. At 60m above sea level, it is an impressive construction. The citadel (Figure 4.4) is walled on three sides (Papadopoulos 1979: 24), its South-western side toward Elis and the Ionian Sea being naturally protected by a cliff (Papadopoulos 2017: 421). While each side had its gate, it seems the South-eastern one was most likely the main entrance to the site. The wall itself (Figure 4.5) amounts to ca.190m in length, is ca.5m thick, and 8.4m at its maximum height (Papdopoulos 1979: 24, Gazis 2010). It resembles circuit walls in Boeotia and the Argolid, although much more akin to those at Midea and Gla than Tiryns and Mycenae, the latter two being more monumental (Gazis 2010). Stylistically, it is hard to categorise, maybe because its construction was simply affected by the type of limestone used (Papadopoulos 2017: 421).

Figure 4.4 Teichos Dyamion: the citadel. (photo credit Michalis Gazis and the 6th Ephorate of Antiquitites.)

Figure 4.5 Cyclopean walls at Teichos Dyamion

4.3.1 Occupation at Teichos Dymaion

Excavations at Teichos Dymaion are divided into two series of archaeological campaigns. The first (figure 4.6, area A) was led by the Ephor Mastrokostas from 1962 to 1965 (Mastrokostas 1962: 127-133, 1963: 93-98, 1964: 60-67, 1965: 128-136, 1966: 156-165, 1968: 136-138). While a few minor interventions happened in between, the next major series of campaigns (figure 4.6 area B), by the 6th Ephorate of Prehistoric and Classical Antiquities would take place decades later starting in 1998, but especially from 2001 until 2007 (Kolonas and Gazis 1999, Kolonas 2006, Gazis 2010, 2017). From the very first campaigns, it was already clear that Teichos Dymaion had been occupied continuously over a long period of time. However, while there is evidence for a Classical, Hellenistic, Byzantine, medieval, Venetian, Ottoman, and even a second World War occupation (Papadopoulos 1979: 24), this section focuses on the prehistoric and protohistoric levels at the site.

The site appears to have been first inhabited during the Neolithic, in the mid 4th millennium (Gazis 2010: 241) and subsequently occupied during the Early Helladic period, with built remains of the EH II and EH III periods (Gazis 2017: 466-468). Interestingly, pottery bearing incised or impressed triangles has been identified (figure 4.7). These were quickly realized to relate to the 'Cetina culture', a tradition most often associated with Dalmatia and the Adriatic coasts. It demonstrates that, in this early stage of the Bronze Age, the site was already involved to some degree in an oversea connection with the Central Mediterranean region. Although it

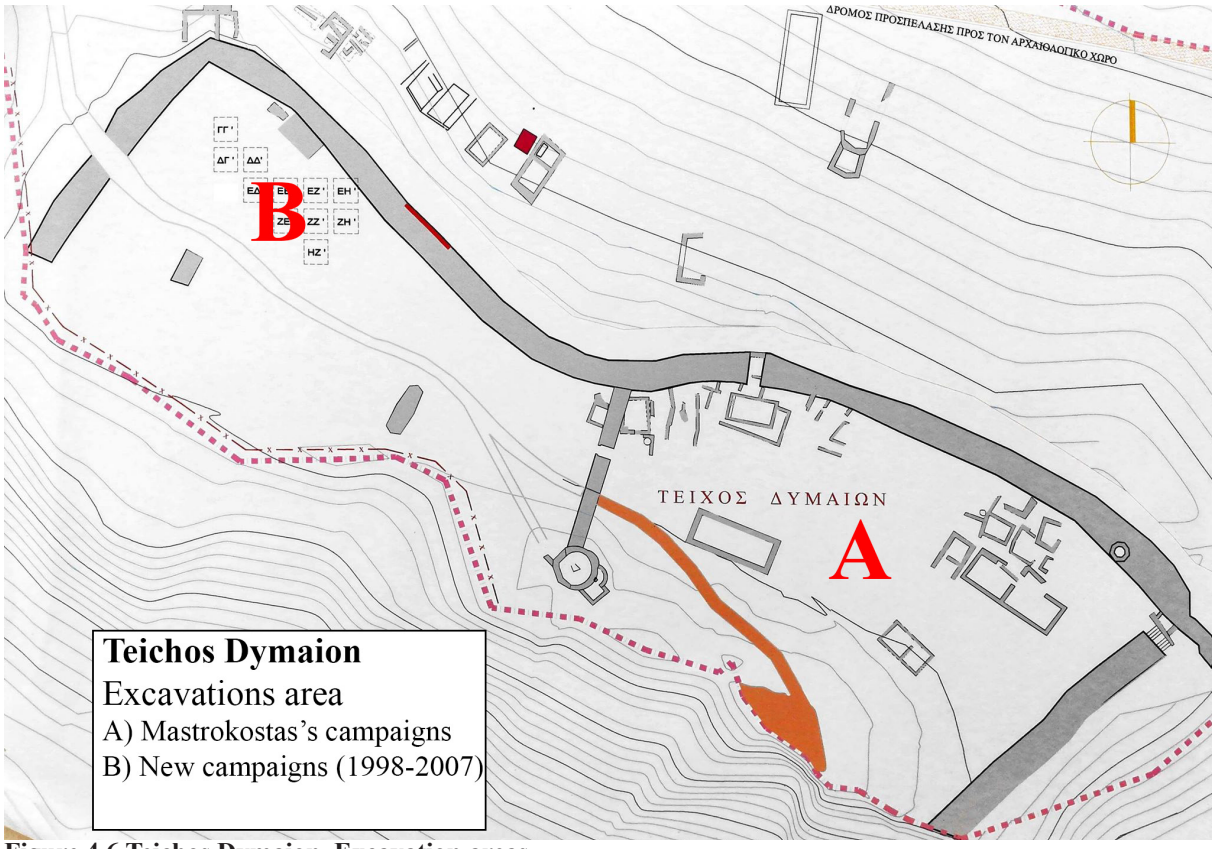


Figure 4.6 Teichos Dymaion. Excavation areas.

has not been as thoroughly studied, it is nonetheless confirmed that this intensive occupation continues into the Middle Helladic period, attested by the numerous sherds from that period identified within the walls of the Citadel, including matt-painted and grey Minyan pottery (Gazis 2010: 241-242).

The most important and visible occupation of the citadel is however its extensive Late Helladic settlement. Its most noticeable feature, the cyclopean walls, were erected in the LH IIIB period[13] (Gazis 2010: 252). Within the walls, multiple phases succeed each other in the LH IIIB and IIIC periods, with a major episode of destruction identified most likely during the transitional LH IIIB2-IIIC period. The Late Helladic occupation ends with a second destruction in LH IIIC Late (Papadopoulos 2017: 421). Overall, and despise the monumentality of the citadel itself, the site does not seem to have been the seat of a ruling entity for western Achaea (Gazis 2010). Indeed, it contains a range of buildings, within and outside the confine of the walls, which give Teichos Dymaion a 'residential' feel (Gazis 2010). None of the buildings excavated so far can be associated with palatial functions (i.e. a *Megaron*, large scale storage, large palace-like building. Gazis 2010, 2017).

There are other finds which help in identifying the functions of such an imposing construction.

13 Giannopoulos (2008) suggest they are Post-Palatial emulation of Argive constructions, but the Palatial, LH IIIB date is more generally accepted in the literature (see Papadopoulos 1979, Hope Simpson and Hagel 2006)

Some relate to domestic functions (coarse pottery for storage and transport purpose, albeit in quantities too small to constitute a palatial stockpile. See Chapter 5), while others are more connected to conspicuous consumption (fine, Mycenaean tableware). Others, interestingly, seem to relate to the Italo-Mycenaean connection, including the large assemblage of HBW, and a smaller set of GW found in the Late Helladic levels, which constitute the main focus of this project. Most notable is also the set of 'Urnfield' bronzes published by Mastrokostas (1965) and discussed by many scholars since (Papadopoulos 1998, Papadopoulos and Kontorli-Papadopoulou 2000, Eder and Jung 2005, Jung 2006, Jung 2009, Jung and Mehofge 2013, Gazis 2017). This assemblage of metal artefacts (figure 4.8) includes a bronze Pertosa type dagger, a bronze violin-bow fibula, and a lead six-spoke wheel-shape artefact. Interestingly, lead-isotope analyses suggest the dagger and the fibula are made of a metal composition coinciding with the majority of bronze found in Greece, in turn indicating that metal of non-Mycenean, Italian typology was perhaps produced in the Peloponnese at the beginning of the Post-Palatial Period (Jung and Mehofer 2013: 180-182).

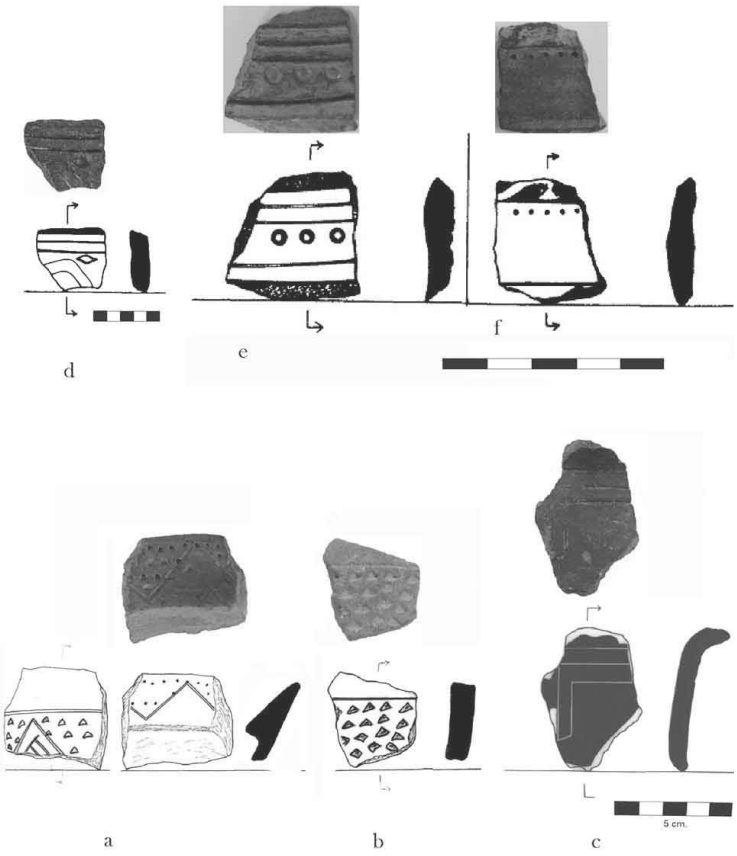


Figure 4.7 Cetina-style pottery from Teichos Dymaion (from Gazis 2017)

4.3.2 Current interpretations.

In light of the present evidence, and before the analyses planned for this thesis are to be taken into account, the most plausible interpretation for the role and functions of Teichos Dymaion was given by Gazis in a recent paper (Gazis 2017: 468-471). He suggests that the key to its interpretation lies in the cyclopean nature of its construction. Indeed, the construction of such an impressive monument on this strategic location that had, by the LH IIIB period, already been occupied for millennia is a significant investment of labour, and probably necessitated the intervention of some

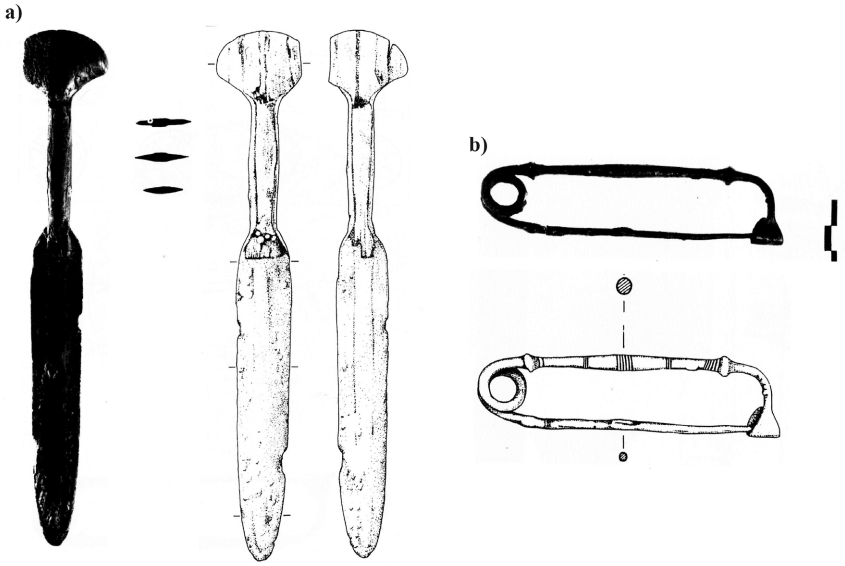


Figure 4.8 Italian-style bronzes from Teichos Dymaion. a) Pertosa dagger, b) Violin-bow fibula (from Papadopoulos and Kontorli-Papadopoulou 2000)

powerful Achaean elite(s). However, as mentioned above, there is no basis so far to suppose this elite was residing at Teichos Dymaion itself, as no monumental or central building has been identified.

As this avenue is closed as an explanation of the role of Teichos Dymaion, Gazis turns to the general socio-economic conditions of Achaea at the very end of the Palatial period and during the Post-Palatial period. This is the period, characterised by a dynamism in this region and during which Italo-Mycenaean connections reach their climax, and the Achaean elites seems to thrive under the new opportunities brought forth by the decline of the major palatial centres (Maschos 2009, Arena 2015). Trade, as suggested by the material evidence from tombs (Moschos 2009) but also from the excavations at Teichos Dymaion (Papadopoulos and Kontorli-Papadopoulou 200, Gazis 2010, Gazis 2017), seems to have been central to this dynamism.

In this particular situation, Teichos Dymaion appears central: it is a "hub of seaborne routes running along the coast of the northern and western Peloponnese, towards the Ionian and Adriatic, as well as overland routes, leading towards the Achaean overland and beyond" (Gazis 2017: 469). As such, just as Arena (2015: 31) suggested Achaea suffered from the 'bottlenecks' that were the major Palatial centres in the Palatial period, it seems that, during the Post-Palatial period and perhaps starting before, Teichos Dymaion became a 'bottleneck' of its own, strategically placed to oversee interactions between Italy, most likely through relations with Apulian partners, and the rest of Greece (Gazis 2017: 470).

Thus, while the citadel is most likely not the residence of the authority figure who organised its construction, and later on its maintenance, it still relates directly to its power, and indeed control, over trade routes with the West. It was "the physical expression of the 'bottleneck'

at Teichos Dymaion" (Gazis 2017: 470), and as such, fits well with Sherratt's hillfort model discussed in the previous chapter.

This, however, while addressing the *meaning* of Teichos Dymaion, does not explain the nature of its occupation, of the people giving it purpose by engaging with the site, and indeed dwelling within it. This will be addressed and clarified, hopefully, later in this thesis, in light of the analyses of its rich deposits of pottery

4.4 Concluding remarks.

Until more settlements are excavated, published, and discussed, the interpretations brought here concerning Achaea in the Palatial and Post-Palatial period remain uncertain. However, it is believed that the general portrait, one of dynamism, renewed local autonomy, and indeed prosperity, is correct.

The question of the Achaean elites is probably the most contentious one, and the 'worst' case scenario, one where a palace would be located under the castle of Patras and therefore impossible to reach in the near future, would mean that the question is doomed to remain unanswered. However, as made clear with the case of Teichos Dyamion, there is other, parallel evidence to go forward and better understand the socio-political landscape of Achaea. Indeed, Teichos Dymaion, while lacking buildings that could act as a residence of an ostentatious elite character, is certainly a symbol suggesting the presence of a high authority figure in Achaea, one capable of gathering enough resources and commandeering enough labour to build an impressive cyclopean citadel, and use it, most likely, to assert its control or influence over an increasingly important trade route with Italy and the Central Mediterranean region.

The following chapters will turn to the ceramic analyses this project is based upon, and by doing so, will attempt to shed new light on Mycenaean Achaea, using HBW to discuss how these manifold interactions characterising the region at the end of the Bronze Age were materialised at Teichos Dymaion.

Chapter 5. *Pottery and chronology at Teichos Dymaion*

5.1 Introduction

As previously mentioned, this thesis, while being grounded materially within pottery and geographically at Teichos Dymaion, is not an extensive study of the whole Late Helladic pottery corpus from this site. While there is no doubt that this would be a much-needed endeavour, as our knowledge of the LH pottery from Achaea is still limited (Lakakis 1992: 137, Mountjoy 1999: 399), it would be another project altogether. Rather, this thesis is, or aims to be, a discussion on and an in-depth study of the HBW phenomenon at Teichos Dymaion. Through this discussion, it also addresses and challenges our approach, as a discipline, to pottery assemblages.

These discussions, however, have to be rooted in the material to hold meaning, and this project is still, at its core, about pottery. This chapter will thus present the LH pottery assemblage from Teichos Dymaion, with a particular emphasis put on the rich handmade portion of the assemblage. It will be divided in two main sections. In the first section, both the Mycenaean and non-Mycenaean (i.e. HBW, Grey Ware, and imports) portions of the assemblage will be presented. While this artificial, and to some extent simplistic, way of dividing the pottery will be critiqued in the following chapters, it was nonetheless selected here for purposes of clarity. Furthermore, as the material has yet to be fully studied and published, this section will follow the current state of pottery classification at Teichos Dymaion, and use excavation trenches to further subdivide the material into meaningful units. Following this, the second section will isolate and present one specific trench, ΓΓ, and explains the reasons why it became the main focus of this project.

5.1.1 Handmade Burnished Ware: Description and Classification

The choice of a classification system for the Mycenaean pottery at Teichos Dymaion was led by the necessity to clearly present the shapes and motifs present in the assemblage. As such, in the absence of an extensive and published study of this material, it was decided for the present project to refer to shapes and motifs using the names used by Mountjoy (1986, 1993, 1999), because of its wide use in publications. When needed, Furumark's motifs numbers were also used, despite their somewhat cryptic nature (see Sherratt 2011: 258-260), to further describe more abstract elements, for instance in the absence of drawing or picture.

While the use of Mountjoy' classification for the description of the Mycenaean pottery goes

without the need for much more introduction or justification, things are different for the description and classification of HBW material. Indeed, while the most common shapes share a widely accepted typology, both minor and significant variations exist between the different publications dealing with HBW, and it is important to define here which system is used in the presentation of the Teichos Dymaion assemblage.

As mentioned by Romanos (2011: 59), the main criteria used to assign pottery to the HBW category have been mostly based on the identification of specific shapes, in addition to the presence or absence of certain characteristics such as burnishing. However, this task is not simple. Multiple typologies exist, as publications have used different names for the same shapes, making any attempt to understand the actual range of shapes of the HBW corpus a complex undertaking. The recent discussion on the so-called HDP is also problematic in a purely typological approach. Certain shapes, such as the collared jar, are now believed to be unrelated to the HBW phenomenon, albeit the other criteria (i.e. handmade facture, burnished surfaces) suggesting the opposite. This must therefore also be accounted for when attributing handmade pottery to the HBW category.

This problem may be attributed to the fact that a purely typological approach is in fact inadequate to define HBW. Indeed, superficial consideration of style, or even function, are not sufficient to define and characterise pottery manufacture. It is necessary to address more intrinsic aspects such as the selection and processing of raw material and the primary and secondary forming techniques used in the practice of making the pottery. For this reason, the technological assessment of the pottery based on the macroscopic observation of the fabric and surfaces was the primary concern for the identification of the HBW material of Teichos Dymaion. The importance given to technology is not, however, to be taken as a rejection of the stylistic aspect of ceramic study. Indeed, and especially in this preliminary stage, the meaningful classification of the pottery based on a typology that allows cross-site comparisons is crucial. Similarely, this choice of focus for the present project does not represent a complete dismissal of the importance of function in identifying, describing, and indeed understanding pottery. Like style, its significance is acknowledged, and nonetheless has a role in the classification and characterisation of the HBW at Teichos Dymaion.

To achieve such classification, the typology developed by Romanos (2011: 59-102) was selected. Using the published material from Mycenae, Tiryns, Korakou, Lefkandi, Aigera, Thebes, Dimini and Khania, the typology she developed is in fact the first attempt to group together, define, and characterise the whole corpus of HBW into one comprehensive classification. It adds details

and useable criteria to Rutter's list of shapes (Rutter 1990: 41-42), while also simplifying the classification used by Kilian (2007: 9-45), which was specific to Tiryns and difficult to transpose onto other assemblages. Moreover, the fact that Romanos' scheme was built based on the material from multiple major HBW assemblages makes easier the comparison of shapes distribution and occurrence between sites.

The typology includes eight types (see table 5.1): carinated vessels (T1), cups (T2), bowls (T3), basins (T4), baskets (T5), wide-mouthed jars (T6), collared jars (T7), and utensils (T8). Multiple subtypes exist, and, when possible, are used in this study. Moreover, when the shape of the subtype is significantly different from the shape of the main type, the subtype name will be preferred. This is the case, for example, for the globular jar with a straight neck (T7A C2), a subtype of the collared jar, or for the hole-mouthed jar (T6B), a subtype of the wide-mouthed jar. However, as many are based on the number or shape of certain elements such as handles, it is not always possible to be precise to which subtype a vessel belongs. Size is also an important criterion for Romanos, and will be critical in determining the general shape of undiagnostic body sherds. Romanos' terminology was also used to describe decoration and handle types (Romanos 2011: 78-81 and figures 2.3a-c, 2.4 and 2.5 in vol. 2).

Type 1: carinated vessels Definition: includes all vessels with a carination on the body	**Type 2: cups** Definition: D (rim) <15 cm, deeper than wide or as wide as deep T2 C1: convex-sided and vertical handle T2 C2: collared
Type 3: bowls Definition: D (rim) < 20 cm, wider than deep T3 C1: rounded and no handle? (link with lids, T8 C1?) T3 C2: rounded with vertical handle T3 C3: conical T3 C4: vessel on foot (including kylix)	**Type 4: basins** Definition: D (rim) > 20 cm, wider than deep, rounded profile T4 C1: no handle? T4 C2: with handles T4 C3: with strong incurving rim
Type 5: buckets Definition: D (rim) > 15 cm, everted profile T5A: with conical profile T5B: with vertical handle on rim (also called situla) T5C with straight profile	**Type 6: wide-mouthed jars** Definition: deeper than wide or as deep as wide and incurving profile T6A: with rounded profile T6B: with shoulder and incurving rim (also called hole-mouthed)
Type 7: collared jars Definition: deeper than wide or as deep as wide with a neck T7A: simple, without handles? T7B: with vertical handle(s) from rim to shoulder T7C: with other types of handles	**Type 8: utensils** T8 C1: lid T8 C2 : stand T8 C3 : dipper/ladle T8 C4: spouted cup T8 C5: pan T8 C6: spoon

Table 5.1 Typology of HBW shapes (From Romanos 2011)

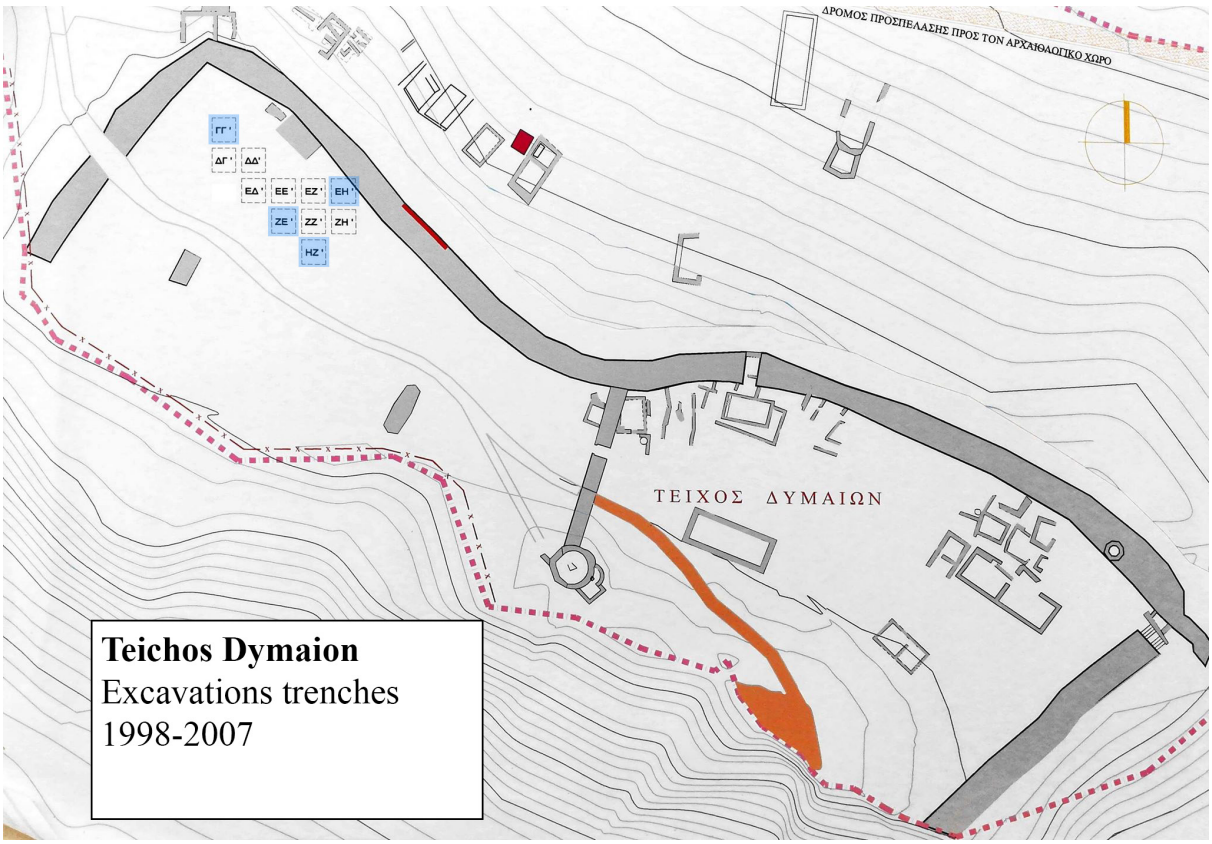


Figure 5.1 Location of trenches HZ, ZE, EH, and ΓΓ, highlighted in blue.

5.2 Pottery overview: trenches HZ, ZE, EH, and Mastrokostas's excavations.

In order to stay centered around the HBW without getting lost in the overwhelming quantity of pottery that has been unearthed, we decided to focus on trenches that were known to contain handmade material. Indeed, at the start of this project, a preliminary study carried out by Michalis Gazis had confirmed the presence of HBW in a number of trenches, and the first stage for the present study was to build upon these first funds and explore the levels containing handmade material. Following this, four trenches were selected: trenches HZ, ZE, EH, and ΓΓ (figure 5.1). Further analysis by Gazis in 2019 has led to the discovery of more HBW in trench EZ, but they could not be included in the present project, and will have to be considered in future publications.

Important observations were made during the first stage of study that have greatly influenced the methodology for the rest of the project. Indeed, it became rapidly apparent that many levels contained material belonging to different chronological periods. With sherds dating from the Early Helladic to the Early Modern period, it was unfortunately impossible to date each "stratum"; as the excavations were done in arbitrary "passes", or levels (Πασα in the excavation diaries and find bags). Indeed, some of those levels contained material from multiple chronological

horizons. However, if this was undeniable for trenches HZ, ZE, and EH, it looked like it was not necessarily true for trench ΓΓ, the later having much more chronologically homogeneous deposits. This will be discussed below in a section dedicated to this particular trench. A certain number of HBW was also identified within the material from the first excavation campaigns by Mastrokostas. As such, this rich assemblage should also have been studied, following the simple criteria we decided upon (i.e. to study contexts with HBW). The nature of this assemblage made this however impossible, at least not in the same way trenches from the more recent excavation were analysed. Indeed, the material from the old excavations is completely mixed, and making sense of this assemblage would be another project altogether. It was thus decided to simply select the few safe HBW sherds, previously identified as Early Helladic by Mastrokostas, for comparison with the material from the new excavation, leaving the rest for future studies.

It was decided, based on these observations, not to give the same depth of analysis to trenches HZ, ZE, and EH as to trench ΓΓ, but to still study those levels that were confirmed to contain HBW. The justification for this was thus more typological than chronological, and much caution was used in the identification of handmade pottery as HBW. Consequently, the HBW pottery count for these trenches is not to be taken as absolute results, but rather, as a conservative indication of the richness of the HBW assemblage. More detailed statistics will be given for trench ΓΓ below.

This section will present the material from the selected levels from the first three trenches, HZ, ZE, and EH, giving an overview of the different shapes that could be identified from the diagnostic sherds, decorative elements, and discuss, if possible, the dating of those trenches (figure 5.2, 5.3, 5.4). It will conclude with a presentation of the few HBW sherds selected from Mastrokostas' excavation campaigns (figure 5.5).

5.2.1 Chronology at Teichos Dymaion: cautionary remarks

It is appropriate, at this point, to make a few comments on the nature of the chronology and phasing that is to follow in the next sections. Indeed, while useful to the project and valid for its purposes, the chronology suggested here remains tentative. As mentioned earlier in the present chapter, the Mycenean pottery of Teichos Dymaion is not yet fully studied or understood, both from a local perspective and within a broader, regional scale. The latter approach, in particular, would certainly help securing the phases and chronology that will be suggested below, but is beyond the scope of this research. Until such study is undertaken, the phasing of the different contexts explored, while considered valid and sufficient for the necessity of the project, remain preliminary in nature.

5.2.2 Trench HZ’

5.2.2.1 Mycenaean pottery

This trench contains a notably large proportion of storage vessels, including, but not limited to, fragments of at least two pithoi. Diagnostic sherds of fine pottery indicate the presence of kylikes, multiple deep bowls, of which many were monochrome (figure 5.2a-5, a-6), and one confirmed to be of Group A style (Mountjoy 1986: 129-130, 150-151), cups, and kraters. Decorative painted motifs include running spirals (figure 5.2a-2), tricurved arcs (figure 5.2a-3), and a rosette dot (FM 27, figure 5.2a-4), which suggest a LH IIIC early date. Intriguingly, two sherds from this trench were incised; one on the base, and one on the handle (figure 5.2a-1), which can be indicative of LH IIIC Middle. There is no indication that any of the available contexts from this trench could be any earlier that LH IIIB2 but, in all likeliness, it seems to sit comfortably within a LH IIIC context.

5.2.2.2 Non-Mycenaean pottery

With the exception of a spool (figure 5.2b-1) found in the 2nd πασα, most handmade pottery from trench HZ belongs to the 4th and 5th levels. While no specific shapes could be identified, the presence of a strap handle (fugure 5.2b-4), of multiple vertical round handles (figure 5.3b-3), and of the shoulder of a jar suggest a dominance of closed shapes. This trench also included a strap handle on rim identified as Grey Ware (figure 5.2b-5).

5.2.3 Trench ZE’

5.2.3.1 Mycenaean pottery

Trench ZE may be divided in two, based on small differences between the upper and lower levels analysed (figure 5.3a). The first group, encompassing the 1st, 2nd, and 3rd πασα, includes shapes such as jugs, kraters, deep bowls, two carinated cups, a basin, an alabastron, and possibly a lekythos. Painted decoration consisted mostly of bands and lines, but wavy lines (figure 5.3aa-1), a hatched lozenge (figure 5.3aa-2), and a semi-circle or spiral((figure 5.3aa-3) were also identified. This group lies most definitely within LH IIIC, mostly early, but with some elements belonging to the later LH IIIC middle period.

The second group includes the 5th, 8th, and 9th πασα. The range of shapes is slightly different. There are no carinated cups, jugs or alabastra, but in addition to the deep bowls, basin and kraters common to both groups, kylikes, a large coarse jar, a small stirrup jar, and a transport stirrup jar (figure 5.3ab) were identified. Motifs include concentric circles, one example of dots

on a rim, with a wavy line or a zigzag below the rim. While the dotted rim could be a LH IIIB2 feature, the group seems to belong to LH IIIC early, as is most of the material from the Late Helladic layers of Teichos Dymaion. It is important to note that while this division between the upper and lower levels of trench ZE looks convincing in the fine and coarse Mycenean pottery, this pattern does not translate when looking at the handmade pottery, which shows elements of much earlier dates, as discussed below in this section.

5.2.3.2 Non-Mycenaean pottery

Interestingly, trench ZE contains more than three times the amount of handmade pottery found in trenches EH and HZ combined, suggesting a heterogeneous distribution of HBW on the site. As mentioned above, however, the handmade portion of the material from this trench indicates that the deposits are much less secure chronologically than the impression when looking at the Mycenaean pottery alone. Indeed, a strap handle (figure 5.3bb-2) from the 3rd πασα with a fine grey fabric was identified as Grey Minyan ware, a hallmark of Middle Helladic pottery. Two more Grey Minyan sherds were also identified in the 5th and the 9th πασα. Another strap handle, clearly handmade with a dull brown fabric, also presented features that are very much at home in a Middle Helladic context (figure 5.3bb-1).

The rest of the material is in line, chronologically, with the rest of trench ZE. Recognisable shapes consist of exclusively large vessels or closed shapes: collared jars (figure 5.3ba-1), hole-mouthed jars (figure 5.3ba-2), wide-mouthed jars (figure 5.3ba-3), and buckets (figure 5.3ba-5). Six body sherds bear cordons (figure 5.3ba-3) or rope-like decorations (figure 5.3ba-2), typical of those shapes in the HBW repertoire. Trench ZE also contains eight Grey Ware sherds, a relatively high amount when compared to trenches EH and HZ. From those, at least four vessels could be differentiated when comparing their fabrics, thicknesses and shapes. A rim sherd was easily identified as a carinated cup (Figure 5.3ba-4).

5.2.4 Trench EH’

5.2.4.1 Mycenaean pottery

Although the 1st πασα is highly contaminated with material from later periods, some useful material was worth noting in deeper layers. The shapes identified include a single stirrup jar, a larger rim that could belong to either a jar, a hydria, or an amphora, and a deep bowl. In addition, a large pithos was found in trench EH, its content securely dated as LH IIIC early. Indeed, the pithos was found sealing a fairly homogeneous deposit of handmade pottery, much of it identifiable as HBW. It was thus treated as a separate context of its own (Πιθος 8). It is,

a) Trench HZ: Mycenaean pottery

b) Trench HZ: Non-Mycenaean pottery

Figure 5.2 Selected Pottery from Trench HZ

Figure 5.3 Selected Pottery from Trench ZE

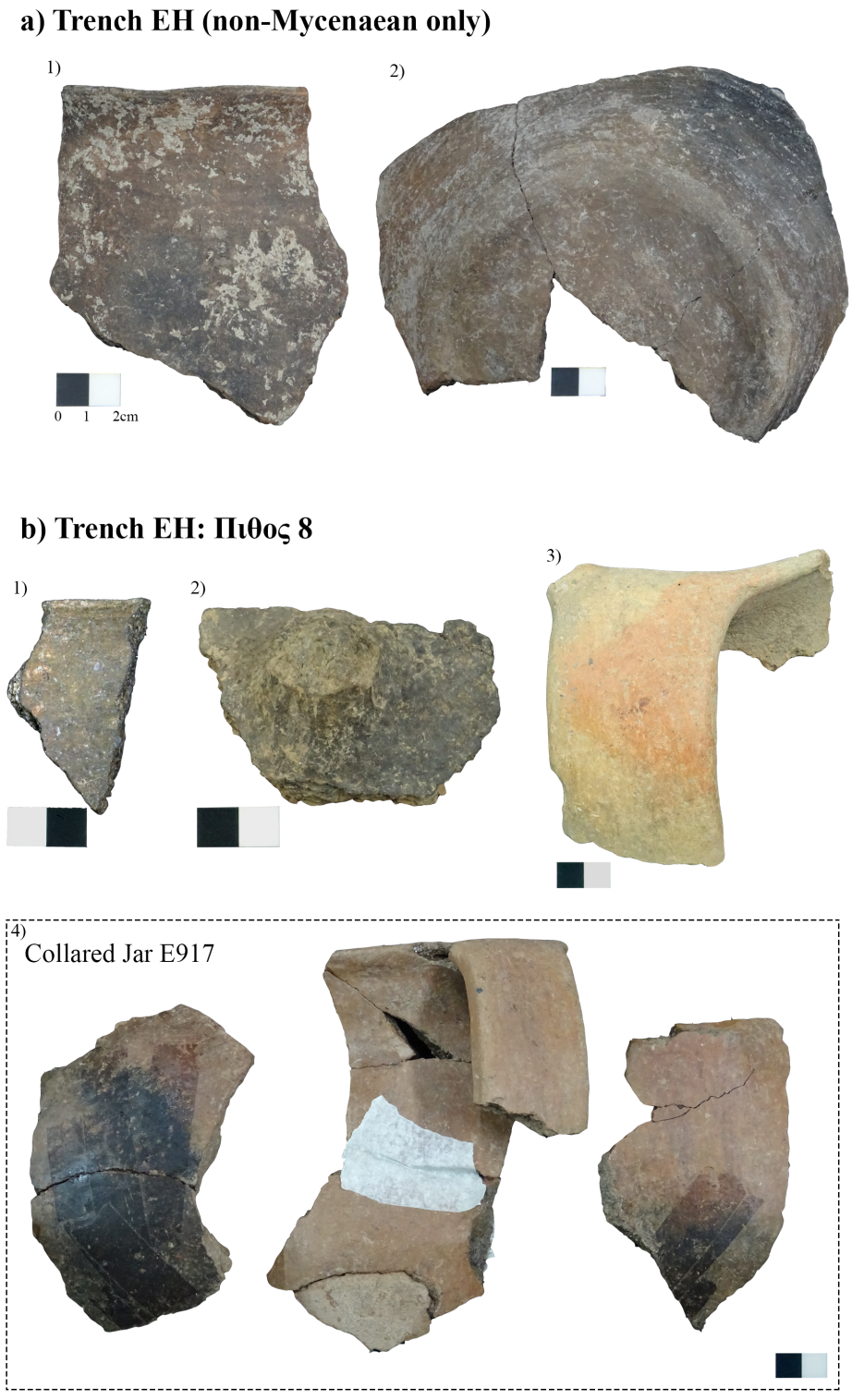
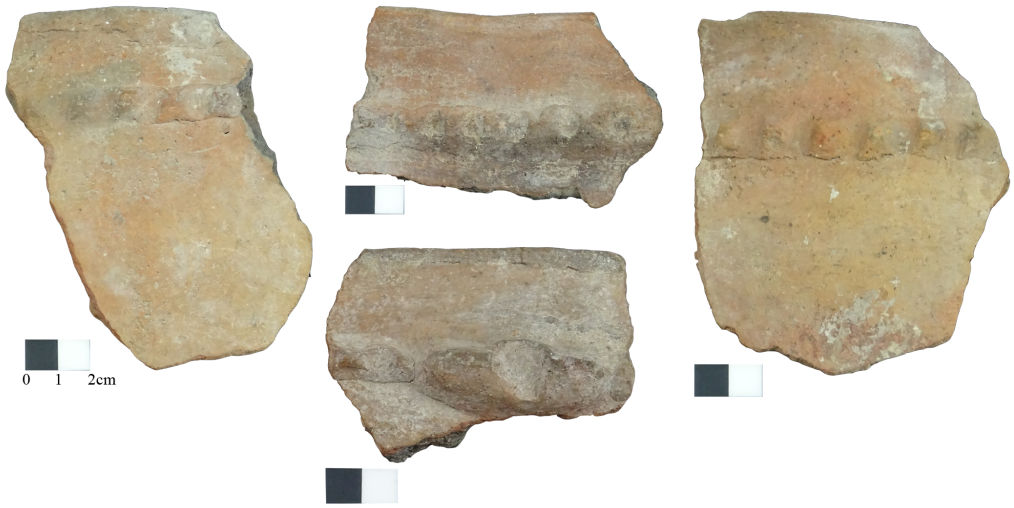


Figure 5.4 Selected Pottery from Trench EH

a) HBW- Mastrokostas's excavation

aa) Wide-mouthed jars



ab) Buckets

ac) Collared jar

b) Surface find- Carinated vessel

Figure 5.5 Other HBW specimens

however, impossible to give a secure date to any of the other levels from trench EH, given the mixed nature of the deposits.

5.2.4.2 Non-Mycenaean pottery

The secure context Πιθος 8 contains 44 sherds, most of which are handmade and burnished. While most were non-diagnostic, the pithos a rim from a collared jar (figure 5.4b-1), a round handle (figure 5.4b-2), a strap handle from a collared jar (figure 5.4b-3), and an easily recognisable well preserved collared jar (E917, figure 5.4b-4). Almost complete, this jar is, to date, one of the only two complete profiles of a HBW vessel found at Teichos Dymaion, the other being a very small bowl from trench ΓΓ (see below). The other levels of trench EH contained the base of a large vessel (figure 5.4a-2), a collared jar (figure 5.4a-1), two Grey Ware carinated cups, and two spools.

5.2.5 Mastrokostas's excavation campaigns

While many sherds look like HBW, the absence of context called for much caution, and only thirteen sherds could be attributed to this category without too much doubt. All are diagnostic sherds, and the shapes identified are within the range observed in the trenches described above, including wide-mouthed jars (six sherds, although two are most likely from the same vessel), buckets (three sherds), collared jars (two sherds). Two sherds could not be identified positively but belong to either wide-mouthed jars or buckets (figure 5.5a). Surface treatments vary from plain to well-burnished.

The sherds selected from Mastrokostas's material are by far the best preserved HBW material from Teichos Dymaion. They include a varied range of decoration and rim types, and the same variability is observed in macroscopic study of their fabrics. While the absence of reliable context limits their usefulness, they are nonetheless relevant as comparative material for this study.

Before concluding this section, one more sherd needs to be addressed: a large carinated vessel rim (figure 5.5b). Indeed, while only a surface finds, its shape and surface finish makes its association with the HBW phenomenon fairly secure. It is however quite different in colour and fabric from the rest of the HBW assemblage. On the contrary, it resembles, in colour and shape, the Grey Ware carinated vessels, and as such, it was suggested that it may not be of a local origin (this will be addressed later in Chapters 6 and 7).

5.2.6 Other trenches: conclusion

While the dating is at times uncertain due to the mixed nature of the deposits analysed in the trenches discussed above, the material remains undeniably useful for the purposes and aims of this present project. Similarly, while much more problematic in terms of dating, the material found within the mixed contexts of Mastrokostas's excavations is also worth considering. This is true for a number of reasons. First, the HBW and Grey Ware found is securely identified, independently of any questions raised by the chronology. Their relation to similar material found in trench ΓΓ, situated a few meters away, is beyond doubt, and as such deserves attention. Moreover, the Mycenaean pottery found within most of the levels analysed from trenches ZE, HZ, and EH is consistent, meaning that it roughly belongs to a single phase, once the few identified anomalies have been removed. While maintaining that trench ΓΓ is a much better candidate for the kind of analyses this project aims to achieve, this consistency certainly eliminates the necessity to completely exclude these other trenches. Finally, some of those levels seem to include Mycenaean pottery from periods only poorly represented in trench ΓΓ, at least in terms of levels including handmade material. This is true, for example, for trench ZE, which contains LH IIIC middle material, only found in the upper parts of the 13th πασα of trench ΓΓ. Those levels are thus very useful to cover any potential shortcoming in trench ΓΓ.

These reasons led to the decision to include, if only in a limited fashion, trenches ZE, HZ, and HE, as well as those few HBW from Mastrokostas's excavation material, in the final sampling, as the information they might provide could be an important complement to the bulk of our sampling from trench ΓΓ, despite their general chronological uncertainty.

5.3 Trench ΓΓ

Figure 5.6 Trench ΓΓ

As mentioned in the preceding section, not all trenches were appropriate to undertake the sort of analysis that this project aims to achieve. Many levels from trench HZ, ZE, and EH are considered to be mixed, and as such, are much more complicated to date with precision and certainty. For this reason, more

Figure 5.7 Stratigraphy, Trench ΓΓ

attention was given to the fourth trench, ΓΓ. Indeed, trench ΓΓ does not present the same issues. First, its Late Helladic material does not lie within the very top levels, as is the case for most other trenches, but much lower. Indeed, while Mycenaean pottery can be found in upper contexts, true Mycenaean levels of dates that are relevant to this project start at the 12th πασα. Moreover, trench ΓΓ possesses a great chronological depth, reaching as early as the Early Helladic in the lowest levels (29th-31st πασα). Finally, this trench contains many built features (figure 5.6), and has a complex stratigraphy (figure 5.7) which includes a clear ashy layer, probably sign of a destruction by fire (Moschos 2002: 20) which almost certainly relates to similar destruction contexts identified in LH IIIB2-IIIC layers of other Mycenaean sites, generally associated with the episodes of destruction that led to the collapse of the Mycenaean palatial polities. This further helps the construction of a chronology for the pottery assemblage.

While the comments made above on the tentative nature of the chronology still stand (see section 5.2.1) , these particular conditions created an ideal situation, where, notwithstanding the nature of the deposits and the methods of the excavation, the Mycenaean levels, and more importantly the levels containing HBW, are isolated between the later and earlier levels in such a way that contamination is considered minimal. As such, a much deeper understanding could be achieved for this particular trench. It is, however, important to mention that there is still a risk that the trench ΓΓ assemblage is, to a certain degree, mixed, but to a lesser extent when compared to the other trenches. Indeed, the presence of LH IIIB2 decorative style such as painted flowers on the shoulder of stirrup jar found alongside carinated cups in the 17th πασα, or of LH IIIB2 Group B deep bowls also found alongside a carinated cup in the 21st πασα, seems to confirm what Vitale pointed out previously in a very brief assessment of the transitional LH IIIB2-LH IIIC early material at Teichos Dymaion (Vitale 2006: 187-188). Certainly, this comes as no surprise, as most levels are not occupation levels but destruction rubble or related deposits. The impact of this degree of contamination is, however, minimal. Indeed, the stratigraphic

complexity and chronological depth of trench ΓΓ constrain this contamination in a way where the overall phasing of the levels is not irreparably affected.

Trench ΓΓ has been, for the purpose of this project, divided into eight groups which include varying numbers of levels (table 5.2) based on the pottery phasing of each respective πασα. Group A, H, I, and J were rapidly discarded, being either chronologically unreliable or unrelated to the aims of this project. Moreover, while group G could have been useful, it was also rejected due to chronological uncertainties and to a general absence of HBW material. The remaining level groups (B, C, D, E, and F), representing the transitional LH IIIB2-LH IIIC early and LH IIIC levels, have in common that they 1) are consistent chronologically, with very little contamination, and 2) contain a significant proportion of HBW. Group B corresponds to the latest occurrence of HBW, and has some elements pointing to a LH IIIC middle phase. The material from groups C and D can be dated securely to the LH IIIC early pottery phase. The same phase was attributed to level group E, but this group differs from the previous one because it includes elements that belong more comfortably within the LH IIIB2 phase. These few elements, however, were not present in numbers that would justify a different date. The situation was different for level group F. Indeed, the presence of typical LH IIIB2 and typical LHIIIC elements, in a proportion and composition that was noticeably different from the previous group, suggested an earlier, transitional LH IIIB2-LH IIIC early phase. Although LH IIIB2 material is clearly recognised at Teichos Dymaion (Vitale 2006: 187), the only potential LH IIIB2 level, the 22nd πασα (level group G), does not have enough compelling evidence to confirm this dating. It places the earlier confirmed and dated occurrence of HBW in the transitional LH IIIB2-LH IIIC early phase, and its latest in LH IIIC middle. HBW is not, however, present in equal proportion in all of

Level group	Πασα(-ες)	Description
A	1st to 11th	Mixed levels
B	12th-13th	LH IIIC middle
C	14th	LH IIIC early
D	15th-16th	LH IIIC early
E	17th-19th	LH IIIC early
F	20th-21st	Transitional LH IIIB2-IIIC early
G	22nd	Potentially LH IIIB2
H	23rd-25th	Mycenaean, but mixed
I	26th-28th	Potentially Middle Helladic levels
J	29th-31st	Early Helladic levels
Legend		
Partially within the grey destruction layer		
Completely within the grey destruction layer		

Table 5.2 Level groups, Trench ΓΓ

these phases. The following section will thus give an accurate portrayal of its chronological distribution in trench ΓΓ, a presentation of the HBW assemblage, as well as an overview of the Mycenaean pottery found alongside the HBW, in an attempt to better understand 1) the phasing and 2) the nature of the pottery of Teichos Dymaion. This section will then conclude with a review of the phases presented above, in light of the information provided by the pottery and the stratigraphy.

5.3.1 HBW in trench ΓΓ: sherd count and percentages.

Πασα (in trench ΓΓ)	HBW	GW	Spool	Myc.
13'	23	0	0	247
14'	21	0	1	189
15'	5	1	1	74
16'	57	0	0	87
17'	43	9	0	171
18'	42	5	0	88
19'	31	9	0	165
20'	13	1	0	98
21'	10	0	0	331
om 142	0	0	0	55
	245	25	2	1505
Total sherd count:				1777
Total non-Mycenaean:				272
Total Mycenaean:				1505

Table 5.3 Pottery count, Trench ΓΓ

As shown in tables 5.3 and 5.4, a significant proportion of the total count of pottery for trench ΓΓ is 'foreign' in style (i.e. HBW or Grey ware), reaching an overall proportion of 15%, and as high as 26% when considering level groups D and E (15th to 19th πασα) as a single unit. In total, 245 HBW specimens were identified, making the assemblage one of the richest for this type of pottery in Greece. Indeed, only Tiryns (484 specimens in Kilian's publications) and Mycenae (301 specimens) possess assemblages that are larger (Romanos 2011: 20-21). Moreover, the percentage of the total pottery count that the HBW constitutes is considerably more important than at any other site. HBW normally represent less that 1% of the total pottery count at any given site where it has been identified (Lis 2009: 153). It is interesting to note that Stockhammer (2008) has demonstrated that percentages similar to or even higher than those of Teichos Dymaion are in fact observed in certain rooms or buildings of the Unterburg of Tiryns. The overall percentage of HBW, when considering the whole site at Tiryns is much lower. In that regard, the ratio observable at Teichos Dymaion is simply outstanding, and was believed at first to be in part due to the rather spatially limited

Level group	%
Group B (13th π.*)	9%
Group C (14th π.)	9%
Group D (15th-16th π.)	22%
Group E (17th-19th π.)	25%
Group F (20th-21th π.)	5%
Ratio ΓΓ- π.15-19	26%
Ratio ΓΓ- π. 17-19	25%
Ratio ΓΓ Non-Myc/Myc.	15%

Table 5.4 Percentages of HBW in trench ΓΓ. 12th not counted due to mixed nature of deposits

scope of this research. Focusing on one trench, those high numbers may be due to a similar situation to the one in Tiryns. Recent work by Gazis (*pers. comm.*) on trench EZ, however, does not seem to support this explanation. Similar percentages were observed (19.7%), and as such, the high proportion of HBW is probably widespread within the citadel.

5.3.2 Level Group B

5.3.2.1 12th, ομ. 134

Although ομ.[14] 134 includes two handmade sherds that were first considered as part of the HBW phenomenon, it was rapidly rejected from the analysis. Much of the other material present in this group is of much later periods, with some sherds positively identified as Hellenistic. As the handmade samples are not in any way diagnostic of known HBW shapes, and do not present any typical features of this ware such as a well burnished surface or applied plastic decoration, their identification as part of this phenomenon could not be sustained based solely on the phasing of the πασα (see figure 5.8 for all Level Group B pottery).

5.3.2.2 12th πασα, ομ. 135

This group, while not as contaminated as ομ.134, is nonetheless also of very limited use for phasing purposes. Indeed, it exclusively contains large storage jars; one pithos, and two smaller unidentified coarse vessels. No potential HBW were found in this group.

5.3.2.3 12th πασα, ομ. 136

Much less contaminated than ομ. 134, this group was associated with the LH IIIC middle phase, although the bases of this assumption are far from compelling evidence. While only one painted sherd from a krater (figure 5.8a-1, the only decorated sherds in this group) suggest this date, it was decided to go along with this dating because the level directly under, the 13th πασα, is also thought to be LH IIIC middle, thus reinforcing an otherwise fragile claim.

5.3.2.4 13th πασα, ομ. 137

The 13th πασα is divided in two roughly equal sections by a wall (Tx60) diagonally running northwest-southeast through the trench. Ομ. 137 corresponds to the area south-southwest of this wall, believed to belong to the LH IIIC middle pottery phase. Indeed, a decorated sherd with concentric circles or spirals and multiple superimposed painted lines (figure 5.8a-2) is typical of this period. The rest of the Mycenaean pottery is in line with this interpretation, with

14 ομ.= ομάδα, which translates to "group". This was used to further devide some πασες during the excavations.

Level Group B (12th-13th πασες)

a) Mycenaean pottery

b) Non-Mycenaean pottery (all from the 13th πασα)

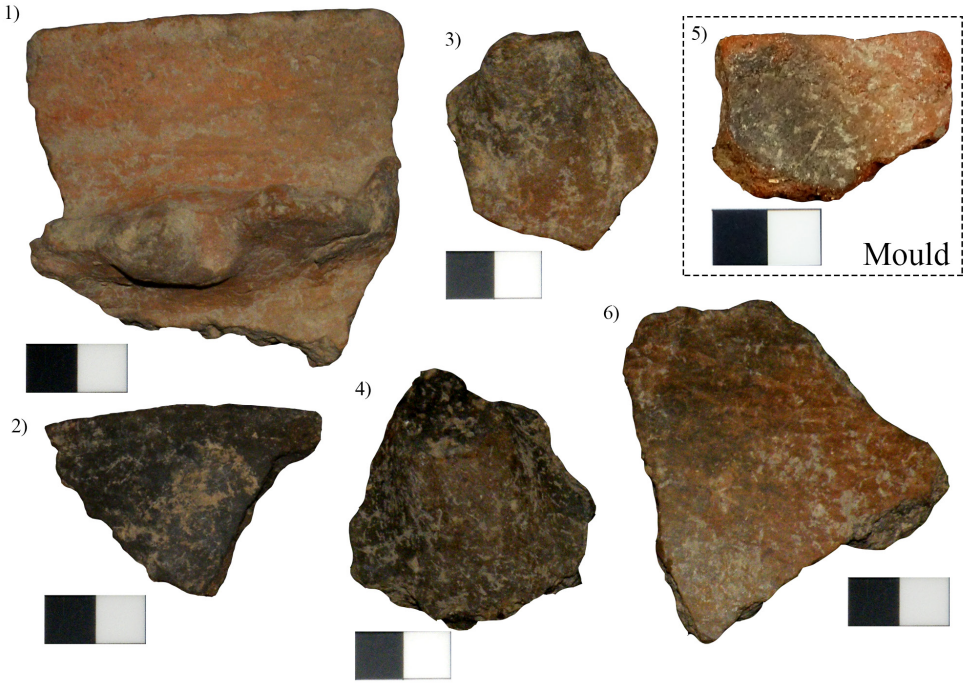


Figure 5.8 Pottery from Trench ΓΓ. Level Group B

Level Group C (14th πασα. + om. 140, 141 and 142)

Figure 5.9 Pottery from Trench ΓΓ. Level Group C

identified vessels types including two monochrome carinated cups (figure 5.8a-4) with very lustrous surfaces, a few deep bowls (with at least one monochrome, figure 5.8a-2), and two kraters (one with a band under the rim). This level also includes a flat handmade sherd, with a very friable and rubified fabric, believed to be part of a metallurgical mould (figure 5.8b-5).

A total of 20 sherds of handmade pottery were found in ομ. 137. Only two are highly burnished, the remainder displaying a great variability of surface finish, although all within the range of burnishing. All were identified as HBW. Recognisable shapes included a wide-mouthed jar (figure 5.8b-1), very lightly burnished with a rope-like band and a double horn lug handle, a globular jar with straight neck, and a lightly burnished collared jar (figure 5.8b-2). A round handle (figure 5.8b-4) could also come from a collared jar, different from the aforementioned similar vessel, but its identification cannot be confirmed.

5.3.2.5 13th πασα, ομ. 138

Located north-northwest of the wall Tx60, this group is more difficult to date than ομ. 137. Indeed, none of the Mycenaean pottery was particularly useful for dating. The deposit was very similar to ομ. 137, and as such was bundled with it in level group B,

This group also contains three handmade sherds, all attributed to the HBW category. Identified shapes include a collared jar, perhaps of globular profile.

5.3.3 Level group C

5.3.3.1 14th πασα, ομ. 139

Still divided by wall Tx60, the 14th πασα also presents elements typically associated with LH IIIC middle. It is impossible, however, to determine if this phase can be attributed to the whole level based solely on datable material. This is the case for the present group, ομ. 139 where the only identified shapes are a few monochrome deep bowls. However, it is interesting to note that this group also included three sherds, most likely from a same small globular vessel, that have been identified as wasters. They are highly overfired, and both their surface and their fabric are dark grey, with signs of vitrification, such as bloating, visible. The vessel seems to have been originally painted, although the spiral pattern is barely visible due to its dark colour which blends with the overall colour of the fabric. While it could relate to the destruction of the citadel, this vessel might also indicate that Mycenaean pottery production happened in the vicinity of Teichos Dymaion. Misfired pots are rarely found far from where they have been fired, as they tend to be immediately discarded. While the pottery is insufficient to attribute a

phase to this level, the stratigraphical evidence can help in that regard. Indeed, the lower part of the 13th πασα and the entirety of the 14th πασα correspond to the upper part of the grey strata of destruction, suggesting that they in fact belong to an earlier phase than level group B. Level group C is thus dated to the LH IIIC early phase.

This group contains six handmade sherds. The only diagnostic element is a rim sherd from a bucket (figure 5.9b-3). If the shape and the fabric are unmistakably HBW, the surface is not burnished. Rather, it seems to have been wiped, by hand or with a cloth, to create a smooth surface. Besides this particular sherd, surface finishes vary greatly, from highly burnished to unburnished. Only one sherd (figure 5.9b-2), in fact, was burnished to a shine. It is also possible to observe a relic coil in its break. Following this observation, comparison between the variations in wall thickness and the breakage of this sherd, confirmed to have been handmade by coiling, was used as a reference to better identify handmade pottery.

5.3.3.2 Ομ. 140

This consists of a small group without any associated level, the absence of diagnostic Mycenaean pottery does not allow precise phasing. While it did include two HBW body sherd, they were not added to the final count, due to the impossibility of calculating the ratio of HBW/ Mycenaean pottery for this group.

5.3.3.3 Ομ. 141

Unfortunately, this group included a large amount of pottery from the classical or Hellenistic period and was not considered in the analysis.

5.3.3.4 Ομ. 142

Although it includes a sherd belonging to the Classical period (figure 5.9a-1), not unlike those found in ομ. 141, the bulk of the material from ομ. 142 is unmistakably Mycenaean. Diagnostic elements include a spout from a feeding bottle, the false neck of a stirrup jar (figure 5.8a-2), a carinated cup rim, and two ring bases, probably part of two deep bowls. It is hard to attribute a specific phase to this group, but its position within the trench suggests that it belongs to either LH IIIC early or LH IIIC middle.

5.3.3.5 14th πασα, ομ. 143

A group rich in pottery, ομ. 143 contains elements that indicate once again a LH IIIC middle phase. This includes a shoulder of a stirrup jar with painted semi-circles similar to

other Achaean examples (see Papadopoulos 1979: 76-77, and fig. 213 (d)), and a body sherd with a painted necklace pattern (FM 72, figure 5.9a-4). Additional identified shapes include at least four deep bowls and one krater. A large number of shells were also recovered from this context. Its position in the stratigraphy however suggests a date earlier than LH IIIC middle, as argued above (see 14th πασα ομ. 139).

Figure 5.10 Coil breakage, 14th π.

A total of 15 HBW sherds were recovered from this group. Once again, burnishing alone is not enough to determine if a sherd should or should not be identified as HBW, as the burnishing varies greatly, even on sherds belonging to typical shapes of this ware. The well burnished elements include a fine example of a vertical handle from a cup or a dipper, one of the very few finer consumption vessels of the HBW assemblage. Other diagnostic elements include strap handles from collared jars (figure 5.9b1 and b5), a rim of a wide-mouthed jar with a rope-like horizontal cordon (figure 5.9b4), and a lightly burnished rim of a collared jar (figure 5.9b-5). The wide-mouthed jar rim is of particular interest technologically, and quite telling for our understanding of the manufacturing processes of this ware as it is possible to discern in the break the joining of the upper rim, as a single flat coil or slab, to the rest of the vessel (figure 5.10).

5.3.4 Level group D

5.3.4.1 15th πασα

While the levels and groups above were sometimes difficult to date with precision due to contaminating material from varied periods and phases, phasing is much clearer starting from the level group D. The 15th πασα, the first of the two levels that constitute group D, presents an assemblage of material with a good chronological integrity, attributed to the LH IIIC early period. Most defining features include a decorated krater rim (figure 5.11a-1), a monochrome deep bowl (figure 5.11a-3), and a small handle (figure 5.11a-5) most likely from a carinated cup. This level also contains at least one additional deep bowl, three cups of unidentified types, and a few large vessels (figure 5.11a-2). Another waster was found in the 15th πασα, belonging to a different vessel than the one found in the 14th πασα, strengthening the idea of a nearby pottery workshop.

A relatively small amount of handmade material is present in this level, especially when compared with the much richer 16th πασα described below. While only two body sherds (figure

5.11b-2 and b-3) are burnished, three additional sherds were also identified as HBW due to their handmade nature and to their seemingly low firing, bringing the total of HBW sherds to five (figure 5.11b). One of those was identified as a cooking jar (figure 5.11b-1), and seems to relate to other similar elements found in the 16th πασα, leading to their grouping together as a single level group. This level also contained a convex clay spool, with a very coarse fabric, and a rim of a Grey Ware carinated cup with a thick dark grey slip (figure 5.11c).

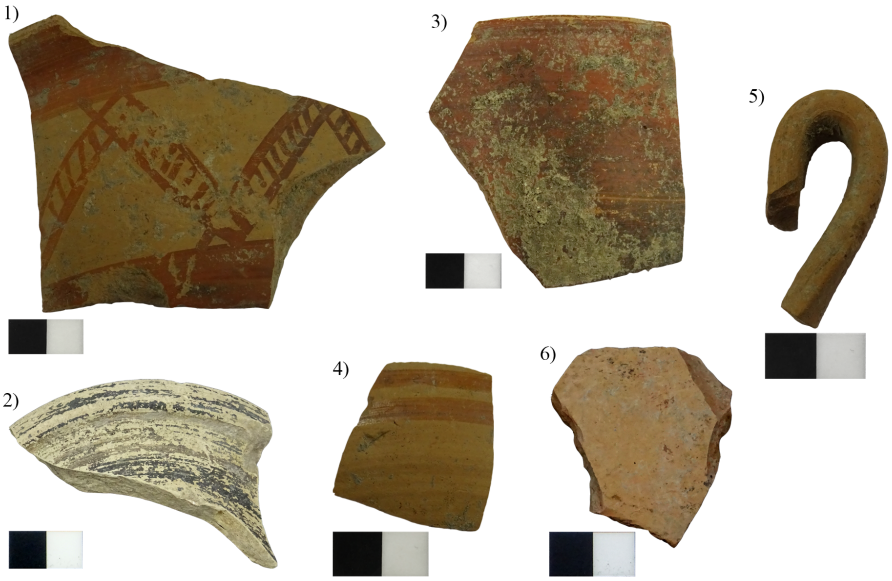
5.3.4.2 16th πασα

The second level of level group D also presented features indicative of an LH IIIC early phase (figure 5.12a). While only one sherd was found bearing an identifiable painted motif (figure 5.12a-4), a red monochrome carinated cup (figure 5.12a-2) was also found, along with a large strap handle on a rim (figure 5.12a-3), very similar to those found on Grey Ware carinated cups such as that found in level group (17-18-19). Other vessel shapes include a stirrup jar, a cup, at least two deep bowls, one krater, and possibly a hydria or a similar closed vessel. A handmade coarse small bath tub was also identified (figure 5.12c).

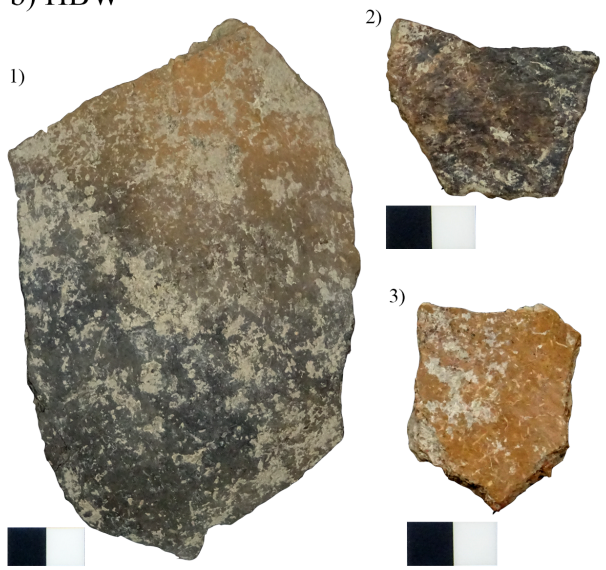
The 16th πασα has, by far, the richest deposit of HBW elements. Indeed, a striking 57 sherds, including many diagnostic elements, were found. Vessels identified include a small, but typical, wide-mouthed jar (figure 5.12b-6) with strap handles and a horizontal plain cordon. The jar is heavily burnished and in a fabric that can be considered fine compared with other HBW elements of this assemblage. Most of the vessel's profile is preserved as one large sherd, and an additional small body sherd most likely comes from it, although the sherds do not join. Another rim sherd (figure 5.12b-1), similar in fabric and decoration, could also come from the same jar, but a drastic difference in colour led to the decision to count it as a different vessel. Other identified vessels include a well burnished collared jar (figure 5.12b-2), a well burnished large bucket (figure 5.12b-3), a lightly burnished rim from a wide-mouthed jar or a bucket (figure 5.12b-4), an unburnished lug handle- most likely form a wide-mouthed jar or a bucket, a pale coloured collared jar, and two unburnished handles that probably belong to collared jars as well. The remaining sherds are non-diagnostic body sherds of varying degrees of burnishing (ex. figure 5.1b-5). Additionally, a group of coarse, handmade but non-burnished sherds was identified, similar to the large jar found in the 15th πασα. Most likely belonging to a limited number of vessels, they are, at this stage, the only potential cooking pots found within the citadel. As their shape cannot be precisely identified, and because they are not burnished, their identification as HBW is uncertain, and will have to be confirmed with the petrographic analysis.

15th πασα

a) Mycenaean pottery



b) HBW



c) Grey Ware

Figure 5.11 Pottery from Trench ΓΓ. Level Group D, 15th πασα

16th πασα

Figure 5.12 Pottery from Trench ΓΓ. Level Group D, 16th πασα

17th πασα

Figure 5.13 Pottery from Trench ΓΓ. Level Group E, 17th πασα

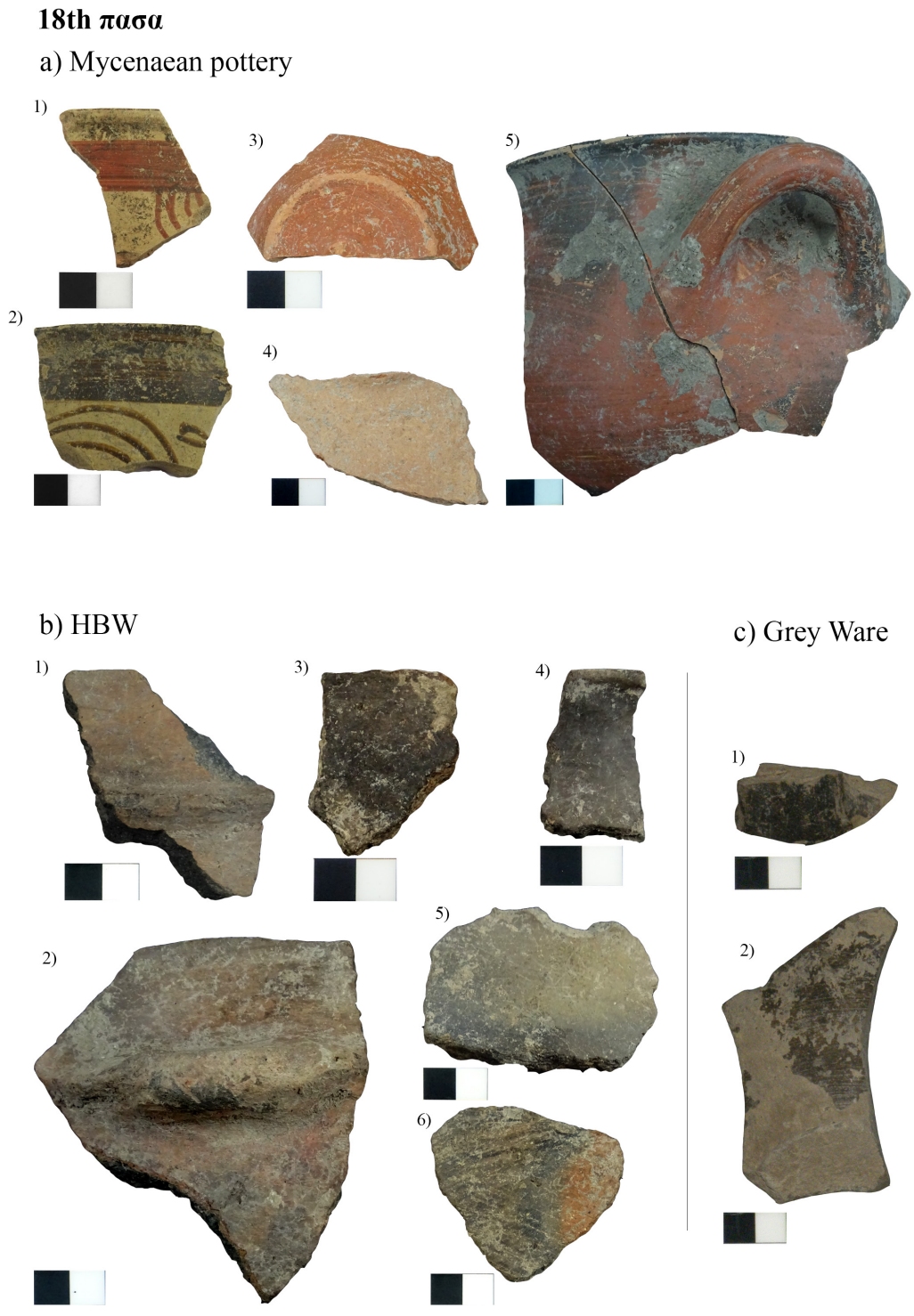


Figure 5.14 Pottery from Trench ΓΓ. Level Group E 18th πασα

5.3.5 Level group E

5.3.5.1 17th πασα

The third level group located within the destruction layer, group E, is rich in both Mycenaean (figure 5.13a) and HBW pottery (figure 5.13b). Its first level, the 17th πασα, included many elements facilitating phasing of the group. While a sherd with a painted motif consisting of a series of joining circles forming a chain pattern (figure 5.13a-2), and a kylix base decorated with two painted rings (figure 5.13a-3) may be indicative of an LH IIIB2 date, the remainder of the deposit is much more akin to a typical LH IIIC early assemblage, with its most characteristic features being two dotted rims of rosette deep bowls (ex. figure 5.13a-5), two carinated cup rims (ex. figure 5.13a-6), and a body sherd with a painted spiral pattern (figure 5.13a-1), probably from a deep bowl with a monochrome inner surface. Other identified vessels include at least two other deep bowls, two kylikes, and a large open vessel, most likely a krater or a basin.

The 17th πασα also contains a fairly large amount of HBW material, with 33 sherds identified. The range of shapes is similar to that observed in previous levels, including a wide-mouthed jar with an oblique slash horizontal cordon (figure 5.13b-1), a wide-mouthed jar or bucket with a piecrust horizontal cordon (figure 5.13b-2), and two jars of unknown types (figure 5.13b-3 and b-4). One of the non-diagnostic body sherds has a piecrust cordon, similar to the one found on the rim sherd of the wide-mouthed jar, and may be from a similar vessel. This level also contained a full profile of a very small bowl or dipper (figure 5.13b-5), very lightly burnished, which is another very rare example of HBW tableware at Teichos Dymaion. The 27 remaining non-diagnostic sherds display once again surface finishes ranging from non-burnished, or smoothed, to heavily burnished, and are all indicative of large vessels for storage or transport.

This level also contains nine Grey Ware sherds, of which seven belong to a single carinated cup (figure 5.13c-1 and c-2). Wheelmade, with a thin layer of dark grey slip and the distinctive grey fabric that gave its name to this ware, the reconstituted vessel is fairly large for a cup: ca.10 cm in height, and 20 cm in diameter. The reconstitution of the profile of this vessel was not possible using only these seven sherds. However, other parts of the vessel were also found in the 18th and 19th levels. While the discovery of a complete profile of a Grey Ware carinated cup is interesting in itself, it is the fact that is can be found within three levels that is most important here: it is what allowed the grouping of the 17th, 18th and 19th πασα together, just like the cooking vessel previously described allowed for the 15th and 16th levels. The remaining two sherds have a similar dull grey fabric and may belong to the same vessel of an unknown type.

5.3.5.2 17th πασα ομ. 144

This smaller deposit contains a small sherd bearing a flower motif (FM 18, figure 5.13a-4) identical to those found on the shoulder band of a small stirrup jar from Mastrokostas's excavations (Figure 5.13aa). The design is usually associated with the LH IIIB2 period (Vitale 2006), but the rest of the deposit does not suggest such phasing, nor does the other contemporary deposits or surrounding levels. This group also contains a least three deep bowls, and a large closed vessel.

A total of 10 sherds were identified as HBW within ομ. 144. All seem to belong to medium or large storage or transport vessels, although only one can be associated with a particular vessel type. Indeed, a burnished strap handle is similar to the one on vessel E917 from Πιθος 8 in trench EH, indicating it could belong to a similar collared jar (figure 5.13b).

5.3.5.3 18th πασα

The 18th πασα also contains material indicative of a LH IIIC early phase (figure 5.14a). This includes as most diagnostic vessels, a carinated cup, and five deep bowls, one of which is monochrome (figure 5.14a-5) and two with painted semi-circles under a painted band on the rim (figure 5.14a-1 and a-2), of which one seems clumsily painted. A kylix and an unidentified large closed vessel were also found in this level.

This second level of level group E contains 42 HBW sherds. All are burnished, although the degree of burnishing varies. Unsurprisingly, the shapes identified are mostly those associated with storage or transport. They include two buckets with a plain horizontal cordon (figure 5.14b-1 and b-2), one bucket with a piecrust cordon, two wide-mouthed jars, one of which has incisions on the rim (figure 5.14b-3) similar to those on piecrust cordons, and three collared jars (ex. figure 5.14b-4). The remaining sherds are, judging from their wall thickness, coarseness and morphology, probably from similar vessels types (ex. figure 5.14b-5 and b-6).

Grey Ware material is also present in the 18th πασα (figure 5.14c). In total, five sherds were identified, belonging to two different vessels. A handle (figure 5.14c-1), two sherds of a flat base (figure 5.14c-2), and a small body sherd all belong to the same carinated cup previously described in the 17th ποσα. Another body sherd, however, has a different fabric, almost blueish, and belongs to a completely different vessel. If the exact shape is impossible to determine, it is most likely a closed vessel, as the interior is not slipped.

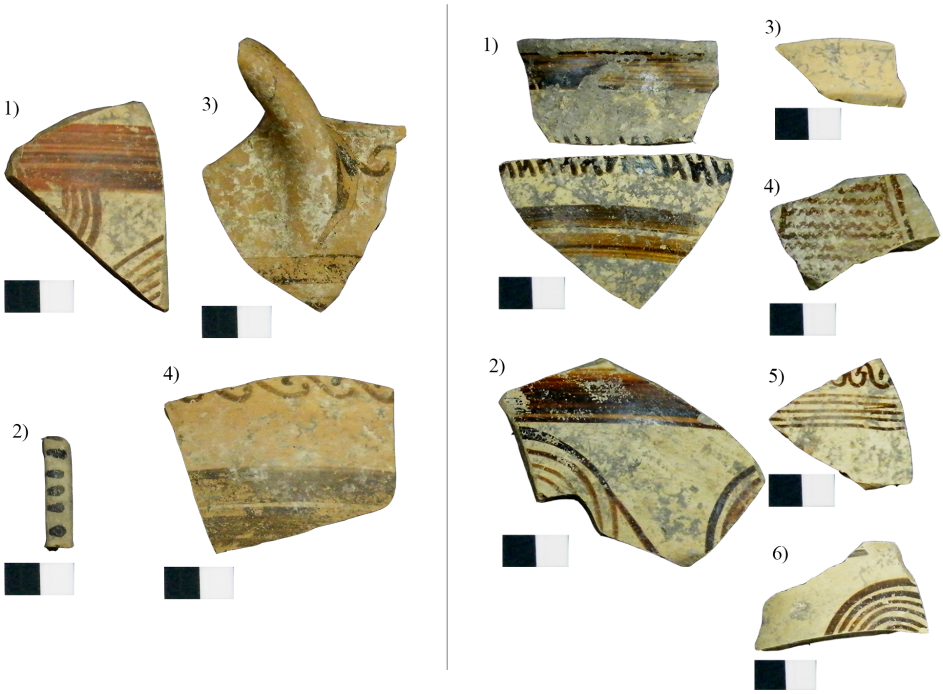
Figure 5.15 Pottery from Trench ΓΓ. Level Group E, 19th πασα

Level group F

a) Mycenaean pottery

aa) 20th πασα

ab) 21st πασα



b) HBW

ba) 20th πασα

bb) 21st πασα

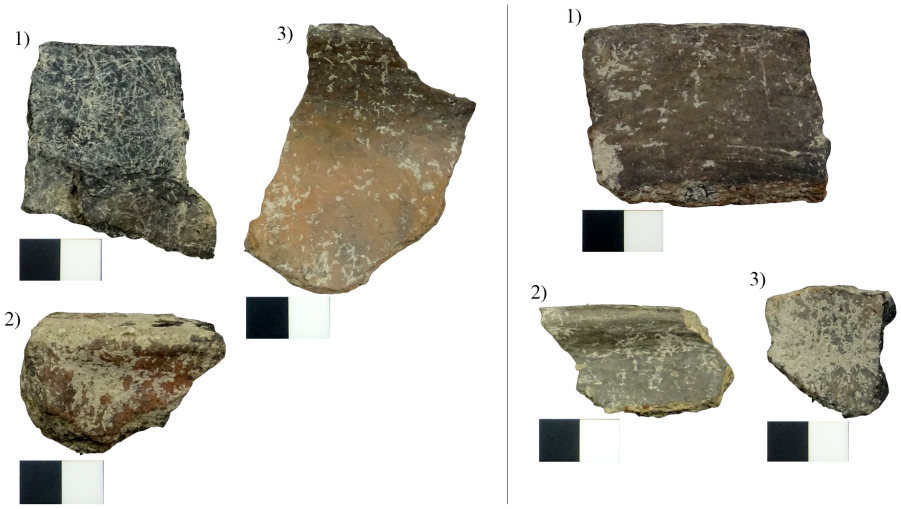


Figure 5.16 Pottery from Trench ΓΓ. Level Group F

5.3.5.4 19th πασα ομ, 148

While a decorated kylix found within this πασα is characteristic of the LH IIIB2 phase, the rest of the deposit does not differ from what has been observed in level group E. However, only a small number of vessels could be identified in this relatively small deposit: excluding the aforementioned kylix, the only other shapes that were recognised were a basin and two cups.

The situation is similar for the HBW and Grey Ware fractions of the deposit. Oμ, 148 contains only seven HBW sherds, all of which are non-diagnostic. Nevertheless, they seem indicative of the same range of transport or storage shapes that are most common in previous levels. Four Grey Ware sherds were also identified, one being a rim of a small cup (figure 5.15c-1), probably carinated although it cannot be confirmed. The remaining three are from a small globular closed vessel with one round handle, probably a jar.

5.3.5.5 19th πασα ομ, 149

The rich deposit of pottery found in within the group contains several elements that are typical of a LH IIIC early assemblage (figure 5.15a). This includes painted tricurved archs, and a quirk pattern under a krater rim (figure 5.15a-1). Other painted decoration observed on the pottery from oμ. 149 could equally belong to a LH IIIB2 phase. A fine example of a painted running spiral under a deep bowl rim (figure 5.15a-2) is one such design that could easily belong in either LH IIIB1, LH IIIB2 or the LH IIIC early phases. However, considering the other material of the deposit, the phasing of the neighbouring oμ.148, and the phasing of the rest of level group E, the LH IIIC early interpretation was preferred. This group also contains a small stirrup jar (figure 5.15a-3), at least three deep bowls, and two cups, amongst many unidentified shapes.

A total of 24 sherds of HBW were found within oμ. 149 (figure 5.15b). Identifiable shapes include two collared jars (figure 5.15-b1 and b2), a very interesting hole-mouthed jar with perpendicular plain cordons (figure 5.15 b-3) reminiscent of the now famous jar of the same type found at Korakou and illustrated in Rutter's seminal paper (1975: 18), a body sherd with a piecrust cordon (figure 5.15b-6), and a globular jar with straight neck (figure 5.15b-7). The presence of a round handle may be indicative of an additional jar, although its exact type is unknown, but its generic type does not allow further conclusions. Finally, a small strap handle was also found. While harder to interpret, it is very similar in size and shape to one found on a cup from Dimini (Adrimi-Sismani 2006), and may belong to one such vessel, thus making it one of the few consumption vessels. The remainder of the HBW material from this level is

mostly well burnished, and seems to belong to storage or transport vessels.

Fragments of the Grey Ware carinated cup present in the 17th and 18th levels were also found in this deposit (figure 5.15c). Indeed, a large strap handle (figure 5.15c-2) joins with the Grey Ware handle sherd from the 18th πασα, already identified as part of the vessel. In addition, a fragment of a base may also be from that same cup. One additional vessel is confirmed from another body sherd (figure 5.15c-3), but not much can be said about its shape, bringing the total of Grey Ware vessels in ομ. 149 to three, and the total of individual sherds to five.

5.3.6 Level group F

5.3.6.1 20th πασα ομ, 150

Level group F, composed of the 20th and 21st πασες, is the last group entirely situated within the grey layer of destruction, although the layer does extend to the upper part of the 22nd πασα. However, the study of the pottery deposits of these levels showed that the same LH IIIC early phase attributed to level groups D and E may not be appropriate in this case, and that the transitional LH IIIB2-LH IIIC early phase might constitute a better fit. Indeed, those deposits, contain elements that could belong to both the LH IIIC early and LH IIIB2 periods. This group's first level, the 20th πασα, contains a relatively small amount of pottery. This pottery is divided in two groups, ομ. 150 and 152, the former being the less useful for dating the level. Oμ. 150 has, however, a fair amount of recognisable Mycenaean shapes, including a small stirrup jar, a cup, two deep bowls, and the rim of a large open vessel, either a basin or a krater.

Only six sherds of HBW were found, of which two can be associated to a specific shape. The first is a rim of a bucket with a piecrust cordon (figure 5.16ba-1), and the second is a handle that most likely belongs to collared jar. No Grey Ware was found within this group (see figure 5.16 for Level Group F pottery).

5.3.6.2 20th πασα ομ, 152

The second group of the 20th πασα contains a few elements that shed light on the phasing of level group F, including two deep bowls with a quirk (FM 48, figure 5.16aa-3 and aa-4) decorative pattern, a deep bowl body sherd with a concentric arcs pattern (FM 44, figure 5.16aa-1), and three unpainted kylikes. All the deep bowls have their interior surface painted. Whereas the unpainted kylikes are reminiscent of the LH IIIB2 phase, the concentric arcs pattern is common in LH IIIC early deposits, and the quirk pattern could easily belong to either phase. While this could simply be attributed to the mixed nature of some of the pottery deposits

at Teichos Dymaion, it is important to note that the overall composition and the decorative patterns used are consistent with what is observed in the 21st πασα. When considered with the depth of the deposits in mind, this consistence strengthens the idea that the deposits of level group F are not simply LH IIIIC early contexts contaminated with LH IIIB2 elements, but rather truly belong within the transitional LH IIIB2-LH IIIC phase. Other identified shapes are two jars- or similar closed vessels- at least four deep bowls, a cup with linear decoration its handle (figure 5.16aa-2), and a krater.

Oμ. 152 contains seven HBW sherds, and one non-diagnostic Grey Ware sherd. Identified HBW shapes include a hole-mouthed jar with vertical cordon (figure 5.16ba-2) and a collared jar (figure 5.16ba-3). In addition, a large body sherd displays a well-worn handle fragment that is similar to small lug handles found on certain bucket types and could very well belong to this category.

5.3.6.3 21th πασα oμ, 157

With almost three times the amount of pottery, the 21st πασα allows for a much better defined dating than the previous level. The transitional LH IIIB2-LH IIIC early phase is indeed clear in this pottery deposit of oμ. 157, and confirm what was observed in the previous πασα. This was mostly based on the presence of both LH IIIB2 and IIIC deep bowls within the deposit. Five deep bowls bear painted motives that helps with the phasing. Two are group A deep bowl. The first (figure 5.16ab-2) has a very fine painted band on the rim with a running spiral motive (FM 46) and a unpainted interior surface, and is similar to LH III B2 examples, and the second (figure 5.16ab-1) has a slightly larger band on the rim with a typically LH IIIC crude foliated band (FM 64) motif. Two are believed to be of group B, although their identification is more uncertain as not much of the vessels' profile was preserved. One of those has a ladder pattern (FM 75, figure 5.16ab-4), dated to LH IIIB2 by Mountjoy (1999:416), and the other one a running spiral (figure 5.16ab--6) similar to a LH IIIB example from Tiryns (Vitale 2006: 182). The last deep bowl bearing a painted motif (figure 5.16ab-5) cannot be attributed to a specific group with any certainty, but its LH IIIC quirk motif (FM 48) suggest that it belongs to group A. Other diagnostic elements include a rim from a jug with cutaway neck, and a rim from a carinated cup (figure 5.16ab-3). Additional shapes were also recognised: a krater, a jar or hydria, and many unidentified large vessels.

The last level with HBW, the 21st πασα includes 10 HBW elements, and no Grey Ware. Recognisable shapes include a globular jar with straight neck (figure 5.16bb-1), a neckless jar (5.16bb-2), and a lug handle most likely from a large bucket.

5.3.7 Earlier levels (level groups G to J)

From the 22nd πασα, no additional HBW was found. It seems to belong to the LH IIIB2 phase; although the dating remains uncertain until a detailed study of the whole assemblage is produced, the stratigraphy seems to corroborate this interpretation, given its position bellow the grey layer of destruction. This would mean that this level corresponds to the Palatial period at Teichos Dymaion. It is, however, impossible to say anything beyond this simple statement for the following levels. Indeed, from the 23rd to the 29th πασα, Middle Helladic material is found in increasing numbers. If the 26th, the 27th and the 28th πασα are likely Middle Helladic, the remaining upper levels seems to belong to Late Helladic phases, based on the Mycenaean material found. The presence of the Middle Helladic material in these levels raises question on their chronological integrity and limits their usefulness for the scope of this project. Finally, by the 29th πασα, we reach Early Helladic levels.

5.3.8 Trench ΓΓ: conclusion

The chronological depth, and rich deposits of pottery, of trench ΓΓ offers great potential for the present project. Although our understanding of the chronology will remain limited until the full publication of the Late Helladic pottery at Teichos Dymaion, it was nonetheless possible to assess, summarise and discuss the phasing of the different level groups of this trench.

Level group B, dated to LH IIIC middle, is so far the latest occurrence of HBW at Teichos Dymaion. Levels of the same date in trench EZ, recently analysed by Gazis, and in trench ZE, described above, seem to confirm this. Stratigraphically, this level group is located above and at the upper limit of the grey destruction layer characteristic of late Mycenaean sites, making it quite important for this study. Indeed, excluding the lower parts of the 13th πασα that is located within this layer, level group B thus potentially contains the only HBW material that is unmistakably post-destruction within trench ΓΓ. Unfortunately, the amount of HBW material in this group is very low, limiting the possibilities for comparison with other level groups. Moreover, the nature of the excavations does not allow us to distinguish between the material coming from the upper post-destruction layer of the 13th πασα and the lower parts that are located within the destruction layer.

Level group C corresponds to the upper part of the grey destruction layer which started to appear in the previous level group. It was thus dated to the LH IIIC early phase. The presence of LH IIIC middle motifs on some of the pottery, however, is worth mentioning. While this could be indicative of an early occurrence of those designs in the later phases of LH IIIC early, their

presence is most likely due to contamination coming from the levels above, Teichos Dymaion having been subjected to the same series of destructions observable at many other Mycenaean citadels. HBW material is found in larger amounts, although numbers are still far from the richest levels found below.

Level group D is located well within the grey destruction layer. The two levels constituting the level groups both have a large amount of pottery, although the 16th πασα is far richer in handmade material, and contains the only potential cooking vessel found so far at Teichos Dymaion. This group also includes the finest, most typical examples of HBW vessels, of which the small wide-mouthed jar is the most outstanding example. The Mycenaean material places this level group firmly into a LH IIIC early phase.

Level group E is very similar to the previous level group D, in terms of dating and relative quantity of HBW. The most common features of the levels from this group are HBW material with a very distinctive black fabric and light, beige surfaces repeated on multiple sherds, and a relatively large amount of Grey Ware material, most coming form a single carinated cup. No cooking vessels were identified in this level group, but it contains the only example of HBW tableware at Teichos Dymaion. These two differences aside, the character of the HBW material from level groups E is very similar to what was observed in the previous groups. Again, the Mycenaean pottery suggests a LH IIIC early phase, but the presence of a few sherds that are akin to LH IIIB2 pottery, either present due to contamination or kick-ups, or as surviving features, seems to predict what is to come in the following levels.

Level group F is quite distinct from the previous D and E. Indeed, the HBW is sparse when put in relation to the large numbers of canonical Mycenaean pottery, and differs in terms of shapes and decoration. Moreover, these levels, albeit still within the grey layer of destruction, are richer in LH IIIB2 material, enough so to suggest an earlier transitional LH IIIB2-LH IIIC early phase for this level group, as defined by Mountjoy (1999). The HBW shapes are still within the range of storage and transport vessels.

Stratigraphically, it could be argued that the upper part of the 22nd πασα, level group G, also belongs to the previous level group F, as it corresponds to the lower limit of the grey destruction strata. However, as no HBW or Grey Ware material were found, and because the Mycenaean material seems slightly earlier, it was treated as a separate group. As the only potential LH IIIB2 level in trench ΓΓ, it is so far the only true pre-destruction level, and the absence of HBW seems to put it prior to the first occurrence of the phenomenon at Teichos Dymaion.

5.4 Conclusion and comments on the assemblage

While the phasing presented above could change following a more thorough study of the Mycenaean pottery, it is considered secure enough for the purpose of this research, and allow some conclusions on the chronology of the HBW phenomenon at Teichos Dymaion. From the available data, it seems that the phenomenon spans from transitional LH IIIB2-LH IIIC early to LH IIIC middle, with a much stronger presence in the LH IIIC early phases of the site. If the LH IIIC middle only rely on sparse evidence from trench ΓΓ, it is helpfully confirmed in trenches ZE and EZ, although the later cannot be addressed here. It would be wise, however, to reassess the present chapter should a complete study of the Mycenaean pottery at Teichos Dymaion be undertaken in the future. Such endeavour could only contribute to a better understanding of the HBW at Teichos Dymaion, and therefore greatly enhance the results of this research.

In addition to the chronological considerations above, it would be useful at this point to make a few comments on the HBW, Grey Ware, and Mycenaean assemblages, in an attempt to summarise their nature and particularities before they are further explored in the following chapters.

- The Mycenaean pottery at Teichos Dymaion seems mainly composed of fine tableware, storage vessels, including pithoi, and of a few transport stirrup jars (ex. figure 5.3ab). No cooking pots have been identified so far.

- As observed at other Mycenaean sites in Achaea, there is an abundance of monochrome vessels at Teichos Dymaion, and a clear preference for a solid painted interior surface on open vessels. This highlights the undeniable Achaean character of the assemblage (Deger-Jalkotzy 2003: 64).

- Fabrics, however, are different from Aigera, albeit a few similar examples. Indeed, while fabrics at Aigeira are reddish-brown or brownish (Deger-Jalkotzy 2003: 64), the fabrics at Teichos Dymaion are dominated by buff, orange, or reddish clays, more akin to what Mountjoy observed for Achaean pottery (Mountjoy 1999: 399). This indicates different production centres for both sites, even though both share similar stylistic trends.

The limited amount of Grey Ware material found at Teichos Dymaion only allows for equally limited statements on its nature and characteristics

- The assemblage is certainly small, and nothing suggests that it was, at any time during the occupation of the citadel, a major portion of the pottery in use. This is expected, and in line with what is observed at other Mycenaean sites where Grey Ware was identified.

- The occurrence of Grey Ware is limited to levels where HBW has also been found. Moreover, it seems to be chronologically restricted to the LH IIIC early phases of the site.

- Surprisingly, the shapes observed in the Grey Ware assemblage are not limited to open, carinated vessels, as demonstrated by the presence of a small and globular closed vessel in the 19th πασα and of another unidentified closed vessel in the 18th πασα.

- Lastly, at least two fabrics and types of slip have been identified, suggesting more than one origin for the production of those vessels.

On the contrary, the relatively large amount of HBW is important, and has led to some interesting preliminary observations on the nature of this assemblage.

- The HBW pottery at Teichos Dymaion is, macroscopically, varied. This is true on many fronts: decoration, features (handles, rim types), and fabrics. The petrography will show if this apparent variability holds true in terms of raw material choice and manipulation.

- Notwithstanding the heterogeneity observed, the range of *shapes* is surprisingly limited. Indeed, collared jars, wide-mouthed jars, and, to a lesser extent, buckets dominate the assemblage. Most unidentified body sherds seem to belong to similar shapes, mostly associated with short-term or long-term storage (Romanos 2011: 61) and with transport.

- Very few examples of what could be called table ware were identified in the HBW material of Teichos Dymaion. This is quite intriguing, as the Mycenaean portion of the assemblage is quite rich in such pottery.

- Another noticeable particularity, this time in line with what is observed in the Mycenaean pottery, is the rarity of cooking pots. Indeed, the only vessels of this category are from level group C, and only constitute a handful of vessels, potentially only one, far below expected numbers for such a site.

The following chapter, building on this preliminary presentation of the material, and on the chronology thus created, will use the data from the ceramic petrography to produce a portrait of the different pottery traditions at Teichos Dymaion

Chapter 6: *The pottery of Teichos Dymaion: Results of analyses.*

6.1 Introduction

This chapter continues the exploration of the pottery of Teichos Dymaion and presents the visual assessment of the macro-traces of forming and the thin section ceramic petrography. It will combine those results, constructing a detailed portrait of the assemblage which highlights its trends and acknowledges its diversity.

To do so, it will follow the structure outlined in Chapter 2, based on the approach developed by Roux and Courty (2007, 2016). As such, it begins with, and is built around, the different technical groups found at Teichos Dymaion. While certain aspects were adapted to respond to the particularities of the present study, the hierarchised, *chaîne opératoire*-oriented approach was otherwise followed closely.

The first section of the chapter will thus characterise the different *technical groups* constituting the assemblage, along with the macro traces which allowed their identification. The second section will move on to the next tier of the techno-stylistic classification system and will present the different *techno-petrographic groups*, with detailed description of all fabrics found within the different technical groups. The third section will describe the morpho-stylistic variability within each fabric, creating the techno-morphological groups. Finally, all results will be summarised in a dendrogram made to illustrate the pottery diversity at Teichos Dyamion.

6.2 Technical groups

Each distinct technical group from the assemblage is defined by its primary forming technique. These are then subdivided based on surface finishing techniques (Rye 1981: 89), as they represent the second most distinctive technological features readily observable on the material, and because they have been used to distinguish between different traditions of handmade pottery in previous work on HBW (see the discussion on HDP: Lis 2009, 2018). Moreover, no secondary forming techniques were positively identified within the assemblage, so they could not be included.

It became rapidly clear that the pottery assemblage from Teichos Dymaion, while diverse in other aspects, was fairly simple in terms of forming techniques, and could be divided in

two main technical groups: one covering the handmade portion of the assemblage, the *Coil-made group*, and the other, covering the vast majority of the pottery at Teichos Dymaion, the *Wheelmade group*. In addition to these two main groups, another minor group of handmade pottery, the *Pinched group*, was identified. The present section will define each of these groups.

It is worth noting at this stage that, while all the assemblage was considered when constructing these groups, only sherds that are part of the sampling will be referred to with a proper reference number. Indeed, with the remainder of the assemblage awaiting full publication, they are not numbered in a way that would facilitate their identification. If needed, they will be identified by their location within the trenches.

6.2.1 Technical group 1: Coil-made

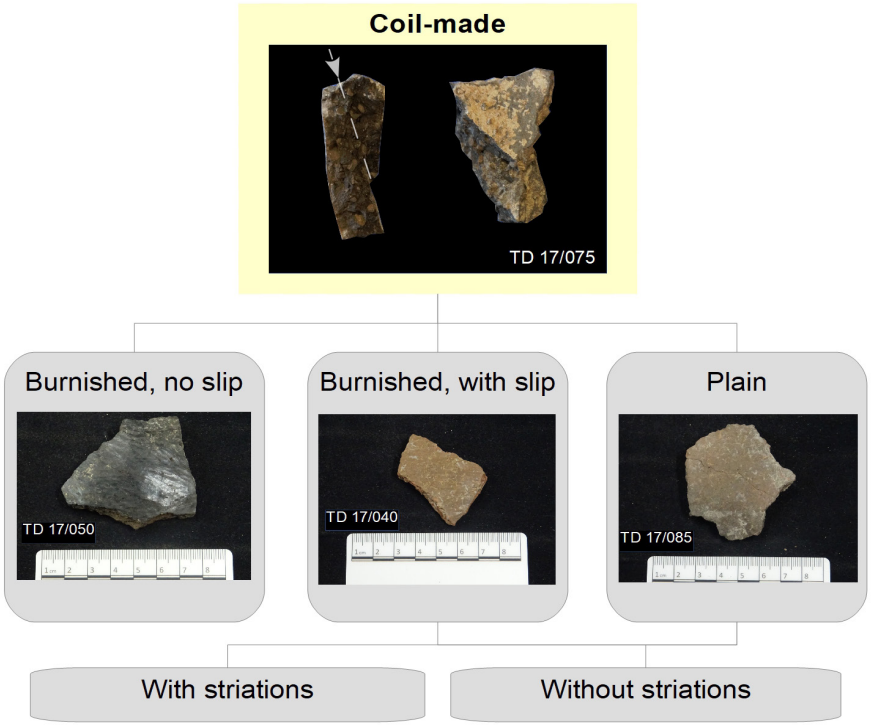


Figure 6.1 Technical Group 1: Coilmade

The handmade portion of the pottery at Teichos Dyamion seems to have been all made using coiling as primary forming technique (figure 6.1). Indeed, a limited but important number of sherds present a *preferred orientation of particles* in their breakage that is clearly indicative of relic coils (figure 6.2a). However, while the rest of the group is easily identified as handmade, the confirmation that they were indeed made by coiling is not simple when relic coils are not seen. As mentioned in Chapter 2, the study of several other attributes is necessary in such cases.

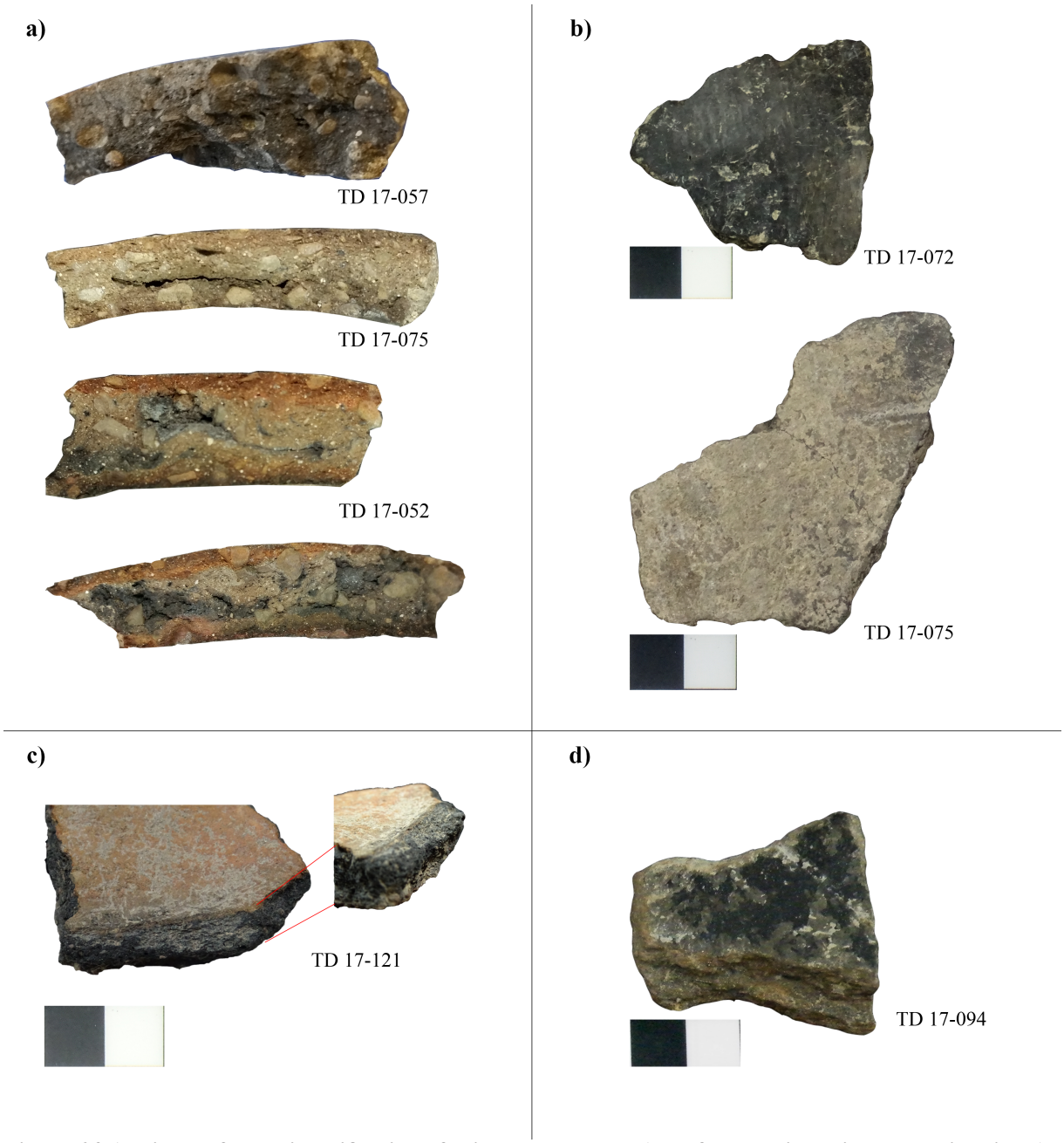


Figure 6.2 Attributes for the identification of coil-made pottery. a) Preferred orientation and relic coils, b) Selective breakage, c) U-shaped break profile, c) Step-like break profile.

Selected attributes were thus compared with reference studies on pottery manufacture (e.g. Rye 1981, Livingstone-Smith 2001, Roux 2016), and used to recognise coiling in other sherds.

6.2.1.1 Identifying coil-made vessels: description of distinctive attributes

Excluding the *preferred orientation of particles* described above, which allow for the identification of relic coils in the breakage, two attributes were particularly useful for identifying coil-made samples:

1) *Relief*: The most commonly observed feature of the coil-made material in the Teichos

Dyamion assemblage concerned its relief. Indeed, the thickness of coiled sherds is often irregular. When the samples are large enough, this irregularity can manifest itself in a wavy texture characterised by an alternation of thicker and thinner areas, which was attributed to the varying thickness or the coils or the way they were joined together to form a homogeneous vessel.

2) *Selective breakage*: Coiling can produce breakages that are distinctive in both their *orientation* and *profile*. Coil-made sherds in this assemblage often displayed irregular or meandering breakage profiles (figure 6.2b) which are particular to this forming technique (Rye 1981: 67-68). U-shaped or indented breakage profiles are rare but nonetheless present (figure 6.2c). Coil-made sherds in this assemblage are often triangular, trapezoidal, or occasionally with a very diagnostic (Rye 1981: 68) step-like shape (figure 6.2d)

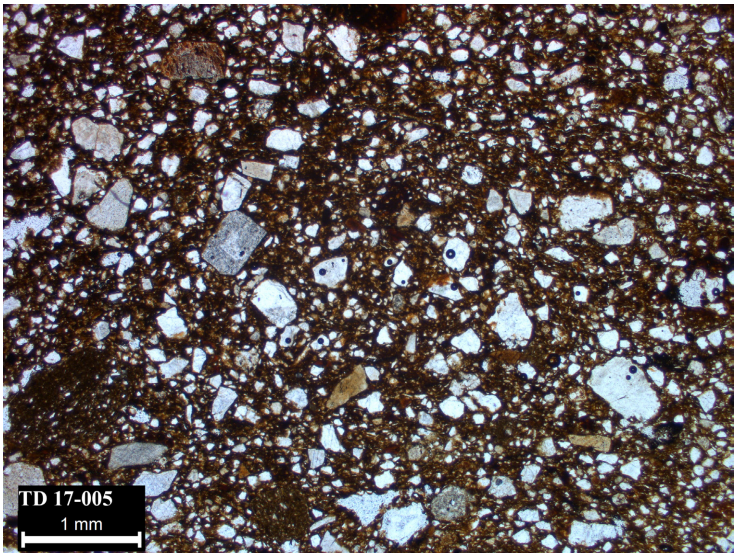


Figure 6.3 Relic coil in thin section

Based on the analysis of all the handmade pottery, no other primary forming technique was identified, and most sherds displayed macro-traces that were indeed indicative of coiling. Technological evidence observed during the petrographic analysis also confirm this, with relic coils being the only features positively identified (Figure 6.3). Variations were however observed in the way the surfaces of vessels were treated, allowing for further subdivisions within this otherwise broad technical group.

6.2.1.2 Variability in surface treatments

The handmade pottery from Teichos Dymaion, now all sorted into this large Coil-made technical group, can be further divided in three subgroups, based on the nature of their surface treatment, or lack thereof.

The first subgroup is constituted of sherds that have *at least* one surface that is burnished. Burnishing is the action of creating a lustre on the surface of a vessel by rubbing it repeatedly with a hard tool (e.g. a pebble, a piece of wood or bone) when it is leather-dry or bone dry (Roux 2016: 130). The treatment leaves a diagnostic pattern on the surface, which is seen on many

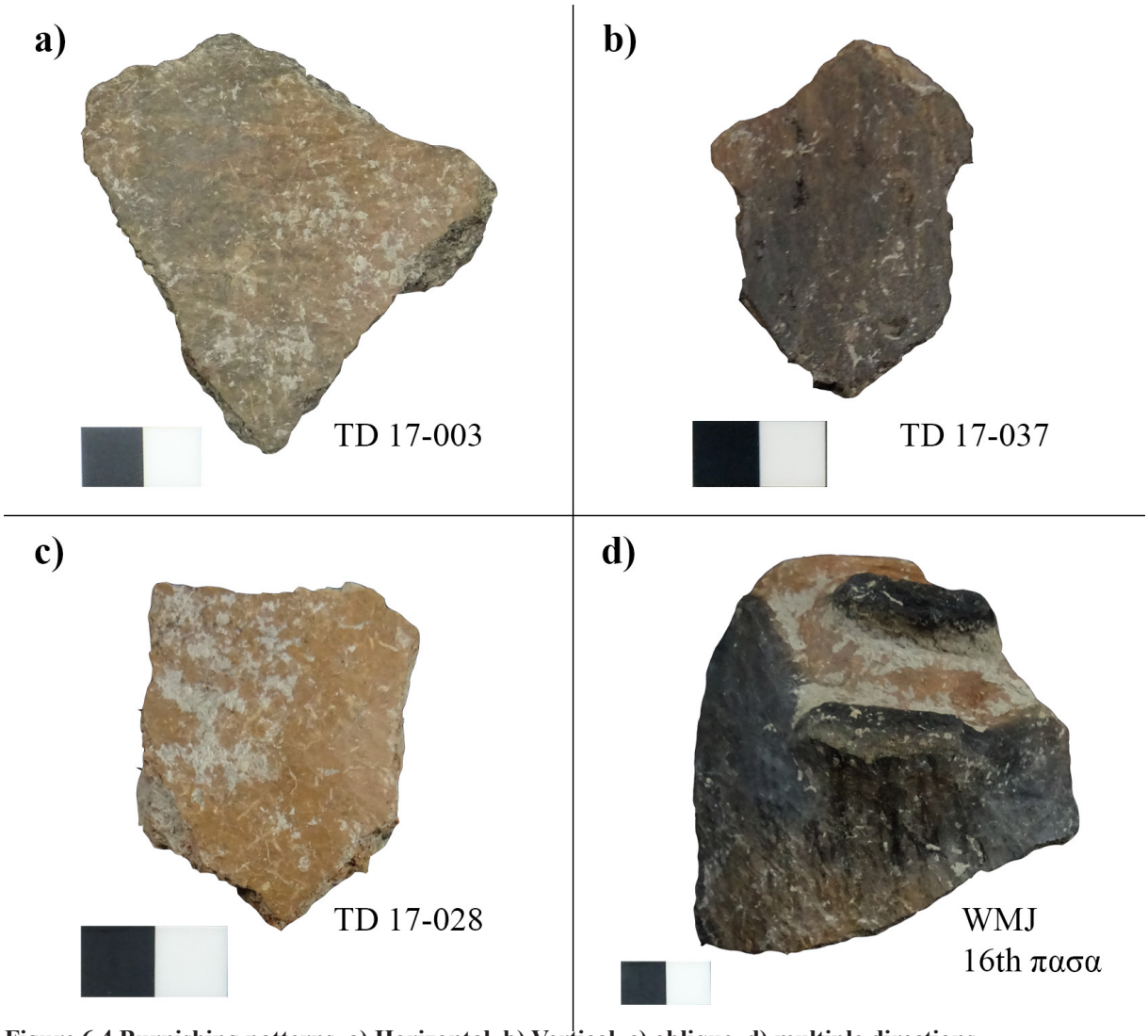


Figure 6.4 Burnishing patterns. a) Horizontal, b) Vertical, c) oblique, d) multiple directions.

samples from Teichos Dymaion. This pattern consists of lines created by each rubbing action, and these can be vertical, horizontal, oblique, random, or a combination of multiple directions. On the Teichos Dyamion material, most burnishing is horizontal (figure 6.4a) or oblique (figure 6.4c), with few vertical examples (figure 6.4b). The most heavily burnished vessels may display a combination of more than one direction (figure 6.4d), but very rarely does the burnishing appear random. While this variation is indicative of different techniques to perform burnishing actions, and may as such be useful to detect different ways of making pottery, it was not used to further divide this subgroup. Indeed, in the absence of a substantial number of complete vessels or profiles, it is impossible to verify if this variation is also visible on any single vessel, and thus not a good criterion to create meaningful subgroups.

The second subgroup is essentially the same as the first one described above, with the addition of an extra step preceding the burnishing. Indeed, it corresponds to sherds that have at least one surface that is burnished *and* slipped (figure 6.5). This subgroup is not as important, numerically,

as the previous one, but nonetheless deserves to be its own group because it adds a significant step in the *chaîne opératoire* of the pots it represents. However, the low number of sherds possibly belonging to this group may be because slip is relatively hard to detect on the handmade material of Teichos Dymaion. Two reasons made it so. First, even in cases where it is clear it has been used, the slip is not thick, nor very different from the actual clay constituting the vessel. It may be due to two different techniques. Perhaps the slip was created using the same clay as the vessel, rather than using a specific recipe, and applied in a very thin layer. Or, more likely, the potters used a form of "self-slip" technique, a smoothing process similar to the one described by Roux (in French: *doucissage,* Roux 2016: 130), where a wet surface is rubbed to cover all pores or imperfection using the vessel itself as its own slip. This technique, which can be hard to detect, seems to have been used on plain vessels as well (see below). The second reason why the detection of slip can be difficult is that the act of burnishing the vessel, done after the slip is applied, makes the features that helps detecting the thin slipped layer less visible. This may explain why so few examples of this subgroup were identified, although it is still believed that the unslipped group's majority would remain.

Figure 6.5 Slipped and Burnished pottery

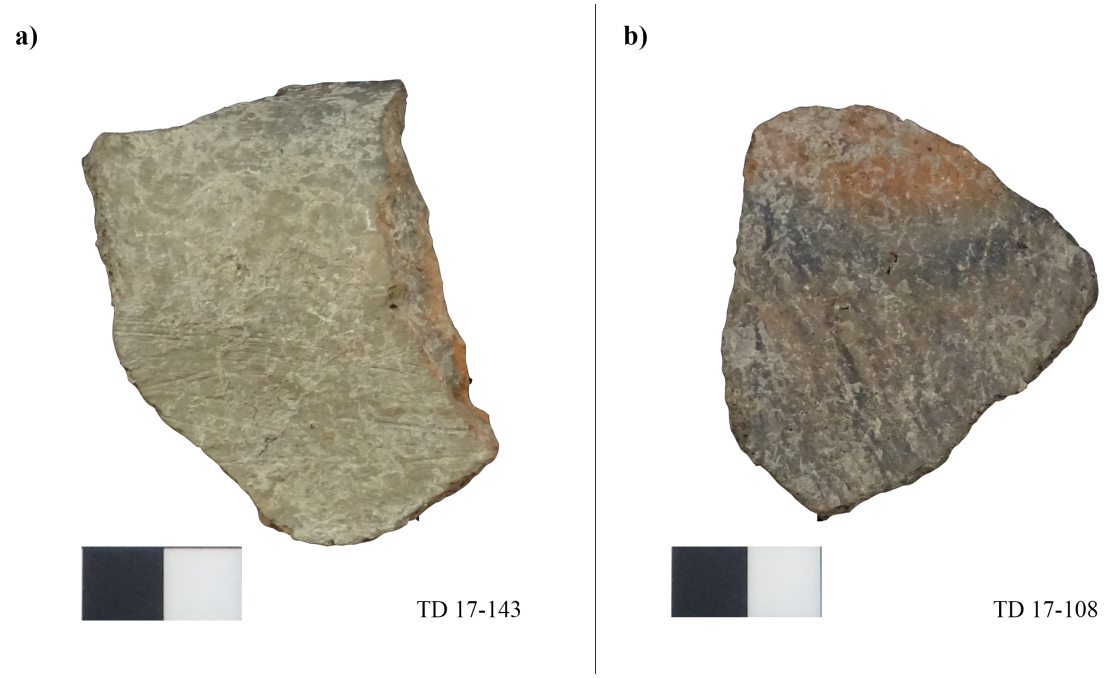


Figure 6.6 Striations on coil-made pottery. a) wiping marks, b) deeper grooves.

Finally, the third subgroup includes all coil-made pottery that is plain (i.e. that is not burnished). It is otherwise identical to the two previous ones in terms of forming.

One last subdivision, restricted to the Burnished and slipped group and the Plain group, was observed. This subdivision is based on the absence or presence of striations on one or all surfaces of the sherd (figure 6.6). These striations are irregular and are not parallel to each other. They cannot be attributed to any rotative forces. The current interpretation is that they are the results of some form of wiping action (figure 6.6a), with a rough cloth or some similar tool. It is possible that some deeper striations observed on a few sherds (figure 6.6b) are instead the results of scraping. However, no traces of displacement or removal of clay are observed, and as such, the wiping hypothesis is still considered more plausible. Some of the striations also fit with the "self-slip" hypothesis explained above. Indeed, depending on what tools or gestures were used, it could leave similar traces to those observed in figure 6.6a. Those traces are never observed on a burnished surface, and must thus correspond to a step which precedes the burnishing. Nevertheless, these macro-traces are much more common on plain pottery, where no slip is observed; it may be that they are related to more than one technical gesture (see polysemic nature of macro-traces, Chapter 2).

6.2.1.3 Rejected features

Other features that would need to be addressed at this stage of the analysis were also observed. However, because their occurrences were sporadic at best, they could not be included in the final classification, and were rejected. As a reference for future research, they are listed and briefly described in the present section.

The carinated cup is a rare shape in the HBW assemblage at Teichos Dymaion. Its only example, an almost complete profile collected as surface find, was however quite useful to investigate how different section of a pots were joined (figure 6.7). It is otherwise not a feature that is easily studied in the rest of the assemblage, due to its fragmentation, and could not be considered to further detail the different *chaînes opératoires*.

Figure 6.7 Joining of two sections on a carinated cup.

Figure 6.8 Rim join

It was also impossible, for the same reason, to determine if there was any change or alteration in the execution of the forming techniques used for different sections of a pot. However, a hint of something similar was observed in a rim sherd displaying a large, single flat coil for the collar section of a vessel (figure 6.8), which seems different than the other relic coils observed in figure 6.2a.

6.2.1.4 Preliminary interpretation

It comes as no surprise that all pottery that was classified as HBW in Chapter 5 belongs in this category. Indeed, Rutter's first publication on HBW was already suggesting coiling as the dominant forming technique for this then new class of pottery (Rutter 1975: 19). What is interesting, however, is that, so far, no technological difference exists between the burnished, canonical HBW and the plain handmade pottery, except where surface treatment is concerned. There is no reason at this stage to divide the HBW into other wares, including the so-called Handmade Domestic Pottery. Further investigation of this particular question will have to be made in the following techno-petrographic and techno-morphological classifications.

As an exception to this dominance of HBW, it soon became apparent that all pithoi, identified as Mycenaean, had to be placed in technical group 1. They are, just like HBW, coil-made, although the coils are certainly bigger. However, they will certainly be segregated from the reminder of the coil-made pottery in further stages of the analysis.

6.2.2 Technical group 2: Wheelmade

The second technical group represent the majority (c.84%) of the pottery that was studied in the course of this project. It is constituted of fine and coarse wheelmade pottery, a primary forming technique which used the centrifugal force of a potter's wheel to form vessels (figure 6.9). It is composed of four different stages (figure 6.10): 1) centering, 2) opening 3) lifting and 4) shaping (Rye 1981: 74, Roux 2016: 101). The attributes that help in the identification of this forming technique often come from the three last stages.

6.2.2.1 Identifying wheelmade vessels: description of distinctive attributes

Maybe because it is by far the most common primary forming technique for LBA material in the Aegean, the identification of wheel-thrown pottery was much simpler than the

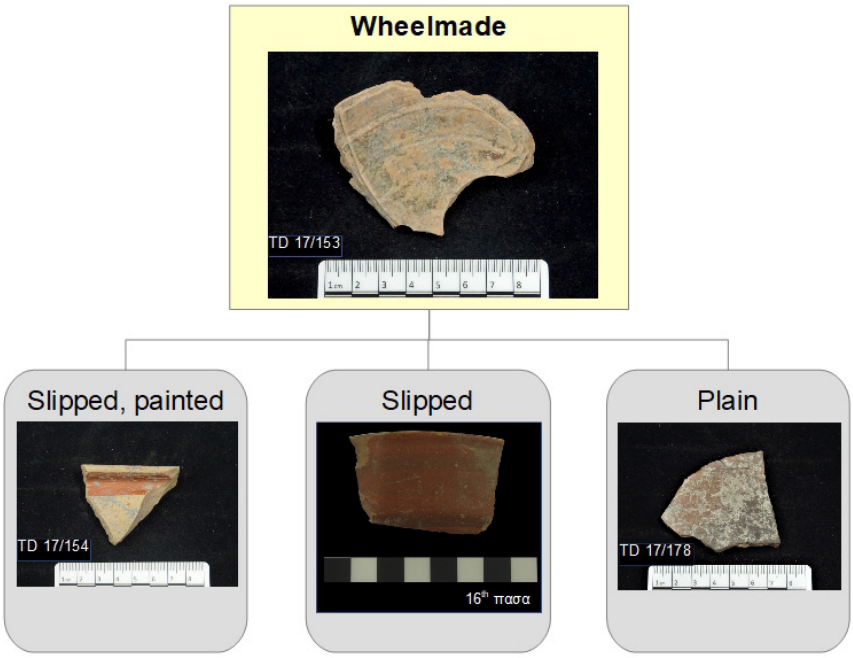


Figure 6.9 Technical Group 2: Wheelmade

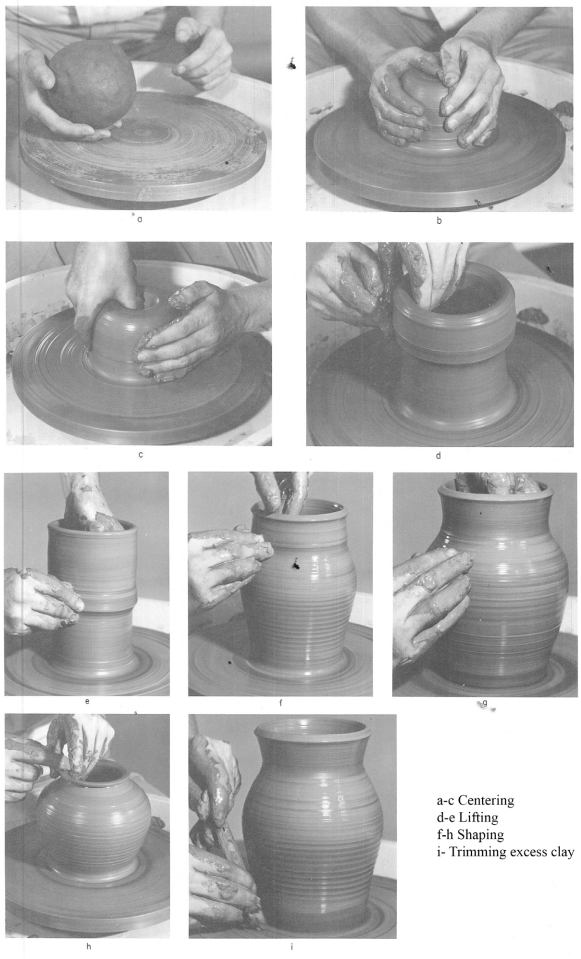


Figure 6.10 Stages of wheel-throwing (from Rye 1981)

identification of coil-made sherds. There were, however, grey areas where the identification was not as straightforward. This is the case for the coarse, usually plain, utilitarian pottery, which can aesthetically be mistaken for handmade pottery. The coarse nature of the fabric may give sherds an irregular feel, similar, if the sherd is small enough, to the relief of coil-made pottery. Moreover, as mentioned in Chapter 2, it is common for potters to hide traces that are indicative of how a vessel was produced (Roux 2016: 165). Depending on the function of a vessel, or on what surfaces were visible, macro-traces may be absent, making those sherds that are in these grey areas difficult to classify. There are nonetheless two attributes that can be helpful to identify wheelmade pottery, and mitigate the situations for which this identification is more complex.

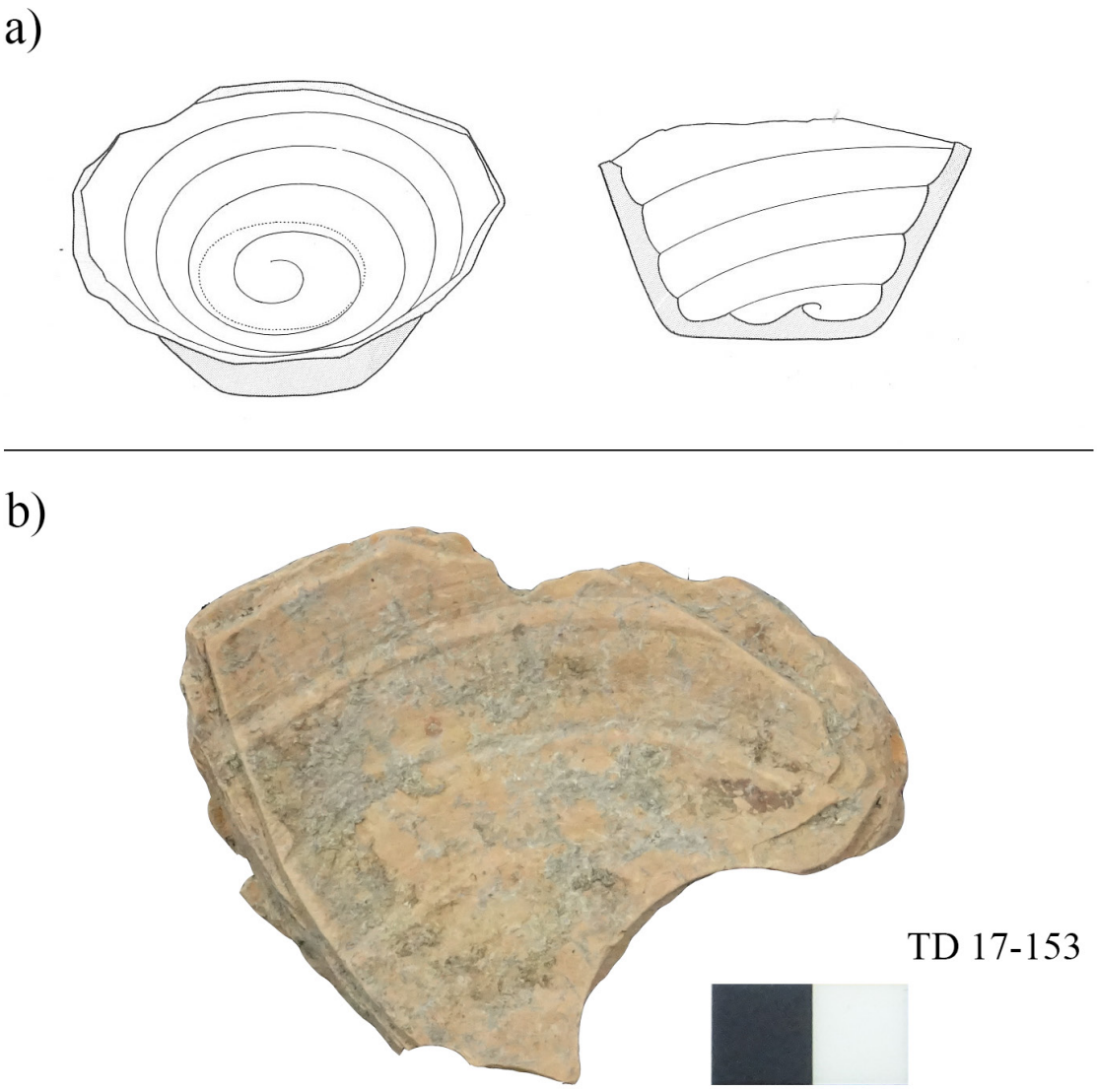


Figure 6.11 Macrotrace of wheel-throwing: grooves

1) *Surface markings*: When nothing is done to erase them, wheel-throwing can leave very distinctive grooves and ridges on both surfaces of a vessel, although it is more common to observe them on the inner surface. The grooves, if completely visible, would form a spiral starting at the centre of the base of the pot. Such marks appear as the vessel is opened, lifted, and shaped (figure 6.11). When the potter tries to erase those traces, parallel lines can replace these groves and ridges. Those finer lines appear as the potter's hand or tool is held against the rotating vessel to flatten its surface(s) (Figure 6.12). These finer macro-traces are usually observed on surfaces that are meant to be seen or decorated, like the outer surface of a closed vessel or the inner surface of an open vessel (Rye 1981: 74-80).
2) *Relief*: If excluding protuberance due to large inclusions, sometimes responsible for the irregular feel described above for some of the coarser vessels in the assemblage, wheelmade pottery is characterised by a smooth vessel wall, of unvarying thickness horizontally, and decreasing thickness vertically, from base to rim. Indeed, if not modified in later stages, the base of a thrown vessel is usually thicker, and its wall usually gets thinner going upward. This variation may not be observed if enough refining is done by the potter.

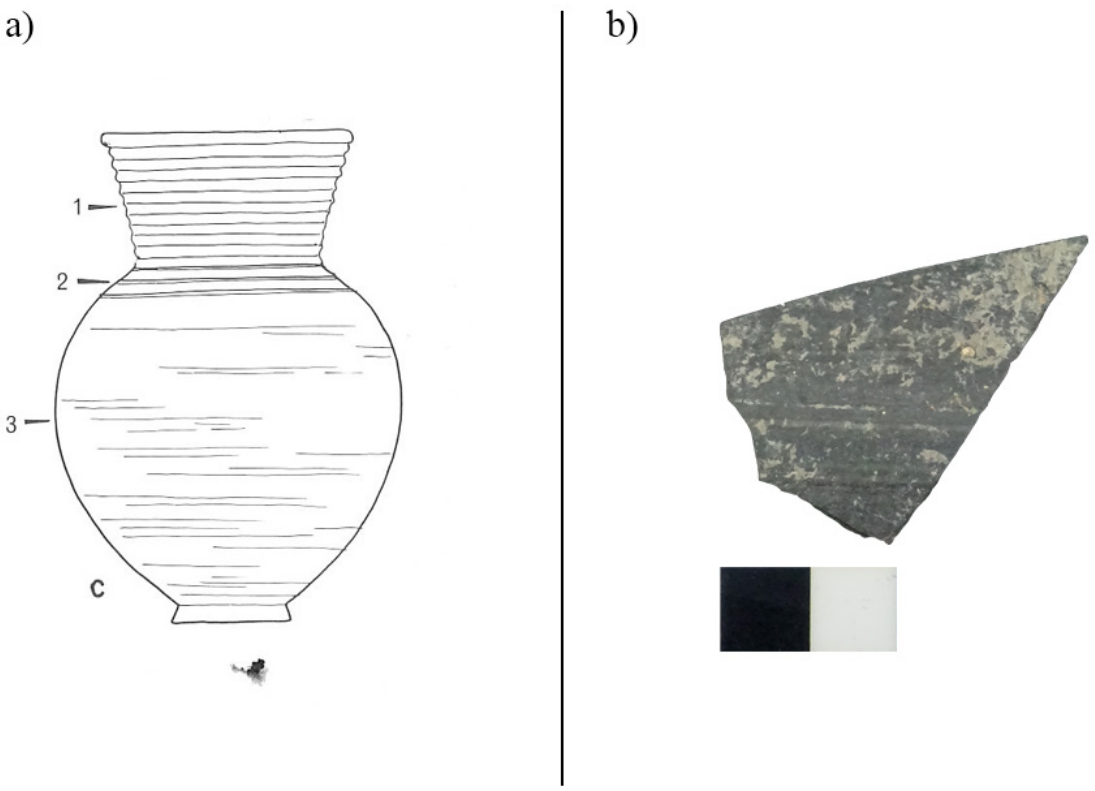


Figure 6.12 Macrotrace of wheel-throwing: parallel markings

While harder to observe on decorated vessels, spiralling grooves or fine parallel lines indicative of a rotative action were confirmed on a large enough portion of the fine pottery from Teichos Dymaion to assume it was all produced on the wheel. Surprisingly, some coarser vessels seem to display fewer grooves or lines than finer ones, implying a more systematic smoothing of their surfaces. In such a case, it was the relief of the vessel wall which was considered to identify the forming technique. Once again, there was a large enough sample size to confirm that the coarse pottery was also wheelmade.

6.2.2.2 Variability in surface treatments

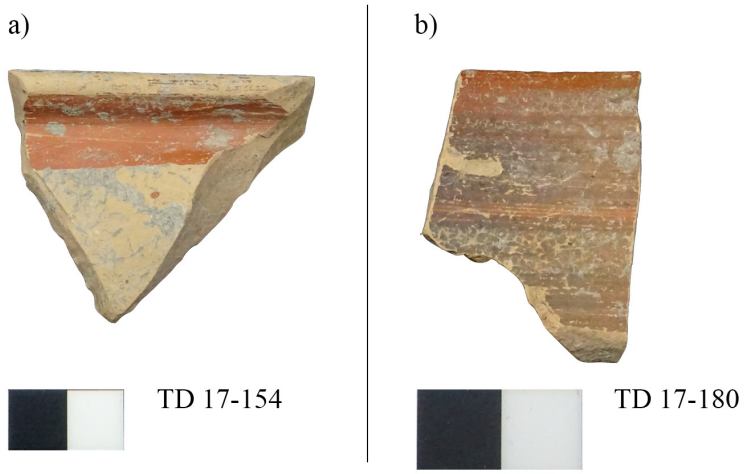


Figure 6.13 Similarity of paint and slip in fine Mycenean pottery

Just like in Technical Group 1, surface treatments, while not primary or secondary forming techniques by definition, were used as a straightforward way to further subdivide an otherwise large group of pottery. This is, again, due the absence of other macroscopically observable meaningful technological features.

The first and second subgroups, labelled respectively *Slipped and painted* and *Slipped*, are very similar, and are discussed together. Because of the fragmented nature of the assemblage, it is possible that a vessel identified as simply slipped was is fact also decorated with paint, but that this paint was absent from the single sherds used for its identification and description. It is also useful at this point to define slip as it is used in this thesis. The word "slip" can refer to a fired coating surface found on a vessel, but also to the fluid raw material which is used to create this coating (Rye 1981: 41). Slips, as raw material, simply are clay particles in suspension in water, with the occasional addition of other substances, for example colorants (Rice 2015:162). Part of the confusion about slip comes from the fact that it can have multiple uses: it can be used, as mentioned above, to coat a vessel, but it can also be used to paint a vessel, if applied to create decorative elements. It is thus essential to differentiate between both functions and define how words such as "slipped" and "painted" are used to make sure no confusion remains. As such, this project uses "slipped" to refer to a surface or a vessel which is completely coated with a slip, and "painted" to refer to

the application of paint (which can be slip) to create decorative motifs or patterns on a surface. To exemplify this, figure 6.13 shows a sherd (6.13b) *slipped* with a similar raw material to what was used to *paint* red lines on another sherd (6.13a); the difference in terminology is not one grounded in the nature of the raw material, but on its application.

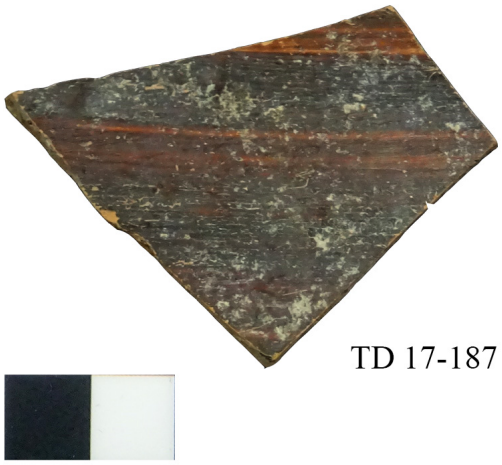


Figure 6.14 Application marks of paint and slip

Moving on to the specificity of the assemblage, both subgroups use similar slips, divided into two main colour categories. The first one is a pale-coloured slip, buff to beige, and is often used as a canvas for painted motifs. The other is an iron-rich slip, red or reddish brown to black, used to paint decorative elements or to coat one or both surfaces of a vessel to create what is refer to as "monochrome" in the literature on Mycenaean pottery (see Mountjoy 1986, 1999, 2001). Contrary to the pale-coloured slip, this iron-rich one is never painted on with darker or lighter coloured slip. The first subgroup, *Painted and slipped,* uses both simultaneously, with the iron-rich slip being used to paint decorative motifs. The second subgroup can use both, but often is limited to one slip type, and does not bear painted elements. No pottery count was carried out to determine which subgroup is the most represented in the assemblage, due to the fragmentation issue mentioned above. However, it was determined that the most frequent slip used to cover surfaces was the pale-coloured one. The iron-rich slip, when used to coat vessels, is mostly used on inner surfaces, although a fair number of vessels are completely slipped with it. Interestingly, the pale-coloured slip seems to be applied by dipping or pouring, but the iron-rich one show striation patterns suggesting it was rather applied using a brush or something of similar use (figure 6.14). Moreover, the regularity and parallelism of the macro-traces left by the brush or tool also suggest the use of a rotative device, maybe a turntable, to assist in the application of the liquid. While it is impossible to determine with any certainty the reason behind the difference in the method used to apply the different type of slips, it has probably to do with viscosity. Indeed, if the iron-rich slip had a less viscous, more diluted nature, application by pouring or dipping would produce less satisfactory results than one more akin to painting with a brush, as it would not adhere as easily to the pot's surface.

In addition to the two main slips described above, a limited number of vessels, corresponding to the so-called grey ware described in Chapter 5, display a dark grey slip. Interestingly, both

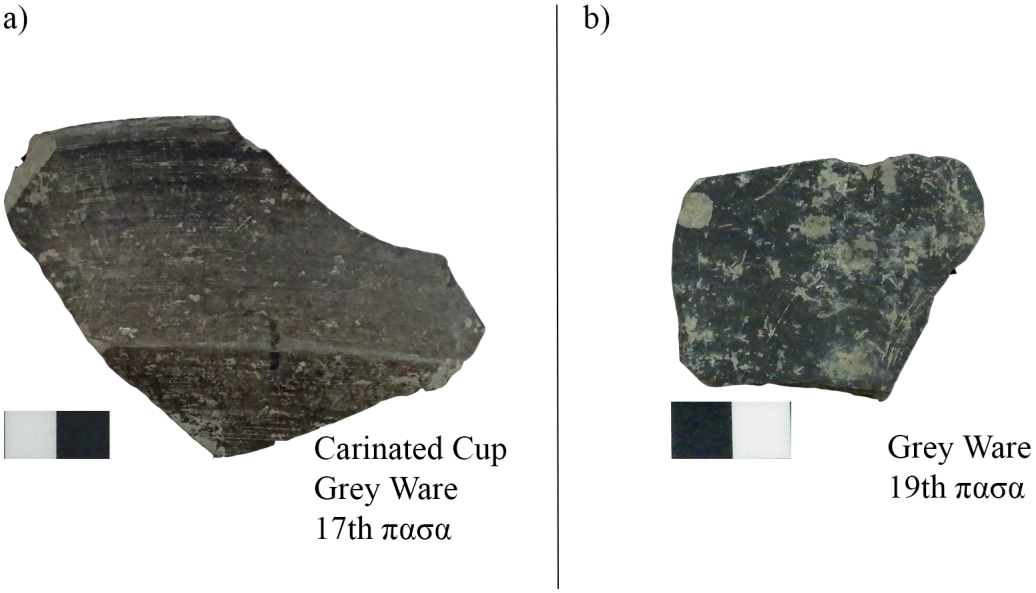


Figure 6.15 Slip types, Grey Ware. a) thin, brushed(?) slip, b) Thick dark slip (poured /dipped ?)

methods of application (pouring/dipping or brushed) seem to have been applied to this very limited group of pottery (figure 6.15).

Finally, the third and final subgroup contains all plain wheelmade pottery, which is neither slipped nor painted. Occasionally, the surface may be smoothed, but no other surface treatment is otherwise recorded.

6.2.2.3 Preliminary interpretation

The Wheelmade technical group corresponds, as expected, to what was labelled as Mycenaean in the material presentation of Chapter 5, both in its coarse and fine manifestations. However, Subgroup 2 (*Slipped*) also includes all sherds of Grey Ware identified in the assemblage. In fact, no difference whatsoever was observed between the technology of the Grey Ware and the fine Mycenaean. While not sufficient to confirm it, this observation fits quite well with the current concensus on Grey Ware, as it is believed to originate from an adoption of Mycenaean ceramic technology, applied to produce Italian vessel shapes (Borgna and Levi 2015: 116).

6.2.3 Technical group 3: Pinched

The third technical group only contains a single sampled sherd, and possibly a few more sherds could be associated with it, but it would necessitate further analysis to be confirmed. As such, only the sampled sherd can be positively associated with this group. The sherd is handmade, very coarse, and has been interpreted as part of a metallurgical mould. No macro-

traces are observable, but the rough nature of the sample and its flat, uneven relief seems to indicate it was produced by pinching. In the absence of more elements belonging to this group, it is however impossible to go further in the visual assessment of this group

6.2.4 Technical groups: comments on firing and final remarks

After adding all technical groups together in a technical dendrogram which includes the forming techniques observed in the pottery assemblage from Teichos Dymaion, one last element is missing: firing. Firing was investigated by looking at fabrics, macroscopically and during the petrographic analysis, and by estimating vitrification by looking at the hardness of the sherds. Therefore, while it clearly belongs in this technical stage of the classification, firing was studied simultaneously with the fabrics, which constitute the basis of the second, petrographic stage of classification. However, because the method for estimating firing was fairly simple and did not allow for very detailed, quantified results, the results were equally simple, and easy to integrate into the final technical dendrogram.

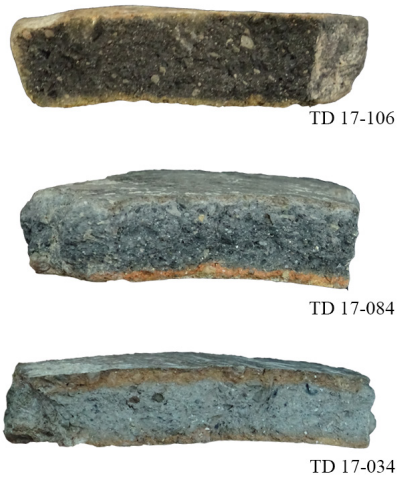


Figure 6.16 Firing, handmade pottery.

Firing can be roughly divided into two categories, roughly fitting both main technical groups. The coil-made pottery contains mostly unvitrified sherds, with a few more high fired examples. This indicates lower temperatures. In terms of fabric, the margins are mostly of light colours, while the core varies between light and dark colours, indicating varying firing atmospheres and/or duration. However, sharp core/margin boundaries indicative of unoxidising atmosphere and rapid cooling (Rye 1981: 116) seem to suggest that most handmade pottery was fired in a simple fashion, probably bonfires (figure 6.16). As temperature and atmosphere are difficult to control with this type of firing technique (Rye 1981: 97-98), this would explain the variability noted in the coil-made pottery.

Figure 6.17 Firing, Mycenaean pottery

The observation regarding firing made on the wheelmade pottery (figure 6.17) is, as expected, completely different. Indeed, the atmosphere of firing seems much more controlled, and most sherds seem consistently oxidised. Most samples are high fired, and the very fine examples seem vitrified. This is observable in the thin sections, with some of the finer pottery displaying a

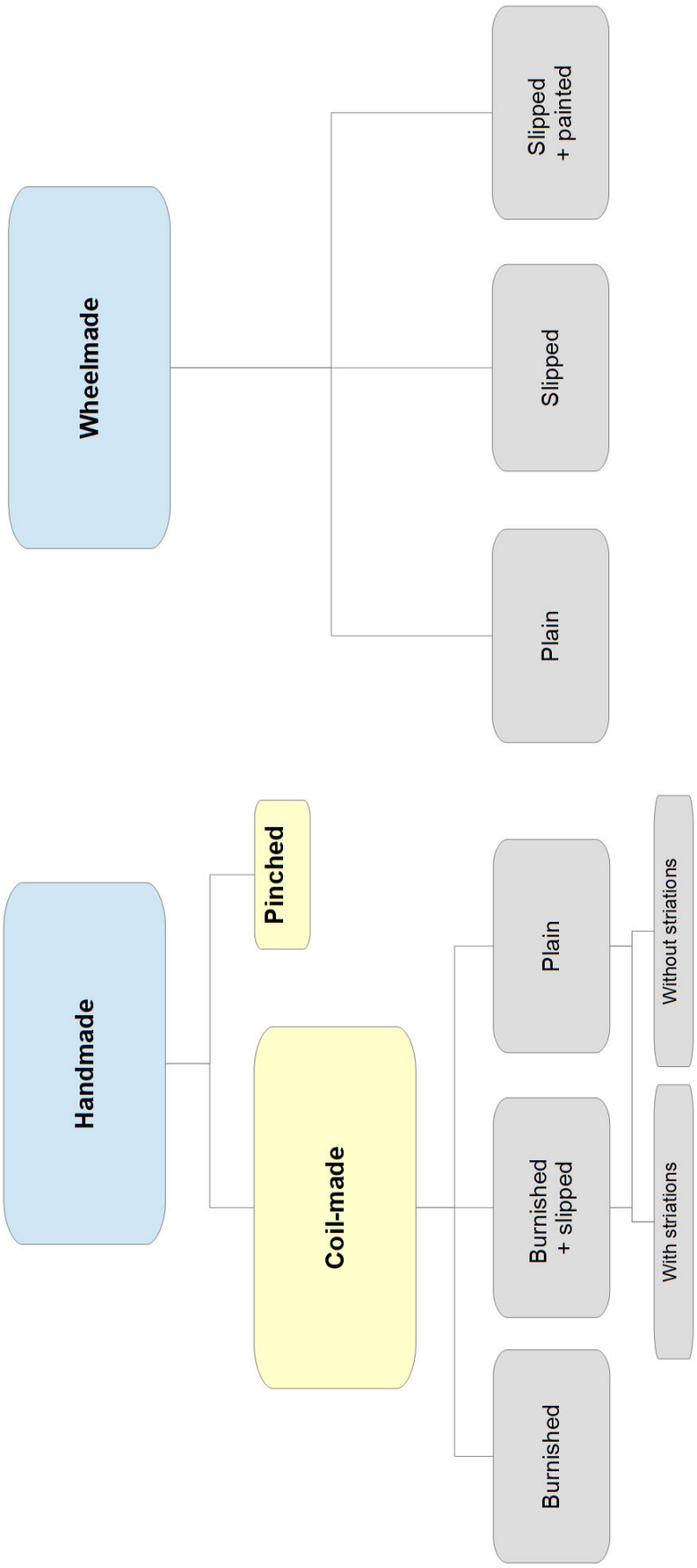


Figure 6.18 Technical groups at Teichos Dymaion

completely optically inactive clay matrix. While vitrification is known to begin around 700°C, extensive vitrification which would result in those observations is reached above 800-850°C (Rye 1981: 108, Quinn 2013: 191). Many sherds also display agglomeration of iron oxides, a phenomenon known to happen above 900°C (Rye 1981: 108). The wheelmade pottery thus seems to have been fired in conditions which allow a consistent control of the firing atmosphere, and uniformly high temperatures that routinely reach above 900-950°C. It can thus be concluded that pottery from Technical Group 2 was fired in kilns.

Some exceptions exist. The coarser wheelmade pottery, for instance, often seems fired at lower temperatures. They are not, however, indicative of bonfire firing like the coil-made pottery, and as such, it was assumed they were still fired in a kiln environment.

Integrating these observations with the description of each technical groups above, it is possible to create a final dendrogram which give a comprehensive portrait of the different technological traditions identified in the assemblage at Teichos Dyamion (figure 6.18). This portrait is however incomplete. The following section will contribute to it by describing the different fabrics and fabric groups identified during the petrographic analysis.

6.3 Techno-petrographic groups

With each technical group having been defined, they must now be analysed in terms of fabrics, to create techno-petrographic groups that aim to address raw material selection, processing, and later, provenance. In order to do so, it is however necessary to *forget* the technical grouping described above. Indeed, while the techno-stylistic classification system aims to create a tree-like subdivision of the assemblage which begins with the technological assessment of the material, it would have been ill-advised to proceed with the thin-section analysis based on the technical groups and their subdivisions (i.e. to study samples from each subgroup independently). This would make the comparison between groups difficult, and the identification of fabrics common to multiple groups impossible.

This section will rather follow, at first, a more traditional approach to presenting results from ceramic thin-section petrography, following more closely how the analysis was carried out. The presentation will however consider the preliminary distinction made during sampling, which considered HBW, Grey Ware, and Mycenaean pottery separately to ensure the HBW, focus of this thesis, was well represented.

It will first present each fabric or fabric group identified, describing their respective composition, distinctive characteristics, and technological features inferred from their analysis. It will address all HBW and Grey Ware fabrics first, then move on to the Mycenaean fabrics. Following this presentation, the different fabrics will be integrated into the techno-stylistic classification, creating the techno-petrographic level of the hierarchical analytical system.

6.3.1 Fabric 1: Alluvial clay group

The largest fabric group by far, Fabric 1 was qualified as a group because of its heterogeneity. It comprises 143 samples, divided among 6 subfabrics. The subfabrics are bound together by a common matrix and fine fraction, suggesting that they share a very similar, if not the very same, clay source. They also share similar void types and distribution, which was attributed to a consistent craft practice involved in the making of the pottery from Fabric 1.

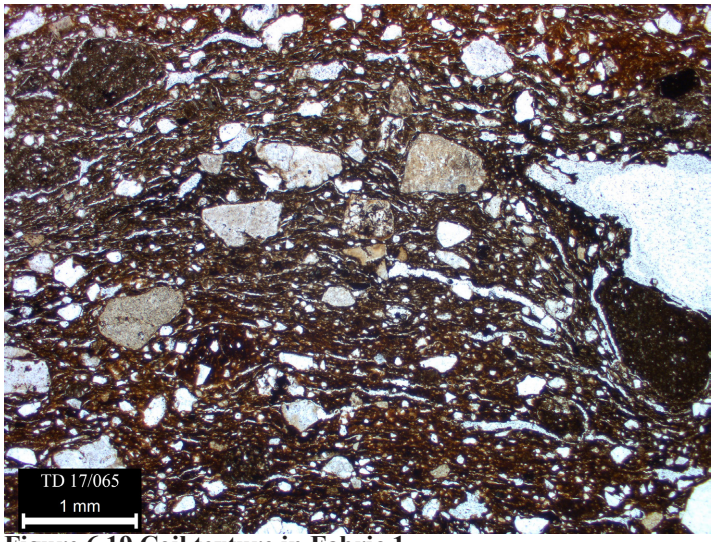


Figure 6.19 Coil texture in Fabric 1

Fabric 1 has a light-brown, brown, or reddish-brown clay matrix, with frequent core to margin differentiation. Indeed, the margins are often lighter and redder than the core. The boundaries between both vary from diffuse to sharp. On very rare occasion, this phenomenon will be inverted, with a margin darker than the core, but this is most often observed on the inner surface of a sample. Voids are similar in all subfabrics as well, mainly consisting of meso- to macro-channels and vughs. They can be aligned in such a way which highlights relic coils that were invisible in hand specimen (figure 6.19). It is also fairly common to find voids displaying black margins or shapes characteristics of the combustion of organic material.

Samples from this fabric group display a highly or moderately bimodal distribution of inclusions. The fine fraction, common to all subfabrics, is characterised by its high sphericity. It contains a high amount of quartz, chert, and quartzite inclusions, and rarer but very distinctive red argillaceous rock and acid igneous rock fragments. Many samples also contain inclusions of plagioclase feldspars with a microperthite texture. The overall size and quantity of inclusions can vary, even within a single subfrabic. It was however deemed an acceptable variability

considering the type of clay source it seems to come from.

Indeed, the mineralogy, size, shape and distribution of the inclusions within the clay matrix suggest the use of a secondary clay, most likely from an alluvial clay deposit. This was deduced from the weathering and high sphericity of the inclusions which suggest water transportation of the sediments. This would explain the variability of inclusions size and quantity observed in this fabric group. Indeed, a clay deposit may present natural variations, horizontally (i.e. from one place where the clay was dug to another) and vertically (i.e. in the different deposition layers of the clay bed). The different subfabrics were thus based on variation within these parameters. Indeed, even when acknowledging the natural variability of an alluvial clay deposit, some differences were too important and necessitated a subdivision.

While three of those subfabrics represent noticeable variations found *within* the commonly shared features described above, three are actually based on what is believed to be changes in tempering practices. Considering the importance put on technology in this project, it would have been justified to create new fabrics altogether based on such differences. However, such drastic divisions would not be representative of the material reality of the assemblage.

Indeed, it is worth mentioning at this point that the boundaries between the subfabrics of the Alluvial clay Group are not firm or impervious. While based on a real, observable, variability, they are based on relative quantity of inclusions. As such, many samples could fit in more than one category when those inclusions are in similar proportions. Equally some samples that definitely belong in fabric 1 could not fit in any subfabric, either because the proportions are too similar, or impossible to establish. This will be explored further in each subfabric description.

6.3.1.1 Mudstone subfabric (subfabric 1.1)

The Mudstone subfabric (figure 6.20) is the most representative of the assemblage, with 59 samples. It is defined by the presence, in dominant or predominant proportion, of a*rgillaceous rock fragments* (see Whitbread 1986: 82) in its coarse fraction. These are brown or rarely reddish argillaceous sedimentary rocks grading from mudstone to siltstone in terms of inclusion size, called *mudstone* for clarity purposes. They contain well-sorted inclusions of quartz and mica, sometimes organised in observable bedding planes. Absent from the fine fraction, these sedimentary rock inclusions are considered alien to the base clay, and are interpreted as a tempering agent added to it as part of the clay preparation processes. The coarse fraction can also include grog, which is by its very nature considered as temper as well. The grog inclusions will be described in more detail below (section 6.3.1.3).

The rest of the coarse fraction is very similar to the fine fraction, with the common occurrence of chert and quartzite, and rarer but nonetheless noticeable radiolarian chert being the most recognisable inclusions. Because they seem to relate to the fine fraction, it is probable that they correspond to coarser inclusions occurring naturally within the alluvial clay. The significant size variability of the coarse fraction (0.8 to 4.6 mm) also support this interpretation.

6.3.1.2 Finer alluvium subfabric (Subfabric 1.2)

This subfabric (figure 6.21) is very similar to 1.1, but presents a finer, better sorted fine fraction. The ratio of inclusions to matrix is generally lower, and the matrix can be more micaceous. The coarse fraction, however, is virtually identical to subfrabic 1.1, with mudstone and chert accounting for the majority of inclusions. Grog is also present, but rare. In total, it includes 16 samples.

6.3.1.3 Grog subfabric (subfabric 1.3)

Subfabric 1.3 (figure 6.22) is the second largest group of samples. With its 44 samples, it is second only to Subfabric 1.1 described above. Both are also closely related, and are virtually the same in terms of inclusion types. Indeed, in addition to the common features shared by all subfabrics of the Alluvial clay group, they also share a very similar coarse fraction. While differences exist, we believe that they are the product of the sampling strategy, more specifically of the number of samples selected, rather than reflection of a meaningful archaeological reality. There is, however, a noticeable change in the proportion of some of the main inclusions, which is believed to reflect a difference in the tempering practices.

Just as mudstone was the hallmark of Subfabric 1.1, Subfabric 1.3 is characterised by predominant to common grog inclusions. Mudstone is still present, but in a much lower proportion. The grog found in Subgroup 1.3 and in the whole of the Alluvial clay group is highly variable in terms of size, shape, and composition. It is often similar to its host fabric, but can also be finer, or even belongs to other fabrics altogether. Its identification was, at first, problematic. This was mainly caused by the presence, as the other major inclusions type, of mudstone. Indeed, both are, along with clay pellets, argillaceous inclusions. These particular type of inclusions are often very similar in look and composition, and as such, their identification and distinction as been the subject of many publications (e.g. Cuomo di Caprio and Vaughan 1993, Whitbread 1986). This project made use of Whitbread's paper, *The Characterization of Argillaceous Inclusions in Ceramic Thin Sections*, to help in the identification of grog.

Whitbread's suggested scheme defines grog as "fired, crushed pottery". As mentioned above,

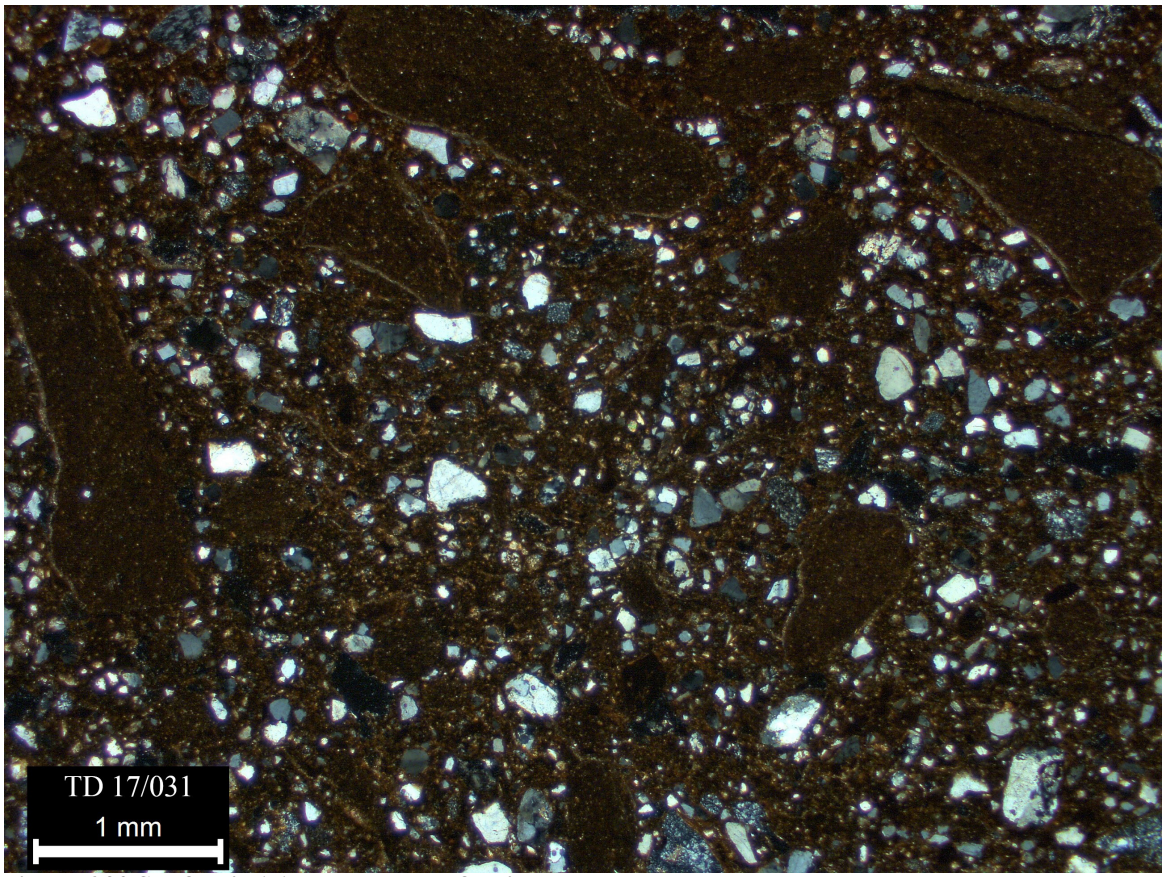


Figure 6.20 Subfabric 1.1 Mudstone subfabric

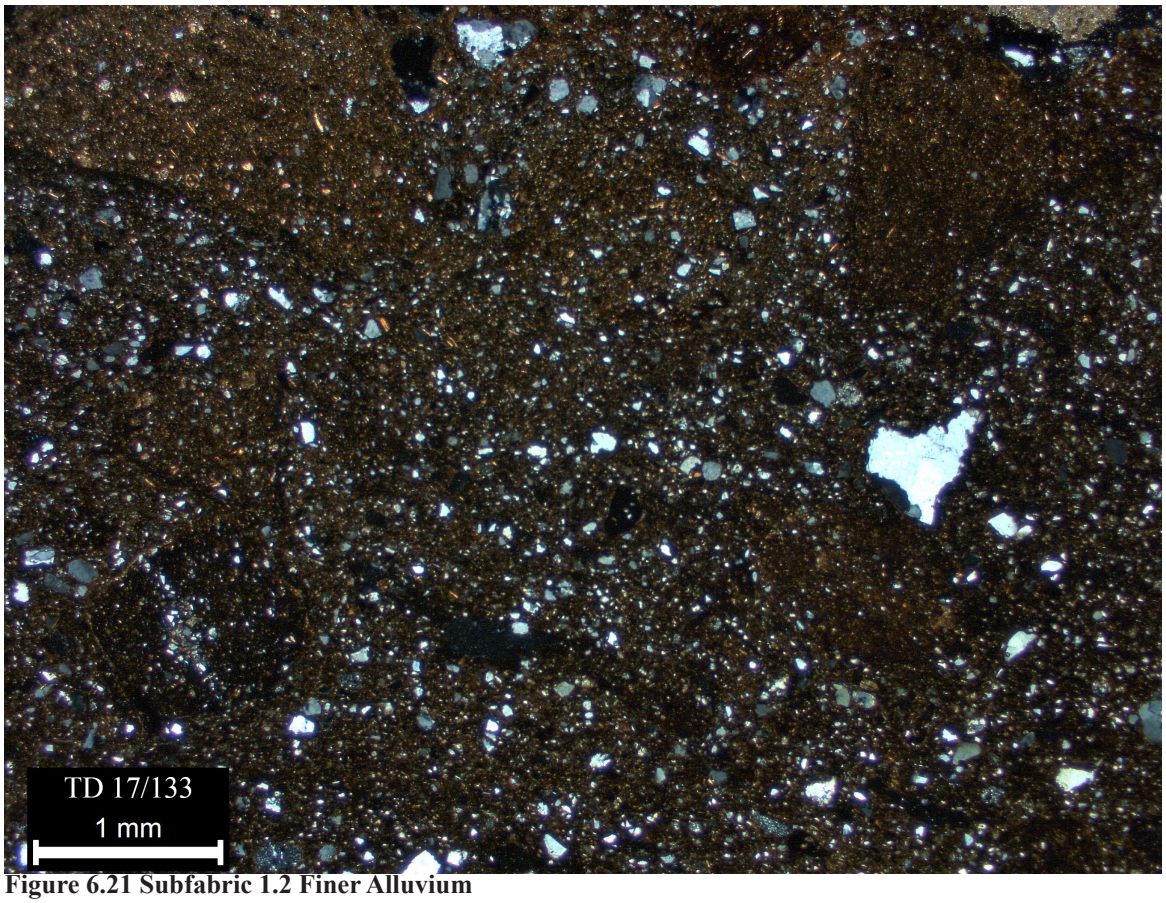


Figure 6.21 Subfabric 1.2 Finer Alluvium

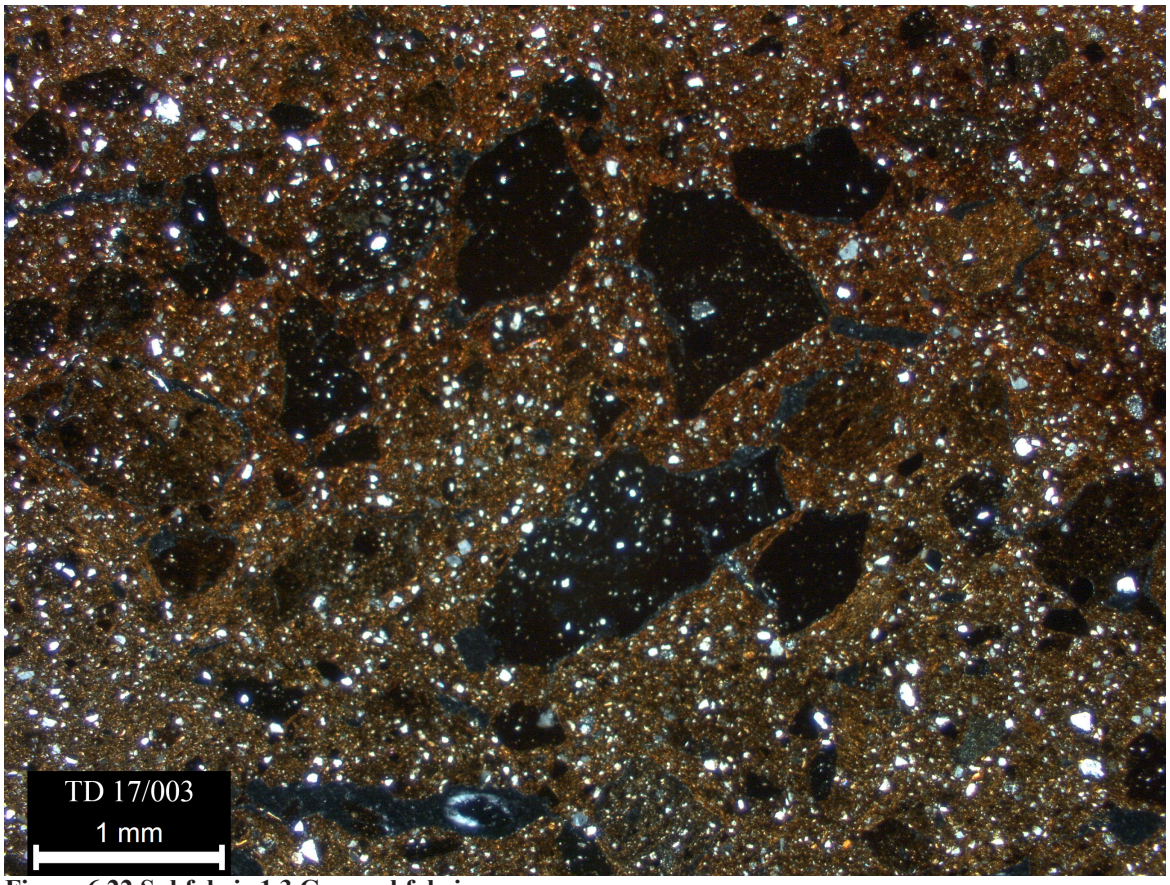


Figure 6.22 Subfabric 1.3 Grog subfabric

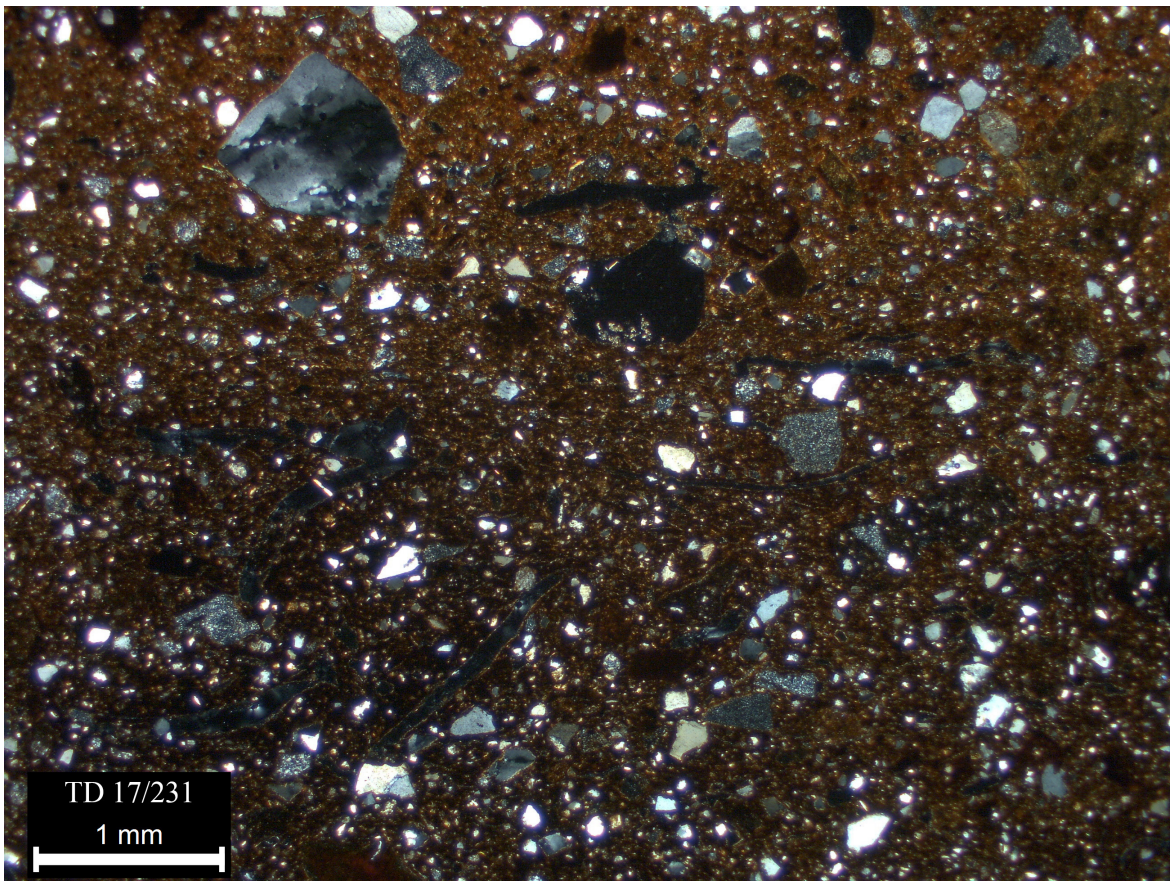


Figure 6.24 Subfabric 1.4 Organis subfabric

	ARF	Grog	Pellet (& Clay Temper)
Boundaries	Sharp to clear	Sharp to clear	Sharp to merging
Roundness	angular to subangular unless abraded	angular to subangular unless poorly fired	rounded to well rounded unless distorted
Shape	prolate to equant	prolate to equant	equant to ovoid unless distorted
Optical Density	usually high, but may be lower owing to composition	neutral when made of a similar clay mixture	frequently high, but can be neutral to low
Internal Features	none, or parallel alignment, banding, graded bedding, polygonal fractures	none, or parallel alignment and voids	none, turbid or weak orientation unless distorted
External Features	usually discordant unless parallel internal orientation and prolate shape	usually discordant unless parallel internal orientation and prolate shape	usually discordant unless it has been distorted
Constituents	usually quartz, micas and opaques, but more unusual material may be present	clay pellets and grog, same range of inclusions as in the matrix unless it is derived from a vessel of different fabric	in general, a similar range of inclusions as is found in the matrix, greater differences may be encountered with clay temper
Colour	possibly different from the matrix, can be affected by firing conditions	similar to the matrix if made of a similar fabric, firing conditions or clay mixture may create differences	often darker than the matrix, but can be very similar
Prominence	distinct to prominent	faint to prominent	faint to prominent

Figure 6.23 Comparison charts for argillaceous inclusions (ARF= Argillaceous rock fragment) (from Whitbread 1986)

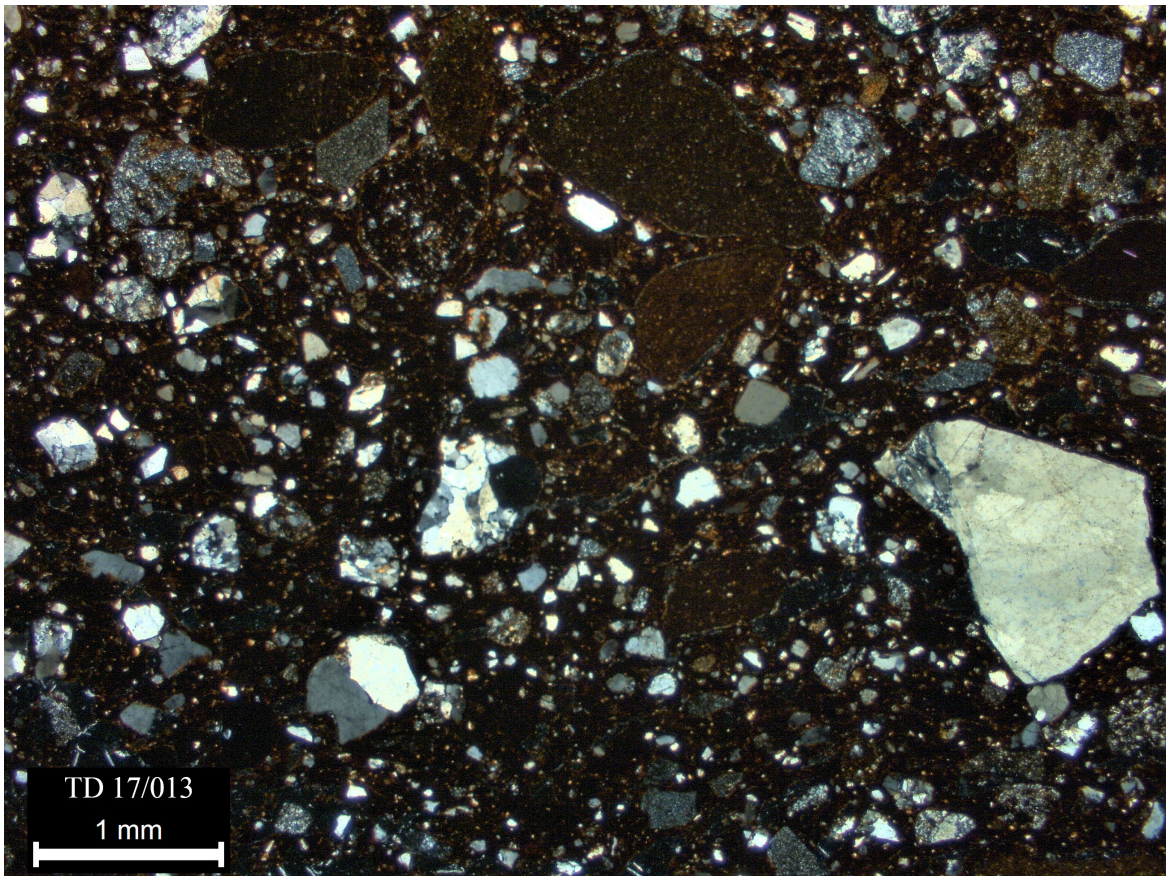


Figure 6.25 Subfabric 1.5 Coarse alluvium subfabric

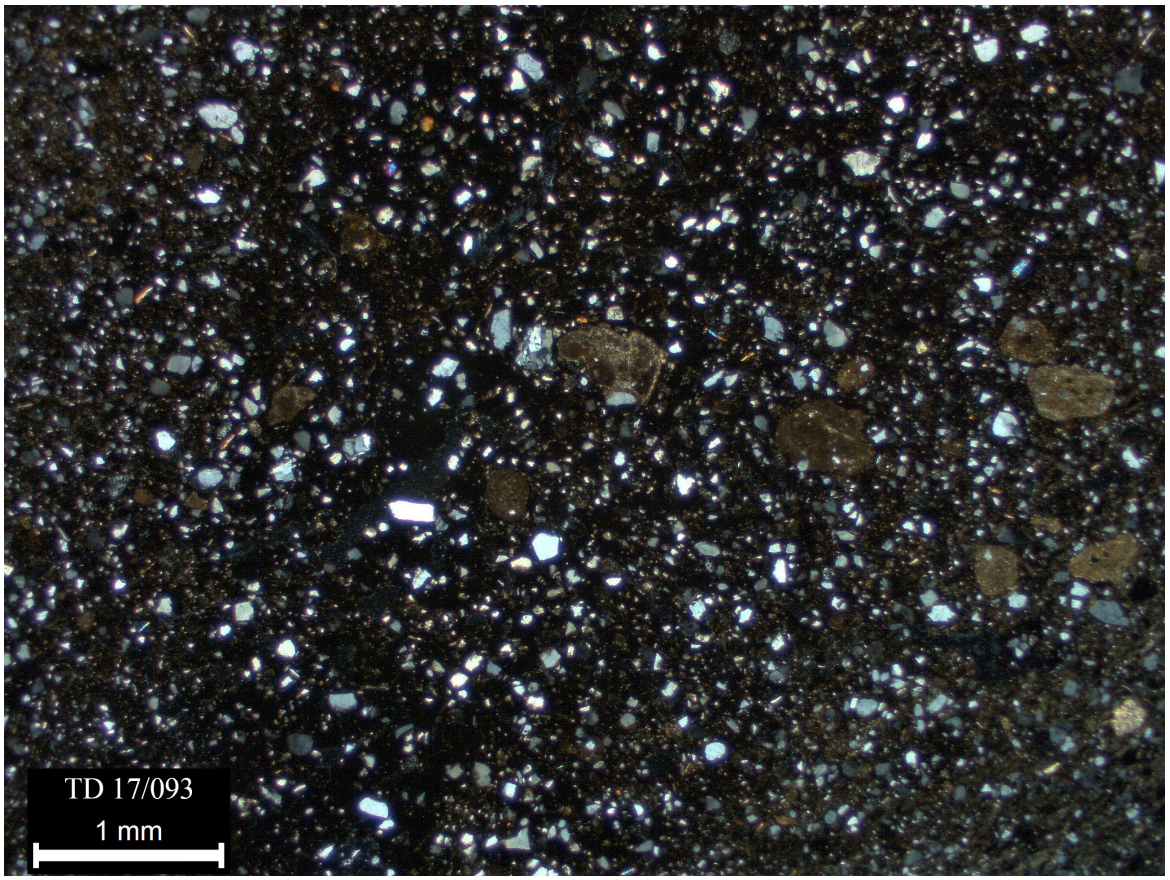


Figure 6.26 Subfabric 1.6 Calcareous subfabric

it is, by nature, a temper, because it is a manmade inclusion. Whitbread suggest two types of grog: one that is of the same fabric as the host pottery, and one that is unrelated to it (Whitbread 1986: 82). This is also what was observed in the samples from Subfabric 1.3. While it could be argued that the second type is easier to identify due to its difference with the surrounding clay matrix, both types can be hard to distinguish from other argillaceous inclusions. Whitbread thus suggests a series of comparative characteristics (figure 6.23) to help in this identification (Whitbread 1986: 83).

While such comparative elements are useful as a starting point, it is important to find an identification methodology that is adapted to the material under study. For the current assemblage, the reality was that the grog was very similar to both the matrix and to the mudstone inclusions. However, the mudstone, easier to identify, was often larger, more elongated, and with more regular edges than the grog. The distribution of inclusions was also much more regular in the mudstone inclusions, and often organised in bedding planes. These differences, along with Whitbread's characteristics, became the bases for the identification of grog in the Teichos Dymaion assemblage.

Subfabric 1.3 is very interesting technologically. Indeed, grog tempering is, in itself, a very specific technological practice that can, in this case, be very informative on the actual origin of the craft traditions (e.g. Whitbread 1992, Day *et al.* 2012). However, while it made the identification more complicated at first, it is the fact that both mudstone and grog seem to have been used simultaneously as temper that is truly informative. Not only does it tie Subfabric 1.3 with Subfabric 1.1, it also paves the way for a discussion on technological change and adaptation. These points will be addressed in the following chapters. This subfabric also contains a significant amount of the samples with sharp, red margins and dark, almost black or grey cores. Those were, in hand specimens, very typical of rapid bonfire firing.

6.3.1.4 Organic subfabric (Subfabric 1.4)

As a very small subfabric of four samples, the Organic subfabric (figure 6.24) is characterised by a higher proportion of voids with blackened margins, enough so to suggest the possibility of organic tempering. The inclusions and matrix are otherwise similar to the rest of fabric 1.

6.3.1.5 Coarse alluvium subfabric (Subfabric 1.5)

Just as Subfabric 1.2 is the finer version of Subfabric 1.1, Subfabric 1.5 (figure 6.25) corresponds to its coarser version. It contains larger chert and rock fragments, which are more

angular. Chert is also slightly more frequent. Only three samples belong to this small subfabric.

6.3.1.6 Calcareous subfabric (Subfabric 1.6)

Last subfabric of Fabric 1, this small group (figure 6.26) of three samples is once again very similar to Subfabric 1.1. It is however distinguished from it by the more common presence of carbonate inclusions such as limestone, micrite, and sparite.

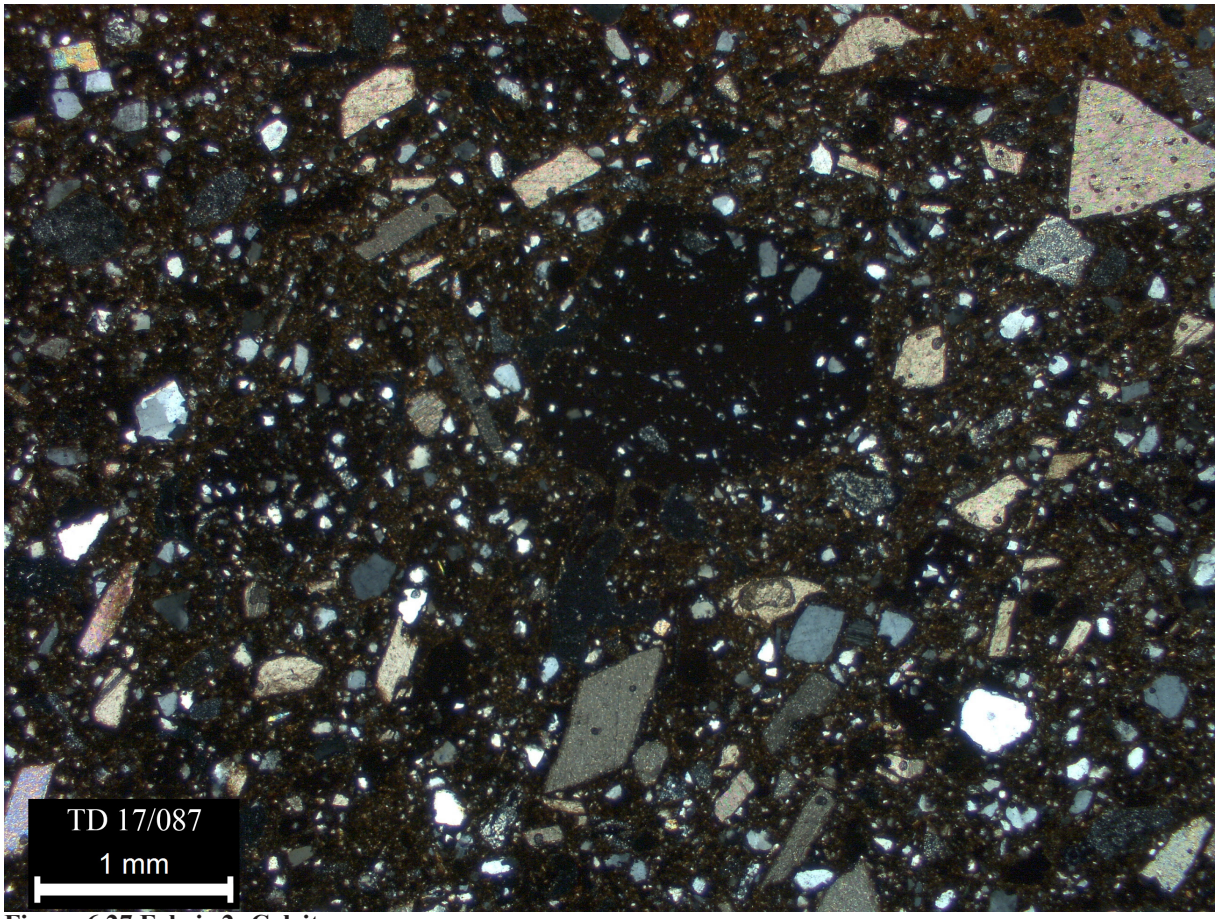


Figure 6.27 Fabric 2: Calcite group

6.3.2 Fabric 2: Calcite group

The Calcite group (figure 6.27) is a small fabric, including 15 samples. The clay matrix is reddish or reddish-brown to brown. Most brown examples display red or pale brown margins. Voids are similar in size and shape to what was described for Fabric 1. While in some aspects similar to Fabric 1, this second group of samples has a coarse fraction which suggest a different set of tempering practices, and consequently, different processing of raw materials. It is defined by a high proportion (predominant to frequent) of crystalline calcite in the coarse fraction, which is often present together with grog (frequent to absent in the fabric).

Inclusions amount to 30-50% of a sample and display a moderately bimodal distribution. The

coarse fraction displays a low sphericity, and mainly includes crystalline calcite and grog. The remainder of the coarse fraction is very similar to Fabric 1, and includes chert, argillaceous rocks, and one instance of marble. The fine fraction is also very similar to Fabric 1, with quartz, chert, and small red argillaceous rock fragments being the most distinctive inclusion. The fine fraction also includes a fair amount of calcite, but its quantity varies greatly between samples, and it most likely relates to the calcite found in the coarse fraction.

The various similarities with Fabric 1 lead to the suggestion that samples from this second fabric probably come from vessels made using the same base clay. What changes, and justifies the existence of this second group as a distinct fabric, is thus technological, and is related to how this base clay was modified through tempering practices. Indeed, instead of the omnipresent mudstone from Fabric 1, it is believed that Fabric 2 was tempered using crushed crystalline calcite. This interpretation is strengthened by the very angular nature of the calcite inclusions, and their high variability in size. The grog, however, is very similar to the inclusions found in Subfabric 1.3, and seems to indicate that both fabrics are related in some ways. This will be explored further later. No other technological observations were made, except that the firing was probably also done rapidly in a bonfire-like environment, as indicated by the paler margins and darker cores.

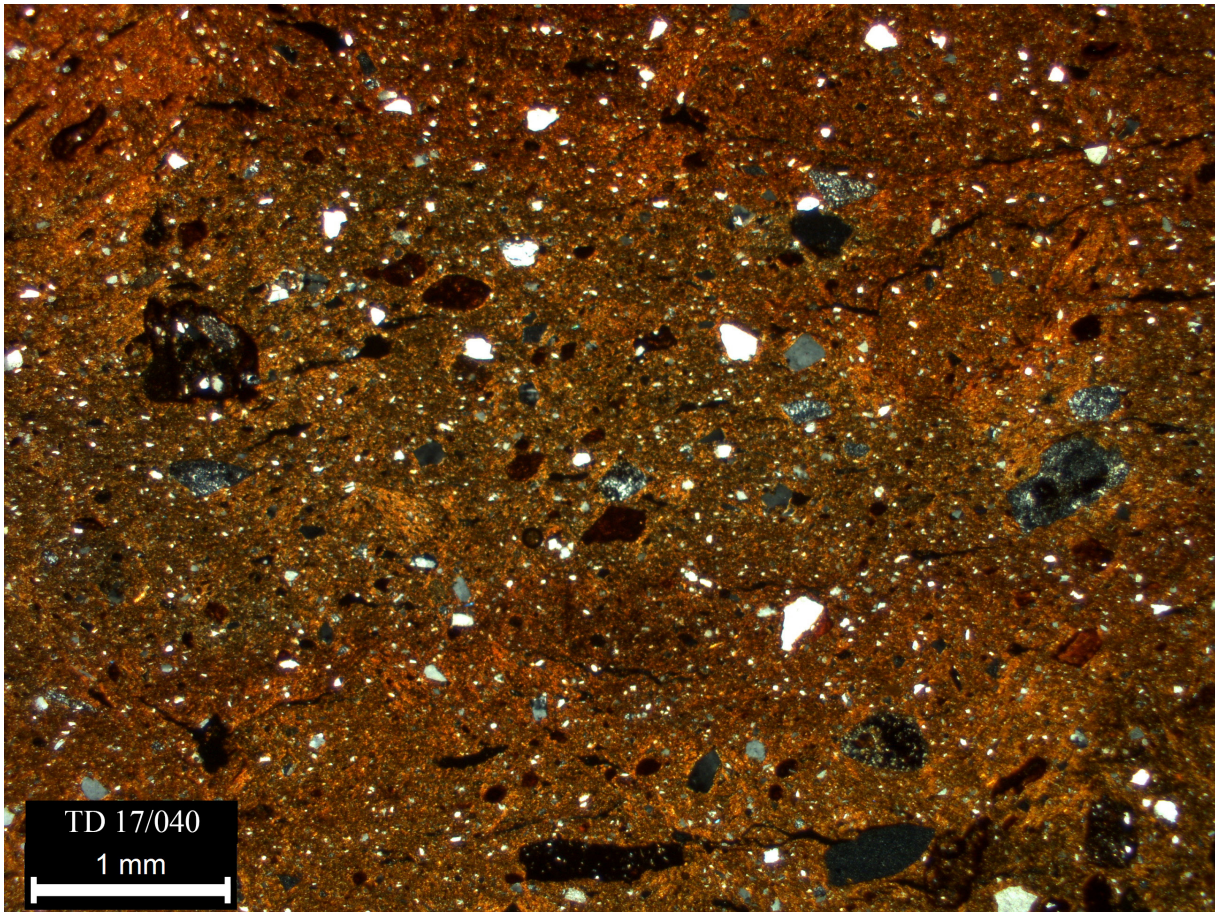


Figure 6.28 Fabric 3: Red clay group

6.3.3 Fabric 3: Red clay group

The third fabric, called the Red clay group (figure 6.28) from the red hue of the clay matrix consists of six samples only. It can be distinguished by its denser appearance, and less diverse coarse fraction. Indeed, only two inclusion types are found in the sample of this group. The most frequent is a mudstone which is very similar to the main inclusions of Subfabric 1.1, but with a reddish matrix. The other constituent of the coarse fraction is inclusions of grog with a very similar composition to the surrounding host matrix. The fine fraction is virtually the same as Fabric 1, but with rare occurrences of white mica and sparite.

As it transpires, the differences between this group and Fabric 1 are minimal. Indeed, the coarse fraction, which most likely is dominated by temper, is very similar, and the fine fraction evokes the same type of clay used in both Fabric 1 and 2. However, the redder hue of both the clay matrix along with the inclusions of mudstone and absence of inclusions relating to the alluvial deposits in the coarse fraction suggest the raw materials, while evidently similar, came from another source. The difference in colour could be due to firing, and the inclusion size discrepancies due to the natural variability of the clay deposits. If this was the case, Fabric 3 would have to be included in Fabric 1. More samples would be needed to confirm or deny the need for a separate fabric, but as the evidence stands now, this third group is considered relevant.

6.3.4 Fabric 4: Clinopyroxene and grog group (Import 1)

The fourth fabric group (figure 6.29) is once again very limited, with only two samples. It is nonetheless very characteristic, and has the potential of being important for the discussion to follow in the next chapters. Indeed, Fabric 4 has a distinctive mineralogy which is completely different from the previous three fabrics described above, including unmistakable inclusions of clinopyroxene.

Samples from this fabric are dark brown or brown with paler margins. They include meso- to macro-channels and meso-vughs voids, which are relatively well aligned to the sample's margins. Some voids display blackened margins. Inclusions are frequent (ca. 30%) and display a strongly bimodal distribution. The fine fraction is dominated by quartz and chert. The coarse fraction is also rich in monocrystalline and polycrystalline quartz inclusions. However, it includes other elements much more informative on the geological origins of the raw material. Fabric 4 includes plagioclase and clinopyroxene, along with rarer occurrences of porphyritic igneous rock fragments, tuffaceous mudstone, and other unidentified yellow inclusions. All of these are similar in size and angularity. In addition to these mineral or geological inclusions,

larger, more angular inclusions of grog are also found in both samples present in this fabric.

The bimodal distribution of the inclusions seems to suggest the use of temper once again. Grog is easily identified as a temper, and technologically links Fabric 4 with Fabrics 1, 2, and 3. The remainder of the coarse fraction is indicative of a second type of temper. Indeed, the similar size of the mineral inclusions and rock fragments may be revealing of the use of sand in the preparation of the clay body. In addition to grog and sand, the blackened margins of some of the voids is probably due to the presence of organic matter at some point during the making of the vessels, but there are not enough examples of such voids to suggest organic tempering.

The inclusions clearly indicate a separation of this particular group of samples from other HBW fabrics. Indeed, the sand which constitutes the coarse fraction includes the disassembled minerals constituting intermediate igneous rocks. This interpretation is strengthened by the presence of porphyritic igneous rock fragments. Together with the presence of tuffaceous mudstone, this lithology shows that Fabric 4 came from an area of volcanic geology. This will be addressed further when the provenance of the different fabrics will be discussed.

6.3.5 Fabric 5: Volcanic group

As with Fabric 4, Fabric 5 (figure 6.30) comprises a small group of two samples that are markedly different from the first three fabrics. Moreover, just like the Clinopyroxene and Grog group, it has a mineralogy suggesting a volcanic geological setting. It is nonetheless different from Fabric 4 in some key aspects.

This fifth fabric has an orange clay matrix, and meso-elongate and occasional meso-vughs voids. Inclusions once again frequent (ca. 30%), and display a highly bimodal distribution. The coarse fraction is dominated by three inclusion types. The first, and most numerous, is grog. The grog inclusions are brown, orange, or dark red, and contain inclusions very similar to its host fabric. The second main inclusions are volcanic rock fragments, which include fine-grained porphyritic igneous rocks, and a single poikilitic igneous rock akin to basalt. The third main inclusion type is a series of tuffaceous mudstones. The fine fraction is mostly constituted of quartz, feldspars, grog, and iron-rich inclusions, with some fine-grained igneous rock fragments and clinopyroxene.

Like Fabric 4, the bimodal distribution of inclusions, and their very nature, suggests tempering. Grog is once again used for the preparation of the clay body, this time, however, in greater quantity. The remainder of the coarse fraction has a roundness hinting that sand was also used as temper, as in Fabric 4.

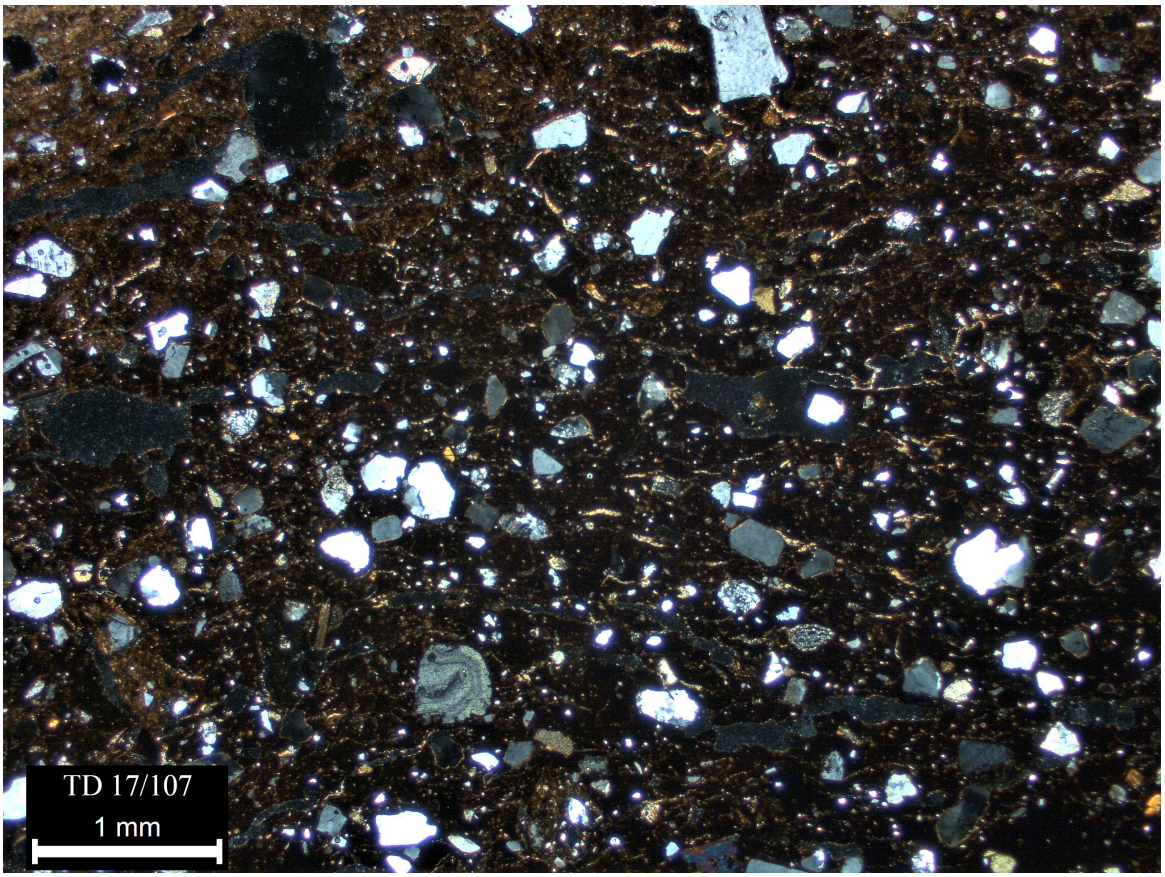


Figure 6.29 Fabric 4: Clinopyroxene and Grog group

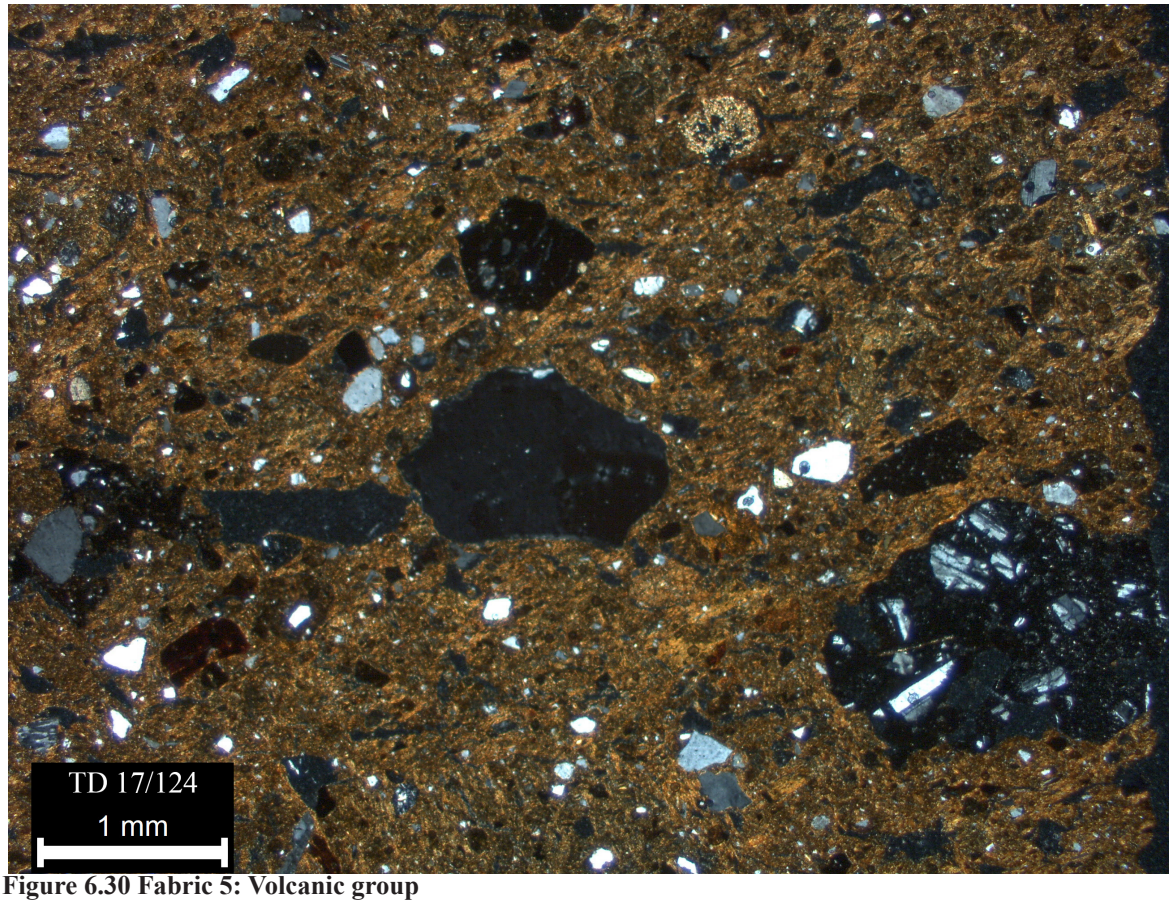


Figure 6.30 Fabric 5: Volcanic group

Despite these similarities, the type of volcanic rocks, their mineralogy, and the increased presence of tuffaceous inclusions suggest a geological setting that is different from Fabric 4, further diversifying the portrait of the assemblage.

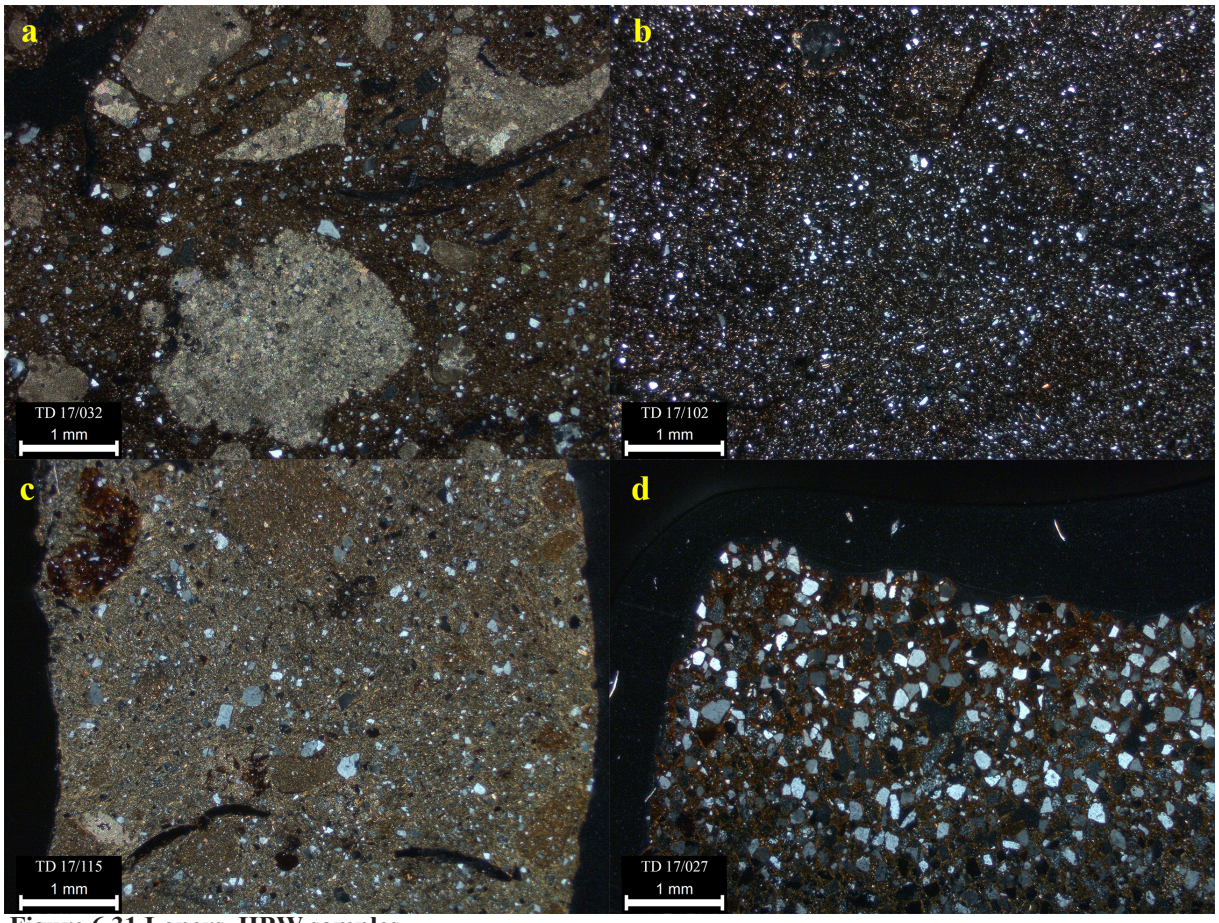


Figure 6.31 Loners, HBW samples.

6.3.6 Grey ware and Loners of the HBW samples

Most samples that were identified as HBW during the preliminary study of the material (see Chapter 5) fit within the five fabrics described above. However, a few were identified as loners, and will be briefly described below.

Loner 1 (figure 6.31a) is a very coarse sample characterised by a brown fabric with meso- and macro-channels, most of which have black margins. It is characterised by the predominant presence of carbonate rocks. These include a range of micrite and sparite that suggests multiple stages of metamorphism of carbonate sediments. The same carbonate rocks are also observed in the fine fraction of the sample. The remaining inclusions are dominated by quartz, chert, and red argillaceous rocks, which are very similar to what was observed in Fabric 1.

Loner 2 (figure 6.31b) is a coarse sample with a brown groundmass. While the inclusions of its

coarse fraction are very similar to that of Subfabric 1.1, it was isolated as a loner because of of its frequent small inclusions of biotite and white mica in the matrix, which are virtually absent from Fabric 1.

Loner 3 (figure 6.31c), on the contrary, is very different from all fabrics described above. The matrix is calcareous, of a beige to yellow colour. It fits, technologically, with the remainder of the HBW samples. Indeed, it seems to have been tempered with mudstone and grog, and a large channel void perpendicular to the margins of the sample seem to divide two coils.

Loner 4 (figure 6.31d) is a very coarse deep red sample. The inclusions have a unimodal distribution, and are dominated by angular inclusions of quartz and chert. It is most likely that these angular inclusions are temper added to create the very particular texture of the sample. Indeed, it had a very sandy and fragile texture in hand specimen, and was interpreted as a mould, which would explain its unique composition.

Finally, before moving on to the Mycenaean samples, only one group of samples is left to be discussed: the Grey Ware. The description of the Grey Ware samples was more problematic. Indeed, as a very fine pottery ware, petrography is not a very suitable technique to analyse it. While the same could be said for the very fine Mycenaean pottery, their number, and the fact that its coarseness varies, made the analyses easier (see below). On the contrary, the Grey Ware samples are limited to four, and are all fairly fine.

A few meaningful observations have been made, nevertheless. First, the matrix and inclusions are different from the fine Mycenaean samples. They include more calcareous inclusions, and two samples suggest a greater presence of argillaceous rock fragments. One sample also includes an igneous rock fragment. The inclusions are otherwise dominated by quartz and mica, not unlike the Mycenaean fabrics described below. Also similar are the voids. This is however unsurprising, as both the forming and firing techniques are believed to be the same.

6.3.7 Fabric M1: Mica fabric

The remaining fabrics to be described includes samples that were identified as Mycenaean during the preliminary study. They are identified as such, using the letter “M” before the fabric number.

The first group, Fabric M1, is a group of three subfabrics that amount to the vast majority of the Mycenaean samples. All three are related to each other by sharing a common matrix and fine fraction, and are characterised by their micaceous groundmass. They have a highly calcareous

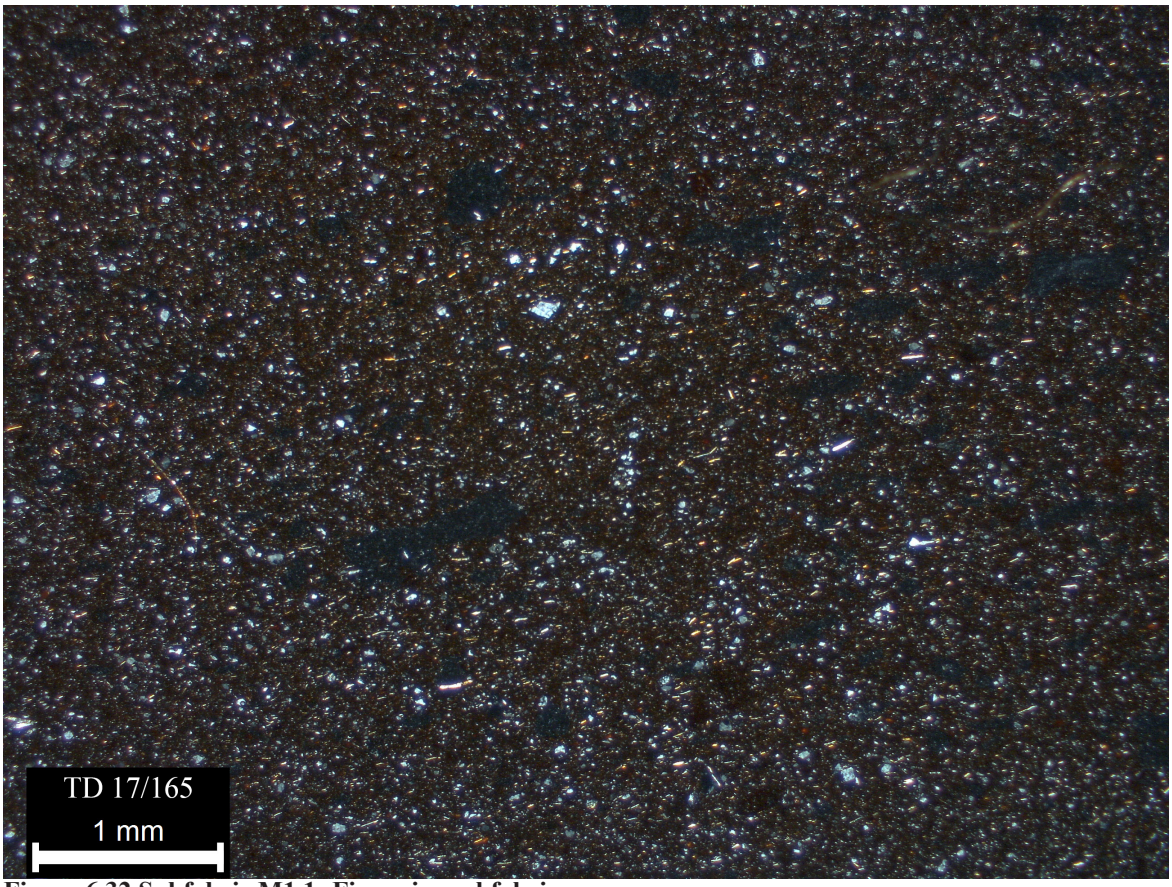


Figure 6.32 Subfabric M1.1: Fine mica subfabric

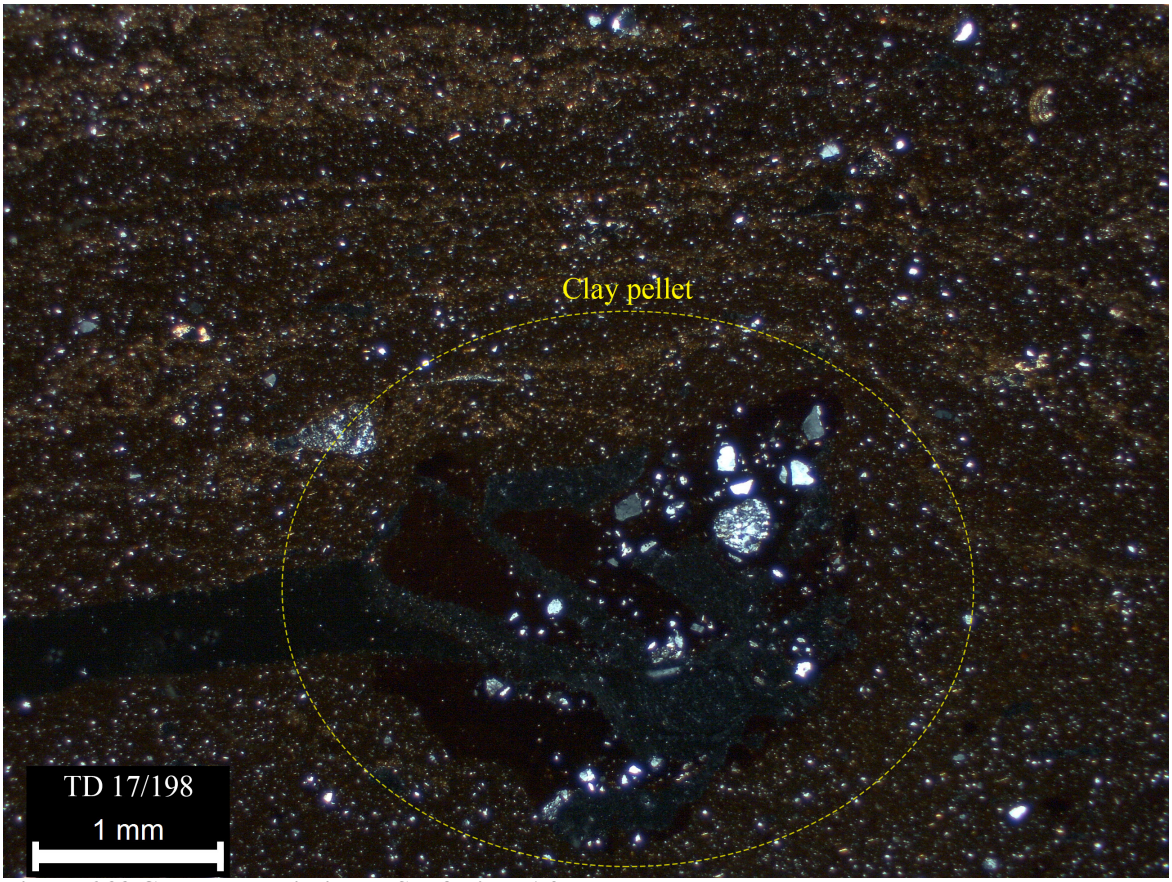


Figure 6.33 Clay pellets hinting at Subfabic M1.2

fabric, characteristically red under crossed-polars (XP), and brown or reddish brown in plane-polarized light (PPL) or hand specimen. Voids includes mainly micro- or meso-vesicles and meso-vughs, the former indicative of their high firing temperature.

Each subgroup represents a different level of coarseness, with M1.1 being a very fine fabric, and M1,2 and M1.3 being semi-coarse and coarse, respectively. The following sections will describe them in more detail.

6.3.7.1 Fine mica subfabric (subfabric M1.1)

This first subfabric (figure 6.32) can be described as the base clay of the next two. It is a variable group of samples, with inclusions ranging between 10 to 40% area. Inclusions also vary in size, but nonetheless display a unimodal distribution. While quartz, biotite, and white mica are the main inclusions, samples also include occasional red argillaceous rock inclusions similar to those found in the fine fraction of the Alluvial clay group (Fabric 1), and rarer occurrences of metamorphic rock fragments, siltstone, plagioclase, sparite, micrite, chert, augite, and igneous rock fragments.

The most interesting feature found in Subfabric M1.1 is a red clay pellet with coarse inclusions of quartz, quartzite, and igneous rock fragments, found in one of the samples (TD 17/198, figure 6.33). Indeed, the inclusion type, size, and angularity are reminiscent of the coarser Subfabric M1.2, and may be informative on how the latter's clay body was prepared.

6.3.7.2 Semi-coarse mica subfabric (Subfabric M1.2)

Subfabric M1.2 (figure 6.34) share a similar fine fraction and clay matrix with Subfabric M1, although the amount of mica is lower. It is however, as mentioned above, a semi-coarse version of the latter. Inclusions are much more frequent, accounting to 45 to 65 % section area, and display a moderately to highly bimodal distribution. The resulting coarse fraction, absent from M1.1, is dominated by chert and quartz, with rare albite, metamorphic rock fragments (probably schist), and altered orange inclusions.

It also includes very fine argillaceous inclusions, rich in iron, that are either red, reddish brown, or opaque. These may relate to the large clay pellets found in Subfabric M1.1, which once again may be indicative of clay preparation practices. Indeed, the presence of the clay pellets suggest that this semi-coarse fabric was obtained by mixing two clays: the same one used in Subfabric M1.1, and a coarser one, probably similar to the large clay pellets in sample TD 17/178. This would explain the similarity in inclusion size, and the lower amount of mica in Sufabric M1.2.

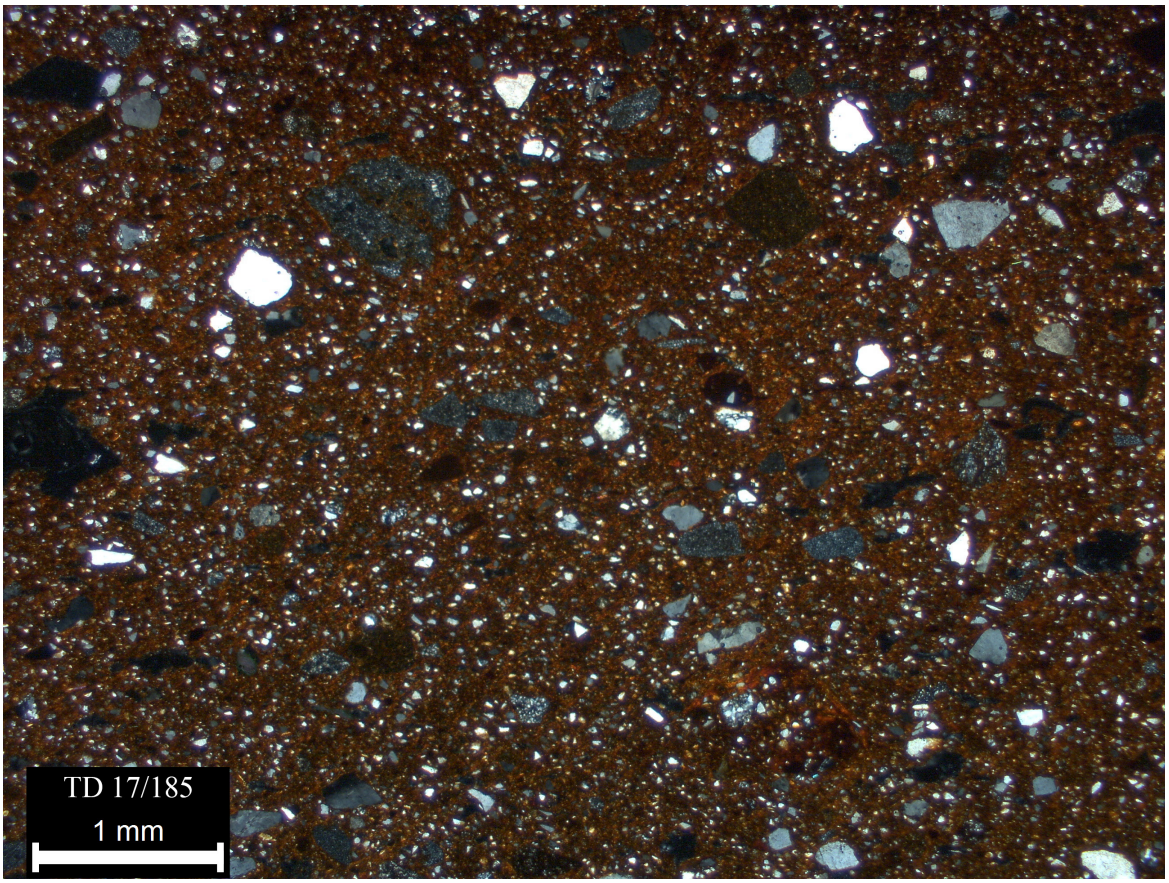


Figure 6.34 Subfabric M1.2: Semi-coarse mica subfabric

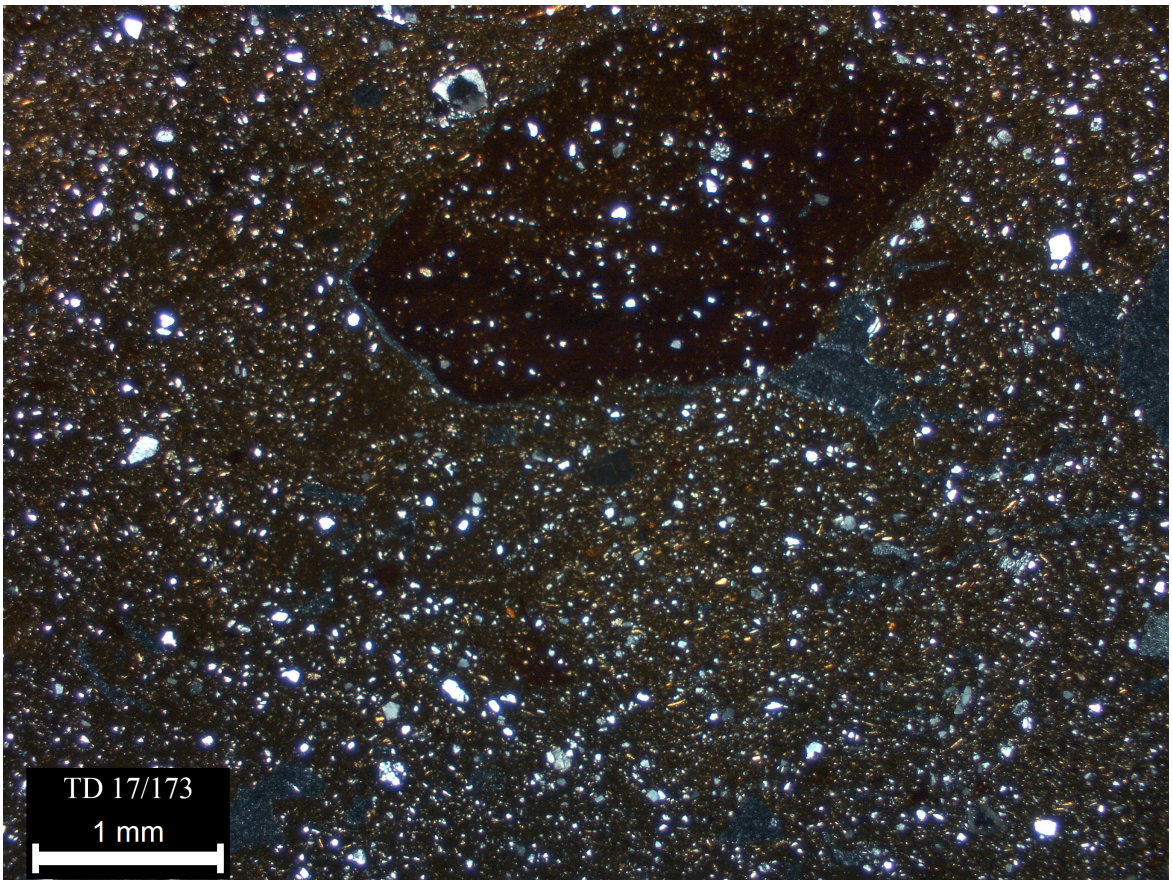


Figure 6.35 Subfabric M1.3 Coarse mica subfabric

6.3.7.3 Coarse mica sufabric (subfabric M1.3)

Subfabric M1.3 (figure 6.35) is a coarse version of the semi-coarse mica subfabric. Its matrix and fine fraction are very similar, with only small variations which can be attributed to the limited number of samples in both Subfabrics M1.2 and M1.3. The coarse fraction however, included a new major element: mudstone. Indeed, this coarse group of samples seems to have been tempered with sedimentary rock fragments that are very similar to those found in the HBW fabrics. Other differences in the coarse fraction include less chert, perhaps due to different proportions in the clay mixing described above for Subfabric M1.2.

6.3.8 Fabric M2: Pithoi fabric

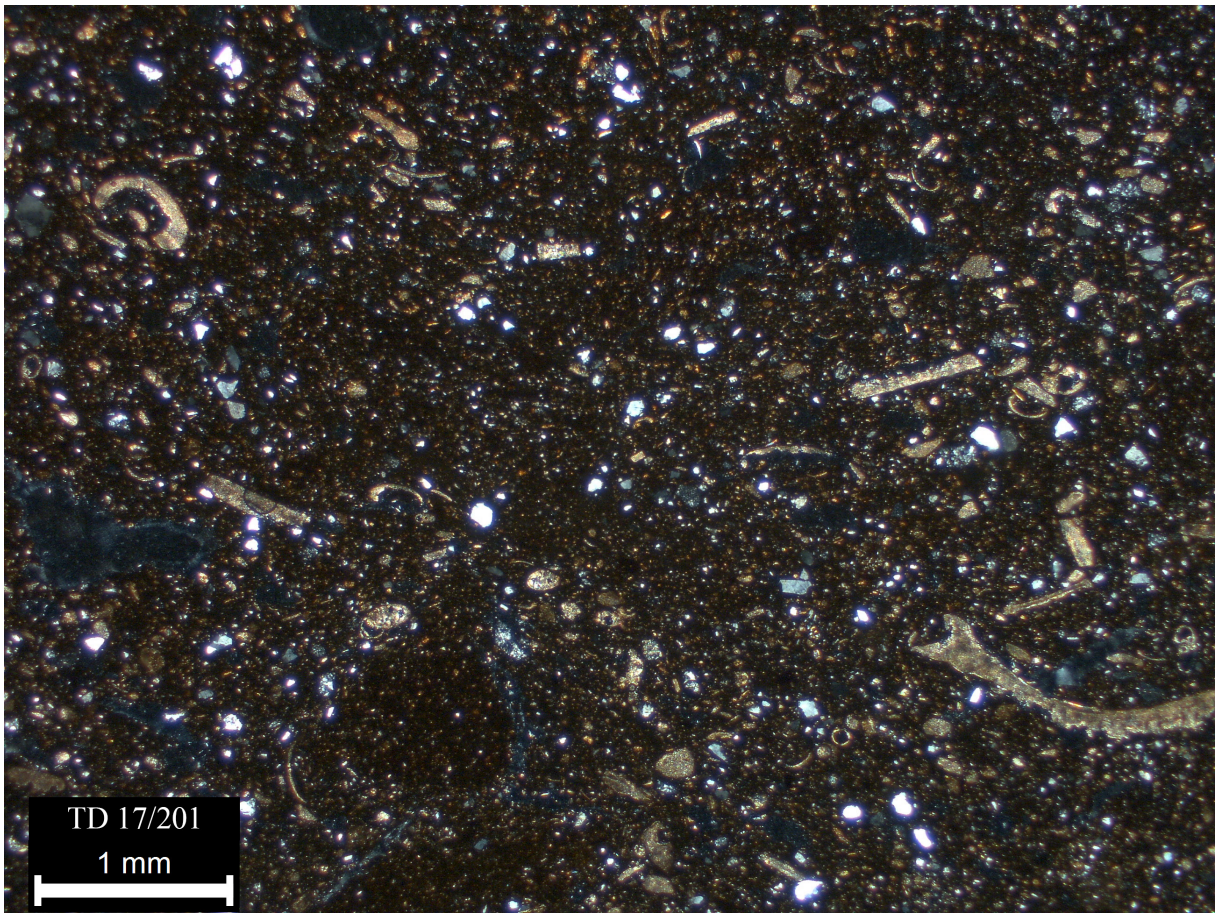


Figure 6.36 Fabric M2: Pithoi fabric

Fabric M2 (figure 6.36), with only two samples, comprises a brown to deep brown clay matrix, with common (15%) voids, mainly composed of meso- or macro-vughs and meso- or macro-channels. Voids are sometimes indicative of the technical elements (large coils, TD 17/202), or of the decomposition of carbonate microfossils (TD 17/201). It is characterised by its large inclusions of siltstone, and carbonate inclusions, containing micrite and microfossils.

Inclusions constitute between 40 and 50% of a sample and have a bimodal distribution. The

fine fraction mostly includes quartz, white mica, and iron-rich argillaceous fragments. Micrite is also commonplace, along with chert and microfossils, although the latter two are not equally present in both samples of Fabric M2. The coarse fraction is divisible in two groups according to the size of the inclusions. The first group includes exclusively large siltstone inclusions. Their angularity suggests they were crushed and added as temper. The second group is much more varied, and is characterised by inclusions of chert, quartz, and micrite. It contains rarer inclusions of sandstone with micritic cement, clay pellets, and metamorphic rock fragments (either schist or quartzite). The inclusions of this second group are similar to the fine fraction and may relate to the clay source itself.

6.3.9 Fabric M3: Green fabric

Fabric M3 is small group with two subfabrics. It takes its name from the characteristic greenish grey colour of its samples in XP, making it distinctively different from the main Fabric M1.

This group is however quite similar to a ceramic fabric found in Corinthia. Indeed, while from a different chronological context, a similar greenish fabric was recently identified by Burke and colleagues in a study of Early Helladic pottery at Midea and Tiryns, and was identified as a potential Corinthian import (Burke *et al.* 2018: 153), based on the dominance of such green fabrics in Corinthia itself (Alram-Stern 2018). This suggests that this group is in fact foreign to Achaea, and will be discussed later when addressing provenance.

6.3.9.1 Fine green subfabric (Subfabric M3.1)

This fine portion of the Green fabric (figure 6.37) displays a highly calcareous clay body, beige in PPL and greenish grey with red patches of iron oxides in XP. The optically inactive matrix suggests a high firing temperature. The clay body contains mainly meso-vesicles or meso-vughs voids.

The inclusions, limited to 10 to 20% of a thin section, are dominated by mica. While biotite amount to the majority, white micas are also present. Quartz is frequent, and other inclusions include red mudstone, metamorphic rock fragments (probably schist), radiolaria (round silica inclusions similar to those found within radiolarian chert), and igneous rock fragments.

6.3.9.2 Semi-coarse green subfabric (Subfabric M3.2)

This subgroup (figure 6.38) is the same as Subfabric M3.1 in many aspects, including matrix, voids, and fine fraction. It is however semi-coarse, with a bimodal distribution of

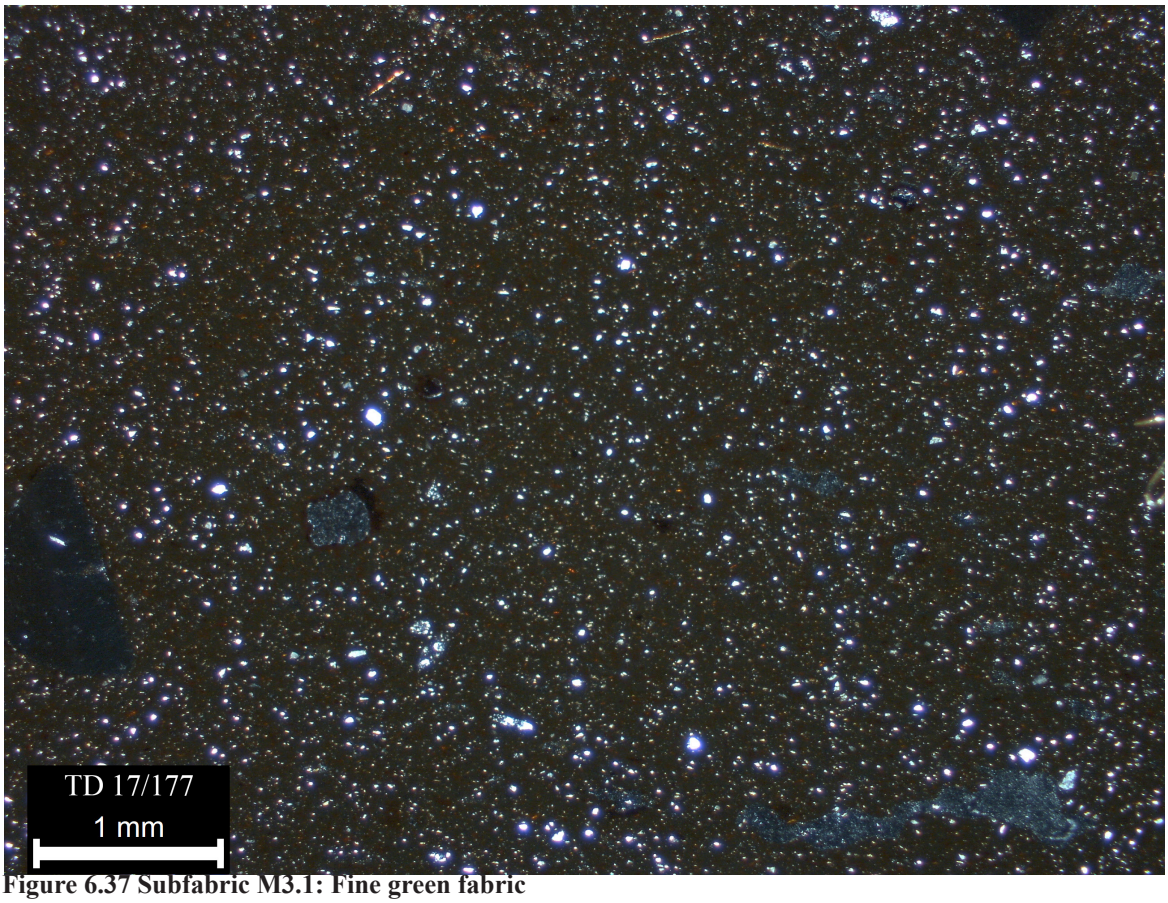


Figure 6.37 Subfabric M3.1: Fine green fabric

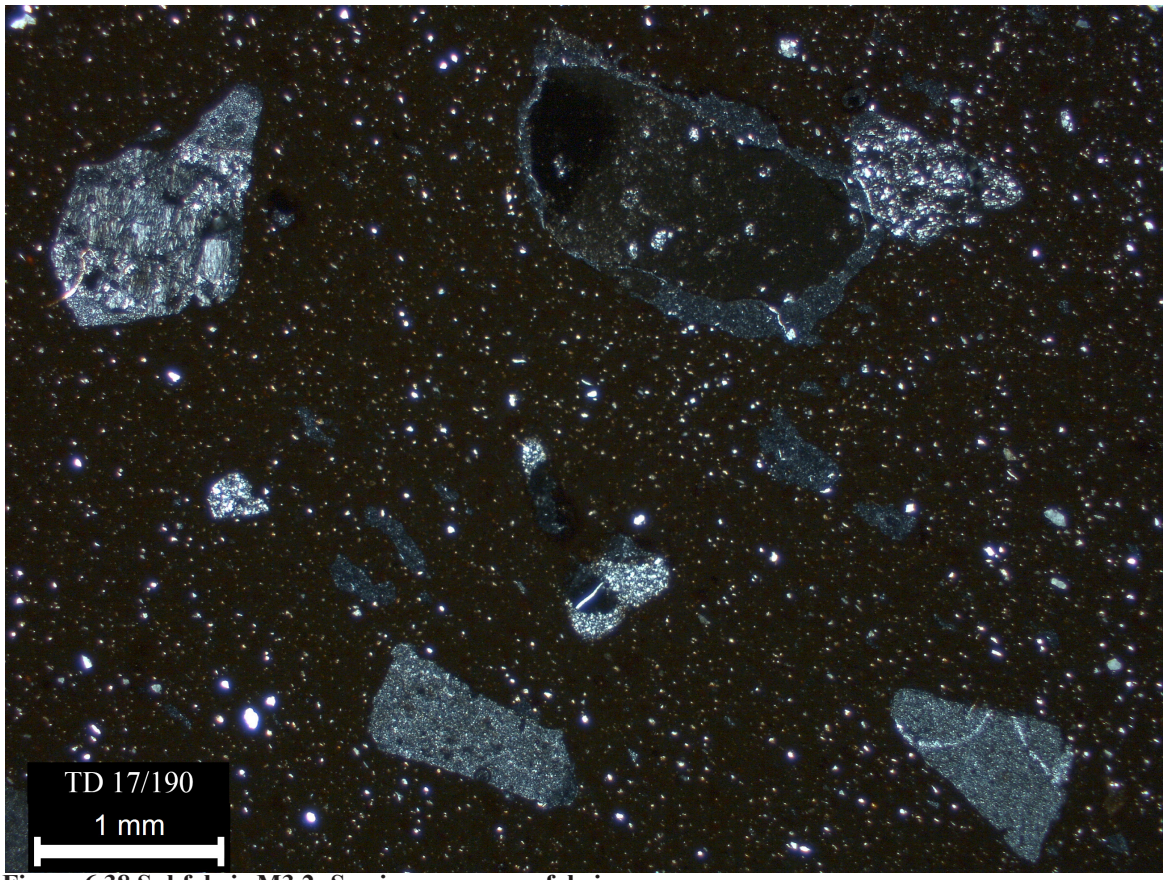


Figure 6.38 Subfabric M3.2: Semi-coarse green fabric

inclusions. The coarse fraction incudes mostly subangular to rounded inclusion of chert, mudstone, and porphyritic igneous rock fragments with inclusion of alkali feldspars.

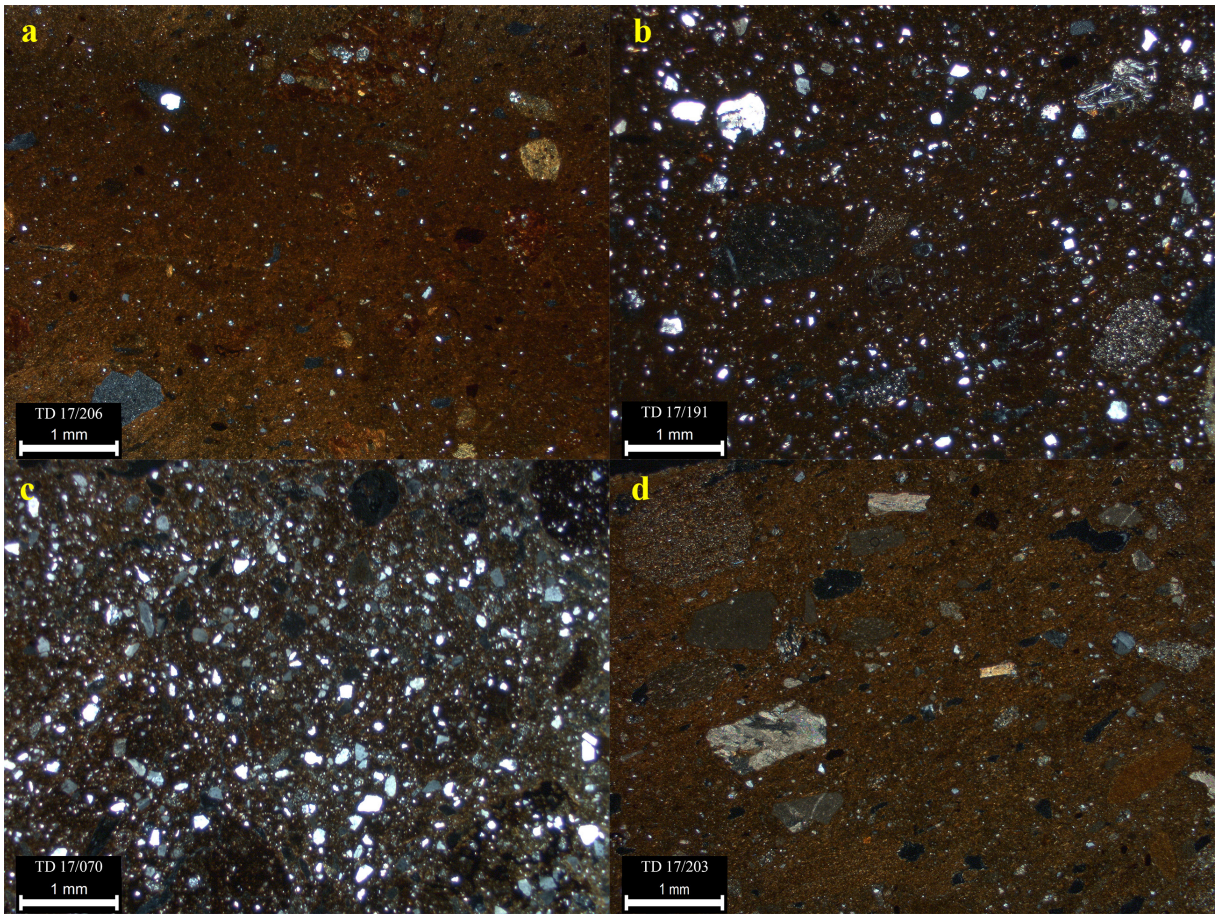


Figure 6.39 Loners, Mycenaean samples.

6.3.10 Loners in Mycenaean samples.

The first Mycenaean loner (M. Loner 1, figure 6.39a) is a coarse, optically active reddish brown fabric. Its coarse fraction is characterised by a dominant presence of clay pellets, along with frequent mudstone and rarer radiolarian chert. The fine fraction is fairly similar, but also includes quartz and white mica.

M.Loner 2 (figure 6.39b) is a coarse volcanic fabric, characterised by the presence of tuffaceous mudstone, porphyritic or granular acid igneous rocks, and small poikilitic igneous rocks that are most likely basalt. The fine fraction is also indicative of a volcanic geology. The clay body is reddish brown, and contains very few voids (less than 1%).

M. Loner 3 (figure 6.39c) is handmade small tub. It is a coarse, brown fabric with voids that are indicative of organic matter, a temper frequently identified in this shape (Gilstrap *et al.* 2016: 506). The rest of the inclusions are however very much similar to the HBW Fabric 1.

M. Loner 4 (figure 6.39d) has an orange groundmass and is characterised by a coarse fraction consisting mostly of carbonate rocks (micrite, and meta-limestone or sparite), The remainder of the fraction includes optically active mudstone fragments, metamorphic rock inclusions (slate or phyllite), and rare plagioclase and white mica.

6.3.11 Distribution and Integration: the techno-petrogaphic groups

Fabric ID	Subfabric	Level group B-C	Level Group D	Level Group E	Level group F	Other trenches	Total
fabric 1	Unsorted	1	3	5	2	3	14
	1.1	12	27	8	4	8	59
	1.2	2	2	7	3	2	16
	1.3	2	11	18	4	9	44
	1.4	2	1	0	0	1	4
	1.5	2	1	0	0	0	3
	1.6	0	1	2	0	0	3
Fabric 2		1	2	10	0	2	15
Fabric 3		0	3	2	1	0	6
Fabric 4		0	0	1	0	1	2
Fabric 5		0	0	2	0	0	2
Fabric M1	M1.1	8	10	10	9		37
	M1.2	0	2	3	0		5
	M1.3	0	1	3	2		6
Fabric M2		0	2	0	0		2
Fabric M3	M3.1	0	0	2	2		4
	M3.2	0	1	0	0		1
Loners		1	1	2	0		4
M. Loners		2	2	0	0		4
					Total Fabric1		143
					Totacl Fabric M1		48
					Total Fabric M3		5
					Total		231

Table 6.1 Sample numbers per fabric

The samples from the Teichos Dyamion assemblage thus present eight main fabrics, and eleven subfabrics. In addition, eight loners were also identified. The samples, however, are not distributed evenly among these fabrics, as demonstrated by Table 6.1. This table reveals the unbalanced distribution of the sampled material in each group, and shows how Fabric 1, especially its Subfabrics 1.1 and 1.3, includes most of the HBW samples. The same unbalanced portrait is observable when looking exclusively at the distribution of the samples from other trenches, which suggests it corresponds to a real trend rather than to a specific, and possibly random, particularity of trench ΓΓ. Fabric M1 is by far the most important fabric group for the Mycenaean samples. Table 6.1 also displays the distribution of samples per level groups, revealing what fabric(s) was preeminent in each. It is thus possible to observe a temporal trend in the distribution of the samples in the so-called HBW fabrics, roughly dividing level groups B, C and D from Level Groups E and F. Indeed, Subfabric 1.3 and 1.2 are dominant in the deeper Level Groups F and E, but are overtaken by Subfabric 1.1 in the upper Level Groups B, C and D. Similarly, Fabric 2, the Calcite group, is much more common in the deeper Level Group E than in any other group, and Fabrics 4 and 5 are also limited to the deeper level. Fabric 3, on the other end, is equally limited in number in all groups, with a slightly more

common presence in Level Group D. No such trend is observable for the Mycenaean fabrics, as Fabric M1 seems to dominate in all level groups.

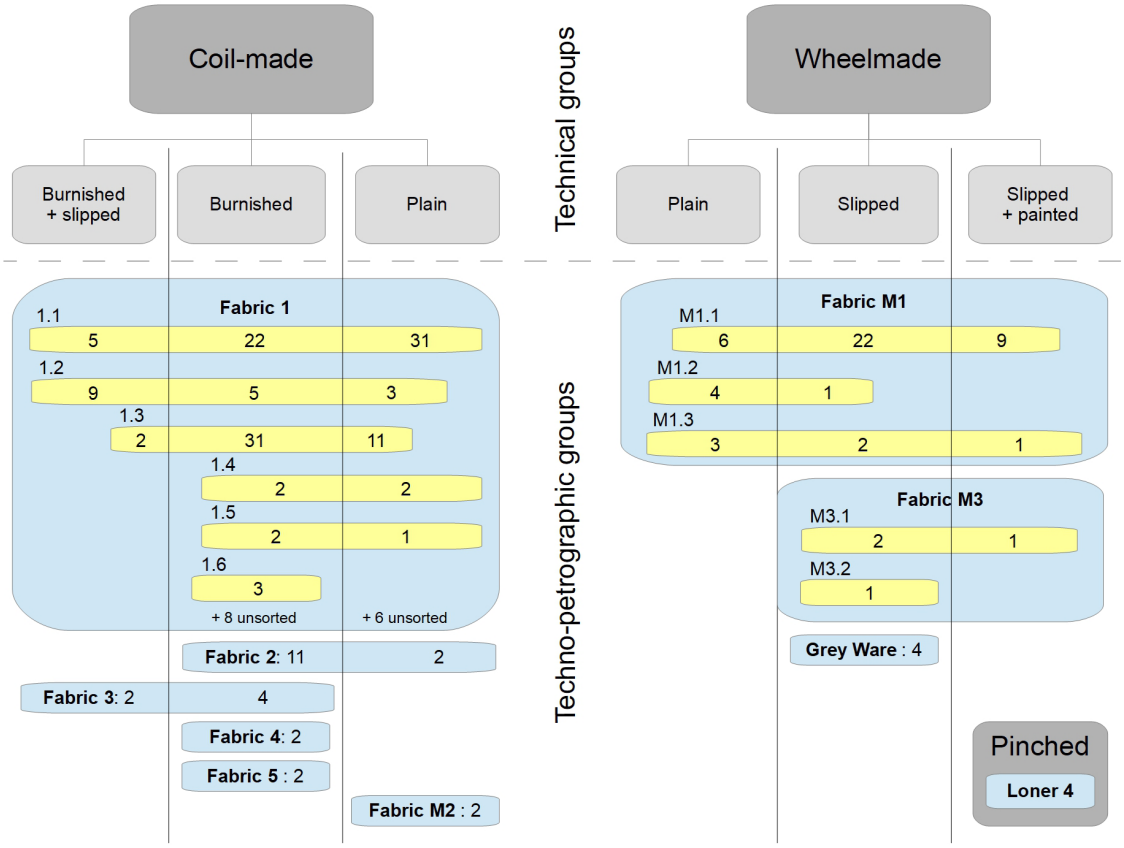


Figure 6.40 Techno-petrographic classification

Returning to the techno-stylistic classification system this project adopted, it is necessary to integrate the fabrics described above into the tree-like grouping started above in section 6.2. Doing so not only reveals overlaps where one fabric is represented in multiple groups, but also indicates the main fabrics for each of the technical subgroups. The resulting dendrogram (figure 6.40) reveals, as expected, the wide coverage of Fabric 1 in the Coil-made technical group, and of Fabric M1 in the Wheelmade technical group. It also reveals less obvious elements or trends worth considering.

The most interesting of such trends concerns Subfabric 1.1 and 1.3 and their presence in the surface finish subgroups of the Coil-made technical group. Just as the stratigraphy of trench ΓΓ showed that their distribution seems to have changed through time, there is an indication that both subfabrics also had a preferred subgroup. Indeed, samples belonging to Subfabric 1.1 amount for the majority of the plain Coil-made pottery. On the other hand, the burnished

(no slip) subgroups contain more samples of the Grog subfabric (Subfabric 1.3), although the difference between Subfabrics 1.1 and 1.3 is less significant in this technical subgroup than it is in the Plain subgroup. Moreover, the Burnished subgroup includes most of Fabric 2 samples, which just like Subfabric 1.3 is characterised by a fair amount of grog in addition to the calcite characterising it, and all samples from Fabric 4 and 5, and Subfabric 1.6.

The Burnished and slipped subgroup of the coil-made pottery, however, is dominated by neither of the two main subfabrics of Fabric 1. Rather, it seems to be characterised by Subfabric 1.2, which is defined by a finer alluvial base clay. Subfabrics 1.4, 1.5, and Fabric 5 do not display noticeable trends that can be used in future interpretations due to their limited numbers. It is worth noting that the subgrouping made using the presence or absence of striations on the sherd surface(s) were not considered for the creation of figure 6.40, also because of the very limited number of samples it involved. The five samples with such marks all belong to Fabric 1, and were included in their parent category: the Plain technical subgroups.

It is necessary at this point to make clear that these patterns were observed only on a portion of the assemblage that was sampled for petrographic analysis. There are, however, reasons to believe that these patterns are valid when discussing the HBW assemblage as a whole. Indeed, the limited total numbers of HBW meant that a large proportion of it could be sampled. For example, more than 60% of the pottery identified as HBW was selected for sampling in trench ΓΓ. This also meant that all macroscopic variables observed during the visual assessment of the pottery could be sampled in representative numbers. This is not the case for the Mycenaean fine and coarse pottery. Indeed, because vastly outnumbering the HBW, the sampled portion is naturally less representative.

The last section of this chapter will use the data from Chapter 5 to build the last level of the techno-stylistic classification system, to see if similar trends are also observable when it comes to shapes and styles.

6.4 Techno-morphological groups

Following the classification hierarchy that has been established in Chapter 2, the morpho-stylistic data presented in Chapter 5 can be added to what was built in sections 6.2 and 6.3 above. However, while Chapter 5 addressed the whole of the pottery assemblage, the techno-morphological stage discussed here is limited to the scope of the samples analysed in thin section.

Following the approach described in Chapter 2, building the techno-morphological groups would simply require, at the present stage, to add each type or shape present in each individual techno-petrographic group. Considering the reality of the material, it would be ill-advised to limit this section to this simple addition of data, as it would leave out the possibility to acquire additional information by executing intermediate steps of data comparison.

To address these concerns, this stage of the techno-stylistic approach was thus executed in three steps. The first examines shape distribution by individual fabrics or subfabrics. Indeed, interesting patterns were observed in the preliminary stages of the thin section analysis, warranting further attention which excluded the technical groups. The second step does the opposite, and looks at the shape distribution by technical subgroups, in an attempt to understand the relation between surface finishes and shapes, regardless of the pottery fabrics. The final step weaves everything together, to conclude the techno-stylistic classification to create one final diagram. Following this three-steps analysis, a few additional details that did not fit in the final dendrogram, or that held no meaning even if integrated into it, will be presented.

	Fabric 1						Fabric 2	Fabric 3	Fabric 4	Fabric 5	GW
Shapes	1.1	1.2	1.3	1.4	1.5	1.6					
Collared jar	12	4	2	0	2	0	0	1	0	0	0
Globular jar	6	1	2	0	0	0	0	0	0	1	0
Wide-mouthed jar*	1	0	9	0	1	0	4	0	0	0	0
Bucket	0	0	5	0	0	0	1	0	0	0	0
Basin	1	1	0	0	0	0	1	0	0	0	0
Hole-mouthed jar	0	0	1	0	0	0	0	1	0	0	0
Cooking vessel	16	0	0	0	0	0	0	0	0	0	0
Small vessel	2	1	1	0	0	0	1	1	0	0	0
Large vessel	0	2	2	1	0	1	0	0	0	1	0
Carinated cup	0	0	0	0	0	0	0	0	1	0	2
* Decorated (cordon) body sherd were counted as Wide-Mouthed jar											

Table 6.2 Shape distribution per fabrics. Major shapes in each fabric are marked in red.

6.4.1 Shapes by fabrics

As mentioned above, interesting patterns can be observed when looking at the shape distribution in each individual fabric and subfabric (table 6.2). Indeed, while the number of samples that could be associated with a certain vessel shape or type is limited, trends are certainly noticeable, especially in the two most important groups of thin sections: the Mudstone subfabric (1.1) and the Grog subfabric (1.3).

Subfabric 1.1 is dominated by two types of vessels: jars, and cooking vessels. Indeed, the

Mudstone subfabric includes all the potential cooking vessels identified in the 15th and 16th πασες. It also contains 12 collared jars, and six globular jars, but only one example of the typical HBW wide-mouthed jar, two small vessels, and one basin. The Grog subfabric, on the contrary, contains a limited number of jars, and no cooking vessels. It contains only two collared jars and two globular jars. However, wide-mouthed jars and buckets are well represented, as Subfabric 1.3 includes respectively nine and five examples of those shapes. Other shapes found in this group include one of the two hole-mouthed jars sampled, one small unidentified shape, and two large vessels. Subfabric 1.2 contains four collared jars, one globular jar, one basin, 1 small vessel, and two large vessels. Other identified shapes found in Fabric 1 include two collared jars and one wide-mouthed jars in Subfabric 1.5, one large vessel in Subfabric 1.4, and another large vessel in Subfabric 1.6.

Of the remaining four fabrics of the HBW samples, only Fabric 2 contains enough shapes to discern any significant pattern. While in more limited numbers, its shape distribution is akin to Subfabric 1.3, containing four wide-mouthed jars, one bucket, one basin, and 1 small unidentified shape but no collared or globular jars at all. Fabric 3 shows no convincing pattern, but does include one collared jar, one small vessel, and the second sampled hole-mouthed jar. Fabric 4 contains the only wheelmade carinated cup, and Fabric 5 includes a globular jar and a large vessel. Grey ware samples were added to table 6.2, as they only contained carinated cups, similar in shape to the one found in Fabric 4.

The Mycenaean samples, on the other hand, showed no patterns worth discussing when looking at the distribution of shapes in individual fabric. Indeed, as the vast majority of samples belong to Subfabric M1.1, the picture is too heavily biased to be meaningful.

6.4.2 Shapes per technical subgroups

Following the analysis of the shapes distribution in each fabric, the same was done focusing instead on the technical subgroups. This second step led to clearer patterns than the previous one based on the different fabrics. This was unsurprising, considering the lower number of parameters to be compared. Indeed, there are fewer technical groups than there are fabrics and subfabrics, which means the limited number of samples that have associated shapes (120 out of 239 sampled sherds) are naturally more concentrated.

The Coil-made technical group, as already determined, corresponds mainly to samples identified as HBW. The only exceptions are two sherds, in the Plain subgroup, belonging to Fabric 2. These have been identified as Mycenaean pithoi. The remaining samples, however, are the same that

Shapes	Burnished	Burnished and slipped	Plain	Plain with striations
Collared jar	15	5	3	1
Globular jar	8	1	1	0
Wide-mouthed jar*	15	0	3	1
Bucket	5	0	1	0
Basin	3	0	0	0
Hole-mouthed jar	2	0	0	0
Cooking vessel	2	0	12	2
Small vessel	4	2	2	0
Large vessel	3	1	2	1
Carinated cup	1	0	0	0
Pithos	0	0	2	0
* Decorated (cordon) body sherd were counted as Wide-Mouthed jar				

Table 6.3 Shape distribution per technical subgroups (striations grouping elimiated for clarity)

have been discussed above in section 6.4.1 and, as such, display the same range of shapes (table 6.3).

The Burnished technical subgroup includes most of the typical HBW shapes found in the Teichos Dymaion assemblage. Indeed, it contains 15 collared jars, eight globular jars, and 15 wide-mouthed jars. It also includes five out of the six identified buckets, all three basins, the only carinated cup, and the two sampled hole-mouthed jars. Additionally, it includes two cooking vessels, four small unidentified shapes, and three large vessels. The much smaller Burnished and slipped subgroup contains five collared jars, one globular jar, two small vessels and one large vessel. While it is less evident due to the lower number of samples in this second group, it seems to fit with the Burnished group. This is especially true when looking at the Plain technical subgroup.

This third subgroup is dominated by cooking vessels, which are minor or absent in the first two groups. It also contains three collared jars, one globular jar, three wide-mouthed jars, and a single bucket. The presence of those shapes, which are also present in the Burnished subgroup and the Burnished and slipped subgroup, validates the relationship between the plain and burnished handmade pottery, while also suggesting their different purposes. The Plain subgroup also contains two small vessels, two large vessels, and the two Mycenaean pithoi mentioned above. Finally, its subdivision, containing the plain pottery with striations, shows a similar but less pronounced pattern, with one collared jar, one wide mouthed jar, two cooking vessels, and one large vessel.

6.4.3 Final diagram and additional elements.

Having considered both the distribution of shapes per fabric and per technical subgroups, the next step is to bring everything together to build the last stage of the techno-stylistic dendrogram that has been progressively built throughout the present chapter. The resulting diagram (figure 6.41) reflects all that have been discussed in the present chapter.

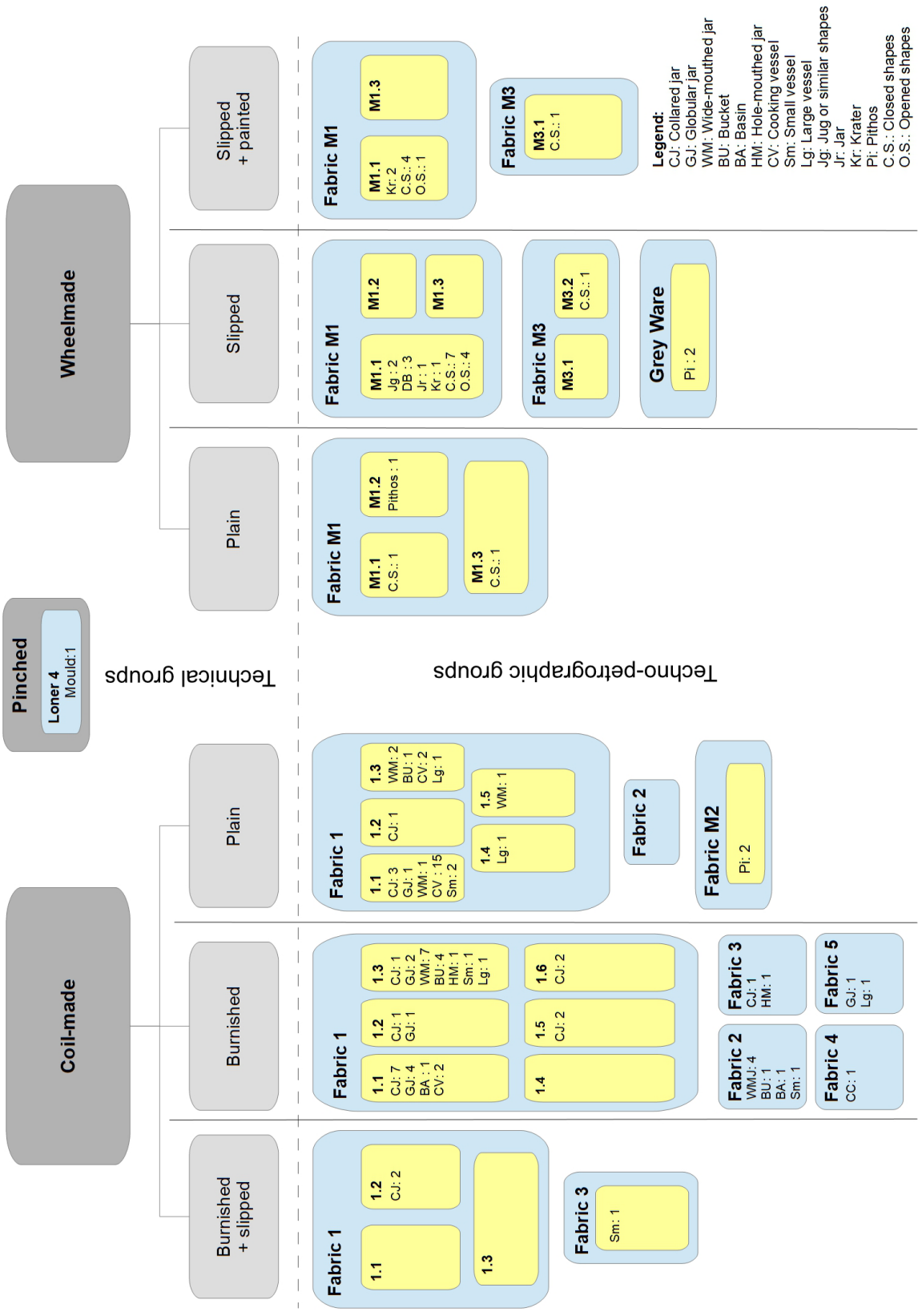


Figure 6.41 Final dendragram, integration all three levels of classification (Numbers reflect the sampled material, and are to be understood as indicative of the *patterns* discussed in section 6.4, not as absolute numbers for the whole assemblage)

A few interesting stylistic elements have been left out. While these are worth discussing, and concern style variability in the handmade pottery from Teichos Dymaion, due to the limited number of samples and for the sake of clarity, they are discussed outside of the techno-stylistic classification.

This section addresses two such stylistic elements that, while put aside for the present classification, are nevertheless significant when discussing HBW: rim types and decoration variability.

6.4.3.1 Rim profiles

A total of six main rim types were identified in the HBW material identified at Teichos Dymaion, with further diversity within these categories. The relation of the rims with the shape on which they are found is however not random, and is worth discussing.

Type 1: lipless rims

Figure 6.42 Rim type 1: Lipless. a) rounded, b) pointed, c) squared, d) inclined (Outside of vessel = left)

The Lipless rim type (figure 6.42) includes mostly simple, straight rims. If they are mostly rounded (1a), they can also be pointed (1b), squared (1c), or inclined (1d). One squared example shows traces of having been formed by folding.

Type 2: Bellied rims

Figure 6.43 Rim type 2: Bellied a) rounded, b) squared, c) inclined (Outside of vessel = left)

The Bellied rim type (figure 6.43) is similar to type 1(Lipless), but the interior of the rim

is slightly thickened and preeminent, hence its bellied appearance. It also appears in many variations: rounded (2a), squared (2b), and inclined (2c). Rim type 2c also differs from types 2a and 2b by being more angular.

Type 3: Flaring rims

Figure 6.44 Rim type 3: Flaring. a) inverted, b) flattened, c) inclined d) rounded (Outside of vessel = left)

A third category, the Flaring rim type (figure 6.44) is divided in two. All, however, are flaring toward the outside of the vessel. Type 3a is similar to type 2a, but inverted, with its thickened, preeminent part being on the outside surface. The remaining three subtypes of type 3 are more akin to what are generally understood as flaring rims. Type 3b is flattened, type 3c is inclined, and type 3d is rounded.

Type 4: Inward Flaring rims

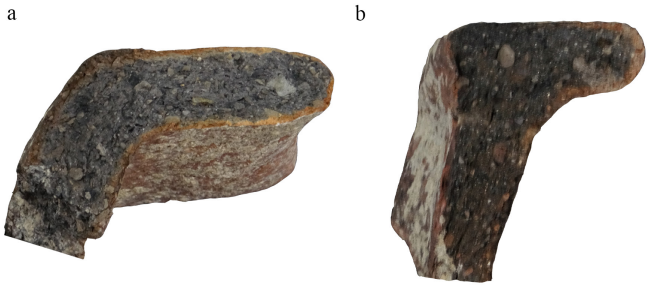


Figure 6.45 Rim type 4: Inward flaring a) plain, b) with small band (Outside of vessel = left)

Type 4, the Inward Flaring rim type (figure 6.45), is characterised by a long and straight lipless rim folded inward. It can be plain (4a), or with a small band on the outside (4b).

Finally, the fifth and last type, the T-shape rims (6.46), is limited to a single vessel. Characterised by its T-shaped profile, it has been noted by Romanos (2011: 72-74) as a common rim type for buckets and wide-mouthed jars.

The different rims types seem to be indicative of specific vessels shapes. Type 1 (except 1b), 2,

3a, and 5 are found on buckets and wide-mouthed jars. Type 3b and 3d are however more frequent on collared jars, while 1b is often found on Globular jars. Type 4 is exclusive to the hole-mouthed jar, while type 3c is only found on one sample: the only handmade carinated cup of the assemblage. Similar observations were also made by Romanos for the same shapes (Romanos 2011: 71-76)

Type 5: T-Shaped rims

Figure 6.46 Rim type 6: T-Shaped (Outside of vessel = left)

6.4.3.2 Decoration

At Teichos Dymaion, decoration on HBW vessels mostly consists of applied cordons on the vessel body, either plain cordons or rope imitations (figure 6.47). The plain cordons (type A) are simple raised, triangular bands of clay that can be either horizontal, or, rarely, vertical (also referred to as

Type A: Plain cordons

Horizontal

Vertical

Type B: Rope imitations

B1: Rope-like type

B2: Piecrust type (vertical)

B2: Piecrust type (oblique)

Figure 6.47 Decoration on HBW: cordon types

Figure 6.48 Incised rim

wavy, see Romanos 2011: 79). Horizontal cordons are located in the upper part of the vessel body, a few centimetres under the rim, while vertical runs diagonally from the rim to the base. There may be a horizontal line on the rim to complement the wavy design of the vertical cordons (see rim type 4b), and slightly above the base, although this has not been observed at Teichos Dymaion (see Illustration 1, in Rutter 1975: 18).

In the Teichos Dymaion assemblage the rope imitation category (type B) has been divided into two types. The Rope-like (type B1) applied cordon is a thick band of clay with round finger impressions, placed at regular interval. It gives it a high relief and a rope-like appearance. The second rope imitation applied cordon is the so-called Piecrust. Thinner than the Rope-like cordon, it consists of an incised band. The incisions can be oblique or vertical slashes or, alternatively, they can be more complex V-shaped vertical incisions, which makes the cordon look like a succession of small, regular clay pyramids.

Figure 6.49 Double-horn handle on a wide-mouthed jar

With the exception of the rarer vertical plain cordon, which is exclusive to hole-mouthed jars, cordons, plain or rope imitations, are mainly found on two distinctively HBW shapes. Indeed, at Teichos Dymaion, they are the hallmark of the wide-mouthed jar and the bucket. No collared jar or globular jar bears an applied cordon.

Concluding this section, it is worth noting two decorative elements that were also observed on the HBW and that do not belong to the applied cordon category. Incisions on the rim were identified on a wide-mouthed jar (figure 6.48). This rare type of decoration was also identified at Tiryns and Menelaion (Romanos 2011: 79). A double-horn handle was also identified on a wide-mouthed jar (figure 6.49).

6.5 Comments and conclusion

A number of interesting elements emerge from the analyses of the shape distribution, both according to fabric and technical group.

There is, as mentioned in Chapter 5, a very limited number of cooking vessels in the Teichos Dymaion material. They are only found in the 15th and 16th πασες of trench ΓΓ, and are exclusive to the handmade portion of the assemblage. It is therefore perhaps unsurprising that they seem equally limited in their range of fabrics and technical groups. Indeed, sampled cooking pots are exclusive to Subfabric 1.1, and almost all in the Plain subgroup of the Coil-made technical group, with only two samples out of 16 being burnished. This uniformity may suggest that some may actually belong to the same vessel and confirms the scarce nature of cooking pots at Teichos Dymaion.

Tableware shapes seems to dominate the Wheelmade technical group fabrics. On the contrary, such shapes are very rare in the Coil-made group fabrics. In fact, the Coil-made group, and as such the HBW, seems to be mostly composed of medium or large vessels, used for transport or storage. This is concordant with observations made in Chapter 5.

Typical HBW shapes present at Teichos Dymaion, namely the wide-mouthed jar, bucket, collared jar, globular jar, and, although in smaller numbers, the hole mouthed jar, are also more frequent in some fabrics than they are in others. Indeed, looking at Subfabric 1.1 and 1.3, which together contain most of the HBW samples, we see that the former is dominated by the collared jar and the globular jar. It only contains one wide-mouthed jar, and is generally limited in shape. The latter, however, is characterised by the more typical wide-mouthed jar, bucket, and hole-mouthed jar. It is richer in shapes than Subfabric 1.1. Fabric 2 shows a similar shape distribution to Subfabric 1.3. Interestingly, the same observation can be made when looking at the distribution of the same shapes by technical subgroups. Indeed, the collared and globular jars are more common in the Plain subgroup, while the other shapes are far more common in the Burnished group. It is thus unsurprising to see that samples from Subfabric 1.1 are more

common in the Plain subgroup, while samples from Subfabric 1.3 and Fabric 2 are more common in the Burnished subgroup.

In general, the Mycenaean is much less diverse than the HBW material. However, as seen in the observations above, the variability of the HBW assemblage is not random, and meaningful patterns are observed. It is interesting to note that the most typical shape for the discussion on HBW, the carinated cup, is very rare at Teichos Dymaion. Indeed, only one handmade and burnished example was found, which is an import. Its only parallels on the site are the Grey Ware samples, also taken to be imports, and the local Mycenaean. This, along with all previous observations, will be addressed in the following chapters.

Not much can be said about the Grey Ware found at Teichos Dymaion, beyond the obvious observation that it is wheelmade, slipped, and mostly contains carinated vessels. The very small number of Grey Ware sherds identified are a class well known in peninsular Italy (Belardelli and Bettelli 2005: 48). Provenance analysis of these fine vessels would require chemical methods (Jones *et al.* 2014).

The picture is overall simple: HBW and Mycenaean coarse pottery are well defined petrographically and technologically, and all the HBW pottery seem to share common practices linking them together. There is however diversity in this simple picture, which, according to the patterns of correlation between fabrics, shapes, and surface finishes, allows for further discussion on the HBW phenomenon at Teichos Dymaion.

Chapter 7. *Pottery traditions at Teichos Dymaion*

7.1 Introduction

The previous two chapters were designed to deliver a detailed presentation of the Late Helladic pottery from Teichos Dymaion, and to present the results of the analyses performed on a selected portion of this assemblage. While they were built following a structure that was more descriptive than interpretative, they nonetheless involved limited interpretations, and are, in fact, the beginning of a coherent portrait of the diversity found within the pottery assemblage of Teichos Dymaion.

Chapter 7 introduces to this picture a range of theoretical considerations aimed at reassessing the methodology now that it has been challenged by the reality of the material. Indeed, while it was grounded both theoretically in a discussion on the social and cultural meaning of craft practices, and materially in decades of ethnographical and archaeological endeavours, the methodology proved problematic in various aspects; some foreseen, some unexpected. By taking these into considerations the thesis can then move towards an account that is truly representative of both the material reality (i.e. its limitations) and its diversity.

There will first be a reassessment of the value of the *chaîne opératoire* approach in the specific context of archaeology, and of this project. Then, an alternative concept will be suggested and explained. Finally, and taking into account the discussion laid out in the previous two parts of the chapter and any subsequent adjustment to this project's methodology, it will present the different pottery traditions. These shall constitute the basic units of analyses for all following discussions.

7.2 Chaîne opératoire: a realistic approach?

This project does not view pottery technology as simply a mechanical, detached description of how a pot came to be, but as a significant marker of social, cultural, and even ethnic identity. Therefore, it was natural to lean toward the *chaîne opératoire* approach as developed by French anthropologists and ethnologists, starting with Leroi-Gourhan and his seminal work *Évolution et techniques* (1943, 1945). The latter allows a systematic understanding of the technical operations leading to the creation of an artefact, in this case a pot. As we

have previously demonstrated, these are culturally significant, even more so in the present paradigm, than the usual morpho-stylistic parameters. Moreover, its use in archaeology goes back decades, and as such, the methodology is backed by a rich literature that serves as the basis for comparison and analysis (e.g. Rye 1981, Gosselain and Livingstone-Smith 1995, Gosselain 2002, Livingstone-Smith 2007, Gomart 2014, Roux 2016a).

The techno-stylistic approach described in Chapter 2 was selected specifically to address the material in a way which would allow the reconstruction of the different *chaînes opératoires* present at Teichos Dymaion. It allowed for a deconstructed view of the different ceramic groups, and for the identification of relations between each group, be it based on technological, petrographic, or stylistic grounds. Because of its hierarchical classification system, it was also somehow forgiving when information was missing due to the nature of archaeological material. Indeed, Roux and Courty (2005, 2007, see also Roux 2016a) were perfectly aware of the difficulties particular to the study of fragmented pottery assemblages. Practically, it meant that, using this system, most sherds could be at least roughly sorted into a main technical group, even if nothing else could be said about it. If this arguably technical point about the techno-stylistic classification system was originally seen as nothing but a safety mechanism to mitigate any potential problems during the study of the material, it became the basis of a second theoretical reflection on the very concept of the *chaîne opératoire*, or more precisely, on its use in archaeological contexts.

7.2.1 An issue of resolution

The material from Teichos Dymaion has already been described and, as has certainly transpired, was found to be substantially fragmented. While some shapes could be recognised, no complete vessels are present in the assemblage, and very few full vessel profiles could be reconstructed, making the identification of the technical operations constituting the different *chaînes opératoires* difficult. These limitations of the *chaîne opératoire* approach in archaeology do not seem to emanate from the concept itself, do not question the theoretical bases discussed in Chapter 1, nor do they imply that it was of no practical use. Rather, what becomes evident is that the *chaîne opératoire* may in fact not be the best suited analytical tool for the reality of archaeological ceramics.

This is due to a problem of resolution. Indeed, reconstructing *chaînes opératoires* in such a way that it becomes effective and useful is often too demanding for what is possible in a fragmented, incomplete archaeological assemblage[15], and requires the identifications of elements that are

15While some assemblages may be more suited than others for taphonomic reasons or otherwise, the situation at

beyond what is observable. This issue of resolution can be divided into three aspects:

1) the challenge of details;

2) the challenge of comparison;

3) the challenge of interpretation.

The following sections will describe and discuss each of these in detail, to better understand the issue of the application of the *chaîne opératoire* approach in archaeology.

7.2.1.1 The challenge of details

In an introductory paper on the very concept of the *chaîne opératoire*, Livingstone-Smith (2010: 10) stated that its real potential for meaningful interpretation cannot be fully exploited without a complete reconstruction of the sequence of operations involved in the making of a pot. He also recognised that, despite the ample literature available on the subject, methodological problems still exist for the identification of the different technical operations constituting the manufacturing sequences.

It is argued here that the core of these methodological problems relates to the amount of information that is available in an archaeological assemblage of pottery sherds, or more precisely, to our capability to access this information. Roux (2010: 7) identifies three difficulties inherent in looking at ceramic sherd, some of which have already been briefly mentioned in Chapter 2. Firstly, each sherd does not necessarily hold the attributes needed to positively identify meaningful technical elements. Secondly, it is not always possible to reconstruct complete vessels or vessel profiles, making it more difficult, if not impossible, to link different steps of the *chaîne opératoire* together. This issue is of particular importance, as it is those very links that transform the individual techniques into a sequence, or *chaîne*. Roux finally raises, as a third problem, the difficulty of applying this approach to a very large, unorganised assemblage.

In short, the reconstruction of the *chaîne opératoire* requires 1) sherds that have diagnostic attributes that allow the identification of technical operations, 2) complete vessels or profiles that allow an understanding of how those technical operations relate to each other in an ordered sequence, and 3) a quantity of material that is small enough to be managed, but, we might add, large enough to be meaningful.

Considering the fragmented nature of archaeological pottery, it is hardly reasonable to expect that all assemblages meet such standards. The present project, for instance, is one such case

Teichos Dymaion is far from exceptional, and may be representative.

where, unfortunately, not all criteria are present, especially concerning the presence of complete vessels. While this material situation was adequate for the purpose of the visual assessment designed for this project, it alone can become a major problem when aiming for a complete reconstruction of the *chaîne opératoire*.

Another issue that influences how detailed the analyses can be is to be found in the attributes (the observable macro-traces of technical operations left on a vessel) themselves. When detailing the methodology in chapter two, it was pointed out that some steps may not leave any observable traces that would allow for their identification (see Rye 1981: 58-95). It is also equally possible to have traces that are erased by subsequent technical operations (Roux 2016a: 165). All these obstacles, as small or surmountable they may be, effectively impede the archaeologist's capability to identify all meaningful technical operations involved in the making of a pot, and consequently, the possibility to reconstruct *chaînes opératoires* in their entirety.

7.2.1.2 The challenge of comparison

The second challenge that archaeologists face when trying to reconstruct the *chaîne opératoire* of pottery relates to the aforementioned attributes. However, the issue is not with the *amount* of information available, but rather with *how* this raw information can be translated into data that is not only useable, but also securely associated with gesture or technical action, which is in turn securely positioned within the whole *chaîne opératoire.* While some attributes clearly relate to one particular action or technique, and are thus more easily understood, some are more ambiguous, and can in fact be indicative of more than one specific technical operation (Roux 2016a: 165). This polysemic nature of some attributes means that a complete and suitable set of comparative material is needed to navigate these attributes and to associate them with the correct technique.

Because they usually deal with material from societies that are extinct or that have changed significantly, archaeologists interested in pottery technology must rely on comparative material that either comes from ethnographic studies, experimental archaeology, or both (Gelbert 2005: 67). These are seldom directly related to the studied collection, except in rare cases where records exist for the manufacturing processes of material which are securely related, geographically, culturally, or ideally both, to the one being analysed.

In his 1979 book *Experimental Archaeology*, John Coles argued that "the problem of technology [was] perhaps the most difficult for experimenters to solve because there is a limit to the degree of knowledge about prehistoric or early technology" (Coles 1979: 38), and that the "wide range

of materials available to early man, the variety of ways they could be obtained and prepared, and the multitude of uses to which they were put make the task of archaeologists virtually impossible" (Coles 1979: 159). Without adhering to such fatalism, this self-critique of his own discipline can certainly be applied to the present discussion. Indeed, the search for the ideal comparative material to be used in ceramic technology studies is poised to come to the same realisations: comparative material, be it experimental, ethnographic, or using both disciplines, is selected to the best of the archaeologist's knowledge of the particular material they wish to study, and as such, also included pre-existing biases concerning how that material had supposedly been manufactured. While there are ways to navigate these preconceptions and use that knowledge to benefit the selection of an appropriate reference collection, there is a subjectivity that may, ultimately, interfere with the archaeologist's capacity to properly identify and interpret macro-traces and attributes,and that must be acknowledged.

7.2.1.3 The challenge of interpretation

While the two first challenges discussed raised issues directly related to the archaeologist's capability to correctly identify techniques and reconstruct a complete *chaîne opératoire*, the last delves into more theoretical issues, and concerns itself with matters of hermeneutics. *Chaînes opératoires,* as understood in the present project and discussed in Chapter 2, are not simple blueprints of artefacts, but rather tools to identify particular craft practices, and also extrapolate and recognise craft traditions. They are culturally meaningful, and are the foundation, in the current paradigm, of any discussion on identity that is based on material and technological evidence.

This preeminent role of the *chaînes opératoires* in the discussion on craft practices and identity raises two problems for any archaeologist interested in using this approach to ceramic studies. The first is fairly simple, and comes from the observations that 1) not all parts of a *chaîne opératoire* are equally meaningful for the potter(s) involved, and that 2) the distinction between those that are and those that are not is a complicated task. Indeed, potters do not act in ways that are determined by the nature of their material (Gosselain and Livingstone-Smith 2005: 39), but rather navigate within a certain range of possibilities (Gosselain and Livingstone Smith 2005: 41). The decisions they take in this process are numerous, and involve a series of variables which include the properties of the clay, the nature of the vessels being manufactured, but also, how the potters have learned their craft, what they consider to be the 'right way'. As Gosselain (2000: 199) points out, this last variable which relates, ultimately, to the identity of the potters, is problematic. Different steps of the *chaîne opératoire* are of varying importance to different

groups of people; what is an important, meaningful step to some may be irrelevant to others. For example, in a village in South-West Niger, Gosselain and Livingstone-Smith (2005) point out that, while the clay itself comes in most case from the same few sources, every step from the collection of the raw material to the firing of the pottery, is significant to 1) identify the different pottery traditions at play in this region, and 2) understand how the potters interact with, and enact those traditions in their everyday craft practices. However, the situation can be drastically different. It is the case, for instance, with the chicha bowls of the Ecuadorian Amazon. In a paper on the politics of pottery making in Conambo, Ecuador, Bowser (2000) describes a situation where the technological practices involved in the making of the large chicha bowls used for the fermentation of beers are in fact very similar over an extensive area (Bowser 2000: 226-227). In this case, it appears that what is truly significant is in fact the way the pottery is decorated. Indeed, not only are the painted designs on the bowls an expression of the potters' (in this case, the women of the different households) individuality, but also an important marker of cultural and political identity (Bowser 2000: 226-229). What connects these two examples is the fact that it is ethnography, and therefore, actual discussions with the potters, that led to these understandings of what was important in the *chaînes opératoires* being studied. Needless to say, this type of confirmation is unavailable to archaeologists.

The second problem, while concretely affecting the present project, is also broader in scope, and addresses the very principles behind archaeological interpretations. Archaeology is, among many other things, a discourse which mediates past and present in a two-way affair involving theoretical projection and archaeological data (Shanks and Tilley 1987: 104). That theoretical projection is necessary, as "one cannot understand anything about the meaning of material culture-patterning in the past (or the present) unless one is willing to make conceptualized interventions by means of social, ethnographic, or other starting points about the manner in which the past social totality was constituted" (Shanks and Tilley 1987: 7). Unfortunately, this conceptualisation is, in archaeology, destined to imperfection.

It relates, ultimately, to what Giddens (1982) refers to as the 'double hermeneutic' of social sciences:

> The social scientist studies a world, the social world, which is constituted as meaningful by those who produce and reproduce it in their activities – human subjects. To describe human behaviour in a valid way is in principle to be able to participate in the forms of life which constitute, and are constituted by, that behaviour. This is already a hermeneutic task. But social science is itself a 'form of life', with its own technical

> concepts. Hermeneutics hence enters into the social sciences on two, related levels. (Giddens 1982: 7)

Shanks and Tilley (1987: 107-108) argue that there is, for archaeology, an additional double hermeneutic. First, the societies it concerns itself with are often completely alien, and as such, possess world views that are drastically different to that of the archaeologist. In addition, archaeologists must deal with the "hermeneutic involved in transcending past and present" (Shanks and Tilley 1987: 108).

In other words, social science requires not only an active participation in the reproduction of the social world in order to describe it in a meaningful way, but also an understanding of its own paradigms. However, archaeologists cannot truly engage with the social world they are involved with because 1) it is completely foreign to their own reality, and 2) it resides in the past. For the conceptualisation necessary to generate meaningful archaeological interpretations, the consequences are somehow concerning, and are felt when dealing with the issues being discussed in the present chapter.

Indeed, going back to the matter at hand, this 'fourfold hermeneutic' described by Shanks and Tilley (1987) affects how *chaînes opératoires* are understood, or rather, how, once reconstructed, one makes senses of this otherwise technical data. In ethnography, the conceptualisation, or rationalisation, necessary for the creation of socially, culturally, and even politically meaningful description and interpretation of technical actions is achieved by interacting directly with the actors, the craftspersons involved, and in our case, with pottery making. As this is not possible for archaeologists, these conceptualisations are necessarily more abstract; they can be based on real cases drawn from ethnography, or from decades of research and debates, but must be understood within their own philosophical constraints.

7.2.2 Concluding remarks

The present section was motivated by tangible methodological obstacles encountered during the reconstruction and interpretation of the different *chaînes opératoires* present in the Teichos Dymaion assemblage. In deconstructing and rationalizing these obstacles, one can better understand where their origins. This does not involve a rejection of the very concept of the *chaîne opératoire*, nor a rebuttal of its usefulness and importance for the study of technological practices and its entanglement with the social sphere.

Indeed, while it is important to be conscious of the different challenges archaeologists face when looking to use this concept to approach ceramic studies, be they technical, as with the

first two, or more fundamentally philosophical as in the case of the third, they must not be seen as insurmountable. Rather, they must encourage a constant reassessment of how one decides to engage with the material, of the methodologies and conceptual tools selected. This exercise, in the present case, led, following the present discussion, to two conclusions. First, the methodology selected, including the application of the techno-stylistic approach, is probably the best suited to overcome the limitations of archaeological ceramics regarding the identification of technical attributes, and their subsequent organisation and interpretation in coherent technological ensemble. Second, the *chaîne opératoire* is, however, much more problematic, and possibly too constraining, for the material reality of this project, and arguably of any archaeological endeavours. As such, it would be sensible to re-evaluate its practicality, and find an alternative which would allow the same sort of meaningful discussion on technology.

7.3 Taking a step back: technological traditions 'unchained'.

In constructing a new conceptual basis for the analysis of data from the Teichos Dymaion assemblage, it is necessary to target the same elements, while being less demanding; however, not in terms of rigour, but certainly in terms of the detail necessary to make it meaningful. It should also encourage the same discussion on identity, technological changes and exchanges, and more specifically, on the origins and diversity of the HBW phenomenon at Teichos Dymaion. The answer, it turns out, is not unfamiliar from that already addressed in this very thesis.

7.3.1 In plain sight: traditions as basic units of analysis.

It is believed that going back to the broader concept of technological *traditions* may help circumvent the various challenges raised above. This concept is not new, nor is its use in archaeology. For instance, Roberts L. Rands was, in 1961, using rim types to differentiate technological traditions in Maya ceramics (Rands 1961). Rye's *Pottery technology* (1981) gave a satisfying definition of the concept , and while the term itself was not used, the idea of technological traditions was also very much present in the edited volume *The Many Dimensions of Pottery: Ceramics in Archaeology and Anthropology* by Pritchard and van der Leeuw (1984), and to some extent, in Matson's *Ceramics and Man* (1965). By the 1990s, the concept was well established in archaeology, and was readily used when discussing pottery manufacture and its technical or socio-cultural mechanisms (e.g. Sackett 1990: 33, van der Leeuw 1993).

While the concept of traditions has already been discussed briefly, it is worth reviewing what

is understood as a *technical tradition* for the purpose of the present thesis. It refers, primarily, to the set of conventions and patterns constituting a technological practice, usually transmitted by apprenticeship (Gosselain 2002: 10-11). It is however not fixed, or neutral. Rather, it is better viewed as a complex system constantly influenced by the social representations of those involved in its reproduction (Gosselain 2002: 10-11, see also Pfaffenberger 1992). A technical tradition is, in short, a technological manifestation of the *habitus*, and is more or less subjected to the same mechanisms. Pottery traditions, as such, concern both the technical and stylistic aspects of pottery, while also encompassing its more functional aspects, and thus enable an exploration of the diverse material manifestations of the different affiliations and feelings of belongings that constitute the very notion of identity (Gosselain 2010: 11, Bentley 1987). It is therefore an appropriate conceptual tool to investigate social boundaries (Druc 2009: 94).

Pottery traditions, as a concept, has also been used for decades, specifically in the context of Aegean archaeology, which greatly enriches the literature available as point of reference for the present project following the conceptual change at play here. Indeed, Day has been using the concept in various publications, notably concerning Cretan pottery (e.g. Day *et al.* 1997, Day and Wilson 1998, Day *2*004). Whitelaw et al. (1997), or more recently (and more in line with the present study), Hilditch (*et al.* 2014), Müller (*et al.* 2015) and Gilstrap (*et al.* 2016) have also made use of the concept in projects on Aegean pottery. It was also used more recently in the ongoing discussion on the regionality of Mycenaean pottery as a way to address the differences observed in the fine pottery found in different parts of the Mycenaean world. Although used more superficially, without necessarily discussing the more technical aspects of pottery, it is nonetheless an interesting and significant change in the vocabulary used in Mycenaean archaeology (e.g. Aktypi 2017).

In using the already well-discussed and established idea of technical traditions, a viable alternative to the *chaîne opératoire* was found. It relies on the same theoretical concepts and assumptions, and it is compatible with how the *chaîne opératoire* was intended to be used in this project. Indeed, traditions also represent different 'know-hows' in the way pottery was made, which is ultimately what Roux and Courty's method was intended to identify.

7.4 The different pottery traditions of Teichos Dymaion: presentation and discussion.

This last section presents the different *pottery* technical traditions identified at Teichos Dymaion, based on the attempt to reconstruct the different *chaînes opératoires* present in the

pottery assemblage, using the techno-stylistic approach, while also keeping in mind what has been discussed above. While the important issue of provenance will also be addressed for each individual tradition, it is not the origins of the traditions themselves that will be discussed here, but rather, the origins of the pottery, of its raw material, in an attempt to identify local and imported pottery. The origin of the traditions themselves will be addressed in the next chapter, as it will naturally lead to more complex discussions on HBW, and on its presence and signification at Teichos Dymaion, and more broadly, in Achaea.

7.4.1 Pottery tradition 1: Mudstone and grog coil-made tradition.

Local coil-made traditions	Clay	Dominant tempering Practices (++, + or -)	Distictinve shapes.	Other characteristics
Tradition 1: Plain Variant	Alluvial clay (Fabric 1)	Mudstone tempering (++) Grog Tempering (-)	Medium or large coarse vessels Cooking pot Limited amount of jars	Rarely decorated
Traditon 1: Burnished Variant	Alluvial clay (Fabric 1) Coarse red clay (Fabric 3)	Grog tempering (++) Mudstone tempering (+)	Jar (Collared, Globular, Wide-Mouthed, Hole-mouthed) Bucket Basin	Includes most samples bearing applied cordons (plain and rope-like)
Tradition 2: Calcite and grog	Alluvial clay (Fabric 2)	Calcite tempering (++) Grog tempering (+)	Jars (Collared, Globular)	Surfaces are most of the time burnished.

Table 7.1 Local coil-made traditions: characteristics and comparison.

This tradition includes the vast majority of the handmade pottery, and therefore, of the pottery that was identified as HBW (figure 7.1, red box, table 7.1). It includes a number of variants, hinting at a degree of heterogeneity of practice. However, these variants are all related, sharing a series of significant common elements, namely the same primary forming technique, a similar clay matrix, and similar tempering practices. Essentially, pottery belonging to this tradition is coil-made and made from a similar alluvial clay. The tempering is more varied, and two main practices can be identified: 1) the addition of crushed mudstone (mainly seen in Subfabric 1.1), and 2) the addition of grog (mainly seen in Subfabric 1.3). However, as seen in Chapter 6, these are not mutually exclusive, and both temper types can be used together. However, they are rarely present in equal quantities, with one temper type often dominating. All variants also share a common repertoire of shapes, which corresponds to the HBW shapes presented in Chapters 5 and 6, as well as the same, fast bonfire firing regimen.

This tradition can be divided into two variants which highlights significant differences that will useful for the unfolding of coming discussions in Chapter 8 and 9 (table 7.1). The first variant corresponds to the portion of the present pottery tradition that is *plain* (see section 6.2.1.2). The second variant includes the burnished portion of the tradition. It also includes all pottery from

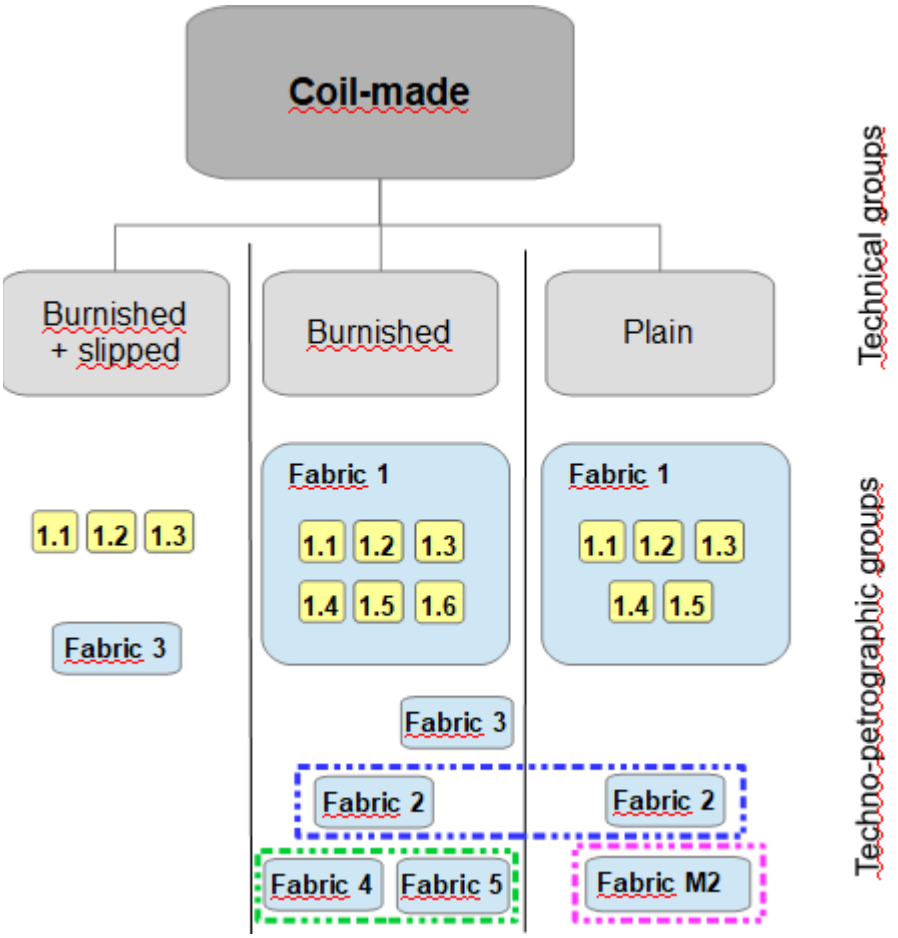


Figure 7.1 Handmade traditions.

the burnished *and* slipped technical subgroup. These two variants differ from each other in two aspects.

First, there is pattern observable in the range and frequency of shapes for each group. Indeed, identified shapes in the Plain variant consist mostly of cooking vessels, and in general, is constituted mainly of coarse, medium to large vessels without the decorative elements that characterise HBW. It however also includes jars (collared, globular, and wide-mouthed) and buckets, albeit in much smaller quantities (see table 6.3). The jars and the buckets are much more pre-eminent in the Burnished variant (see table 6.3). Moreover, it includes two shapes (basins and hole-mouthed jars) which are absent from the plain variant. In contrast, the number of cooking vessels is much lower, restricted to only two samples. Given that the identification of cooking pots in the initial macroscopic study was uncertain, it may be that these outlier examples were in fact misclassified. As most decoration is found on burnished wide-mouthed jars and buckets, this variant group includes most of the typical HBW decorations: the plain and rope-like bands. In short, contrasting once again with the first variant, this second one is in general finer, and, in shape and surface finish, more 'typically' HBW.

Second, while both variants are petrographically similar, and include samples from both the mudstone-dominated (Subfabric 1.1) and the grog-dominated (Subfabric 1.3) groups, the respective proportion of each subfabric differs. The Plain variant includes only a few examples of Subfabric 1.3, and is otherwise dominated by Subfabric 1.1 and its mudstone tempering pre-eminence. It also includes samples from Subfabric 1.2, 1.4, and 1.5. The Burnished variant is more balanced, as it has both tempering practices in relatively high numbers. It nevertheless includes a majority of Subfabric 1.3, and as such is characterise by a higher proportion of grog tempered vessels. In addition, this variant also includes all samples from the Red clay group (Fabric 3) and from Subfabric 1.6, and samples from Subfabrics 1.2, 1.4 and 1.5.

These differences were, at first, thought to be indicative of an altogether different pottery tradition. However, as seen in chapter 6 (table 6.1), this might be more of a chronological issue. A temporal shift regarding the favoured temper is indeed observable when looking at the distribution of the subfabrics in the stratigraphy of trench ΓΓ, with Subfabric 1.3 and its greater amount of grog temper, being more present in the lower πασες, and Subfabric 1.1 and its predominant mudstone temper being more present in the upper πασες. This observation is of the utmost importance, as it suggests that the variations described above for this main handmade pottery tradition, which includes most of the HBW pottery, may not be due to different craft practices, but on the contrary, to evolutions within the same practices. After all, both temper types are always present; it is their respective proportion that changes. This will be addressed further in the next chapter.

7.4.1.1 Mudstone and grog coil-made tradition: provenance.

The clay used in this first coil-made tradition seems to correspond to alluvial clay, characterised by quartz, chert (of which some is radiolarian), quartzite, frequently with small inclusions of red argillaceous rock. It also includes acid igneous rock fragments and carbonate inclusions, although in lesser quantity.

This particular lithology fits within the local geology. Indeed, the area surrounding Teichos Dymaion (see geological map, appendix 2) is mostly composed of torrential deposits (H.l), eluvial deposits (H.el), and coastal deposits (H.sl), which all could related to the alluvial materials observed in thin section[16]. Indeed, previous petrographic analyses of Achaean pottery have demonstrated that radiolarian chert, non-radiolarian chert and red argillaceous rocks are

16 Sampling of the different clay sources present in these deposits would be necessary to confirm the provenance of the different fabrics. However, for this example and the one below, the arguments are considered compelling enough to be the bases of further discussion on the provenance of the HBW and Mycenaean pottery of Teichos Dymaion.

indeed frequent elements of the local geology (Iliopoulos and Xanthopoulou 2017, Rathossi 2005).

Fabric 3, while part of this first tradition, does not seem to use the same alluvial clay as Fabric 1. The Red clay group is characterised by red argillaceous inclusions, and contains more white mica. Despite these differences, its chert inclusions are similar to those in Fabric 1, and it remains compatible with a broadly local provenance, as the local geology does include red sand and clay deposits (see Pleistocene formations, appendix 2). Perhaps more importantly, the clay matrix of Fabric 3 is very similar to that of Fabric M1, which undoubtedly constitutes the bulk of a local wheelmade pottery tradition (see below, section 7.4.5).

This clear use of a different clay-rich raw material within the same technical tradition is interesting and shed lights on the significance of two minor subfabrics of Fabric 1: the Finer Alluvium subfabric (1.2), and the Coarser Alluvium subfabric (1.5). Indeed, it seems increasingly probable that they are the results of the exploitation of different clay sources within the area of Teichos Dymaion, although the same general type of alluvial clay seems to have been favoured. There are also indications that the exploitation of some of these sources was chronologically limited. Indeed, Subfabric 1.2 is mostly present in the deeper parts of trench ΓΓ, while Subfabric 1.5 is exclusively found in the upper parts of the trench (table 6.1). However, more samples, and ultimately, more trenches would be necessary to confirm this trend.

7.4.2 Pottery tradition 2: Calcite and grog coil-made tradition.

Corresponding to the second HBW tradition, it is in many ways similar to the previous category (figure 7.1, blue box, table 7.1). They share an identical primary forming technique, a similar alluvial clay, and can also be subdivided into a plain and a burnished variant. However, it is a much smaller tradition, containing only 13 samples. As only two of those are plain, both the burnished and plain pottery will be discussed together.

This tradition is rather distinct in terms of its coarse fraction, containing a limited amount of added mudstone. It is, however, moderately to heavily tempered with crushed calcite, a very different practice than that of the first tradition. This difference does not seem to be related to vessel function. Indeed, while the repertoire of shapes found in Fabric 2, and thus in this second coil-made tradition, is more limited than in pottery tradition 1 described above, the shapes that *are* present are common to both, and are in no way indicative of specific and unique functions. This choice of temper corresponds to a markedly different practice of raw material manipulation. Nevertheless, the two share a common clay and primary forming technique, and importantly

are both grog tempered. This particular inclusion seems to link all coil-made, HBW traditions together, whatever the other variability in their production; this is a pattern that corresponds to that observed elsewhere (see D'Agata *et al.* 2012, Boileau *et al.* 2010, Whitbread 1992).

7.4.2.1 Calcite and grog coil-made tradition: provenance.

With its compatible alluvial base clay, the calcite and grog coil-made tradition is likely also to be of local production.

7.4.3 Pottery tradition 3: Volcanic sand and grog coil-made tradition.

Local coil-made traditions	Clay	Dominant tempering Practices (++, + or -)	Distictinve shapes.	Other characteristics
Tradition 3: Volcanic sand and grog	Characterised by its volcanic inclusions	Sand tempering (+) Grog Tempering (+ or -)	Carinated cup	Includes two disctinct fabrics.

Table 7.2 Non-local coil-made tradition (Volcanic sand and grog): characteristics.

Tradition 3 is similar in many respects to the two previous HBW traditions (figure 7.1, green box, table 7.2). All four samples are coil-made, burnished and tempered with grog. However, they have different base clay, which appears to be tempered with sand in addition to the now-familiar grog. Notably, it also includes a carinated cup, a shape otherwise absent from all other handmade traditions.

7.4.3.1 Volcanic sand and grog coil-made tradition: provenance.

Fabrics 4 and 5, which constitute this tradition are distinct from the other handmade pottery at Teichos Dymaion on account of their volcanic geology, observable in both the fine and coarse fraction. Each fabric has a distinct volcanic geology, indicative that they are probably from different locations, in all likelihood, from the Italian peninsula.

Indeed, the volcanic geology that characterises both these fabrics is incompatible with the geology surrounding Teichos Dymaion (see geological map, appendix 2). It also is not only different from eastern Achaean fabric (Iliopoulos and Xanthopoulou 2017), but also incompatible with an origin in the Peloponnese. Just like the shape of the carinated cup itself was suggesting, its closest parallels are found in Italy, more precisely in the southern Adriatic region (Cannavò and Levi 2018: 16-27). Indeed, the grog tempering combined with the clipyroxene, tuffaceous material, and porphyritic igneous rock inclusions in Fabric 4 is similar to fabrics E4 and ES3 describe by Cannavò and Levi (2018: 17), while the higher quantityof tuffaceous mudstone and grog in Fabric 5 is more akin to fabric E2 and E3 (Cannavò and Levi 2018:16, 17, 116-117). While the positive correlation of these fabrics with specific fabrics found in Italy would

require a more in-depth analysis, the lithology is enough to suggest a Southern Italian origin for the volcanic sand and grog coil-made tradition. It also correspond to the technology of *Impasto* pottery as described by Borgna and Levi (2015: 118-119), and as such, this small group will be reffered as such to distinguish them from the bulk of the HBW assemblage.

7.4.4 Pottery tradition 4: Micaceous wheelmade tradition.

Wheelmade traditions	Clay	Dominant tempering Practices	Other characteristics
Tradition 4: Micaceous red clay	Red clay Calcareous High mica content	Untempered (Fine) OR Clay mixing (Medium) OR Clay mixing and mudstone tempering (Coarse)	Includes most wheelmade samples Has coarse, medium coarse and fine versions which relate to each other
Tradition 5: Green clay	Greenish Calcareous Lower Mica content	N/A	Rarer Has a medium coarse and a fine version, but tempering is unclear
Tradition 8: Grey Ware	Grey	Very fine, untempered	Distinct dark grey or black slip Mostly includes carinated shapes

Table 7.3 Wheelmade tradition: characteristics and comparison.

This red wheelmade tradition is the most prevalent Mycenaean pottery tradition at Teichos Dymaion (figure 7.2, orange box, table 7.3). It corresponds to Fabric M1 and its subfabrics, and as such, represents the vast majority of the Mycenaean pottery of Teichos Dymaion. Unsurprisingly, it includes vessels displaying typical Mycenaean shapes and painted motifs. It is characterised by a calcareous base clay, reddish in hand specimens and by its abundant mica inclusions.

There are three variants: fine, medium-coarse and coarse. The fine variant includes small or medium table ware, with occasional closed transport or storage shapes. It can be plain, slipped, or slipped and painted. It has a fine calcareous untempered clay; any of the rare larger inclusions are unlikely to have been added by the potter.

The medium-coarse variant contains plain or slipped vessels, although the limited number of samples makes intepretation of the range of surface finishes or shapes uncertain at best. The base clay is the same as the fine variant, seemingly mixed with a coarser clay (see chapter 6 for details).

The last coarse variant is very similar to the second medium-coarse one. with the addition of large crushed mudstone fragments as temper.

7.4.4.1 Micaceous wheelmade tradition: provenance.

The micaceous wheelmade tradition, representing the majority of the Mycenaean pottery at Teichos Dymaion, is most likely broadly local to the area around Teichos Dymaion. Firstly, it could be described as a 'complete' range of pottery, including as it does fine, medium-coarse, and coarse pottery that are all related in terms of their composition and production technology

The coarser inclusions found in Subfabrics M1.2 and M1.3 are similar to those found in the main coil-made traditions (see 7.4.1 Pottery tradition 1, above). Furthermore, previous analyses of micaceous red pottery from western Achaea have a degree of similarity, and while not perfect fits, seem to reinforce, in conjuncture with the other elements, the idea that the present tradition is indeed local (Rathossi 2005: 491-500, samples TH21, MP2, G11).

Besides the analytical argument for a local provenance, this distinctive fabric comprises the majority of Mycenaean pottery at the site and is indeed present in overfired wasters at Teichos Dymaion. While this does not necessarily suggest pottery production at the site itself, it suggests that the production centre should have been located not far away. The suggestion that the tradition is local also fits, although on a regional scale, with typological observations such as the marked preference for monochrome pottery and solid-painted interiors in the Teichos Dymaion material that is compatible with other Achaean sites such as Aigeira, reflecting an overarching regional stylistic trend (Deger Jalkotzy 2003: 64). The clay appearance in hand specimens is akin to what was observed by Mountjoy for Achaean pottery (1999: 399), but not to what Deger-Jalkotzy described for Aigeira (2003: 64), suggesting that they were made at different locations. It is therefore suggested here that one of those locations was close to Teichos Dymaion, and was the source of its main, micaceous wheelmade tradition.

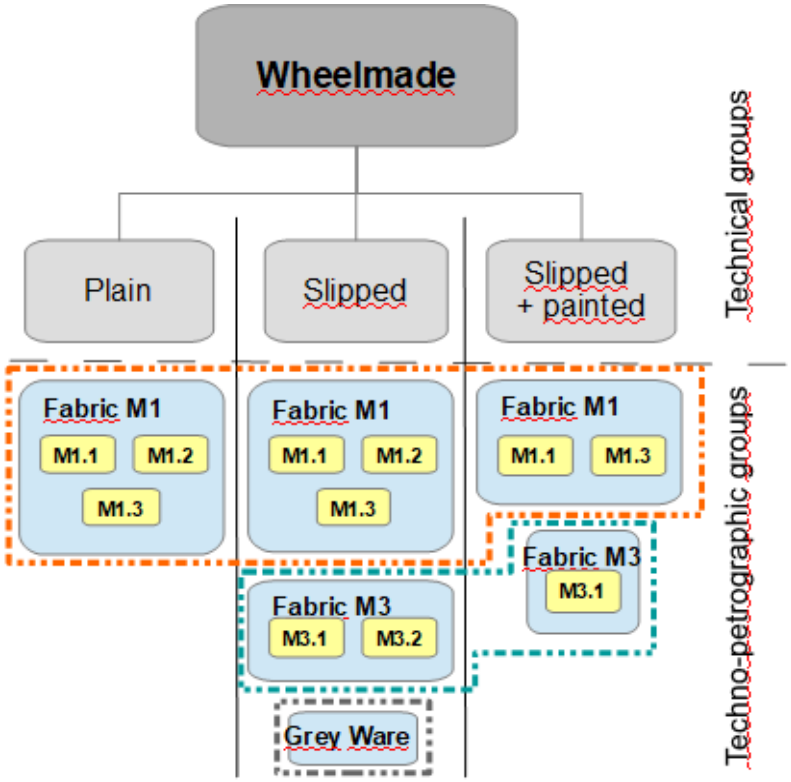


Figure 7.2 Wheelmade traditions.

7.4.5 Pottery tradition 5: Green wheelmade tradition.

This small wheelmade tradition is technologically the same as the pottery tradition 5 described above, and as such, could have joined it based on this criterion alone (figure 7.2, cyan box, table 7.3). Their differences lie in the distinctive nature of the clay.

This tradition consists of all samples belonging to Fabric M3. This fabric, while also calcareous, contains fewer mica inclusions, and is characterised by its green hues in cross-polarised light, and as such is petrographically distinct from Fabric M1 and the main red micaceous tradition.

7.4.5.1 Green wheelmade tradition: provenance.

These characteristics were rapidly associated with a fabric described by Burke *et al.* (2018). It indeed bears striking resemblances to the Corinthian fabric they describe (Burke *et al.* 2018: 153, Alram-Stern 2018), and while it concerns Early Helladic contexts that predate the scope of the present research, the similarities between the clays are enough to suggest that the Green Wheelmade tradition discussed here is likely from Corinthia, or at the very least foreign to Achaea.

7.4.6 Pottery tradition 6: Pithoi tradition.

This tradition (figure 7.1, pink box) contains most of the pithoi observed in the assemblage. However, only two sherds were sampled, which limits confidence in their representative nature. The pithoi at Teichos Dymaion are, technologically, closer to the HBW traditions than to those of Mycenaean pottery, if one emphasises their coiled construction. There is however no reason to think that these pithoi are in any ways related to the HBW: large burnished storage vessels identified as HBW were treated separately, and mostly belong in Fabric 1 (and incidentally in pottery tradition 1 above). The present pithoi are on the contrary very distinct petrographically, including most characteristically carbonate inclusions and microfossils. In light of this admittedly limited evidence, it is necessary to assume that the large pithoi of Teichos Dymaion are distinct from both the HBW and the main Mycenaean traditions.

7.4.6.1 Pithoi tradition: provenance.

The pithoi are most likely local, as their carbonate inclusions may correspond to the different fossiliferous deposits found in the vicinity of Teichos Dymaion (see Appendix 2). At this stage, it is however impossible, considering the amount of data available and the sample size for this particular tradition, to say more on the matter.

7.4.7 Pottery tradition 7: Bathtub tradition.

An additional handmade Mycenaean-style pottery class was identified at Teichos Dymaion: the Bathtub tradition. While limited to a single rim sherd, it is nevertheless distinctive in the way the clay body is conceived and produced, correlating with a distinct tradition, already recorded from Attica and the Saronic Gulf region (Gilstrap *et al.* 2016: 506). It is characterised by the unique shape it produces (namely, large and small bathtubs), its handmade nature, and especially its use of organic temper.

The example found at Teichos Dymaion fits this description, but is most likely the result of a local production, as its inclusions are similar that those of Fabric 1. The presence in Achaea of the very particular practice of clay preparation in vessels of this specific shape, observed by Gilstrap *et al.* in Attica, is of great interest in itself.

7.4.8 Pottery tradition 8: Grey Ware wheelmade tradition.

The last pottery tradition of Teichos Dymaion concerns the small group of pottery that has been identified as Grey Ware (figure 7.2, grey box, table 7.3). Distinctively grey, it bears a thin or thick dark grey slip and is characterised by carinated vessel shapes. While it is technologically related to the Mycenaean traditions, being wheel thrown, it is typologically much different, and rather resembles the volcanic coil-made fabric described above, as they are the only two traditions which include these typically Italian shapes.

7.4.8.1 Grey Ware wheelmade tradition: provenance.

While chemical analysis would be required for confirmation, it is safe to suggest that these are impiorted from the Italian peninsula, on the basis of similarities with pottery from Calabria and elsewhere (e.g. Allen 1991, Belardelli and Bettelli 2005, Borgna and Cassola Guida 2005, Badre 2006, Girella 2007, D'Agata *et al.* 2015, Borgna and Levi 2015).

Grey ware is generally understood to be an Italian phenomenon, a pottery tradition often referred to as a hybrid of Mycenaean pottery-making techniques (i.e. the potter's wheel), and Italian shapes and styles (Borgna and Levi 2015: 115-116). Moreover, the only other Italian-inspired carinated cup present in the present assemblage is also considered to be an Italian import. The shape is otherwise absent from the HBW material. Put together, these elements suggest that the Grey Ware of Teichos Dyamion is no exception and is also to be considered a foreign import from Italy.

7.4.9 Concluding remarks.

Some loners, while sometimes hinting at more local or foreign traditions of pottery, had to be left out of this discussion. Indeed, except in cases such as the bathtub (loner M3) or pithos tradition, where information outside from the analysis done in the course of this project allowed a meaningful discussion, it would be presumptuous, after the discussion held above in section 7.2 and 7.3, to pretend that one or two sherds are sufficient to discuss traditions.

7.5 Conclusion

This chapter served two different but related purposes that together concluded the presentation of the material realities of Teichos Dymaion. Its presentations of technical traditions created a more complete picture of the assemblage and presented the range of pottery traditions identified at Teichos Dymaion, including the suggested production locations of each based upon the understanding presented here, the next chapter will move on to discuss the central questions of the study, namely:

How does the HBW at Teichos Dymaion, relate to other assemblages that have been referred to as HBW?

Is it a homogeneous tradition? Where should we seek its origin(s)?

What is its significance in the specific context of Teichos Dymaion and, more generally, western Achaea?

Chapter 8. *The pottery of Teichos Dymaion: comparisons and interpretations.*

8.1 Introduction

At the beginning of this thesis, the boundaries between the different classes of pottery that were of interest to this research were very defined, and while a certain degree of complexity was assumed, the results of the analysis have enabled a more detailed consideration of the initial categories and motivated a more critical consideration of the pottery from Teichos Dymaion.

What is initially interesting, and quite clear when looking at the results presented in the previous three chapters, is that the rough, preliminary classes of pottery initially contrasted and opposed; the HBW, Grey Ware, and Mycenaean pottery, seems to hold. The analyses, however, also revealed a more complex picture underlying this simpler facade, and a hidden diversity, especially in the case of the HBW material, which highlighted multiple provenances, and more importantly, different technological practices.

The present chapter aims to go beyond acknowledging this variety in provenance and technological practice, and use it to attempt to understand the HBW phenomenon as it unfolds at Teichos Dymaion, and perhaps in its wider Achaean context. First, it will try to make sense of the pottery itself, looking at the technological, stylistic, and morphological variability of the different traditions to comment the type of activities taking place in the citadel. This assessment will then be contrasted with other known assemblages of HBW in mainland Greece in an effort to contextualise the present situation. Having explored the *meaning* of the pottery traditions in regard to what was happening at Teichos Dymaion, the following section will then discuss the populations dwelling therein. It will do so first by looking at how they physically interacted, addressing the issue of distinct, yet co-habiting groups of individuals. It will then move on to assess if this close proximity translated into the technical sphere, penetrating craft traditions through what has been referred to as 'technical hybridity', a recurring topic in the discussion of the HBW phenomenon. Finally, these interpretations will be combined to consider the situation within its particular historical context, bearing in mind that Achaea, and in particular the citadel of Teichos Dymaion, were experiencing a period of dynamism in the period immediately preceding the collapse and the subsequent Post-Palatial period. This dynamism seems related to the privileged position of the region and its active role in trade with Southern Italy. A reassessment of the role and functions of Teichos Dymaion, in relation to its own local reality on a site level, to the wider Achaean context, and to the broader context of Italo-Mycenaean

contacts will thus be attempted, in light of the results of this project.

8.2 Comments and interpretations on the diverse pottery traditions of Teichos Dymaion

8.2.1 On the origin of the HBW at Teichos Dymaion: a brief assessment

Before going any further in the present discussion, it is necessary to re-address the issue of the origin of the HBW phenomenon. In the introduction of the present thesis, it was pointed out that the preferred explanation concerning the source of the HBW pottery, based on typological comparison, was that it was from Southern Italy. Critiques of this hypothesis, however, emphasised that the situation was most likely more complex, but the solutions suggested so far do not address this complexity, at least not in a satisfactory way (see Small 1990, 1997, for a complete rejection, or Lis 2009, 2018 for a divergent view). This situation stems from how pottery is traditionally considered and recorded (see chapter 1 for a more detailed discussion on ceramic studies).

This section will briefly address what is believed to be the heart of the issue, and from this, suggest a *local* assessment of the origin of the HBW *at* Teichos Dymaion.

8.2.1.1 Scaling down: the problem with 'umbrella' categories

The main problem concerning the dominant approach to HBW is simple: its name, or rather what it suggests about how the phenomenon is understood[17]. In line with how pottery was viewed at the time (as presented in van der Leeuw 1984: 710), the identification of HBW in the 1960's as a new type of pottery led inevitably to the suggestion it was the result of a substantial episode of migration. This was addressed by creating a new 'umbrella' category which, albeit with many name changes throughout the years, has been conceptually unchanged ever since.

Because this unified vision for HBW was maintained for a long time, despite sporadic claims that it was a more complex phenomenon (e.g. Sherratt 1981), it became common to address this group of pottery as a single unit. Even as scholars became increasingly aware of the complexity of the HBW, the *approach* remained unchanged, with the creation of more categories, which effectively divided the problem.

17 Handmade Burnished Ware (HBW) is now widespread in the nomenclature and has become essential for understandability between scholars. It is for this reason that, despite the critiques raised in the present chapter, it was decided to maintain its use for this project. Moreover, it is not the name itself that is critiqued, but what it implies.

One such attempt, perhaps more 'successful' than others, is the so-called Handmade Domestic Pottery (HDP), from the work of Lis (2009, 2018) at Kalapodi and Mitrou, which tackles the diversity found in the handmade pottery at these two sites. However, while probably correct in the specific context of his research, the expansion of his observations to the whole of the HBW phenomenon is still problematic. Moreover, his approach is mostly typological, based on the close stylistic relations between the HBW (or HDP) collared, unburnished jars, and contemporary Mycenaean cooking vessels (Lis 2009). This specific part of the argument will be addressed briefly below when assessing the situation at Teichos Dymaion.

In terms of categorisation, it is not argued here that Lis' work is erroneous. In fact, it is useful in detailing the nature of handmade pottery at Mitrou and Kalapodi, and more generally raises awareness of more general diversity in assemblages of Late Helladic handmade pottery. By acknowledging this HDP, considered a local development, and the HBW, a foreign phenomenon, as simultaneous and co-occurring, he effectively closes down the local versus foreign development debate (see introduction). It is the addition of new categories that is contested as a solution, because they ultimately suffer from the same limitations described above when aplied broadly to multiple assemblages.

The solution, as mentioned previously, lies in scaling down our approach to HBW, focusing on understanding the material at a local level first and foremost, before attempting to tie things up regionally or inter-regionally. For this reason, the following section will specifically concentrate on Teichos Dyamion in the review of the elements which were used in the assessment of the origin of its HBW assemblage.

8.2.1.2 The origin of the HBW at Teichos Dymaion

Prior to assessing the actual origin(s) of the HBW traditions at Teichos Dymaion, it is essential to first determine whether its identification as 'foreign' is correct. It was, partly, the aim behind the technological reconstruction of the assemblage, and the reason why it was important to detail the diversity of pottery traditions at Teichos Dymaion and comment on the relations between them.

While displaying obvious differences in surface finish, and a relatively high variability in decoration and rim type, all pottery identified as HBW is coil-made. The local Mycenaean pottery, in contrast, is mostly wheelmade, except for the pithoi and the unique bathtub identified. While this is in itself a compelling evidence of the alien nature of the HBW in Mycenaean Greece, there is further evidence from the petrographic analysis. Indeed, the HBW pottery

presents quite different tempering practices, which led to the division of the assemblage into multiple traditions (see chapter 7). However, these traditions all have in common, albeit to varying degrees, the use of grog temper. Whitbread (1992) has argued convincingly that the addition of grog is an unknown tempering practice in Southern Greece during the Late Helladic period, and that, therefore, it could be used as evidence of the foreign nature of HBW, together with the strikingly different forming techniques used in the production of HBW.

More specifically, at Teichos Dymaion, the evidence appears to indicate that we can be more specific in searching for the origins of this intrusive ceramic traditions. The first element for this assessment is the presence of imported Italian handmade pottery (henceforth reffered to as *Impasto,* see section 7.4.3.1 above) among the HBW material. It is in fact a surprising find, as *Impasto* pottery had yet to be identified anywhere in Greece, even in Achaea. Of course, imported material from Italy has been identified: namely metal finds of 'Urnfield' typology, and the Grey Ware pottery often found alongside the HBW. The identification of imported *Impasto* pottery at Teichos Dymaion is important as not only does it add an extra category of imported items, but it shares a variety of technological attributes found in the locally produced HBW. The shared use of grog, identical forming techniques, and similar firing practices (Borgna and Levi 2015: 118-119) suggest that the imported *Impasto* specimens can serve as a bridge to relate HBW to Italian pottery in a way that was previously impossible.

In Teichos Dymaion there is no evidence to suggest that HBW was developed from an existing pottery tradition, as the pre-existing local Mycenaean practices are markedly different. The 'HDP' identified by Lis (2009, 2018) is considered absent from Teichos Dymaion. This may be surprising, considering the quantity of collared jars identified and the association elsewhere of this shape with the HDP group. There are, however, no petrographic or technological grounds to separate the handmade collared jars of Teichos Dymaion from the rest of the HBW material at the site. On the contrary, the HBW is close to Italian practices, suggesting that its manufacture at Teichos Dymaion represents Italian production technologies enacted in Achaea. Of course, attributing such importance to the choice and manipulation of raw materials raises the question of the meaning of the technical variants, including mudstone and calcite tempering. This will be discussed below.

8.2.2 The picture so far: particularities and explanations

The different pottery traditions of Teichos Dymaion can be reorganised into three meaningful groups: a first, locally produced Mycenaean group including pottery traditions 4, 6 and 7; a second, locally produced, HBW group including pottery traditions 1, 2 and 4; and a

third group of imported pottery, which is further subdivided into an Italian subgroup (pottery traditions 3 and 8), and Mycenaean subgroup (pottery tradition 5).

The first group includes the pottery originally recognized as fine and coarse Mycenaean pottery which was subsequently identified as local to the vicinity of Teichos Dymaion. It is technologically uniform, except for the handmade pithoi and the odd bathtub fragment. While these two are most likely the product of a different set of practices, the remaining pottery seems to be the result of a single group of potters sharing a similar set of the craft practices covering every stage from the selection and processing of raw material to the vessel firing.

The coarse portion of this first group seems to include large, closed shapes. The presence of recognised pithoi and stirrup jars suggests they were used for both storage and transport purposes. The most significant part of this group, however, seems to be the fine, decorated pottery, which suggests the fine Mycenaean assemblage was mostly related to the consumption of food and drink. Noticeably, this group does not include any cooking vessels.

The second locally produced group includes the pottery identified as HBW, the fabrics of which correspond to local geology. This group is morphologically less varied than the first group described above. Indeed, it contains very few small, open shapes that would mirror the functions of the fine Mycenaean pottery. One major absentee is certainly the carinated cups or mugs which are normally expected in an HBW assemblage. There is, however, a great proportion of larger shapes that could be associated with storage or transport functions. It also includes a few potential cooking vessels, however these are limited to simple, closed shapes; no pans or other cooking utensils were identified.

Technologically, two main practices can be identified. One, accounting for the majority of the HBW assemblage, is characterised by the use of siltstone and grog for the main tempers. The second, smaller, also contains grog, but is mainly characterised by the addition of crushed calcite to the clay body. Both groups, however, share common forming techniques and firing practices; and it is suggested here that they are clearly related.

The much smaller third group includes all pottery identified as imported, with subdivisions according to provenance. One such subgroup includes the pottery which was attributed to an Italian origin: the Grey Ware vessels, and the so-called *Impasto* (Fabrics 4 and 5). While some *Impasto* sherds suggest large, closed vessels, the majority of this imported group seems be composed of open, carinated vessels suggesting functions similar to that of the fine Mycenaean pottery. It is interesting to note that no such shapes exist in the local HBW assemblage. The

second imported subgroup corresponds to a group most likely originating from Corinthia, which is otherwise very similar to the fine local Mycenaean.

These observations will later help to give an up-to-date, pottery informed picture of the functions and nature of Teichos Dymaion. However, before doing so, it is necessary to go deeper in rationalising the results of the analyses. The following section will continue in this vein and compare the HBW of Teichos Dymaion to other known assemblages, in an attempt to use the resulting contrasts to highlight its particularities.

8.2.3 Teichos Dymaion and the rest of Mainland Greece: comparing and contrasting HBW assemblages

Having characterised the stylistic, technological, and morphological variabilities of the HBW pottery and its traditions at Teichos Dymaion, it is now compared to four major site where HBW has been found: Mycenae, Tiryns, Menelaion, and Korakou. The reasons for the choice of these four assemblages will be covered in considering their individual natures.

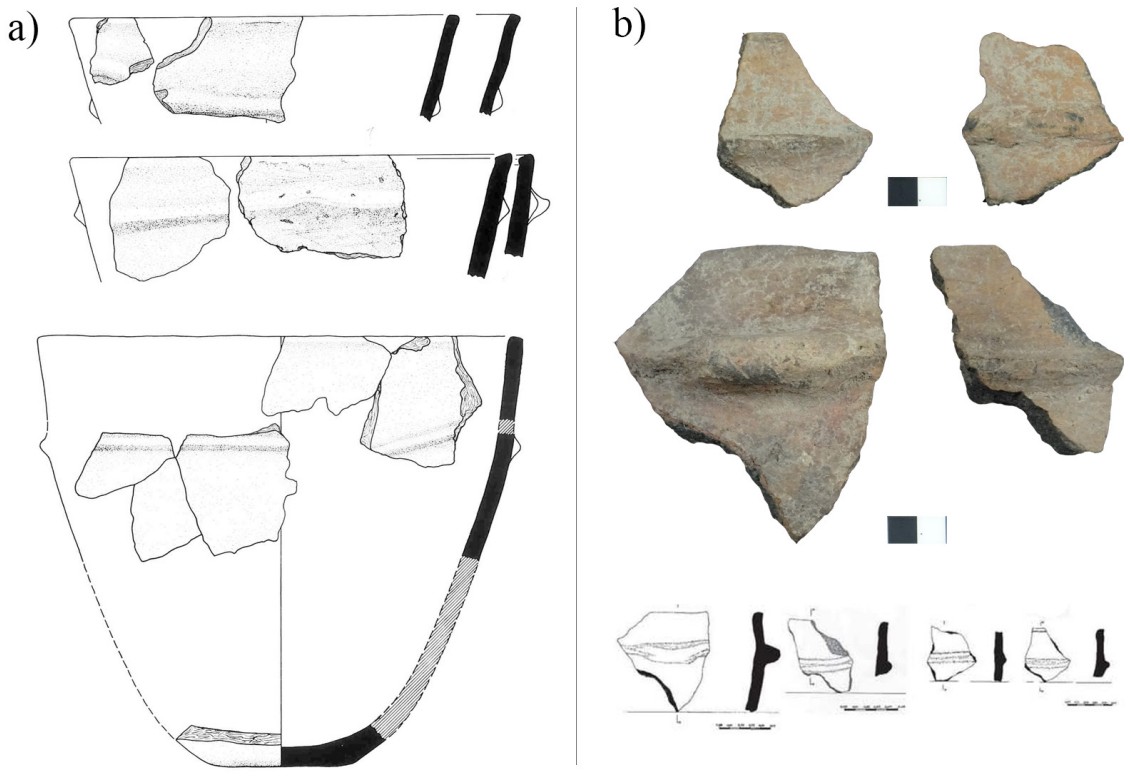


Figure 8.1 Plain cordons. a) Tiryns (from Kilian 2007), b) Teichos Dyamion

8.2.3.1 Tiryns

Tiryns, with its very large HBW assemblage, is an obvious choice for comparison in any

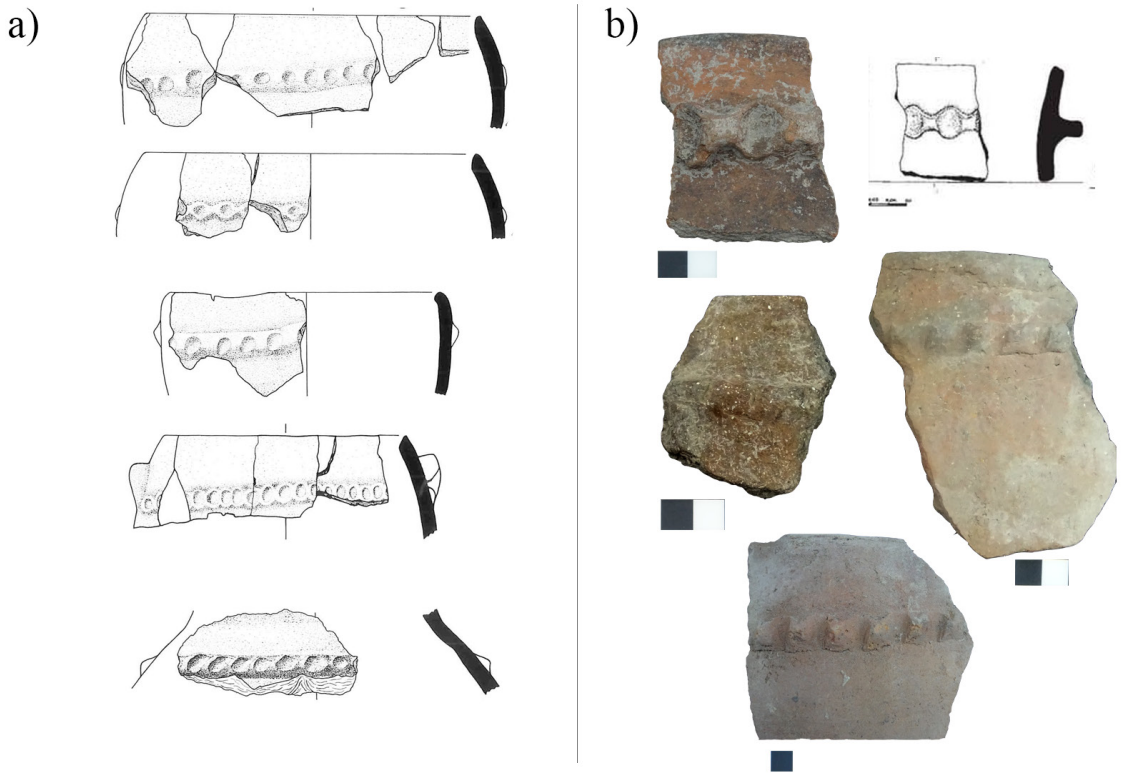


Figure 8.2 Rope-like decoration. a) Tiryns (from Kilian 2007), b) Teichos Dymaion

project investigating this particular ware. Moreover, having been also identified as a harbour, it offers a setting similar to that of Teichos Dymaion. Kilian's posthumous publication listed 484 specimens (Kilian 2007). However, as this number only includes 'feature' sherds, it is most likely that the actual amount of HBW at Tiryns is in fact much higher. In addition, 577 HBW sherds have also been found during the excavation of the Unterberg associated with the citadel (Stockhammer 2008: 286, Maran 2016). The chronology of the phenomenon is well understood, and while it has received criticism from Romanos (2011: 45), it is safe to consider it spans from the LH IIIB2 period until the very end of the Bronze Age.

The assemblage at Tiryns appears quite varied, both stylistically and morphologically. The variability in decoration types, while displaying a far greater range, is familiar to that observed at Teichos Dymaion. Indeed, the plain cordon seems to have been a popular applied plastic decoration at both sites. This feature is also stylistically similar at both sites, and used on similar vessel types (figure 8.1). The rope-like cordons, however, do not display the same degree of similarity, the Tiryns assemblage being dominated by simple finger impressed cordon, rather different from the slashed or high relief rope-like cordons of the Teichos Dymaion HBW material (figure 8.2). In general, the Tiryns material displays many decorative features absent at Teichos Dymaion, among which the horseshoe handle is perhaps the most noticeable (figure 8.3).

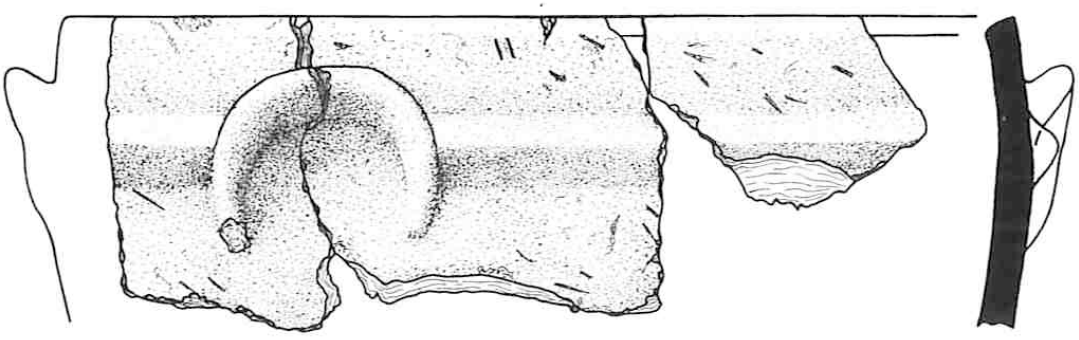


Figure 8.3 Horseshoe handle, Tiryns (from Kilian 2007)

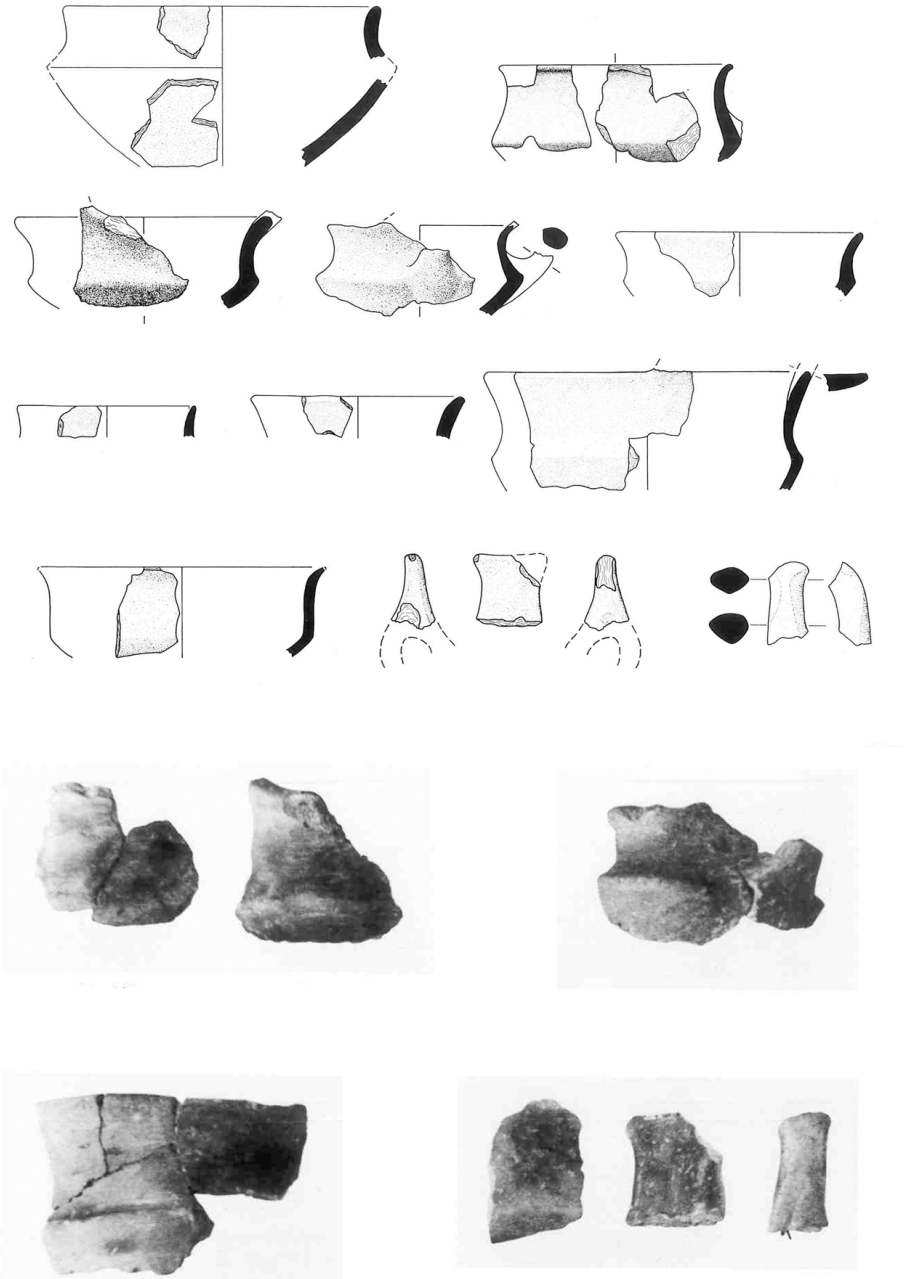


Figure 8.4 Carinated shapes, Tiryns (from Kilian 2007)

Morphologically, the contrast with Teichos Dymaion is equally interesting, but perhaps more useful for the present analysis. There is, it seems, a similar dominating presence of large shapes, such as wide-mouthed jars, buckets, and collared jars[18]. The wide mouthed jars and buckets, however, vastly outnumber the collared jars at Tiryns, while at Teichos Dymaion, the latter are just in the majority. The main difference between both assemblages, however, is found in the wider variety of shapes found at Tiryns, especially for smaller consumption-type shapes such as mugs or cups (Kilian 2007: 9-46). The site also has many examples of the carinated shapes that are absent from Teichos Dymaion (figure 8.4). The assemblage at Tiryns also contains a clearer set of HBW vessels associated with cooking activities, which includes both cooking pots (*kochtopf*), and utensils such as pans (figure 8.5).

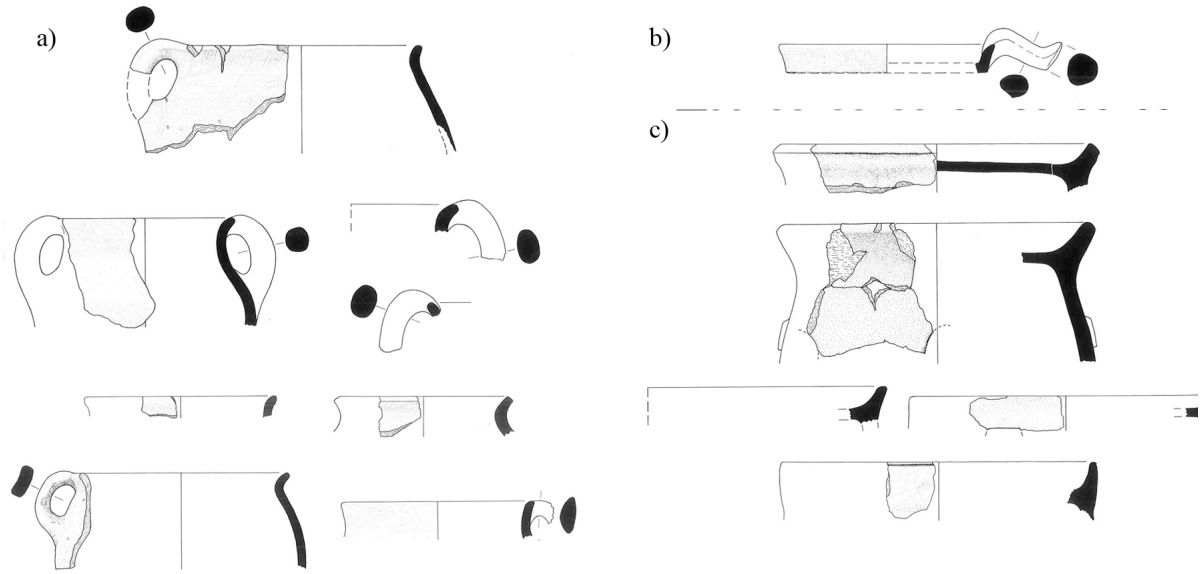


Figure 8.5 Cooking pots and utensils, Tiryns. a) kochtöpfe b) pan c) stands (from Kilian 2007)

In short, the HBW assemblage at Tiryns appears more complete, and perhaps more complex than that at Teichos Dymaion. While similar in terms of vessels suggesting storage or transport functions, the proportion of collared jars in the assemblage is smaller at Tiryns. The main difference, however, lies in the fact that the domestic material indicative of cooking or consumption activities is very clearly present at Tiryns, while it is elusive at Teichos Dymaion.

8.2.3.2 Mycenae

At Mycenae, another major HBW findspot, Late Helladic levels include over 476 sherds of this particular ware, but only a small proportion has been properly studied (Romanos 2011: 191 and fig. 4.7). That study, however, was thorough, and therefore selected as comparison material because of its typological insight, even though there is limited data on style and decoration.

18 Including the globular jars, as these types are often bundled together, see chapter 5.

With a chronology similar to that of Tiryns (Romanos 2011: 181), and a close geographical proximity, the portrait offered by the Mycenae assemblage of HBW is nevertheless different, based on the shapes identified by Romanos in her study of a selected 74 specimens (2011: 196-205). Far fewer shapes were identified, and, not unlike Teichos Dymaion, there are proportionally fewer wide-mouthed jars, than collared examples. Still, the representation of utensils, cooking vessels, and small domestic shapes is better than that at Teichos Dymaion.

Again, even if the shape distribution of large, storage or transport vessels is somehow similar to what is observed at Teichos Dymaion, Mycenae is, like Tiryns, more 'complete', as it also includes a clear set of domestic HBW shapes.

8.2.3.3 Additional comparison with minor assemblages: Menelaion and Korakou

The final two sites to be used in this comparison of the present HBW assemblage with others found in the Peloponnese are Menelaion and Korakou. They have been selected not for the abundance of secure HBW material, but rather because of their geographical location. Indeed, Korakou is located at the eastern end of the Gulf of Corinth, effectively acting as a last stop on the body of water for which Teichos Dymaion acts as first stop for Adriatic sea traffic. The Menelaion, near Sparta, does not share such a link with Teichos Dymaion, but with its 52 HBW specimens, it constitutes a valuable comparative assemblage. Unfortunately, there is no data for cooking vessels at the site.

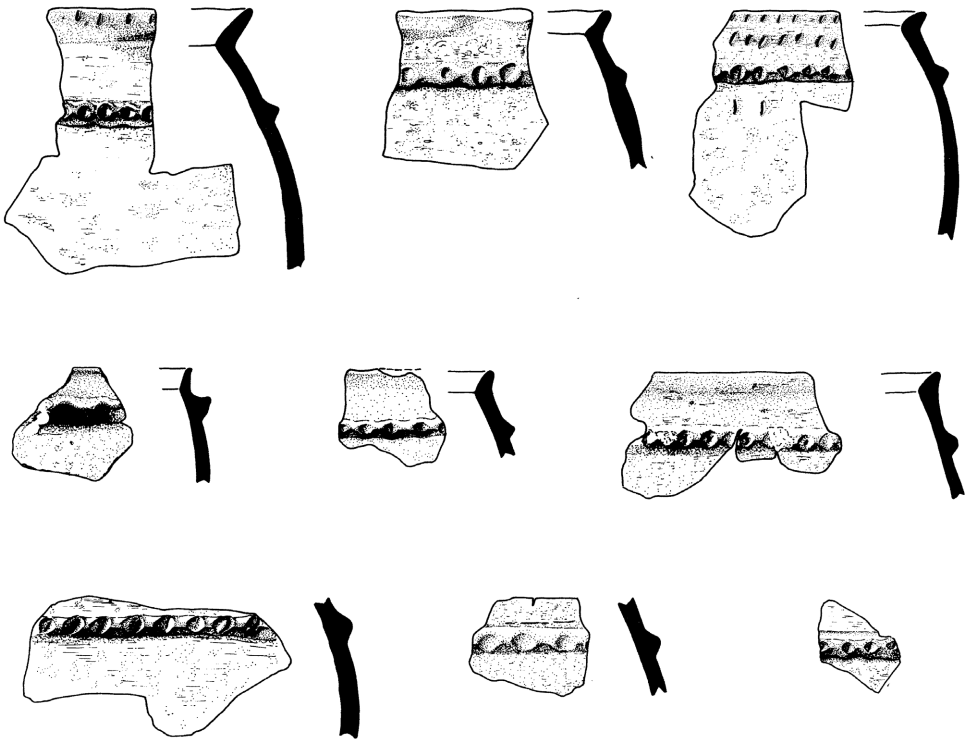


Figure 8.6 Ropelike cordons, Menelaion (from Catling and Catling 1981)

The Menelaion HBW material was first dated to the later part of LH IIIB2 (Catling and Catling1981: 74). However, the chronology has since been readjusted, and the HBW is now associated with the transitional LH IIIB2-IIIC period (Catling 2009: 462). Stylistically, there is a marked preference for finger-impressed, rope-like cordons. Moreover, they are relatively uniform (figure 8.6), and the assemblage looks rather less diverse than the ones at Tiryns or Teichos Dymaion. Morphologically, there is a similar dominance of wide-mouthed jars and buckets over collared jars to that observed at Tiryns (in contrast to Mycenae and Teichos Dymaion). Overall, the proportion of large, storage or transport shapes to small, consumption shapes is similar to Tiryns and Mycenae. The HBW of Teichos Dymaion is once again singled out for its lack of morphological diversity.

Finally, this trend seems to also apply to the HBW from Korakou (Rutter 1975). Indeed, while the assemblage is limited to 17 specimens, there is already a bias toward large shapes, but nonetheless an undeniable presence of smaller consumption shapes. Stylistically, there are similarity with the Teichos Dymaion material, notably in the use of diagonal and horizontal plain cordons on a hole-mouthed jar (see chapter 5 and Rutter 1975: 79), but the limited quantity of material at Korakou makes further comments on the subject difficult.

8.2.4 Comments

While similar petrographic and technological assessments for each assemblages would be require for these comparisons to be complete, the similarities and differences observed above are significant enough in regard to the purposes of this project to be relevant nonertheless, and produce meaningful data worth discussing.

Indeed, from this brief assessment of other Peloponnesian HBW assemblages, Teichos Dymaion seems to stand out as different. There are similarities between the assemblages: all present a larger proportion of storage or transport shapes than of consumption or cooking shapes. However, the situation is more extreme at Teichos Dymaion, as it seems to be the only site where smaller consumption shapes are remarkably low. Cooking vessels are present, but it is worth remembering that their identification is far from certain, and that no other cooking utensils, such as pans or stands, have been identified.

This is even more interesting considering that Tiryns is identified, just like Teichos Dymaion, as a harbour/anchorage *and* a walled cyclopean citadel. However, there is one major difference between both sites, namely that Tiryns is also confirmed as a palatial centre. The explanation for the different natures of their respective HBW assemblages might lie in this important detail. To

further explore this avenue, the case of Tiryns will be further explored in the next section, to help contrast the situation at Teichos Dymaion concerning notions of co-habitation of multiple socio-cultural, and perhaps ethnic, groups. With consideration of the material at Mycenae, the more contentious question of 'technical hybridity' will also be addressed, in an attempt to move on from what has been so far a very materialist approach to the HBW phenomenon at Teichos Dymaion.

8.3 Co-existence at Teichos Dymaion: qualifying the interactions between the HBW traditions and other local practices.

Most of the analyses presented so far have been rooted in a materialist approach to pottery: the people making or using the pottery, while always *implied*, have yet to be addressed properly. The theoretical foundations of the current work (see chapter 1) clearly elevate the *agent*, the human element, to a central role in understanding social and technological practices, following the principles of practice theory (Bourdieu 1972, Giddens 1979, 1984, Garfinkel 1984) and technical agency (Dobres 2000, 2010). It was, however, necessary to avoid bypassing essential stages of research, and to obtain a complete understanding of the more materially grounded elements of the assemblage before making any attempts at building an understanding in which people, and their practices (craft or otherwise), are the main unit of analysis.

In putting people centre-stage, this section looks at two sets of practices, which refer to topics that lie at the core of the discussion on HBW. First, it will use the information on the functions and activities hinted at by the pottery to discuss the *co-habitation* of the different populations hinted at by the diversity of pottery traditions at Teichos Dymaion. Then, the more contentious question of *hybridity* will be addressed, especially in the sphere of craft practices, looking at interactions between potters of different traditions.

8.3.1 Co-habitation or segregation? The diverse population of Teichos Dymaion in context.

The question of co-habitation and of the nature of the relations between the different groups present at Teichos Dymaion is not an easy one to address. Indeed, due to the nature of the excavation and the current stage of knowledge of the spatial organisation within the citadel, the exact find context of the HBW material is unknown. This may compromise engagement with the fine-tuned spatial analysis such as the one done for Tiryns (Stockhammer 2008). The information available, however, does make it possible to see that the situation described for Tiryns does not seem to apply completely at Teichos Dymaion. Before discussing why this is the case, it would be appropriate to review the situation at Tiryns.

It was Kilian (2007: 51) who first noted that the deposition pattern for the HBW at Tiryns was biased toward specific contexts. Indeed, he argued the ware was limited to storage or cooking areas of the Lower Citadel, while being excluded from the high-status areas of the Upper Citadel. New observations, however, were made following the more recent excavations of the Unterberg (Maran 2016, Maran and Papadimitriou 2016). The area included a large quantity of well stratified HBW, offering new possibilities to 1) explore a different setting in which the ware appeared, and 2) engage in a finer level of spatial analysis. This resulted in a series of interesting observations, brought forth by Stockhammer (2008: 88-89, 283-294). First, he suggested that while present in the same area of the site, the HBW was usually concentrated in specific rooms or deposits where the Mycenaean pottery was rarer (Stockhammer 2008: 286-288). Combining this with the absence of HBW Kilian noted for the Upper Citadel, Stockhammer pointed out the there is, at Tiryns, strong evidence for a form of social discrimination of this population of immigrants, which albeit living in close proximity, never fully integrated in the same space the Mycenaeans (especially those of higher status) occupied (Stockhammer 2008: 289). The trend, he adds, is strong for the earlier phases of the site, but seems to slowly dissolve in later stages (Stockhammer 2008: 294).

There are two main reasons to believe that this situation of spatial, and thus social, segregation did not take place at Teichos Dymaion. First, in the excavated area analysed for this project, and especially in Trench ΓΓ, there was no indication that the HBW came from different contexts than the rest of the pottery, nor was there any noticeable spatially limited concentration of it. While this could be explained by the fact that most deposits at Teichos Dymaion are fills, the fact that the HBW was found in multiples trenches, and in both excavated areas of the sites (see figure 4.6) reinforces the idea that the situation is unlike the one at Tiryns. Second, in accepting the drinking and dining implications of the fine Mycenaean pottery and imported Grey Ware and *Impasto* pottery, the situation of isolated and segregated social life observed at Tiryns is simply incompatible with Teichos Dymaion. Rather, the situation is one where two or more groups, some of which were non-Mycenaean, were jointly involved in a similar set of activities. It is necessary, however, to remember that these activities involved no, or very little, locally produced HBW. Indeed, while jars, abundant in the HBW assembalge, could have been used for such activities, very little HBW tableware were found. It may have been that only the imported Italian material was used, but as there is only a very limited amount of Grey Ware, and only one example of *Impasto* tableware, probably too large for individual use, the explanation is more likely related to the nature of these eating and drinking activities, which will be discussed further in Chapter 9. This image of co-habitation seems to also fit for the storage functions of Teichos Dymaion.

The portrait is thus one of seemingly co-habitation and interaction, as no form of segregation can be demonstrated at Teichos Dymaion. This only applies, however, to the confines of the citadel, and to the activities taking place within its walls. Indeed, it may be that future discovery of living quarters with clear assemblages of domestic pottery will show a different picture, perhaps closer to what has been recorded at Tiryns. However, such an area is still unknown for Teichos Dymaion; if it had a lower town or another associated settlement, as is the case for Tiryns and Mycenae, it remains to be found. Until then, we must focus on the assemblage at hand and its own intramural setting.

8.3.2 Adoption, rejection, and *hybridity*: craft interactions at Teichos Dymaion

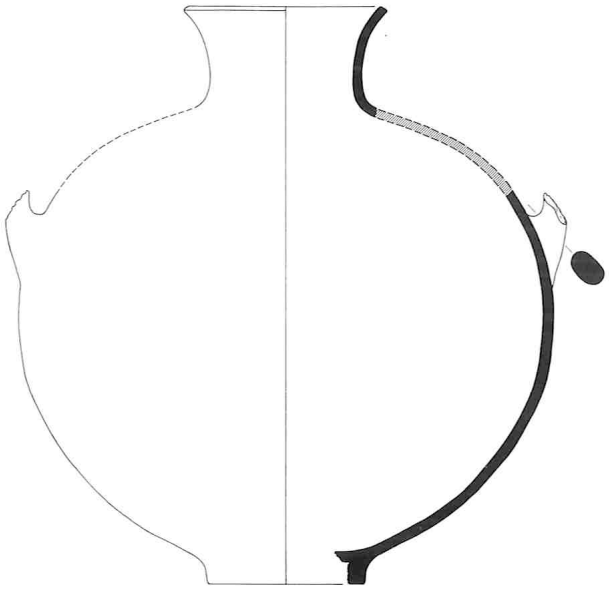


Figure 8.7 HBW Amphora, Tiryns (from Kilian 2007)

While in the present context, the form of hybridity that is referred to is essentially technical, it ultimately relates more broadly to what has been discussed as 'cultural hybridity' (Maran 2012, see also Bhabha 1994, Petersson 2011). The idea that there is notable and significant influence between HBW and traditional Mycenaean pottery has been a recurring discussion (Rutter 1979, 1990, Pilides 1994, Badre 2005, Kilian 2007, Romanos 2011). However, that mostly focusses on stylistic variables.

Interactions between HBW and canonical Mycenaean wares have been described as a two-way relationship, where both pottery groups influenced each other in specific stylistic aspects. On one hand, there are several instances of HBW assemblage that seem to adopt shapes that are typically Mycenaean, mainly observed in the material from Tiryns (Rutter 1990: 39, Kilian 2007: 51). This is most notable in the broad category of Collared vessels (Romanos 2011: 92). Perhaps the clearest example, an amphora (figure 8.7) from Tiryns, is often cited to illustrate this phenomenon (Kilian 2007: taf. 16). Kilian however also suggests that many HBW cooking shapes at Tiryns were also borrowed from the Mycenaean repertoire (Kilian 1982: 90). The opposite influence is also present, as HBW is thought to have influenced Mycenaean pottery in several ways. The most frequently cited Mycenaean borrowing of HBW elements is the carinated cup, for which it is said that the HBW examples are the prototype (Rutter 1990: 39-39, Evely *et al.* 2006: 138). It is possible that the wheelmade Grey Ware example, being

technologically closer to the Mycenaean cups, also played a role in the spread and adoption of the shape (Hallager and Hallager 2003: 202-203). HBW influence on Mycenaean pottery is also observed in decoration. Applied plastic cordons or painted cordons on kraters appear in the LH IIIC period, and are strikingly similar to those observed on HBW wide-mouthed jars or buckets (Rutter 1979: 391). It has also been suggested that the dotted rims observed on certain cups or Deep Bowls imitate HBW incised rims, but this has been contested recently by Romanos (2011: 99) due to the scarcity of such rims in HBW assemblages.

In Teichos Dymaion, the picture described above is certainly less clear. The carinated cup, for example, is a well-known shape in the Fine Mycenaean shape repertoire and is also represented in the Grey Ware and imported *Impasto* groups. It is however completely absent from the HBW. The collared jars, potentially influenced by Mycenaean cooking vessels, are well represented at Teichos Dymaion but, so far, no comparative Mycenaean vessels have been identified. Hybridity, as traditionally addressed in the specific context of the ongoing discussion on the HBW phenomenon, is therefore quite hard to address in the present project.

There are, however, issues with this particular way of approaching hybridity. It is indeed a very static view, where the emphasis is put on the starting point and receiving end of the equation, or to put it differently, on the copied model and resulting modified product. While interesting to assess stylistic influences HBW and Mycenaean pottery may have had on one another, this approach is not necessarily compatible with the way technology and craft practices are considered in the present thesis. Rather, if the concept of hybridity is to be used, it needs to acknowledge the dynamic and sociogenic nature of technological practices (Pfaffenberger 1992: 500). As such it is better understood, like technology itself, as a continuous, ongoing process (Petersson 2011: 169, see also Friedman 1997, Hahn 2008) that goes beyond binary opposition of two sets of features (Liebmann 2008:5). It is a process of *interaction* between different technical traditions, involved in the affirmation of a continuously created and recreated identity (Hall 1990: 222). In this, ‘origin’ and ‘end’ are non-consequential (Petersson 2011: 169), mere snapshots in a series of decisions involving routine acts of adoptions and rejections in a perpetual negotiation of identity through craft practices (see chapter 1, section 1.3 for details on this mechanism).

In this readjusted understanding, where hybridity is much more aligned with the paradigms brought forth in chapter 1, the material at Teichos Dymaion becomes more informative, allowing a deeper discussion involving the concepts of adoption, rejection, and indeed *adaptation* in craft practices. More precisely, it is the evolution in tempering practices within the HBW pottery

traditions that offer the most interesting case for the present discussion.

Mudstone tempering is by far the most common clay processing practice in the HBW assemblage (see Chapters 6 and 7). It is often found in tandem with grog, and the proportions of the two vary significantly. As such, two subfabrics were created: subfabric 1.1, in which mudstone is dominating, and subfabric 1.3, in which grog is more common. However, the differences between both are otherwise minimal, and both are still considered to be part of the same pottery tradition.

The picture is clearer when examined diachronically. Grog, a typically Italian temper for this period, seems to concentrate in the deeper, earlier πασες. Eventually, mudstone becomes more frequent as a dominant temper. While grog never disappears, it appears to be reduced to a secondary importance (table 6.1). Interestingly, mudstone is not exclusive to HBW. Indeed, it is also the main temper of the coarse version of the local Mycenaean pottery tradition. This sharing of tempering practices, increasing through time, is certainly noteworthy.

A similar evolution is also observed in relation to the shape distribution (table 6.2). Indeed, subfabric 1.3 also includes most of the typical, well-burnished HBW shapes. Subfabric 1.1, however, includes most of the collared jars and globular jars, not all well-burnished, and most of the non-burnished cooking vessels. These shapes, considered more 'generic', are thought to have been inspired by Mycenaean vessels (see Romanos 2011: 92). In short, these shapes are the 'less' typical HBW shapes.

This diachronic view of technological and typological changes may be explained using the concept of 'organic hybridity' as described by Werbner (1997). Opposing 'intentional hybridity', which involved conscious act of cultural borrowing in an act of dissociation from a 'main' culture, 'organic hybridity' is a routine process in which the borrowing happens in a much more natural, unchallenging way (Werbner 1997: 5), and is much more accommodating for the concepts of adoption and rejection discussed above. It is particularly useful in the present situation.

With this is mind, the main portion of the foreign HBW population at Teichos Dymaion, represented materially by the main, mudstone and grog pottery tradition, has produced pottery in relatively close proximity to another pottery tradition, which was arguably more compatible with the local resources, for a prolonged period of time. While the resulting interactions between potters may not have been collaborative, the situation was most likely one of mutual awareness. As such, the foreign potters making HBW, *adapting* to raw material which must have been

initially unfamiliar, may have progressively adopted certain practices from the local potters, for instance the use of mudstone as temper, while keeping other elements of greater importance for their own self-representation: their forming techniques, use of grog, and specific shapes and decorative elements. The notion of *choice* in this process of adoption and rejection is crucial: the need for adaptation, is *perceived*, and negotiated not based on environmental constrains, but on what the potters consider to be *possibilities,* according to the socio-technical construct under which they operate (Pfaffenberger 1992: 502, Gosselain and Livingstone-Smith 2005: 40-41). As time went by, the influence became more important, and was more visually noticeable, as shapes originally less popular began to spread more, such as the collared jar and globular jar. While the exact reason behind the selection of certain practices or elements, and rejection of others might forever stay unknown, the mechanism under which it operated might have been as described here.

The contrast with another HBW tradition present at Teichos Dymaion reinforces this particular suggestion. Fabric 2, considered a separate tradition on the basis of its different tempering practices which uses calcite and grog instead of mudstone and grog, a combination often recorded in Italy (see Cannavò Levi 2018 : 107-114), seems much more constant and does not present the evolution in technological practice and style described for the main HBW tradition. It is also, however, mainly confined to a single level group (table 6.1). As such, it is quite possible that the presence of this particular way of doing at Teichos Dymaion was simply more chronologically constrained, which resulted in a pottery tradition unaffected by change. The situation is thus one the different traditions involved in the production of HBW pottery in Achaea display unequal indications of active and transformative interactions with the local Mycenaean craftspeople, perhaps simply because these practices have not been exposed to the products and techniques of the latter for the same amount of time, either because the practices themselves were abandoned early, or because the people using them left.

8.4 Concluding remarks

In terms of the diachronic patterning of technological change at Teichos Dymaion, the new LH IIIC Middle and Late material brought to light in the recent analyses by Gazis (pers. comm.) is likely to clarify the situation, as the material analysed here is chronologically limited mainly to LH IIIC early, with only limited elements of Transitional LH IIIB2-IIIC and LH IIIC Middle. With the present analysis, however it is already possible to suggest that changes can be observed in the assemblage and that they may have been occurring quite rapidly. It is

also clear that this dynamic approach to hybridity as an ongoing process playing an active role in technological changes offers insights into craft interactions at Teichos Dymaion. Craft practices, in the portrait depicted above, do not happen in a vacuum, but are also not very dynamic. Interaction between different traditions occurred, but perhaps in a controlled way where potters were navigating between adoption and rejection of what they surely perceived as alien practices. Finally, going back to the question of co-habitation at Teichos Dymaion, this so far does not seem to indicate the type of segregated picture seen at Tiryns.

Chapter 9. *A tale of two shores: Understanding Teichos Dymaion and its HBW on a local and global scale.*

9.1 Introduction

If the different pottery traditions identified at Teichose Dymaion suggest the presence in the area of differing populations, it is of interest to know how they might have related to one another. If the origin of the HBW traditions is of course important in this consideration, it is equally necessary to understand how they fit within the specific context of their locale.

In this discussion, the materially-focused discourse has been taken to a more social- and human-led level, discussing how the co-habitation of distinct groups of people at Teichos Dyamion was reflected in their technological practice and how this fits into a more regional and supra-regional picture of HBW.

This closing chapter brings together these different strands to contextualise the HBW phenomenon; locally, at Teichos Dymaion and more broadly in Achaea; chronologically, in the context of the collapse and Post-Palatial period; and globally, within the specific reality of the continuous relations with Southern Italy.

9.2 HBW and the Italian connection.

The Italian origin of the stylistic markers and technological practices involved in the production of HBW at Teichos Dymaion is convincing, and thus, this ware has been suggested as a physical marker of population elements which may have their origin in the Italian peninsula, present at the site and in Achaea. Considering the discussion on international relations (Chapters 3 and 4) this is unsurprising. Indeed, relations between Southern Italy, and more specifically the region of Apulia, and Achaea are strong in the later phases of the Late Bronze Age. On a broader scale, these Italo-Mycenaean contacts are increasingly important in the Post-Palatial period; perhaps not in numbers of pottery vessels in Greece, but certainly in significance.

If the markers of these relations are found in Italy for much of the Late Helladic period , the appearance of the locally produced HBW in the period immediately preceding the collapse changes this, making Italian-style pottery a much more common sight for the following Post-Palatial period. Italy, it seems, was no longer simply on the receiving end of the flow of material

goods.

The period of these changes corresponds to a period of developing and changing social complexity in Southern Italy (Iacono 2016, 2019), something which may be of equal importance in understanding the HBW presence than the events unfolding in Achaea and the rest of Greece. Indeed, it has been suggested that the Italian groups, elites, merchants or otherwise, now had the capacity and will to engage directly in international exchange (Iacono 2016: 133-134), and thus started venturing to Greece seeking opportunities and profiting from increased demands for Italian and Central Mediterranean goods, just as Mycenaean seafarers had been doing for most of the LH period. The HBW, in this context, mirrors what the Italo-Mycenaean pottery represents in Italy (see section 3.4.2): it is the indication that a portion of the people engage in these relations had established themselves, permanently or semi-permanently. This increased the level of interaction, and just as happened in Italy with the appearance of Grey Ware and Dolii (Borgna and Levi 2015), led to routine acts of technological interactions, and perhaps *hybridity*, albeit in very different ways, unique to the specific contexts in which the interactions unfolded.

9.2.1 Trade, craft, and mobility: incentive and mechanisms of contact.

Having discussed the presence of HBW in Achaea, we can now turn to consideration of the activities undertaken by this intrusive population, and the motivations for such activities, leading in some cases to a more long term settlement in Achaea. There is an emerging consensus that the answer may lie in the phenomenon of the new metal shapes that appear in LH IIIB2-LH IIIC in Greece. It has indeed been suggested that the introduction of a new metallurgical *koine*, the 'Urnfield' bronzes, in Greece and the local production of Italian *Impasto* pottery are related (Borgna and Càssola Guida 2005, Eder and Jung 2005, Jung 2006, Jung and Mehofer 2013). It is certainly not the first time that metals have been seen as a prime mover in technological and population mobility during the Bronze Age and this may be related to emergent entrepreneurial individuals from Italy taking advantage of 1) this new popularity for these new bronze types, and, more simply, of 2) the increased intensity of Italo-Mycenaean contacts, in Italy in this context of increasing social complexity described above, and in the Mycenaean polities at a time of evolving international relations.

In this scenario, these individuals perhaps became 'enablers' of trade, positioning themselves on important trade nodes such as Teichos Dymaion or Tiryns. It is, however, possible that these individuals were more directly involved in the distribution of new metal shapes in Greece, as travelling artisans (Romanos 2011: 269). Indeed, much of this material, well represented

at Teichos Dymaion and more generally in Achaea (see sections 4.2.1 and 4.3.1), was in fact produced locally in the Peloponnese (Jung and Mehofer 2013: 180-182). However, this is mostly based on lead isotope analysis data, and it must thus be taken with caution, as it implies a number of assumptions concerning the metal used to produce the objects, including the absence of significant recycling or mixing of raw materials (Wilson and Pollard 2001). However, adding weight to this hypothesis is perhaps the potential mould fragment identified at Teichos Dymaion, although its function is not confirmed.

There is also the possibility that both hypotheses are true, as there the situation may be too complex to be given a single, overarching explanation. As self-evident as this last sentence might be, it is nevertheless frequent in the HBW debate to find scholars seeking a *single* hypothesis to explain the phenomenon. This situation is, we believe, symptomatic of a dominating paradigm in archaeology, in which *migrations* are still viewed as large-scale phenomena to be used as an explanatory device to understand change in material culture (Hakenbeck 2008: 18). This view, historically rooted in archaeological practice, does not correspond to what is observed when looking at modern examples of migrations, which in fact can manifest in multiple shapes and forms (Anthony 1990, 1997, Burmeister 2000). It is crucial for the past understanding of events of human movement, whether or not it is called migration, that they reflect this variability. For that purpose, a better concept is 'mobility' (Hakenbeck 2008: 19).

Mobility, as an explanatory concept to address movement of people and change in material culture, has had an enduring popularity in Aegean archaeology. This is perhaps most clear for the rich discussion on Cretan-style and 'minoanising' pottery found outside of Crete (see Rutter and Zerner 1984, Rutter 2003, Broodbank 2004, Broodbank and Kiriatzi 2007, Kiriatzi 2010, Müller *et al.* 2015). The most discussed example is probably the island of Kythera, on the South coast of the Peloponnese. There, mobility and increasing events of connectivity over the course of a millennium have been used not only to explain the presence of Cretan-style pottery on the Island (Broodbank 2004, Broodbank and Kiriatzi 2007), but also the development of a local Cretan tradition of pottery (Kiriatzi 2003), first co-existing with a local, Kytheran tradition (Broodbank 2004: 75) but subsequently supplanting it (Broodbank 2004: 75). The identification of locally produced 'minoanising' pottery on Kythera, and notably at Ayios Stephanos (Jones and Rutter 1977), Lerna (Whitbread 2001b), Aspis (Kilikoglou *et al.* 2003) and at Kolonna (Gauss and Kiriatzi 2011) led to the suggestion by Kiriatzi (2010: 694-697) that potters trained in a Cretan tradition were settling seasonally in Mainland locations, producing pottery, which she (2010: 696) compares to modern examples of such mobility in Crete (Day 2004). It also mirrors what has more recently been suggested for the 'minoanising' pottery of Akrotiri (Müller

et al. 2015: 45-46). Broodbank *et al*. (2007: 266-268) further relate this material connectivity, based on the far-reaching range of mobile potters, to an expanding dendritic Cretan network to participate in an effort to access metal resources, most notably from Lavrion (Maran 1998).

The case of Kythera is of particular interest to the present research, mainly because it allows for a combined understanding of craft mobility leading to displaced production of pottery traditions that are initially foreign to the locale of their production, and more routinized mobility relating to trade networks. Contrary to migration, mobility, as understood in the case described above, allows for a holistic understanding of the interrelated events that constitute the movement of people and goods in the past. This concept also acknowledges the socio-historical specificity of each event of mobility, thus encouraging a localised, 'bottom-up' approach which is particularly relevant to the local focus of this research (Hakenbeck 2008: 19-20).

It works particularly well in the specific context of Teichos Dymaion, where the HBW phenomenon is not uniform, but instead consists of multiples related pottery traditions. Indeed, in stepping back and looking at the present HBW material not as a single unit, but as multiple ensembles relating to as many episodes of mobility which resulted in a prolonged presence at Teichos Dymaion, it is possible to explain the small diachronic differences between the two main traditions. As mentioned above, the Calcite and grog pottery tradition is chronologically limited, and did not appeared as early, nor survived as long, as the dominant Mudstone and grog pottery tradition. The reason between these differences may simply be that both traditions are the material manifestations of their own episode of mobility.

The HBW phenomenon should then not be approached as the result of a wide-spread migration reaching not only the Aegean but also Cyprus and the Levant, but rather as signs of multiple events of mobility, which, as argued in Chapter 3, are increasingly frequent following the collapse. It is possible that the specific episodes of mobility between the Aegean and Italy, leading to a noticeable Italian presence on the Greek mainland as indicated by the presence of HBW, relates to similar incentives. It is also most likely that those incentives were indeed related to trade and craft activities, as seems to have been the case at Teichos Dymaion based on the above analyses. What is argued here, however, is that this should not be *implied* to be true for all locales which have HBW, and that each site should be understood first on its own terms before being included in any attempt at a grand narrative.

9.2.2 Cautionary remarks

While the attempts to position this research within the debate on HBW, and to relate it

to broader discussions on mobility and trade at the end of the Bronze Age, are materially and theoretically grounded, it is essential to point out its limitations. The claims above are indeed based on an admittedly limited dataset, due in part to the nature of the excavations, and more simply to the material available. They are, more than anything, an attempt to demonstrate the interpretative possibilities the current approach offers, and while it is believed it succeeded in raising valid interpretations, must be understood as such first and foremost.

Further work, when more studies following a similar approach have been conducted, are necessary to investigate these claims and hypotheses, and more importantly, to explore the particular issue of tying small, localized studies such as the present project, into broader historical and geographical narrative.

9.3 Revisiting Teichos Dymaion

From this comment on HBW, and more generally on all the pottery analysed from the excavations at Teichos Dymaion, a few elements stand out as of particular interest

- The site is relatively poor in terms of domestic pottery, with only a few HBW vessels identified as probable cooking pots.
- Storage and transport vessels, on the other hand, are well represented, especially in the HBW assemblage.
- Finally, eating and drinking seems to have held an important role at Teichos Dymaion, in light of the large presence of fine dining pottery in the Mycenaean assemblage.

These are central for understanding the nature of the activities taking place within the citadel, and also the very nature of the site itself, when combined with the most current interpretations. Once again, however, it is necessary to keep in mind the current understanding of the pottery at Teichos Dymaion before delving into interpretative discussions. Indeed, as it has been mentioned before in chapter 5, the Mycenaean pottery has yet to be fully studied, and all chronological claim is to be taken with caution until such study is undertaken. Moreover, not all trenches have been thoroughly explored beyond simply assessing if HBW pottery was present. That being said, from the current understanding of Teichos Dymaion presented in chapter 4, and following the reasoning for the validity of the data expressed in chapter 5, it is believed that the claims made here are not merely fabulations

, but in fact based on valid data. It is simply important to keep in mind that all interpretations or hypotheses bellow are based on the data available to date, and that the complete study of the pottery of Teichos Dymaion could alter some of the conclusions made in the present chapter or previously in chapter 8, especially for claims based on quantitative data such as proportions of certain types of pottery compared to others.

In a recent paper, Gazis (2017) referred to Teichos Dymaion as an 'Acropolis-Harbour of the Ionian Sea', and it surely seems to be the best description for the site. Indeed, while not a palace, in the sense that it was *not* the seat of power of any authority, it nevertheless comprises a conspicuous display of power and control by a local elite or group of elites over what seems to have been an important trade node (Gazis 2017: 468). Indeed, as mentioned in Chapter 4, not only was the lagoon north of the site a natural, protected anchorage during the Bronze Age, but the location itself is the first landfall for ships coming to the Peloponnese from the coast of Southern Italy. As such, using Earle's (2015) 'bottleneck' model, Gazis (2015: 470-471) argues that the cyclopean walls are in fact the material, physical expression of that 'bottleneck', and thus of some Achean elites' attempt to assert its power over this portion of an increasingly important trade route.

In this context, the HBW presence is possibly an indication that it worked, and that Italian individuals gathered at Teichos Dymaion on account of its status as an important hub for the increasingly important trans-Adriatic trade relations with different Post-Palatial Mycenaean polities.

It also indirectly explains the limited amount of domestic pottery at the site. Indeed, in this portrait of Teichos Dymaion as a citadel overseeing an important trade node, it is likely that it simply was *not* a residence of any sort, that is was not 'home' to anyone (Gazis *pers. comm*). It was as place of meeting, a locale for trade, and perhaps in some respect a symbol of coercion and power reminding any passer-by that someone was indeed exerting its control over this area and its commercial activities.

In that light, the fine assemblage of pottery makes sense. In Chapter 3, the importance of feasting for the maintenance and creation of relationships throughout the Late Helladic period was discussed, supporting the view that it survived and maintained a central role during and after the Palatial period. Concerning specifically the connection between Mycenaean Greece and Italy, it was also suggested, based on the material from Roca, Apulia (Iacono 2015), that feasting was also an important mechanism of reciprocal hospitality for the cultivation of bonds and relations between the Italian hosts and their Aegean partners (Iacono 2019).

Considering the reciprocal nature of this kind of hospitality, under the mechanisms of *gift-debt* (Sahlins 1972: 174-213), and the large amount of eating and drinking vessels identified at Teichos Dymaion, which includes a small yet visible portion of Italian material (Grey Ware and an *Impasto* carinated vessel), it is possible that similar events of commensality were central to the role of the citadel.

This cements the portrait of the site as an 'acropolis-harbour' and a symbol of authority: not only was it involved in the material aspects of trade, as suggesting by the storage and transports vessels, but it was also a locus, not unlike what is observed at Roca, for maintenance and creation, through acts commensal hospitality, of important relations with new or renewed Italian partners, some of which were settled permanently or semi-permanently in the area.

9.4 Concluding comments.

This picture is one of connectivity and interaction. Indeed, the HBW at Teichos Dymaion is the physical marker of sustained relationships between Achaea and Southern Italy. These relations were maintained, it seems, at Teichos Dymaion, the locale for events of gatherings involving the consumption of food and drinks, perhaps in an attempt to consolidate local *and* international relations, but also most likely for more trivial and routine acts of trade. Just as Mycenaeans populations started to settle in Italy earlier, the HBW-producing Italian population settled in Achaea, near Teichos Dymaion. It must not however be seen as a result of a grand event of migration, but rather as part of multiple events of *mobility*, which is generally increasing in the latter stages of the Late Helladic period. It is perhaps best illustrated by the different grog-based traditions of tempering, which suggest complexity and diversity within the HBW group.

Mobility encourages the type of localised research advocated in this research. As such, the picture suggested is one specifically tailored to the HBW at Teichos Dymaion, although it is possible that some of its elements apply on a wider scale.

Chapter 10. *Conclusion*

10.1 Summary of content

This thesis, ultimately, concerns craft practices and the people involved in their unfolding. Through a theoretically informed, analytical program, it aimed at highlighting the possibilities of such an approach for detailed studies of stylistically and technologically diverse pottery assemblages. It was, however, not simply a theoretical enterprise. Rather, it aimed to understand the HBW phenomenon as it is manifested in the specific context of Teichos Dymaion, and to some extent, Achaea. Both aims, however, are related and complement each other. On the one hand, the theoretical investigation of craft practices (Chapter 1) and technologically informed methodology used in the ceramic studies at Teichos Dymaion (Chapter 2), addressed specific issues raised in previous studies of HBW, namely: 1) its heavy reliance on *typological style* and 2) its monolithic approach to pottery grouping. On the other hand, the subsequent, materially-grounded study of the pottery (Chapters 5 and 6) was an attempt to anchor an otherwise rather abstract discussion to a tangible archaeological problem, in an effort to test its viability in this specific context. In doing so, it was possible to immediately adjust the theoretical position and methodological approach as they presented challenges during the study , making sure the following discussion was as grounded as possible in the material reality of the assemblage (Chapter 7).

As such, the conclusions brought forth by this research are in two distinct categories. One, more general, includes comments on ceramic studies, addressing how pottery is discussed in archaeology from a theoretical and analytical viewpoint. The second, more specific, concerns HBW at Teichos Dymaion, addressing its significance, its diversity, and its relation to the Italian connection (Chaper 8), and to the wider context of the end of the Bronze Age in Achaea and Greece (as presented in Chapters 3 and 4). Incidentally, it also includes interpretations for Teichos Dymaion itself specifically, and, going back to more general conclusions, on how craft interactions and movements of population past should be approached to better fit the localised focus of this research (Chapter 9). The following section will review each category, highlighting their most important elements.

10.2 Summary of results

The analysis of the pottery from Teichos Dymaion revealed a picture that is, although based on a limited number of forming techniques, quite diverse. Most of the Mycenaean pottery is coherent and falls into one large tradition which includes fine, semi-coarse, and coarse versions, with a few minor loners and imported groups. The HBW is more diverse with two main traditions and a few outliers, but is all believed to have been the result of a local production. Interestingly, some of the pottery originally identified as HBW was subsequently recognised as imported *Impasto*, which adds an interesting dimension to the conclusion that the population making the HBW was from Italy. The similarity between the *Impasto* pottery and the HBW pottery from Teichos Dymaion reinforced the current understanding that the latter originated from Italian technological practices.

Considering the context in which the HBW was recovered, this Italian origin makes sense. Indeed, Teichos Dymaion is located on a privileged position on the Post-Palatial trade route system, as an anchorage, a crucial trade hub for seafarers coming from or going to Southern Italy. Accordingly, the material culture, and especially pottery, highlights two sets of activity for Teichos Dymaion:

- Storage and/or transport, unsurprisingly, but also;
- Commensality, which indicates that the fortified citadel, in itself a symbol of authority, was perhaps not only involved in the routine business of trade, but also in the maintenance of the relationships that were the foundation of this trade, through acts of conspicuous hospitality.

The project also revealed a few elements which are more broadly relevant to all studies involved in a similar localised, theoretically informed, and technologically oriented approach such as the one advocated here. First, it was argued that the *chaîne opératoire* approach, while still theoretically central to the considerations of the analyses, was perhaps too demanding for the sort of material archaeologist usually deal with. An alternative was suggested: pottery *traditions*. Becoming the basic unit of analysis for this project, its use proved much more appropriate and realistic in expressing the diversity of pottery at Teichos Dymaion. It allowed, in turn, the development of a picture grounded in the material reality of the assemblage, allowing for more fine-tuned discussion on certain recurring subjects of the HBW discussion. Two of these are of particular interest: mobility, and hybridity.

Indeed, for both concepts, the traditional discourse had been quite static, involving simple

and superficial opposition of contrasting realities. In both cases, however, the introduction of the element of diversity, through the different pottery traditions, and of localised chronology, through a local understanding of how this diversity unfolded at Teichos Dymaion specifically, led to interesting results. In this context, it was argued that mobility, in opposition to migration, should not be simplified into statements such as 'group A moved to B', but rather, as a series of episodes of movements, involving both people and goods. It is exemplified at Teichos Dymaion, by the presence of two different HBW pottery traditions (Pottery traditions 1 and 2, Chapter 7) with different chronological depth. The same two HBW traditions also led to interesting observations concerning technological interactions and hybridity. Indeed, as the traditional, static image of stylistic hybridity between HBW and Mycenaean pottery did not fit at Teichos Dymaion, it was decided to look deeper, in the very technological practices of each individual tradition. It was thus revealed that certain adoptions of specific elements, notably in tempering practices, might have occurred progressively in the tradition that was in contact with the local Mycenaean potters for the longest (pottery tradition 1), but not in the other, short lived HBW tradition (pottery tradition 2). From this, it is determined that hybridity, as a concept, is much more useful if considered not as a static concept which serves to identified hybridised elements to be pointed out in a typological assessment, but rather as an interactive process involving routine acts of adoption, rejection, and *adaptation*.

However, this final portrait brought forth from the results of the present project would greatly benefit from a more complete study of the Mycenaean pottery at Teichos Dymaion. Not only could it validate some of the conclusions suggested here, but also, perhaps on a more fundamental level, verify the suggested phasing of the site, to better situate the site and its HBW phenomenon wihtin the regional chronology of Mycenaean Achaea.

10.3 Final comments and recommendations.

The conclusions reached in this thesis were made possible by a series of important elements that were gathered, and that I argue are essential for the research on HBW to go forward. The first, perhaps obvious, is the choice of analytical techniques. Indeed, the integrated analytical approach used here is fundamental, as it allows the technologically oriented approach needed to highlight the genuine pottery diversity at Teichos Dymaion. Future researches, however, could consider the addition of more accurate analyses to allow for a more precise analysis of firing practices. Also, to circumvent the limitations of highly fragmented assemblages, Micro-CT scanning (Kozatsas *et al.* 2018) or X-Radiography (Berg 2008) could be used as a complement

to the visual assessment of macro-traces of forming. It is uncertain, however, if adding these would truly benefit our understanding of the compexity and variability of the HBW traditions. Such analyses would need to be tailored for the specificities of each assemblage and project.

The second element is related, and is the theoretical approach chosen for this project. Indeed, while readjusted during the course of the project, the *chaîne opératoire* approach, and more broadly the ethno-archaeological insights, enabled an approach to pottery which was, I argue, the most appropriate to make sense of the diverse assemblage of pottery involved in this project. The introduction of craft traditions as the basic units of analysis for pottery studies should, I believe, be more widely implemented, as it allows, much more than the common *types*, an understanding of the material *as it appears* in the assemblage, rather than from the perspective of what it *should be* according to standard classifications.

Which leads to the final element, which is the local focus of this research. Indeed, this project was built on the premises that the conclusions it would produce should not aim at making generalised claims, but rather be specific to the context of the research, that is, Teichos Dymaion and its HBW pottery. This allowed an approach which, while aware and mindful of the historical framework in which the HBW appeared, and conscious of the previous researches done on the subject, put precedence on local interpretations grounded in the specific material and geohistorical realities of the site first and foremost, before addressing, when possible, more general hypotheses and consensus on the HBW phenomenon.

Concluding, I believe the future of HBW researches lies in such localised approach of the material. Through the comparison made in Chapter 8 with other HBW assemblages, or through the discussion of the HDP pottery group, it is clear that each site is unique. The diversity demonstrated in the material from Teichos Dymaion is most likely reflected at most sites which have a HBW assemblage. Individual studies aimed at understanding the HBW phenomenon on a local level, such as the present research or Stockhammer's spatial analysis of the HBW at Tiryns, may not, by themselves, offer a complete portrait of the situation which led to the presence of this pottery type throughout the Mediterranean at the end of the Bronze Age. However, they can, if applied more systematically when this material is identified, contribute to a more realistic and diverse discussion of these episodes of mobility at the end of the Bronze Age.

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APPENDIX 1: Fabric descriptions

HBW fabrics

Fabric 1- Alluvium group

General description

Matrix

50-80%. Non calcareous. Matrix colour range from Light brown (TD 17/034, TD 17/059) or brown (TF 17/074, TD 17/066, TD 17/214) to reddish-brown (TD 17/037, TD 17/069) in PPL. In XP, it is dark grey (TD 17/034, TD 17/059), brown (TF 17/074, TD 17/066, TD 17/214), or reddish-brown (TD 17/037, TD 17/069). The margins can be of a paler, reddish hue, sharply defined (TD 17/034) or, more often, diffused (TD 17/004, TD 17/010, TD 17/011). The opposite can be true, with darker, brown margins, especially on the inside surface of a pot (TD 17/083, TD 17/014, TD 17/117). Optically inactive (TD 17/010, TD 17/074) to moderately active (TD 17/004, TD 17/037, TD 17/069, TD 17/214). In samples of the latter category, the margins are often more optically active than the core.

Voids

8-12% Mainly consisting of meso- to macro-channels, and some meso- or macro-vughs. Poorly to well aligned to margins. Channels also surrounds large inclusions in a concentric fashion. They can also indicate the presence of relic coils (TD 17/049, TD 17/065). Some voids also present blackened margins.

Inclusions

20-50% Single-spaced or less. Angular to well-rounded. Poorly sorted. Highly to moderately bimodal. High sphericity of fine fraction. Low sphericity of coarse fraction. Equant to elongate. Absent to weak alignment to margins.

Fine fraction (common to all fabric 1 subgroups)

Predominant to dominant:

Quartz

Frequent to common:

Chert

Polycrystalline quartz

Common to rare:

Quartzite

Few to absent:

Red argillaceous rock

Acid igneous rock fragments (fine or medium-grained, mostly with a porphyritic texture, and occasionally with a granular or Myrmekitic texture).

Plagioclase feldspar (can have a microperthite texture)

Rare to absent:

Micritic calcite

Very rare to absent:

White mica

Alkali feldspar

Marble

Microfossils

Clinopyroxene

Olivine

1.1 Mudstone subfabric

17/002, 17/004, 17/005, 17/007, 17/010, 17/011, 17/012, 17/014, 17/015 17/018, 17/020, 17/023, 17/029, 17/030, 17/031, 17/034, 17/035, 17/036, 17/037, 17/044, 17/049, 17/052, 17/053, 17/054, 17/055, 17/059, 17/060, 17/065, 17/066, 17/067, 17/069, 17/071, 17/073, 17/074, 17/075, 17/076, 17/077, 17/078, 17/079, 17/083, 17/085, 17/105, 17/113, 17/116, 17/117, 17/123, 17/140, 17/141, 17/146, 17/152, 17/176, 17/214, 17/215, 17/216, 17/217, 17/221, 17/222, 17/223, 17/234,

Coarse Fraction 4.6- 0.8 mm

Predominant to dominant:

Mudstone: Eq & el. sa-r. <4.6 mm. mode: 2 mm. Argillaceous sedimentary rock grading from mudstone to siltstone, called mudstone for clarity. This variation in particles size can sometimes be observed within a single inclusion (TD 17/012). Brown or rarely reddish matrix with well-sorted clay to coarse silt sized inclusions of quartz and muscovite, and occasionally, observable bedding planes with larger or finer inclusions.

Common to absent:

Chert: Eq. sa-sr. < 3.4 mm. mode: 1.5 mm. Clay-sized silica-rich matrix, occasionally with veins of iron oxides coursing through the inclusion.

Quartzite: Eq. sr-r. < 4 mm. mode: 1.2 mm. The relatively uncommon quartzite inclusions in the coarse fraction are often found along smaller example, and as such are most likely related to their fine fraction counterparts. Often contain iron-rich inclusions.

Few to absent:

Radiolarian chert: Eq & el. sa-sr. <2.4 mm. mode: 1.2 mm.

Quartz arenite: El. wr. < 3.2 mm. mode: 1.5 mm. Fine grained quartz sandstone with an iron-rich cement. One example has a band of metamorphosed quartz running through (TD 17/018).

Grog: Eq & el. a-sr. < 3.4 mm. mode: 1.6 mm. Most grog fabrics are similar to fabric 1 and its subgroups (e.g. sample TD 17/004, TD 17/047, TD 17/105), but can be finer (e.g. sample TD 17/123).

Calcareous limestones. Eq. & El. sr. < 2.15 mm. mode: 1.1mm. With coarser inclusions than the main, brown mudstones, these are characterised by their calcareous matrix and their occasional muscovite inclusions.

Very few to absent:

"Soil features": Eq. wr. <2 mm. mode: 1.2 mm. Iron rich spheroidal features.

Rare to absent:

Clay pellet: Eq. sa-r. < 4.4 mm. mode: 2.4 mm. Identical to the surrounding groundmass and fine fraction but may vary in terms of colour due to its different density and reaction to firing. These clay pellets can easily be mistaken for grog, but their sphericity and their merging margins can help in the identification.

Marble: Eq. sr. 1.2 mm. Only one example, in one sample, TD 17/030.

1.2 Finer alluvium subfabric

17/008, 17/019, 17/038, 17/039, 17/082, 17/086, 17/094, 17/100, 17/111, 17/132, 17/133, 17/143, 17/147, 17/150, 17/218, 17/239

Comments:

This subfabric is very similar to subfabric 1.1 in terms of inclusions type. Indeed, mudstone and chert still account for the majority of the coarse fraction, and grog is present, albeit rarely. Subfabric 1.2 however has a finer, or at least better sorted, fine fraction. The ratio of inclusions to groundmass is generally lower, and some sample are more micaceous.

1.3 Grog subfabric

17/001, 17/003, 17/033, 17/041, 17/042, 17/043, 17/045, 17/050, 17/058, 17/063, 17/064, 17/068, 17/072, 17/081, 17/091, 17/097, 17/103, 17/104, 17/106, 17/109, 17/114, 17/118, 17/119, 17/120, 17/125, 17/126, 17/127, 17/129, 17/131, 17/134, 17/135, 17/139, 17/142, 17/145, 17/151, 17/219, 17/220, 17/228, 17/230, 17/232, 17/233, 17/235, 17/236, 17/237

Inclusions

25-55%, most between 40-50%, single-spaced or less. Angular to sub-rounded. Poorly sorted. Highly to moderately bimodal. High sphericity of fine fraction. Low sphericity of coarse fraction. Equant to elongate. Absent to weak alignment to margins.

Coarse Fraction 3.6-0.48 mm

Predominant to common:

Grog: Eq & El. a-sa. < 3.6 mm, mode: 0.8 mm. Highly variable in terms of size, shape and composition. Most grog fabrics are similar to fabric 1 and its subgroups (e.g. sample TD 17/118, TD 17/050), but can often be finer (e.g. sample TD 17/237). Three samples have grog inclusions that can be related to the Mycenaean pithos Fabric X (samples TD 17/045, TD 17/058 and TD 17/236).

Common to absent:

Mudstone: Eq & El. sa-sr. < 3.2 mm. mode: 1.5 mm. Argillaceous sedimentary rock grading from mudstone to siltstone, called mudstone for clarity. Brown, Beige, or reddish matrix with well-sorted clay to coarse silt sized inclusions of quartz and muscovite.

Frequent to absent:

Chert: Eq & El. a-sr. <2.5 mm. mode: 0.08 mm. Clay-sized silica-rich matrix, with occasional larger

inclusions of quartz (TD 17/220)

Few to absent:

Radiolarian chert: Eq & El. sr-r. <2.24 mm. mode: 1.2mm. *17/072 17/134 17/125*

Rare to absent:

Micrite: Eq. & El. a-r. < 3.6 mm. Only 2 limestone inclusion in this group, one is 3.6 mm (TD 17/109) on its long axis, the other much smaller at 0.08 mm (TD 17/043). Both have a clay-size matrix. The largest has quartz inclusions, and displays a layer of calcite crystals on two sides.

Soil features: Eq. wr. <2 mm. mode: 1.25 mm. Iron rich spheroidal features, only present in three samples of subgroup 1.3 (TD 17/118, TD 17/119, TD 17/126).

Quartzite: Eq. & El. sr-r. <2 mm. mode 0.88 mm. Quartzite inclusions in the coarse fraction are often found along smaller example, and as such are most likely related to their fine fraction counterparts.

Very rare to absent:

Clay pellet: Eq. r. 5.4 mm. Only present in one sample, TD 17/233.

Altered igneous rock: El. sa. 1.6mm. Present in only one sample, TD 17/228. Acid igneous rock with a range of coarse sand to very fine sand quartz and alkali feldspars in a poikilitic texture.

Fine fraction:

See fabric 1- general description

1.4 Organic subfabric

17/006, 17/009, 17/046, 17/231

Comments:

Subfabric 1.4 has the same groundmass and inclusions as subfabric 1.1. It contains, however, a much higher proportion of voids with blackened margins, indicating possible organic tempering.

1.5 Coarser alluvium subfabric

17/013, 17/017, 17/048

Comments:

Subfabric 1.5 correspond to a coarser version of subfabric 1.1. Indeed, it contains larger inclusions of chert and rock fragments, and the chert is slightly more frequent.

1.6 Calcareous subfabric

17/057, 17/093, 17/128

Comments:

This last subfabric 1 is once again very similar to subfabric 1.1. It can be distinguished from it by the more common presence of carbonate inclusions such as limestone, micrite, or sparite.

Fabric 2- Calcite Group

17/021, 17/061, 17/080, 17/084, 17/087, 17/088, 17/089, 17/096, 17/099, 17/101, 17/130, 17/136, 17/225, 17/226

Matrix

45- 65%. Non calcareous. Goundmass colour range from reddish or reddish-brown to brown, with some example displaying both colours (TD 17/096). Brown clay body often have red margins (td: 17/021, TD 17/084, TD 17/87, TD 17/ 089, TD 17/099) or pale brown margins (TD 17/101). Margins are weak to strongly optically active, and cores are weakly optically active to optically inactive.

Voids

2-5%. Consisting mainly of meso-vughs and occasional meso- to macro-channels. Poor to moderate alignment to margins of section.

Inclusions

30-50%. Single-spaced or less. Angular to rounded. Poorly sorted. Moderately bimodal. Low sphericity of coarse fraction. High sphericity of fine fraction. Equant and elongate. Absent to weak alignment to margins. The coarse fraction can be difficult to distinguish from the fine fraction for the smaller inclusions, but can be identified from their different shape, as they have a lower sphericity, and are generally much more angular.

Coarse fraction: 0.25-2.4 mm

Predominant to frequent:

Calcite: El. & Eq. a-sa. <1.6. mode: 0.8 mm. Inclusions of crystalline calcite, often lath shaped, and highly variable in size. The smaller example can only be distinguished from the fine fraction from their shape, closer to their larger counterparts than to the rest of the fine inclusions.

Common to absent:

Grog: El & eq. a-sa. < 2.4 mm. mode: 1 mm. Similar to the samples in subfabric 1.3, two samples have grog that relates to fabric 1 (TD 17/021, TD 17/084), and two have grog rich in microfossils, not unlike the pithos fabric M3 (TD 17/061, TD 17/130).

Few to rare:

Chert: el & eq. a. < 1.2 mm. mode: 1 mm.

Few to absent:

Argillaceous rocks: Eq. sr-r. < 2.15 mm. mode: 1.5 mm. Fine argillaceous rock fragments with occasional larger quartz inclusions.

Rare to absent:

Marble: El. sr. 1.04 mm. Only in TD 17/0.61.

Radiolarian chert: Eq. r. <1mm. mode: 1mm. Only two inclusion in TD 17/088.

Fine fraction: 0.01-0.24 mm

Predominant:

Quartz

Frequent to common:

Chert

Common to few:

Calcite *(Could also be counted in the Coarse Fraction, see above in the coarse fraction description)

Few to very few:

Red argillaceous rocks

Quartzite

Very few to absent:

Alkali feldspars

Plagioclase

Rare to absent:

Acid igneous rocks fragments, fine to medium grained.

Fabric 3- Red clay group

17/028, 17/040, 17/051, 17/090, 17/122, 17/144

Matrix

55-63%. Reddish brown in PPl, red to reddish brown in XP. Moderately heterogeneous, due to a core/margins differentiation.

Voids

2-5%. Consist of meso channels voids and meso- and macro-vughs. Sample TD 17/090 has one example with dark margins. Weak to absent alignment to margins.

Inclusions

35%. Single-spaced or less. Angular to sub-rounded. Poorly sorted. Highly bimodal distribution. High sphericity of fine fraction. Moderate sphericity of coarse fraction. Equant and elongate. Absent or weak alignment to margins.

Coarse fraction: 0.56-3.12 mm

Predominant to Frequent:

Mudstone: El. & eq. sa-r. < 3.12 mm. mode: 1.2 mm. Argillaceous sedimentary rock grading from mudstone to siltstone, called mudstone for clarity. Reddish matrix with well-sorted fine to coarse silt-sized inclusions of quartz and muscovite, and occasionally, observable bedding planes with larger or finer inclusions.

Frequent to few:

Grog: El. & eq. sa-sr. < 1.6 mm. mode: 0.88 mm. Most grog inclusions have composition similar to the surrounding groundmass and fine fraction, but some have a much darker fabric.

Fine fraction: 0.01-0.5

Dominant:

Quartz

Frequent:

Chert

Few to very few:

Argillaceous rocks

Plagioclase

Polycristalline quartz

Rare to very rare

Muscovite

Calcite (sparite)

Fabric 4- (Import 1) Clinopyroxene group

17/107, 17/194

Matrix

60%. Highly optically active to inactive groundmass. Dark brown (TD 17-107) or brown (TD 17/194) in PPL and XP. Heterogeneous due to core/margins colour differentiation, with the outer margins paler brown (TD 17/107) to orange or beige colour in XP (TD 17/194), and a paler brown or dark yellow colour in ppl. A thin black layer is observable on both surfaces of TD 17/194, most likely corresponding to the burnished layer of the sample.

Voids

10%. Mostly meso to macro- channels and meso- vughs. Some channels display dark margins and dark surrounding matrix. The channels are strongly aligned with the margins in TD 17/107, strongly to weakly aligned in TD 17/194. The vughs display no noticeable alignment to the margins.

Inclusions

30%. Double to closed spaced. Angular to rounded. Moderately to poorly sorted. Moderately (TD 17/194) to strongly (TD 17/107) bimodal. Equant and elongate. Weak to high sphericity of coarse fraction. High sphericity of fine fraction. Weak alignment to margins.

Coarse fraction: 0.08-1.2 mm

Frequent:

Quartz: eq & el. sa-sr. < 0.72 mm. Mode: 0.3

Common:

Polycrystalline quartz: eq. & el. sa-sr. < 0.8 mm. mode: 0.3 mm. Some have a texture akin to that of a metamorphic rock most likely quartzite, but this cannot be confirmed due to the small size of the inclusions.

Few to very few:

Plagioclase feldspars: eq. a-sa. < 0.3 mm. Mode: 0.25 mm. The vast majority is plagioclase, but the sample also contains a few fragments of albite.

Clinopyroxene: eq. & el. a-r. < 0.72 mm. mode: 0.25 mm. While most clinopyroxenes are anhedral, most likely due to fragmentation, some still hold, if only partially, their typical phenocryst shape.

Grog: eq. & el. a-sa. < 2.4 mm. mode: 1 mm. The grog in this group has a very similar set of inclusions as its surrounding, with visible quartz and plagioclase. The groundmass is however much darker and can be optically active.

Very few to rare:

Porphyritic igneous rock fragments: eq. & el. sa-sr. < 1.6 mm. mode: 0.72 mm. Very fine texture with larger quartz inclusions. Feldspars, although expected, are not found in any of the rock fragments. While the observable examples seem to belong to an acid igneous rock, the composition of the coarse and fine fraction of this group rather suggest that they rather come from the fragmentation of intermediate volcanic rocks.

Rare to very rare:

Altered yellow inclusions: eq. sa-sr. < 0.4 mm. mode: 0.25 mm. Fine inclusion with a frequently cracked texture, yellow in both XP and PPL. It is always anisotropic.

Tuffaceous mudstone: eq. & el. sr-r. < 0.8 mm. mode: 0.5 mm. Fine grained inclusions, brown to buff, with a very distinctive glassy matrix, dark and inactive in XP. Some inclusions display a bloated texture. Possibly tuff or pumice, although tuffaceous mudstone is preferred due to the difficulty of identifying very small inclusions.

Very rare to absent:

Soil features: eq. r. 1 mm Only one example in TD 17/107.

Alkali Feldspar: el. a. 0.4 mm. Only one example in TD17/194.

Fine fraction: 0.01-0.08 mm

Dominant:

Quartz

Common to rare:

Argillaceous rock fragments (iron rich)

Few:

Plagioclase

Very few:

Clinopyroxene

Fine grained igneous rock fragments

Very rare:

Muscovite

Fabric 5: (Import 2) Volcanic group.

17/124, 17/137

Matrix

60%. Optically active. Orange to brown in ppl. Orange to buff in xp. Moderately heterogeneous due to paler, more orange margins.

Voids

10%. Meso-elongate voids (channels or planar) or meso-vughs. Weak to moderate alignment to margins.

Inclusions

30%. Double to closed spaced. Very angular to rounded. Moderately sorted. Highly bimodal. Equant and elongate. Moderate sphericity of coarse fraction. High sphericity of fine fraction. Weak to absent alignment to margins.

Coarse fraction: 0.25-2.4 mm

Frequent to common:

Grog: eq. & el. a-sr. < 2.4 mm. mode: 0.56 mm. The grog present in fabric 5 has a brown, orange, or dark red groundmass, mostly optically inactive. Observable inclusions are consistent with what is found within fabric 5 itself.

Common to few:

Volcanic rock fragments: eq. sa-r. < 1.84 mm. mode: 1.04 mm. This group of inclusions includes two types of volcanic rock. The first type is a fine-grained porphyritic rock with feldspars inclusions and, occasionally, a bloated texture in ppl (TD 17/124). The second type is a poikilitic rock, akin to basalt, with once again feldspar inclusions and occasionally a bloated texture in PPL (TD 17/124).

Tuffaceous mudstone: eq. & el. sa-r. < 1 mm. mode: 0.4 mm. Can occasionally display a bloated or flowing texture (TD 17/137). Possibly tuff or pumice, although tuffaceous mudstone is preferred due to the difficulty of identifying very small inclusions.

Few to rare:

Quartz: eq. sa-r. < 1.44 mm. mode: 0.5 mm.

Rare:

Mudstone: eq. & el. a-sr. < 1.6 mm. mode: 0.8 mm. Very fine reddish argillaceous rock fragments.

Very rare:

Micritic calcite: eq. a. 1.6 mm. Only one inclusion of this type present in TD 17/124.

Fine fraction: 0.01- 0.25 mm

Common to few:

Quartz

Iron oxide

Plagioclase feldspars

Polycrystalline quartz

Grog

Few to rare:

Fine igneous rock fragments

Clinopyroxene

Rare:

Alkali feldspars

Loner 1

17/027

Matrix

45%. Pale brown to brown in PPL and XP, homogeneous. Optically inactive.

Voids

15%. Mostly consisting of meso- to macro-channels and of a few meso- to macro-vughs. Weak alignment to margins. Most channels voids display blackened margins and surrounding matrix.

Inclusions

40%. Single-spaced or less. Angular to well-rounded. Poorly sorted. Highly bimodal. Equant and elongate. Moderate to high sphericity of both fractions. No alignment to margins.

Coarse fraction: 0.14-2.8 mm

Predominant:

Carbonate rocks: eq. & el. a-wr. < 2.8 mm. mode: 0.65 mm. Carbonate rocks inclusions, including micrite, dismicrite, and sparite.

Very few:

Quart: eq. & el. sa-r. < 0.64 mm. mode: 0.24.

Polycrystalline quartz/ quartzite: eq. sa-r. < 0.4 mm. mode: 0.24 mm.

Chert: eq. a-r. < 0.3 mm. mode: 0.20 mm.

Red argillaceous rock: el. sr-ré < 0.48 mm. mode: 0.20 mm. Very small rock fragments, red or almost opaque, with clay to silt sized inclusions.

Very rare:

Pyroxene: eq. A. 0.48 mm. Only one example.

Fine fraction- 0.01-0.13 mm

Frequent:

Carbonate rocks (Sparite or micrite)

Quartz

Common:

Polycrystalline quartz

Chert

Rare

Plagioclase

Calcite

Loner 2

17/032

Matrix

54%. Brown or pale brown in PPL. Very dark brown in XP. Heterogeneous, with a slightly redder outer margin. The inner margin also displays a very thin dark surface. Optically inactive.

Voids

1%. Rare meso-channels and meso-vughs. No alignment to margins.

Inclusions

45%. Single-spaced or less. Angular to rounded. Poorly sorted. Moderate sphericity of fine fraction. Equant and elongate. Moderate to low sphericity of coarse fraction. No alignment to margins. Highly bimodal.

Coarse fraction: 0.30-3.76 mm

Predominant:

Argillaceous rocks: eq. & el. sa-sr. < 3.76 mm. mode: 1.6 mnm. Rock inclusions with grain size varying from mudstone to fine siltstone, although most of the inclusions are within the mudstone range. Very similar to the surrounding matrix and fine fraction, and as such, some are barely visible in XP. Inclusions consists mainly of quartz and white mica.

Few:

Chert: eq. sa-r. < 2.08 mm. mode: 0.4 mm.

Very few:

Siltstone: eq.& el. sr. < 1.2 mm. mode: 0.4 (for the only other inclusion of this type). Coarse version of the predominant argillaceous rock inclusions with more quartz and less white mica.

Fine fraction: 0.01-0.3 mm

Dominant:

Quartz

White mica

Few

Chert

Porphyritic igneous rock fragments

Very few:

Polycrystalline quartz

Biotite

Red argillaceous rock fragments.

Loner 3

17/102

Matrix

55%. Calcareous. Beige in PPL and XP, almost yellow for the margins. Highly optically active.

Voids

5%. Consists of a few meso-vughs and macro- to mega-channels. No alignment to margins, but the large channels voids could indicate the joining of two coils. The channel voids often have a black residue inside.

Inclusions:

40%. Double to close-spaced. Sub-angular to rounded. Poorly sorted. Highly bimodal. Equant and elongate. High sphericity of fine fraction. Moderate sphericity of coarse fraction. No alignment to margins.

Coarse fraction: 0.56-2.4 mm

Predominant:

Argillaceous rocks: eq. & el. sr-r. < 2.4 mm. mode: 0.8 mm. Fine grained argillaceous rock inclusions, varying from mudstone to siltstone. Brown matrix, with inclusions very similar to its surrounding, although better sorted.

Few:

Grog: eq. sa.sr, < 1.44 mm. mode: 0.4 mm. Hard to distinguish from the argillaceous rocks, except for on example which displays a vessel surface. Most example have a red matrix with quartz inclusions.

Rare:

Porphyritic rock fragment: el. A. 0.48 mm (only 1 example). Small acid igneous rock inclusion with quartz and biotite inclusions.

Calcite: el. a. 0.6 mm (only 1 example). Well-formed subhedral calcite phenocryst. There is only one example in the coarse fraction, although calcite is common in the fine fraction (see below).

Fine fraction: 0.01-0.56 mm.

Frequent:

Quartz (mono and polycrystalline)

Common:

Calcite/Micrite

White mica

Red argillaceous rocks

Few:

Chert

Igneous rock fragments

Quartzite

Rare:

Micritic carbonate rock fragments

Plagioclase

Loner 4

17/115

Matrix

40%. Deep red in both ppl and XP. Homogeneous. Optically active.

Voids

5%. Mostly consists of micro-bughs, with a few meso-vughs. No alignment to margins.

Inclusions

55%. Close-spaced. Very angular to sub-rounded. Well sorted. Unimodal distribution. Equant and elongate. High to moderate sphericity of inclusions. 0.01-0.72 mm.

Frequent:

Quartz: eq. va-sr. < 0.45 mm. mode : 0.25 mm. Very homogeneous in size and shape.

Chert: eq. & el. a-sr. < 0.72 mm. mode: 0.15 mm.

Few:

Polycrystallione quartz: el. & eq. sa-sr. < 0.3 mm. mode : 0.25 mm. Some are most likely quartzite, but the size of the inclusions makes the identification uncertain.

Rare:

Igneous rock fragments: eq. sr. 0.3 mm (only 1 example). Probably a porphyritic acid igneous rock., although very hard to confirm due to its size.

Mycenaeans fabrics

M1 Mica fabric

M1.1 Fine Mica fabric

17/153, 17/154, 17/155, 17/157, 17/160, 17/161, 17/162, 17/164, 17/165, 17/169, 17/170, 17/171, 17/172, 17/175, 17/179,17/180, 17/181, 17/183, 17/184, 17/186, 17/187, 17/189, 17/192, 17/193, 17/195, 17/196, 17/197, 17/198, 17/199, 17/205, 17/207, 17/208, 17/209, 17/210, 17/211, 17/212, 17/213

Matrix

50-85%. Highly calcareous. Mostly brown (TD 17/160, TD 17/179) or pale brown (TD 17/157) in ppl, with some reddish brown (TD 17/195) or reddish (TD 17/207) examples. Deep red (TD 17/180, TD 17 160) or reddish brown (TD 17/189, TD 17/197) in XP. Most samples display a homogeneous groundmass, but core top margins colour differences can be observed in a small number of sections (TD 17/184, TD 17/205, TD 17/213). Optically highly active (TD 17/164), moderately active (TD 17/184), or inactive (TD 17/181).

Voids

5-10%. Consist mainly of micro- or meso-vesicles (TD 17/209), meso-vughs (TD 17/189), occasional meso-channels (TD 17/165), and very rare mega-channels (TD 17/198). Moderate to strong alignment to margins.

Inclusions

10-40%. Open-spaced to single-spaced, depending on the percentage of inclusions. Sub-angular to well-rounded. Well-sorted to poorly sorted. Unimodal distribution but can display a great difference between the size of the smallest and largest inclusions. Moderate sphericity of inclusions. Equant and elongate. Crude alignment to margins. 0.01-0.65 mm (In addition, one large inclusion, at 2.8 mm on its long axis, was not accounted in the range as it is an outlier).

Dominant to Common:

Quartz: eq. & el. a-sr. < 0.6 mm. mode: 0.02 mm.

Dominant to rare:

Biotite: el. a. < 0.12 mm. mode: 0.04 mm.

Frequent to common:

Polycrystalline quartz: eq. & el. sa-sr. <0.32 mm. mode: 0.1 mm.

Frequent to few:

White mica: el. a. < 0.22 mm. mode: 0.06 mm.

Few to rare:

Argillaceous inclusions: eq & el. sr-wr. < 1.1 mm. mode: 0.05 mm. Very fine, iron rich (red or reddish brown) argillaceous inclusions, most likely mudstones or clay pellets. Can be completely opaque (TD 17/187).

Few to absent:

Metamorphic rock fragments: eq. & el. r-wr. < 0.32 mm. mode: 0.12 mm. Consisting of quartz and mica, these fine metamorphic rock fragments can display schistosity (TD 17/1175).

Siltstone: eq. & el. r-wr. < 0.94 mm. mode: 0.4 mm. Argillaceous rock fragments with quartz, mica and opaque inclusions within a brown fabric.

Rare to absent:

Plagioclase: eq. a. < 0.06 mm. mode: 0.04 mm.

Sparite: eq. a-sr. < 0.18 mm. mode: 0.05 mm.

Micrite: eq. wr. < 0.65 mm. mode: 0.25 mm. May be secondary deposition of calcite, as there is also noticeable deposition of micrite within voids.

Chert: el. sa-r. < 0.44 mm. mode: 0.30 mm.

Clay pellets: eq. sa. 2.8 mm (only one example). Red clay pellet with coarse inclusions of quartz, quartzite, and igneous rocks. The groundmass is very similar to the other argillaceous inclusions.

Very rare to absent:

Augite: eq. wr 0.06 mm (only one example).

Igneous rock fragments: eq & el. sa-sr. Granular (TD 17/186) or porphyritic (TD 17/184) igneous rocks with quartz, plagioclase, and altered orange inclusions.

M1.2 Semi-coarse mica fabric.

17/167, 17/168, 17/178, 17/185, 17/188

Comments

Groundmass and fine fraction are very similar to M1.1 fabric, although the amount of mica is often lower. This subgroup is a coarser version of M1.1, moderately to highly bimodal. It was most likely created by mixing two clays: the same one used in subfabric M1.1, and a coarser clay probably similar to the clay pellet found in TD 17/198.

Matrix

45-65%. (See M1.1)

Voids

5-12%. (See M1.1)

Inclusions

45-65%. (See M1.1 for fine fraction, or below for coarse fraction)

Coarse fraction: 0.1-1.44 mm

Dominant to frequent:

Chert: eq. & el. a-sr. < 1.44 mm. mode: 0.4 mm.

Frequent to common:

Quartz: eq & el. < 0.4 mm. mode: 0.32 mm.

Common to few:

Polycrystalline quartz: eq & el. sa-sr. < 0.65 mm. mode: 0.4 mm. Some may be quartzite, but the size of the inclusions makes the identification uncertain.

Argillaceous inclusions: eq. & el. sr-r. < 0.8 mm. mode: 0.5 mm. Very fine, iron rich (red or reddish brown) argillaceous inclusions, most likely mudstones or clay pellets. Can be completely opaque.

Rare to absent:

Plagioclase (albite): eq. a-sa. < 0.32 mm. mode: 0.24 mm.

Altered orange inclusions: eq. sa-sr. < 0.56 mm. mode: 0.4 mm.

Metamorphic rock fragments: el. sa. 0.24 (only one example). Most likely schist.

M1.3 Coarse mica fabric

17/158, 17/159, 17/166, 17/173, 17/174, 17/200

Comments:

Just like M1.2 is a coarser version of M1.1, M1.3 is a coarser version of M1.2. Its groundmass and fine fraction are virtually the same, with small variations that can be attributed to sampling, as both groups are represented by a limited number of samples. The coarse fraction is also similar, but in M1.3, also includes large mudstone inclusions and larger metamorphic rock fragments. Chert is less frequent, maybe due to a different ratio in the clay mixing discussed above for M1.2.

Coarse fraction (element to be added to the list from M1.2)

Frequent to Common:

Mudstone: eq & el. sa-sr. < 3.2 mm. mode: 1.6 mm.

Very rare to absent:

Microfossil: eq. wr. O.8 mm (only one example).

M2 Pithoi fabric

17/201, 17/202

Matrix

35-45%. Brown (TD 17/202) or deep brown (TD 17/201) in both PPL and XP. Homogeneous. Weakly optically active.

Voids

15%. Contains meso- and macro-vughs, and a fewer meso- or macro-channels. Weak alignment to margins in both samples. Some voids in TD 17/201 are most likely traces of microfossils that have been decomposed during firing. Within the same sample, it is possible to observe an alignment of voids that may be the joining of two sections of the vessel.

Inclusions

40-50%. Double-spaced (TD 17/202) to close-spaced (TD 17/201). Angular to rounded. Poorly sorted. Highly bimodal. Equant and elongate. High sphericity of fine fraction. Moderate sphericity of coarse fraction. It is worth noting that the coarse fraction could also be divided into two size categories, the argillaceous rock inclusions being much larger than the rest of the coarse inclusions.

Coarse fraction: 0.32-4.24 mm

Dominant:

Siltstone: eq. & el. a-sr. < 4.24 mm. mode: 1.84 mm. Argillaceous rock fragments with inclusions ranging from very fine sand to clay in size, but called siltstone for clarity purposes. Inclusions includes quartz, mica, and red argillaceous rocks. Very similar to the argillaceous rock inclusions found in fabric 1 and subfabric M1.3.

Few to rare:

Chert: eq. & el. a-sa. < 0.5 mm. mode: 0.32 mm.

Quartz: eq. sa-sr. < 0.4 mm. mode: 0.32 mm.

Micrite: eq. & el. sr-r. <2.4 mm. mode: 0.8 mm. Can include non-carbonate metamorphic rock fragments (see TD 17/202)

Few to absent:

Sandstone with micritic cement: el. sa. < 2.4 mm. mode 1.44 mm. Only in TD 17/201. Sublithic arenite inclusions with fine to very fine sand sized quartz, opaque, chert, and rock fragments.

Very few to absent:

Clay pellets: eq. & el. sr-r. <2.8 mm. mode: 0.5 mm. Argillaceous inclusions virtually identical to its surrounding groundmass, but darker, with diffuse margins.

Rare to absent:

Metamorphic rock fragments: eq. & el. sa-sr. < 0.48 mm. mode: 0.32 mm. Schist or quartzite inclusions.

Very rare to absent:

Polycrystalline quartz: el. Sa-sr. < 0.5 mm. mode: 0.32 mm.

Fine fraction: 0.01-0.32 mm.

Frequent:

Quartz

White mica

Iron-rich argillaceous rock fragments

Frequent to absent:

Microfossils

Common

Micrite

Common to rare:

Chert

Very few to rare

Metamorphic rock fragments

Very rare:

Clinopyroxene

M3 Green fabric

M3.1 Fine Green fabric

17/157, 174/163, 17/177, 17/182

Matrix

70-85%. Highly calcareous. Beige in PPL. Greenish grey with red patches in XP. Homogeneous. Optically inactive.

Voids

5-10%. Mostly consisting of meso-vesicles (TD 17/156) or meso-vughs (TD 17/177). Weak to absent alignment to margins.

Inclusions

10-20%. Open-spaced to close-spaced. Angular to well-rounded. Well to moderately sorted. Unimodal distribution. Equant and elongate. Crude alignment to margins.

Dominant:

Biotite: al. a. < 0.1 mm. mode: 0.04 mm.

Frequent:

Quart: eq. & el. a-r. < 0.1 mm. mode 0.02 mm.

Few to rare:

Mudstone: el. sa-sr. < 0.2 mm. mode: 0.1 mm. Red groundmass.

White mica: el. a. < 0.1 mm. mode: 0.04 mm.

Very are to absent:

Metamorphic rock fragments: eq. a-sa. < 0.16 mm. mode: 0.14 mm. Probably schist, with quartz and biotite inclusions.

Radiolaria: eq. wr. 0.05 mm. (only one example). Round silica rich inclusions with a chert-like texture.

Igneous rock fragments: eq. sa. 0.14 mm. (only one example). Fine matrix with quartz inclusions.

M3.2 Coarse Green fabric

17/190

Comments

This subgroup is the same as M3.1, but with a bimodal distribution of inclusions. The fine fraction is identical to the inclusions described above for M3.1, but in addition, this subfabric, technically a loner as only one sample can be attributed to this group, also as a coarse fraction.

Coarse fraction: 0.4-2.24 mm.

Predominant:

Chert: eq. & el. sa-r. < 2.24 mm. mode: 1.04 mm.

Few:

Igneous rock fragments: el. a. < 1.6 mm. mode: 0.64 mm. Porphyritic igneous rock inclusions with alkali felds^pars inclusions.

Mudstone: el. r. 1.92 mm. (only one example). Brown matric with sparse rounded polycrystalline quartz inclusions.

M Loner 1

17/206

Matrix

63%. Calcareous. Brown colour in PPL. Reddish brown in XP. Homogeneous. Highly optically active.

Voids

7%. Contain micro- and meso-vesicles and meso-vughs. Moderate to crude alignment to margins.

Inclusions

Opens-spaced or less. Angular to rounded. Poorly sorted. Highly bimodal distribution. Equant and elongate. High sphericity of fine fraction. Low to moderate sphericity of coarse fraction. No alignment

to margins.

Coarse Fraction 0.24-1.92 mm

Dominant:

Clay pellets: eq. & el. sa-r. < 1.92 mm. mode: 0.64 mm. Red or brown inclusions, very similar to the surrounding groundmass and fine fraction.

Frequent:

Mudstone: aq. & el. a-sr. < 1.44 mm. mode: 0.4 mm. Very fine beige or brown argillaceous rock inclusions.

Few:

Opaque argillaceous inclusions: eq. sr-r. < 1.05 mm. mode: 0.64 mm. Black or dark red in both PPL and XP.

Very few:

Radiolarian chert: eq. sa. 0.32 mm. (only one example)

Fine fraction: 0.01-0.12 mm

Frequent:

Clay pellets

Quartz

Common

Mudstone

Few

White Mica

Polycrystalline quartz

Very rare:

Plagioclase

M Loner 2

17/191

Matrix

60%. Reddish brown in both PPL and XP. Homogeneous. Optically active.

Voids

< 1%. Very few meso-vughs. Crude alignment to margins.

Inclusions

Double-spaced or less. Angular to rounded. Poorly sorted. Bimodal distribution. Equant and elongate. High sphericity of both fractions. No alignment to margins.

Coarse fraction: 0.4-1.6 mm

Frequent:

Tuffaceous mudstone: eq. & el. A-sr. <1.6 mm. mode: 0.56 mm. Glassy matrix, very fine, although some include quartz and mica inclusions. Can display flow structure.

Few:

Mica-rich siltstone: eq. & el. sr-r. < 1.12 mm. mode: 0.8 mm. Very fine siltstone with quartz and mica inclusions.

Igneous rock inclusions: eq. & el. sa-sr. < 1.2 mm. mode: 0.7 mm. Porphyritic or granular acid igneous rocks, although their exact texture is difficult to confirm due to the size of the inclusions.

Polycrystalline quartz: e1.é & el. sr-r. < 0.56 mm. mode: 0.4 mm.

Poikilitic igneous rock inclusions: eq. & el. r. < 0.88 mm. mode: 0.4 mm. Most likely basalt, with plagioclase, olivine, and pyroxene inclusions, although some are altered.

Argillaceous rock inclusions. eq. & el. sa-r. < 0.8 mm. mode: 0.4 mm. Very fine red mudstone.

Very few:

Monocrystalline quartz: el. sr-r < 0.56 mm. mode: 0.4 mm.

Fine fraction: 0.01-0.2

Frequent:

Quartz

Tuffaceous inclusions

Common:

White mica

Mudstone

Very few:

Igneous rock inclusions

Chert

Rare:

Altered red inclusions (probably ferromagnesian minerals)

Very rare:

Olivine

Plagioclase

M Loner 3

17/070

Matrix

45%. Brown to beige or pale brown in both PPL and XP. Heterogeneous due to margins top core colour differentiation.

Voids

5%. Consists of meso-vughs and meso-channels. Can display slightly darker surrounding matrix, or black residue within the void itself. No alignment to margins.

Inclusions

50%. Single-spaced or less. Sub-angular to rounded. Poorly sorted. Bimodal distribution. Equant and elongate. Moderate sphericity of both fractions. No alignment to margins.

Coarse fraction: 0.8-2.4 mm

Predominant:

Argillaceous inclusions: eq. & el. sa-r. < 2.4 mm. mode: 1.3 mm. Siltstone or clay-pellets, with a very similar composition to the surrounding groundmass ands fine fraction, although one example is richer in mica.

Fine fraction: 0.01-0.48 mm

Frequent:

Monocrystalline quartz

Chert

Few:

Polycrystalline quartz

Rare:

Iron rich argillaceous inclusions.

M Loner 4

17/203

Matrix

65%. Calcareous. Orange in both PPL and XP. Homogeneous. Optically active.

Voids

10%. Mainly contains meso-vughs and occasional macro-vughs. Crude alignment to margins.

Inclusions

25%. Double-spaced or less. Angular to rounded. Poorly sorted. Bimodal distribution. Equant and elongate. High sphericity of fine fraction. Moderate sphericity of coarse fraction. No alignment to margins.

Coarse fraction: 0.32-2.72 mm

Dominant:

Carbonate rock inclusions: eq. & el. a-r. < 1.44 mm. mode: 0.64 mm. Includes micrite, dismicrite, and meta-limestone (or sparite) inclusions.

Common:

Mudstone: eq. & el. sr-r. < 0.08 mm. mode: 0.4 mm. Highly optically active argillaceous inclusions.

Few

Metamorphic rock inclusions: eq. & el. sa-r. < 2.72 mm. mode: 1 mm. Fine metamorphic rock fragments, with a cleavage similar to that of a slate or a phyllite, and with inclusions of quartz and biotite.

Rare:

Plagioclase: eq. wr. 0.32 mm. (only one example)

White Mica: el. a. 0.4 mm. (only one example)

Fine fraction: 0.01-0.32

Frequent:

Carbonate rock inclusions

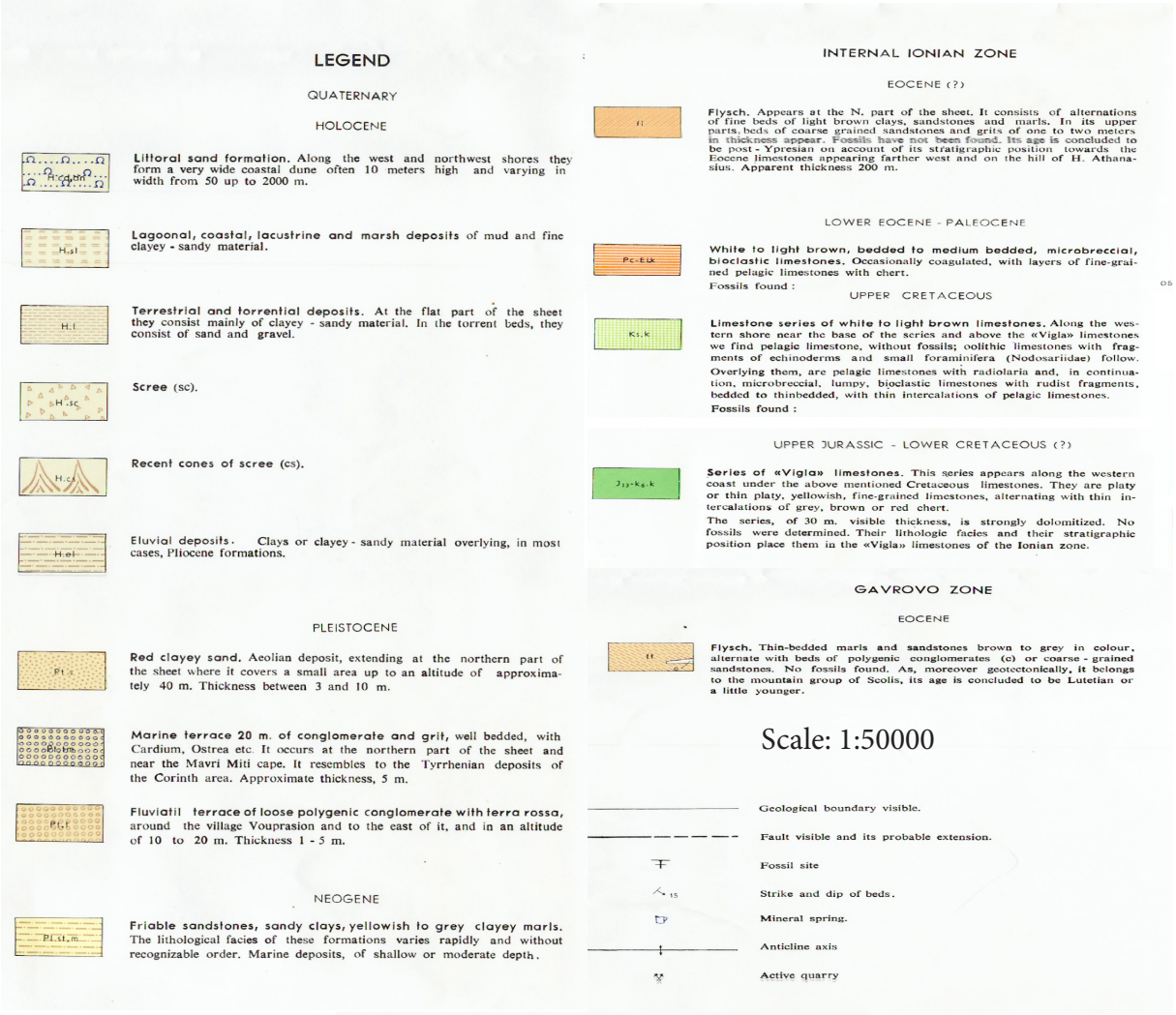
Quartz

Common:

White mica

Mudstone

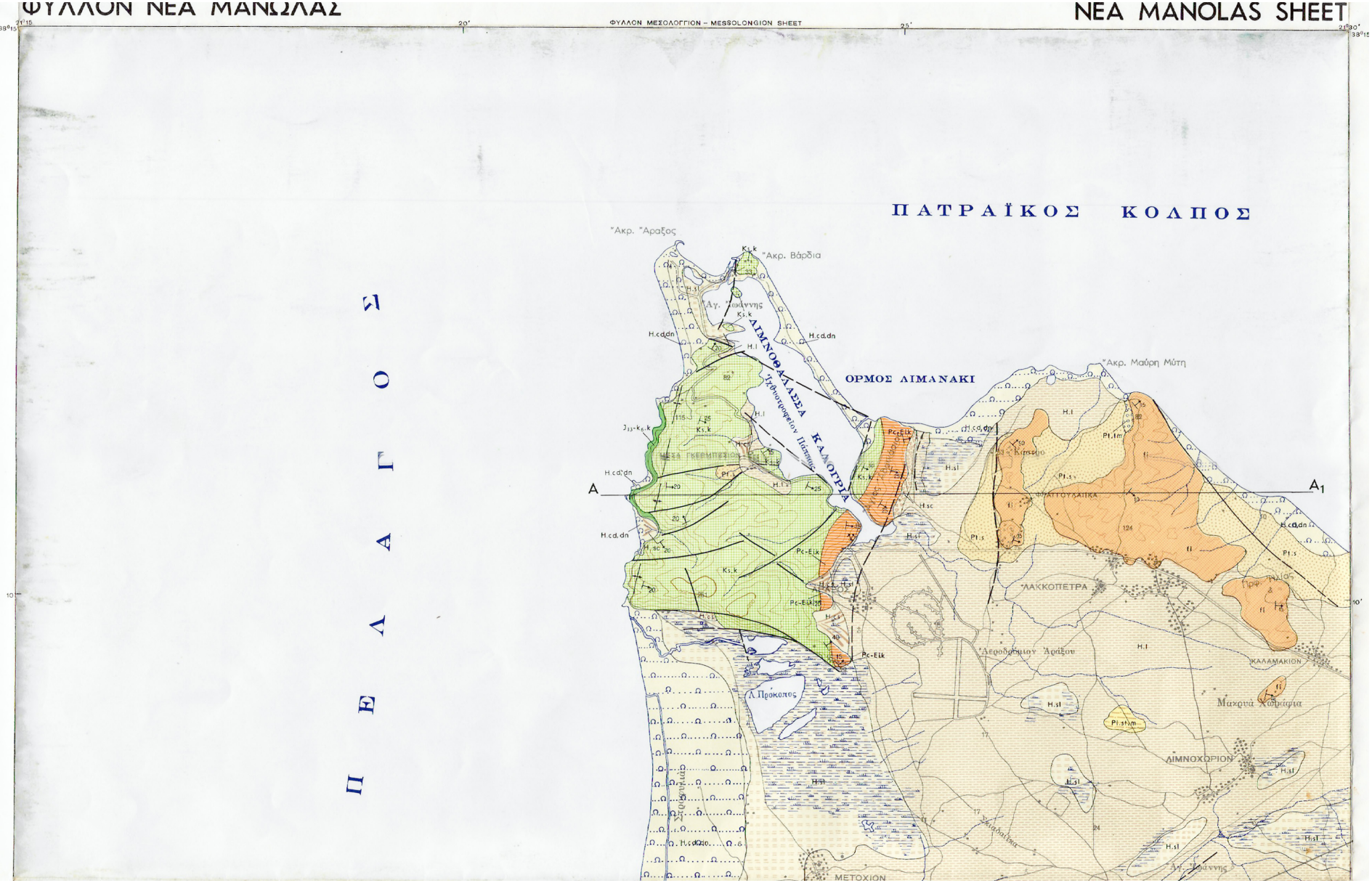
APPENDIX 2: Geological Map, (Greece: Nea Melonas sheet)

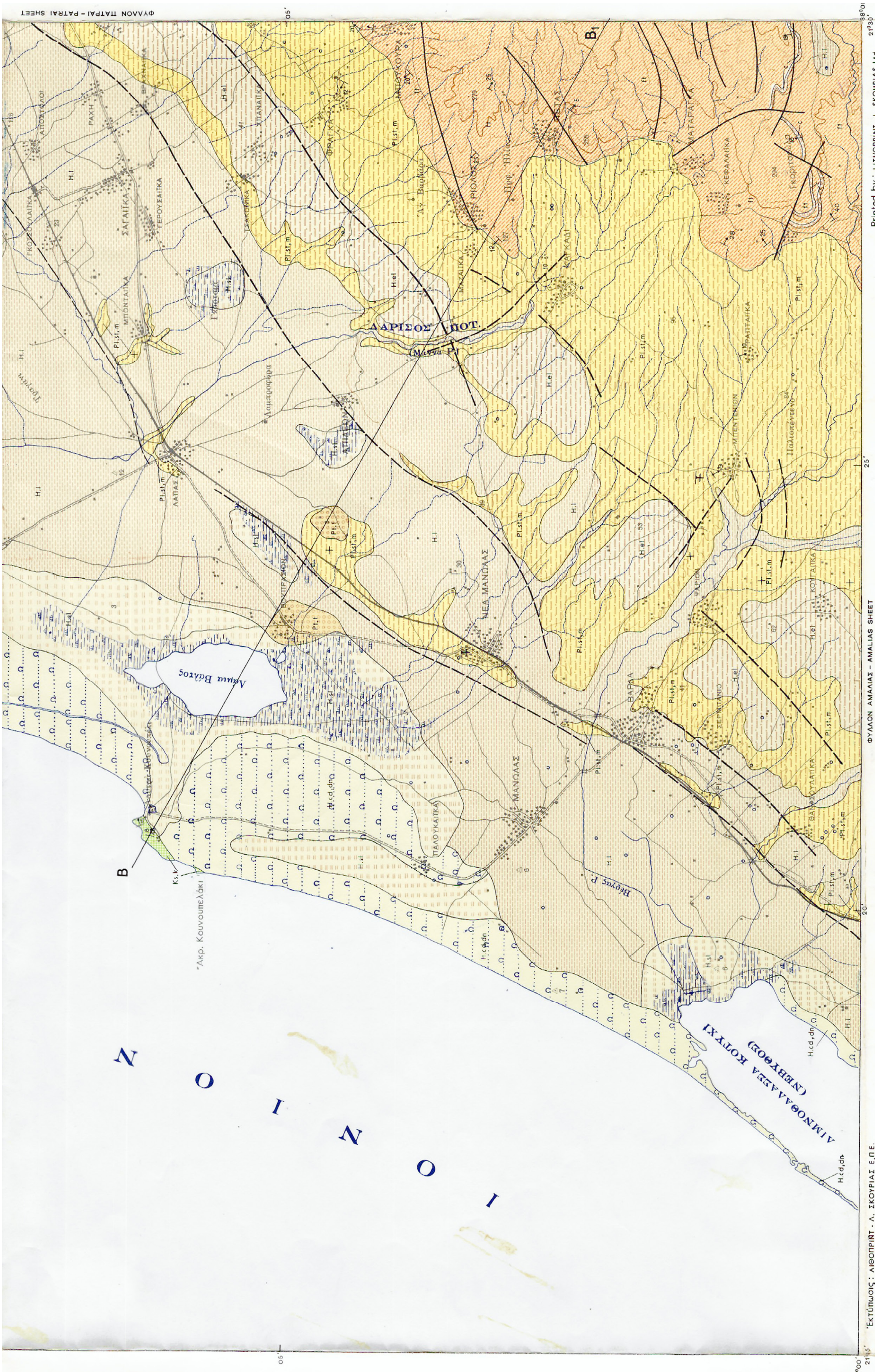


ΦΥΛΛΟΝ ΝΕΑ ΜΑΝΩΛΑΣ

ΦΥΛΛΟΝ ΜΕΣΟΛΟΓΓΙΟΝ – MESSOLONGION SHEET

NEA MANOLAS SHEET

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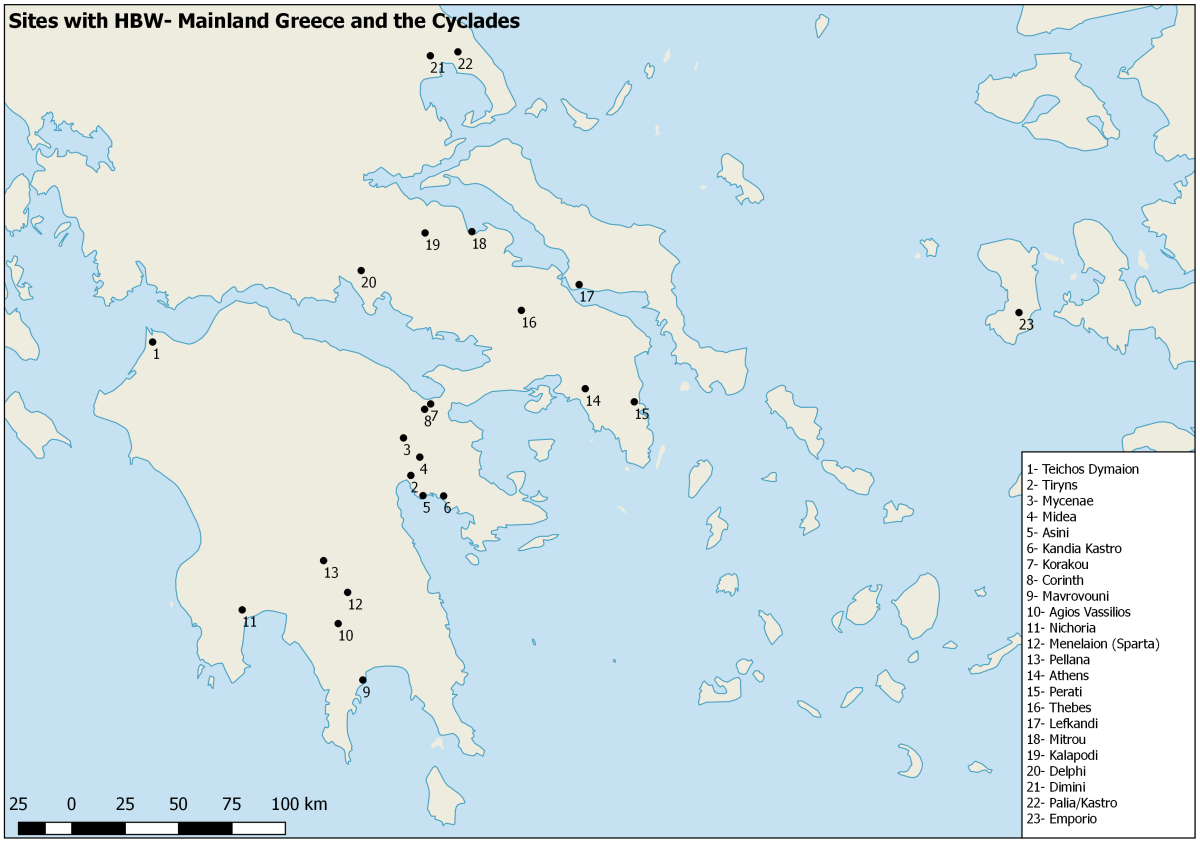
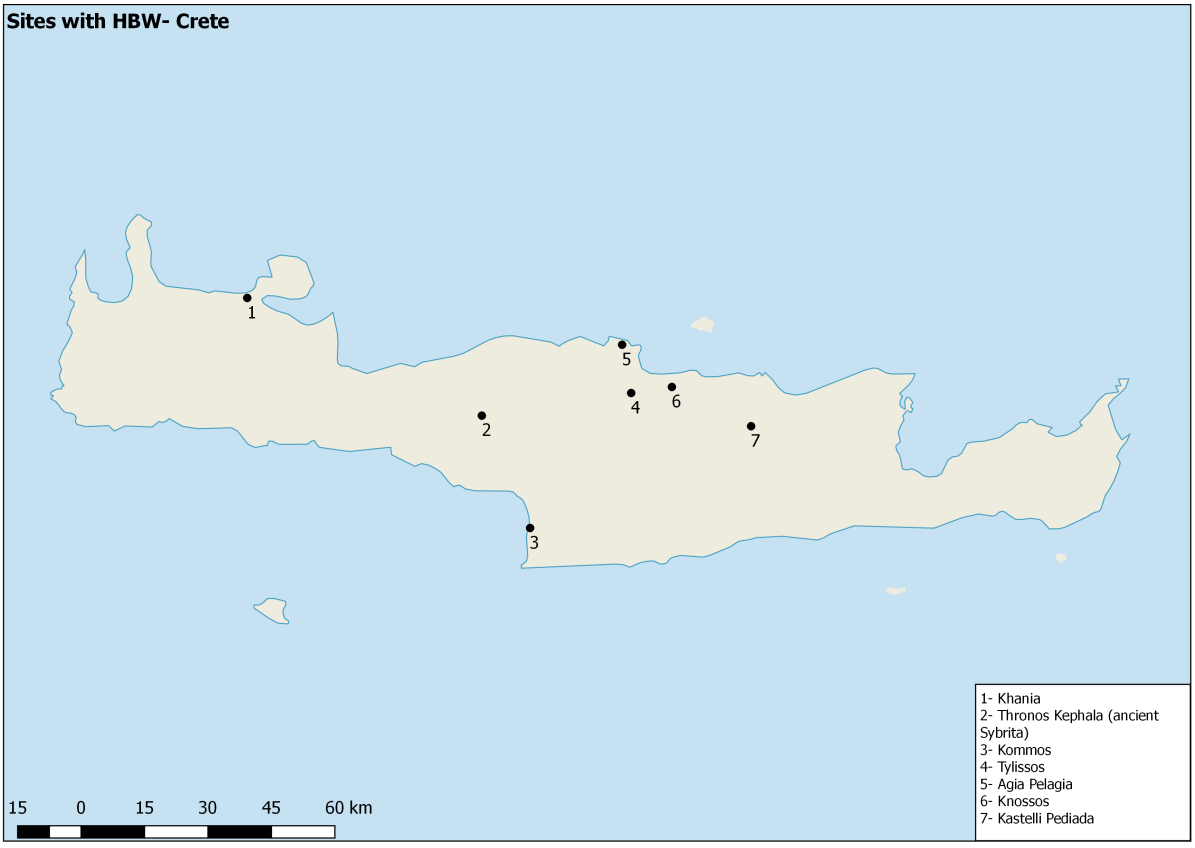
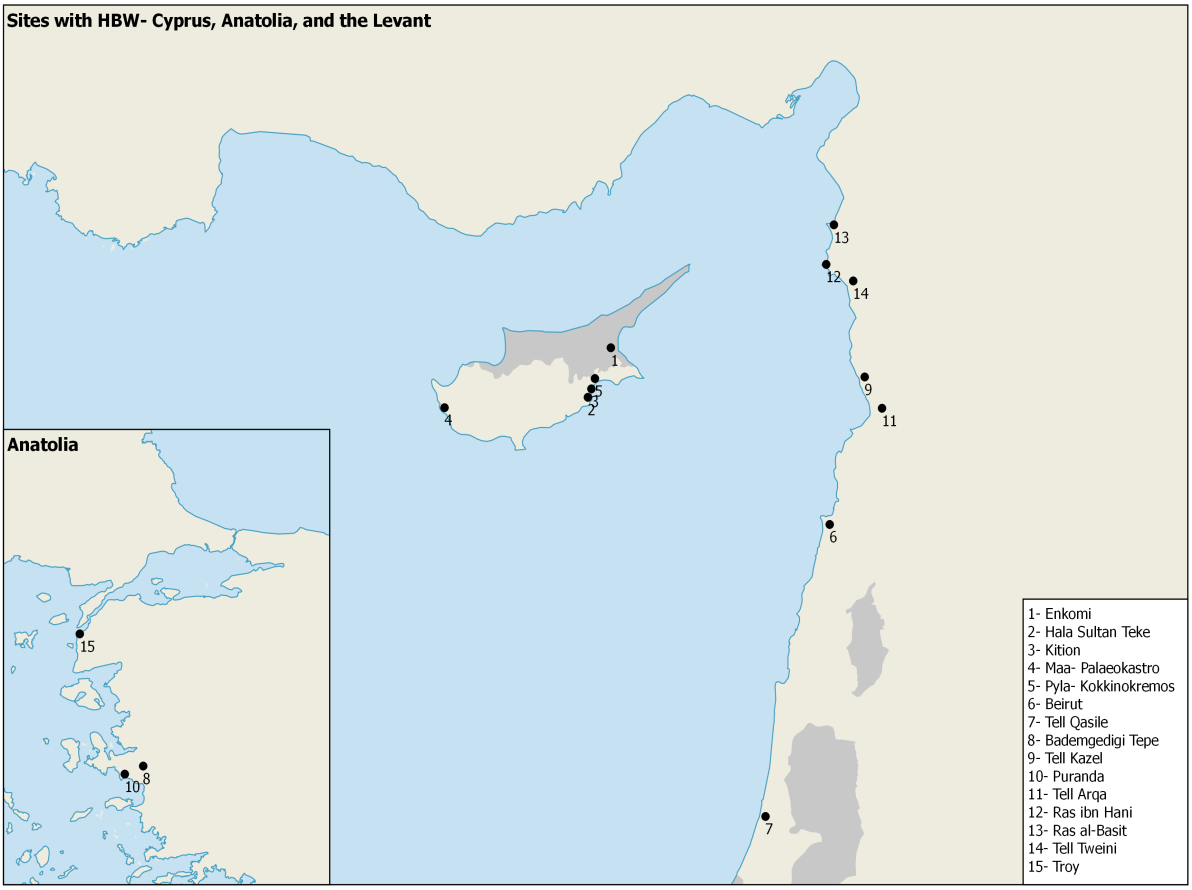
ΦΥΛΛΟΝ ΑΜΑΛΙΑΣ - AMALIAS SHEET
ΛΑΡΙΣΟΣ ΠΟΤ.
ΛΑΠΠΑΣ
ΝΕΑ ΜΑΝΩΛΑΣ
ΜΑΝΩΛΑΣ
ΒΑΡΔΑ
Λίμνη Βάλτος
Ακρ. Κουνουπέλακι
ΛΙΜΝΟΘΑΛΑΣΣΑ ΚΟΤΥΧΙ
Ι Ο Ν Ι Ο Ν
ΕΚΤΥΠΩΣΙΣ: ΛΙΘΟΠΡΙΝΤ - Λ. ΣΚΟΥΡΙΑΣ Ε.Π.Ε.

APPENDIX 3: Sites where HBW has been identified.






Sites with HBW- Cyprus, Anatolia, and the Levant
Anatolia
1- Enkomi
2- Hala Sultan Teke
3- Kition
4- Maa- Palaeokastro
5- Pyla- Kokkinokremos
6- Beirut
7- Tell Qasile
8- Bademgedigi Tepe
9- Tell Kazel
10- Puranda
11- Tell Arqa
12- Ras ibn Hani
13- Ras al-Basit
14- Tell Tweini
15- Troy