Leave No Sherd Unturned: A ceramic analysis of the Middle to Late Chalcolithic transition of Chlorakas Palloures, Cyprus

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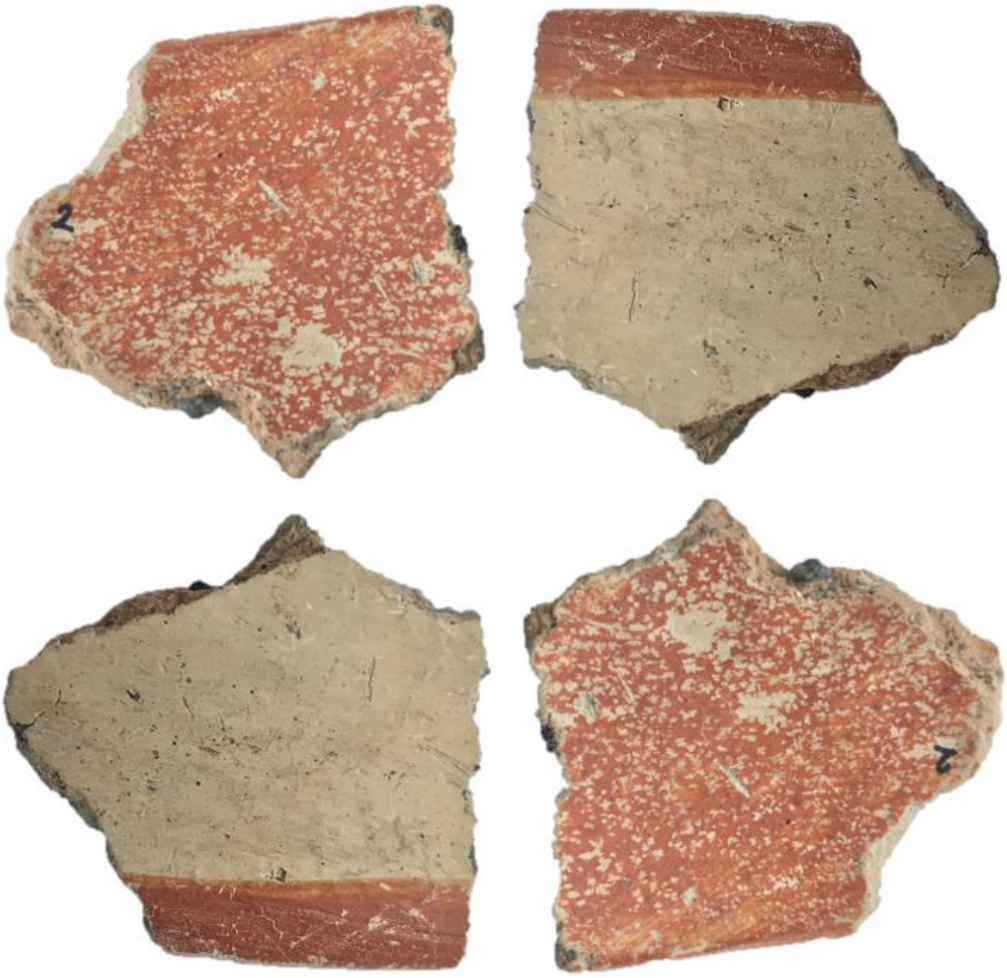

By

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Front Page Cover: Exterior and interior of a Red-on-White sherd from Chlorakas-*Palloures* (Image by the author).

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Table of Contents

Chapter 1: Introduction **5**

1.1 Research Problem 5

1.2 Research Questions 5

1.3 Methodology 6

1.4 Reading Guide 6

Chapter 2: The Archaeology of Cyprus **8**

2.1 Geographical Relevance 8

2.2 Archaeological History 9

2.3 The Chalcolithic Period 10

2.4 Chlorakas-*Palloures* 14

Chapter 3: Approaches to Ceramics **17**

3.1 Pottery & Chronology 17

3.2 Chalcolithic Pottery 19

3.3 Methodology 24

Chapter 4: Analysis & Results **29**

4.1 Case Study: BU13 29

4.2 Dataset 30

4.2.1 Wares 32

4.2.2 Shapes 33

4.2.3 Fabrics 34

4.2.4 Surfaces 37

Chapter 5: Discussion & Conclusion **40**

5.1 Reflecting on the Research Questions 40

5.2 Conclusions 43

5.3 Limitations & Future Research 44

Abstract **45**

Bibliography **46**

List of Figures **51**

List of Tables **53**

Appendix A. Database Layout **55**

Chapter 1: Introduction

1.1 Research Problem

The Chalcolithic period (ca. 3900-2400 BCE) is crucial for the research of key developments taking place over the course of Cypriot prehistory, such as social differentiation, craft specialisation, long-distance trade and metallurgy (Düring and Klinkenberg, 2016, 91). With several extensive excavations at sites such as Lemba-*Lakkous*, Kissonerga-*Mosphilia* and Kissonerga-*Mylouthkia,* the Chalcolithic on Cyprus is generally well investigated (see Peltenburg, 1985; 1998; 2003). Since 2015, excavations at Chlorakas-*Palloures* aim to extend this knowledge, which in 2018 resulted in new insights into the development of metallurgy on the island (Düring et al., 2018, 11-25).

Despite all the research conducted over the years, the transition between the Middle Chalcolithic (ca. 3400-2900 BCE) and the Late Chalcolithic (ca. 2800-2400 BCE) is still poorly investigated. This leaves a research gap in our archaeological understanding concerning the Cypriot Chalcolithic. Filling the gap is crucial for creating a complete picture and understanding of this period. The site of Chlorakas-*Palloures* has occupation layers from both the Middle and the Late Chalcolithic and therefore provides an excellent opportunity to investigate this transition while at the same time gaining a better understanding of the site (Düring, 2016, 1-2).

1.2 Research Questions

Pottery is the most abundant kind of material found at Chlorakas-*Palloures* and is present in the occupation layers from both periods (Düring et al., 2016, 27-31). Each ceramic sherd is documented so that its location within the stratigraphy is known. By analysing this material and placing it in its chronological context, change over time can be observed to gain a better understanding of the transition from the Middle to the Late Chalcolithic.

This leads to the following research question:

How does the pottery assemblage of Chlorakas-Palloures change over time from the Middle to the Late Chalcolithic and how does this improve our understanding of this transition?

The research question is tied to the following sub-questions:

I. *What kind of pottery wares can be observed and how does this change from the Middle to the Late Chalcolithic?*
II. *What kind of pottery shapes can be observed and how does this change from the Middle to the Late Chalcolithic?*
III. *What kind of fabric characteristics can be observed in terms of type, texture and hardness and how does this change from the Middle to the Late Chalcolithic?*
IV. *What kind of surfaces can be observed and how does this change from the Middle to the Late Chalcolithic?*

1.3 Methodology

To deal with the aforementioned questions, this research will focus on a specific case study from Chlorakas-*Palloures*. In 2017 the project excavated trench 'BU13' which contains layers from both the Middle and the Late Chalcolithic. Of all the pottery discovered in this trench, a diagnostic assemblage was selected by the specialists of the project, containing a total of 116 sherds. I analysed the selection over the summer of 2021 and will use this as the dataset for this thesis. For the research, a database in Microsoft Access was created in which all the data was stored to enable statistical analysis. I analysed the sherds on the basis of four categories: ware, shape, fabric and surface. When the sherds were excavated, the locations and stratigraphic layers were recorded and also placed in this database. Research involves linking the data to the exact locations within BU13 to create an overview of the pottery in its temporal context. This overview acts as a means to look at how the material changes between the Middle and the Late Chalcolithic, leading to more insight into this still poorly investigated transition and the site itself.

1.4 Reading Guide

Before starting with the research, some background knowledge will be given to inform the reader about the information required for the chapters to come. Chapter 2 gives a general overview of Cyprus and its archaeology, followed by a focus on the Chalcolithic and the site of Chlorakas-*Palloures*. Chapter 3 focuses in more detail on the theory and

methodology, describing an approach to analysing pottery and chronology. Furthermore, the chapter presents the different pottery wares and shapes present at the site. Lastly, the dataset will be presented in terms of how it is acquired and how it will be used in the analysis. Chapter 4 contains the analysis by using both the dataset and the stratigraphy of BU13, creating an overview of the Middle to Late Chalcolithic transition. Then, this data will be used to answer the research question and its sub-questions. Finally, the analysis is wrapped up in a conclusion followed by some suggestions for further research.

Chapter 2: The Archaeology of Cyprus

2.1 Geographical Relevance

'Cyprus: A Dynamic Island', was the name of an exhibition in the National Museum of Antiquities in Leiden, the Netherlands in 2019. This exhibition aimed to show the dynamic past of Cyprus through its archaeological record and proves to be a fitting title (www.rmo.nl). Cyprus is the third-largest island in the Mediterranean with a size of 9251 km^2 and is located less than a hundred kilometres from the Anatolian (70 km) and Syrian (95 km) coasts (fig. 1). It furthermore has been argued that the island acts as an important crossroad within the broader eastern Mediterranean (Knapp, 2013, 1-3).

Already in the early ninth millennium BCE, the island was colonised by inhabitants from the mainland and played a relevant role in the extensive interactions and networks of the Near East and the eastern Mediterranean (Manning et al., 2010, 702-704.). Furthermore, during the Bronze Age, Cyprus was involved in intense maritime trading of copper coming from the Troodos Mountains with Egypt, the Aegean, the Levant and even as far as Sicily and Sardinia (Steel, 2013, 578, 583). Copper was traded in the form of ingots which are found in various shipwrecks across the Mediterranean, especially in the Aegean and south of Anatolia (Steel, 2013, 583). The relevance of the island is further emphasised by its name, Cyprus, which is derived from the word copper (Düring et al., 2018, 11).

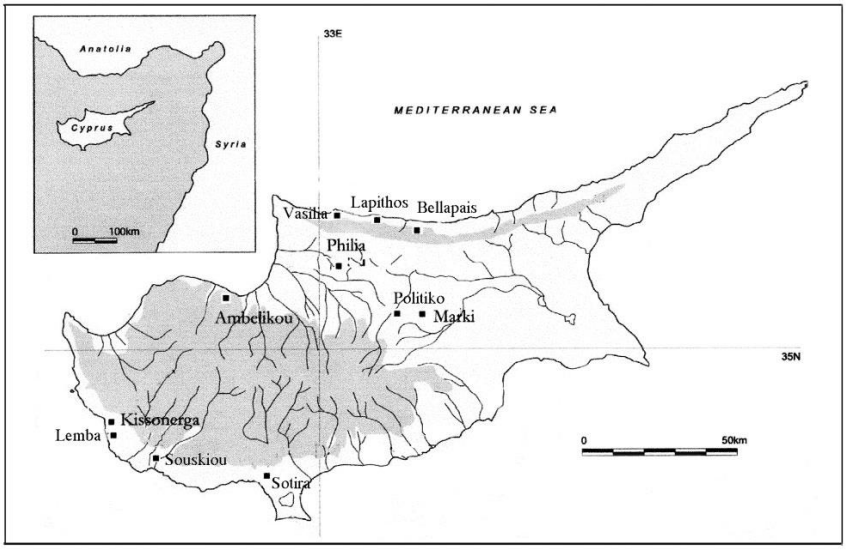

Figure 1: Map of Cyprus, with its proximity to the mainland (Bolger, 2013, 3).

2.2 Archaeological History

The history of Cypriot archaeology is intrinsically tied to its colonial past. Already in the second half of the 19th century, first under Ottoman rule, Cyprus attracted well-known antiquarians, like Robert Hamilton Lang. These antiquarians were mainly interested in filling museums with outstanding finds and filling their pockets with money. In 1878, the island became a British colony, resulting in the enactment of a law stating who was entitled to run excavations (Knapp, 2013, 20). However, research projects did not produce many extensive results and the shipping of artefacts to museums, e.g. The British Museum, continued (Karageorghis, 1987, 4).

During the early 20th century, the Swedish Cyprus Expedition (SCE) led by Einar Gjerstad laid the foundation for the culture-historical approach in Cypriot archaeology and contributed to the research of the Neolithic, Bronze Age and Iron Age of the island. (Gjerstad, 1926; 1934). The SCE furthermore placed the archaeology of Cyprus in a broader Mediterranean and Near Eastern context (Knapp, 2013, 21). In 1935 the Cypriot Department of Antiquities introduced the Antiquities Law, which set strict rules for excavations and fieldwork projects (mcw.gov.cy; Knapp, 2013, 22). Under the Department of Antiquities, many projects were carried out and greatly contributed to the field of Cypriot archaeology, most notably the research done by Vassos Karageorghis, who conducted several projects at the ancient site of Salamis (Karageorghis, 1969; 1999).

On the 20th of July 1974, something happened that greatly affected archaeological research on Cyprus. On that day, a Turkish invasion led to the occupation of about one-third of the country. This resulted in a closure of the north-eastern part of the island, which made archaeological sites in this area inaccessible for research and also led to a lot of destruction of heritage (Knapp, 2013, 31). Over the past decennia, excavations could therefore only take place in the southwest, but this did not stop archaeologists from doing research on Cyprus. In 1991 the Archaeological Research Unit of the University of Cyprus was founded and led to more local researchers and interest in Cypriot archaeology. However, up to this day, research still has to deal with the bias of not having complete access to the island.

2.3 The Chalcolithic Period

From 1933 to 1935 Porphyrios Dikaios was the first to excavate a Chalcolithic site, Erimi-*Pamboula*, which became the type site, hence: the 'Erimi Culture' (Dikaios, 1936). He later developed this periodisation further and divided the Erimi Culture into Chalcolithic I and Chalcolithic II (Dikaios, 1962, 184-189). However, later excavations, such as at Kissonerga-*Mylouthkia* led to the extension of the Chalcolithic record with finds that predated phase I. Therefore, a new division was created to deal with this extended data, namely Early, Middle and Late Chalcolithic (Peltenburg, 2014, 252; Steel, 2004, 13, 83-118). Although some scholars still refer to the entire period as Erimi Culture, for this thesis the most accepted and recent periodisation will be used (Peltenburg, 2014, 252).

The transition into the Early Chalcolithic (ca. 4000/3900-3600/3400 BCE) is characterised by the abandonment of Neolithic settlements and a demographic shift to the west of the island (Peltenburg, 2014, 253). It is in this area where the most important excavated settlements of the Chalcolithic are found, such as Erimi-*Pamboula*, Kissonerga-*Mosphilia* and *Mylouthkia* and Lemba-*Lakkous*, suggesting that this part of the island was the most densely populated area during the Chalcolithic (Knapp, 2013, 197; Peltenburg, 2014, 253). It is important, however, to keep in mind that with the north being inaccessible for research, this theory is biased towards the southwestern part of the island.

Early Chalcolithic data are relatively scarce. The site of Kissonerga-*Mylouthkia* provides evidence of various pits and postholes with fills of bone, antler and other materials (Peltenburg, 2003, 264-266). The pits themselves are interpreted as pit houses, suggesting an early-stage development into the later semi-subterranean circular houses of the Chalcolithic (Knapp, 2013, 198-199). The switch from sub-rectangular to circular buildings, together with new uses of internal space is one of the more prominent changes going into the Chalcolithic (Knapp, 2013, 195). This is most noticeable starting in the Middle Chalcolithic, visible at sites such as Kissonerga-*Mosphilia* (Peltenburg, 2014, 255-256).

The Middle Chalcolithic (ca. 3600/3400-2900/2700 BCE) marks the beginning of significant population growth, leading to the first signs of social inequality and the intensification of symbolism and ritual activity. Furthermore, during this period the first

cemeteries emerge, with the first signs of copper also appearing (Peltenburg, 2014, 255, 258-259). These developments are largely visible in the Chalcolithic house, which becomes fully developed in the Middle Chalcolithic. These circular buildings have a stone foundation, plastered walls, a roof supported by rings of posts and a hearth in the centre. The inside has a highly structured organisation of space, with divided areas to work, cook, sleep and store goods (fig. 2). Some buildings had a special function, however, such as a ceremonial or a ritual one. (Knapp, 2013, 206-207).

At Kissonerga-*Mosphilia*, a raised terrace, named the ceremonial area includes several roundhouses. Among these houses is one of the largest buildings of prehistoric Cyprus currently known (fig. 3). This building, called the Red Building contained many bowls to serve a large number of people. The walls of this building were elaborately decorated, which must have been visually impactful (Knapp, 2013, 209, 233; Peltenburg, 2014, 257). Furthermore, in a pit deposit located in the ceremonial area and predating the Red Building, a unique find was discovered. This deposit contained about 50 objects surrounding a painted ceramic house model. Among these objects were an anthropomorphic vessel, a model stool, eight pottery and ten stone human figurines, eighteen tools, a pristine triton shell, and a bone needle. It is suggested that the house model parallels ordinary house abandonments, with the figurines intentionally broken and the decoration above the doorway of the model damaged. (Peltenburg, 2014, 257-258). Together with the numerous earth ovens discovered on the raised compound, it is suggested that this area was used for ritual feasting and public display (Peltenburg, 1993, 14-15).

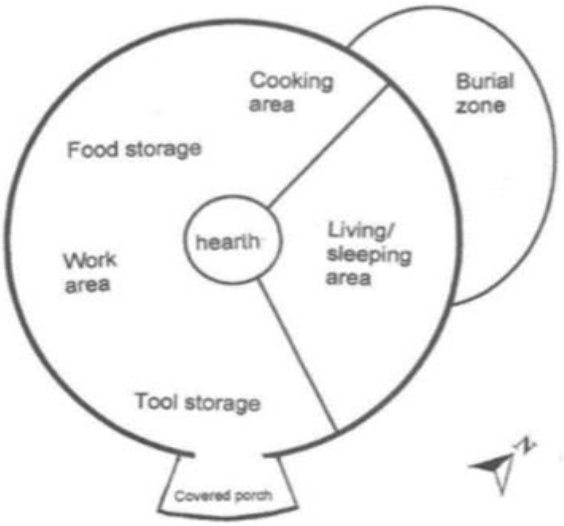

Figure 2: Divisional plan of the Chalcolithic house (Steel, 2004, 28).

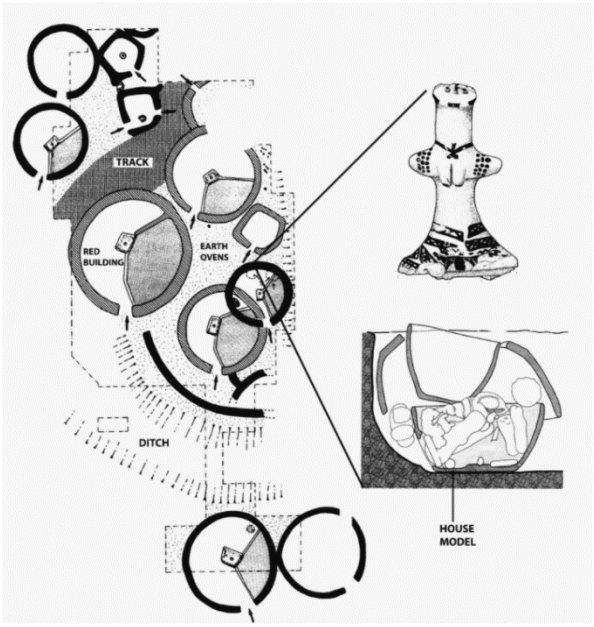

Figure 3: Plan of Kissonerga-Mosphilia and the elevated ceremonial area. Highlighted are the house model (bottom right) and one of the figurines (top right) (Peltenburg, 2014, 256).

Ritual behaviour and symbolism are also visible in the wide representation of anthropomorphic cruciform figurines made of clay, limestone or picrolite (Knapp, 2013, 238). They are found in different sizes, from as tiny as 5 cm to as large as 36 cm, such as the famous Lemba Lady, found at Lemba-*Lakkous* (fig. 4). Various interpretations are given for the meaning of these figurines, but they are generally viewed as women in a crouched position possibly giving birth. Since they are often made of picrolite, which is a rare material, it is argued that these figurines were exchanged as prestige goods. Their symbolism is argued to be tied to various concepts, such as matriarchal society or some form of cult (Knapp, 2013, 237; Steel, 2004, 101). They are found throughout the island in various habitation contexts but are especially evident in the first separate cemeteries in Cyprus, which appear in the Middle Chalcolithic, the Souskiou Complex, Souskiou-*Laona* and *Vathyrkakas*, in the southwest of the island (Peltenburg, 2014, 258).

The cemeteries of Souskiou yielded many burial goods, providing information on status differences and the development of house-based communities. Some graves, such as grave 74 at *Vathyrkakas* are exceptionally large and yielded way more goods than others, while some graves contained up to fourteen individuals (Peltenburg, 2014, 258). Furthermore, it is at these locations where evidence for copper is found, albeit in small

quantities: two spiral ornaments and some fragmented pieces. It is until the Late Chalcolithic that copper finds become slightly more evident (Knapp, 2013, 224-225).

Figure 4: 'Lemba-Lady'. Cruciform figurine made of Limestone, 36 cm tall (Peltenburg, 1977, 139).

The end of the Middle Chalcolithic is marked by what was previously thought to be a 200-year gap, or occupational hiatus. This interpretation was largely based on archaeological data from Kissonerga-*Mosphilia* and Lemba-*Lakkous*. However, more recent excavations at Politiko-*Kokkinorotsos* and Chlorakas-*Palloures* provide us with data that fills this gap, but much is still unknown (Peltenburg, 2014, 261; Webb et al., 2014, 231-234). What is known is that from the Late Chalcolithic (ca. 2900/2700-2400 BCE) the widespread cruciform figurines are found less often and new objects such as conical stones and stamp seals are introduced. Burial customs also change, with adults now being placed in newly introduced burial tombs. Moreover, a new standardised type of pottery is introduced, which largely replaces the pottery used in the Middle Chalcolithic (Knapp, 2013, 246-247; Peltenburg, 2014, 261-262). More information on Chalcolithic pottery and the various types and shapes present will be presented in Chapter 3.

One of the more prominent discoveries of the Late Chalcolithic is the Pithos House at Kissonerga-*Mosphilia* with a diameter of about 10 metres (fig. 5). Named after the storage vessels, this building yielded 58 *pithoi* and occupied more than half of the space (Peltenburg, 2014, 262). Among the 300 objects found there were 47 stone axes and adzes and other objects indicating activities, such as food processing, metal production and possibly olive oil production (Peltenburg, 1998, 37-43; 252-254). The large distribution of standardised bowls may suggest that this place was used for the redistribution of surplus goods. Furthermore, the house conforms to the standard norm of an elite household (Peltenburg 1998, 213-14, 253; Peltenburg, 2014, 262). The Pithos House

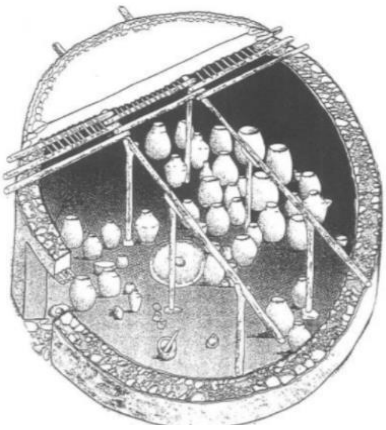

Figure 5: A representation of the Pithos House (Steel, 2004, 111).

seems to have been destroyed by a fire. Peltenburg argues that this happened deliberately which may indicate a rejection of a central, concentrated source of economic resources, longing back to the equal way of life that seems to have been the standard of the Chalcolithic (Peltenburg, 2014, 262).

Much of the knowledge about the Chalcolithic comes from the sites excavated by the Lemba Archaeological Projects quite a few years ago. Despite the information retrieved from these excavations, more data is needed, especially to shed more light on the transition from the Middle to Late Chalcolithic. Since 2015, excavations have started at a new site close to the earlier excavated sites of Lemba-*Lakkous* and Kissonerga-*Mosphilia*, called Chlorakas-*Palloures.*

2.4 Chlorakas-*Palloures*

The site of Chlorakas-*Palloures*, henceforth Palloures, is located in the southwest of Cyprus, north of the modern city of Paphos. Just like the previously mentioned sites of Lemba-*Lakkous*, Kissonerga-*Mosphilia* and Kissonerga-*Mylouthkia*, Palloures is part of a group of Chalcolithic sites in the Ktima Lowlands (fig. 6). Here, the sites are situated on raised terrain, overlooking the coastal plain of western Cyprus (Düring et al., 2018, 12).

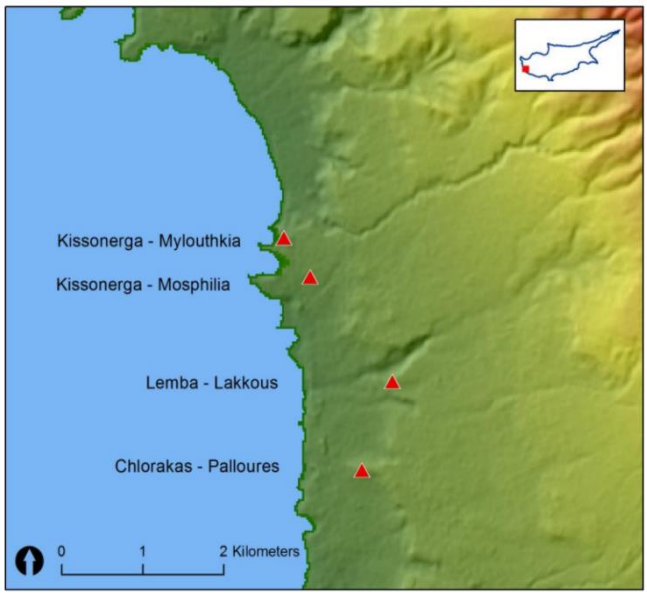

Figure 6: The Chalcolithic sites of the Ktima Lowlands (Düring et al., 2018, 12).

Palloures was discovered in the 1950s and first recorded by G. Eliades as Chlorakas-*Moutti* (Düring et al., 2016, 3). Since then, the site has been the subject of multiple studies and surveys. The Paphos District Survey described Palloures as a site located on a hillslope with a spring to its northeast (Düring et al., 2016, 6). From the 1970s onward, Palloures was surveyed several times by the Lemba Archaeological Project, led by Edgar Peltenburg. At that time, Palloures and other sites in the region were in an area that was planned for a land consolidation program. This had a significant impact on the structures and finds that would be exposed to the surface (Düring et al. 2016, 7). The slope on which the site is located was terraced for agricultural purposes, exposing an area of about 5 ha filled with artefacts, structures and surfaces. From the 1990s onwards, Palloures continued to be under threat. The area was disturbed for the construction of buildings and roads, which led to the destruction of parts of the site (During et al., 2016, 7).

In 2015, Palloures still did not have a protected status when another threat emerged. The land was planned for more development and the construction of tourism infrastructure which would lead to severe damage. For that reason, the Department of Antiquities of Cyprus and Edgar Peltenburg requested help from Bleda Düring of Leiden University to conduct a rescue excavation at plot 568 (Düring et al., 2018, 13). The rescue excavations, lasting three years, yielded many significant discoveries of which a large jar containing some unique finds is the most prominent (fig. 7). This jar included a copper axe, a stone axe and four pig tusk hooks. The copper axe is the oldest one found on the island so far. A charred barley seed that was located in the same jar was radiocarbon-dated to ca. 2600 BCE. The other objects from the jar, including the axe, are at least as old as the seed, if not older (Düring et al., 2021, 6). Furthermore, the jar does not seem to be produced locally (Düring et al., 2018, 14).

Due to the time constraints and the fact that it was a rescue excavation, the strategy was to expose as much of the archaeology within the timeframe as possible. In total, 17 trenches of 10 x 5 metres were excavated at plot 568 and revealed two building clusters, including one of the largest Chalcolithic buildings found so far (Düring et al., 2018, 13; Düring, 2019, 2). This three-year excavation led to the confiscation of the plot by the Department of Antiquities of Cyprus, which gave it a protected status (Düring, 2019, 1).

In 2016, the Museum of Paphos conducted trial trenches in the adjacent plot 355 and exposed more of Palloures. This plot was purchased by the Department of Antiquities, allowing the Palloures Archaeological Project to expand its area of research (Düring, 2019, 1). The last two seasons of 2019 and 2021 focused mainly on the new plot and so far, five trenches of 10 x 5 metres have been opened. During the last season, the team also continued excavating plot 568 to continue where they left off. The data of these last two years is quite recent, however, and is still being processed and part of upcoming publications. In the coming years, the project will continue working on both plots to shed more light on the Chalcolithic on Cyprus.

Figure 7: Contents of the jar found at Palloures, including the copper axe (Düring et al., 2018, 15).

The overview presented in this chapter acts as an aid for the analysis and discussion of the succeeding chapters to come. However, it is also necessary to focus on pottery and explain in detail how chronology and change help to answer the research questions presented in Chapter 1. Furthermore, it is crucial to provide an overview of the Chalcolithic pottery found at Palloures and, more importantly, show which wares and shapes are currently thought to belong to the Middle or the Late Chalcolithic. These questions will be the focus of the next chapter, followed by a detailed methodology of the research itself.

Chapter 3: Approaches to Ceramics

3.1 Pottery & Chronology

In the 1880s, an increased need to classify pottery marks the beginning of the so-called typological phase. As the most abundant source of dating evidence, pots were treated as type-fossils to create vertical (chronological) distributions (Orton et al., 1993, 7-8). The main method for this was seriation, a method created by Petrie who ordered grave groups based on the presence or absence of artefact types (Orton et al., 1993, 10; after Petrie, 1899). In the decennia after, the method evolved into a tool for creating cultural chronologies either from proportional data or the absence/presence of sherds (fig. 8). The main assumption for this method is that similar assemblages have chronological connections and that co-occurring types share a date range (Orton et al., 1993, 10-11, 226-227).

One way of presenting seriation is by using the 'battleship curve' method, named after its appearance (Orton et al., 1993, 228; after Ford, 1962). The frequency of an assemblage is displayed along a vertical chronology in the battleship shapes that increases in thickness as frequency increases. When reading such a diagram, the underlying assumption according to Orton et al. is that usage follows a pattern of "*not in use → increasing use → steady use → decreasing use → no longer in use*" (Orton et al., 1993, 227-228).

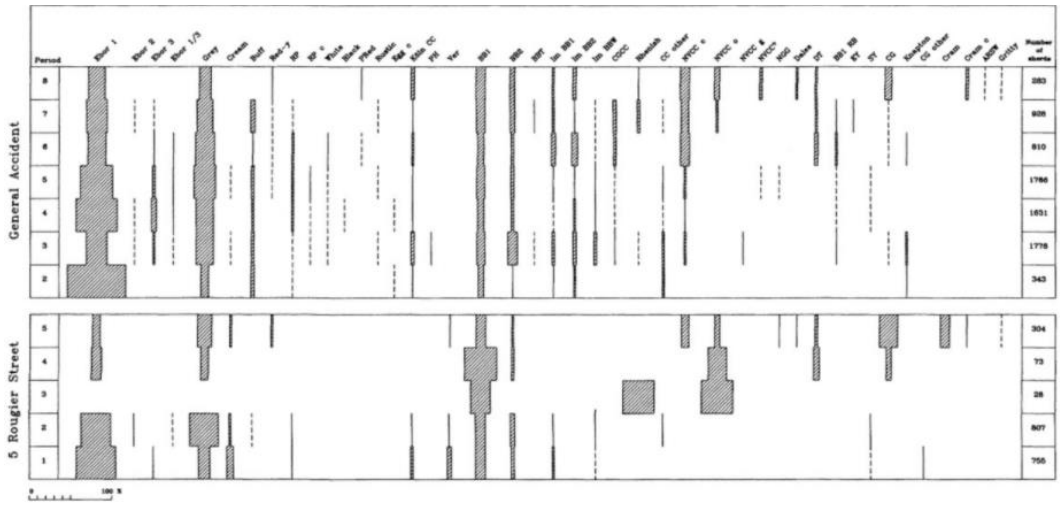

Figure 8: Example of a seriation diagram. Values of 1% are displayed by a solid line and of less than 1% with a broken line. Presence is shown by a dotted line (Orton et al., 1993, 231 after Perrin 1990).

From the 1950s onwards, the contextual phase led to an expansion of ceramic studies. Instead of treating ceramic material as mainly fossil types, pottery was studied more thoroughly in terms of material, physical characteristics and technological development (Shepard, 1956, 102). Shepard, whose work laid the foundation for this, furthermore, relied on technological features of sherds for her typologies. Types and physical characteristics were identified to study chronology and technological development. The materials the pottery consisted of and their source of origin were also analysed for concepts, such as trade (Orton et al., 1993, 12).

During this phase, largely due to Shepard's work, the study of ceramics advanced more in its own right. The classification of shapes by looking at characteristic points and the study of decoration by analysing elements and motifs developed. This also raised the discussion about the concept of 'type', where Shepard argued that typology should be tentative rather than fixed (Orton et al., 1993, 12; Shepard 1956, 227–245, 255-305, 307-318).

It is also from this moment onwards that the study of ceramics is combined with scientific techniques for dating, sourcing and studying function (Orton et al., 1993, 13,17-18). The rise of radiocarbon dating in the 1950s did not influence ceramic dating much. However, in some cases, organic inclusions could be extracted from low-fired pottery and used for dating. For sourcing, or provenance studies new scientific techniques were introduced, such as petrographic analysis. By thin sectioning, ceramic compositions could be studied to shed more light on their origins and technology (Orton et al., 1993, 18-19). Several scientific techniques were also introduced to the study of function. Four notable ones are mentioned by Orton et al.: associating pottery types with stratigraphic features in which they are found (Millett, 1979, 35-48), residue analysis (Moorhouse, 1986, 110–111), analysing physical properties to assess suitability for certain functions, like cooking (e.g., Steponaitis, 1984; Bronitsky and Hamer, 1986) and wear mark analysis (Griffiths, 1978; Hally, 1983) (Orton et al., 1993, 20-21).

Over the last decennia, archaeology is becoming more and more digital and this also influences methods like seriation. Where previously seriation diagrams were created using paper and paperclips, nowadays archaeologists are looking for software that automates this time-consuming process. Today's most common tool for creating various

types of diagrams is Microsoft Excel. However, the battleship curve diagrams used for archaeological seriation seem to be too exclusive and are not available as a standard option in Excel. This forces archaeologists to come up with creative ways to solve this issue. Those with more knowledge in programming and computers can attempt to create the tools themselves. This is what Hunt and Lipo did for their research published in 1997 and what Lipo did for his PhD dissertation in 2001 (Lipo et al., 1997, 323; Lipo, 2001). This does not solve the problem forever, as technology is constantly evolving and these digital tools become constantly outdated. This forces archaeologists to keep looking for new and innovative ways to display their data.

For this thesis, the dataset will be processed according to a method that combines traditional quantitative seriation with the technological aspects as started by Shepard. Instead of only looking at sherd count or ware, a more extensive approach is chosen. Following a more technological approach, shape, fabric and surface will also be included. Looking at how these features change along the vertical axis, will reveal changes in more than just pottery type but instead provides insight into changes in technological development. Before that, an introduction to Chalcolithic pottery is required to better understand what kind of information will be included in this process.

3.2 Chalcolithic Pottery

All the pottery of the Chalcolithic, including that of Palloures, is hand-made and local clays were used for its production. Surprisingly, this pottery has a large fabric diversity, present through various shapes and finishes (Peltenburg 1991, 10). The first to establish a classification of Chalcolithic pottery was Porphyrios Dikaios in his excavations at Erimi-*Pamboula*. He divided the pottery into wares based on fabric, finish and shape, but this resulted in a relatively broad typology (Dikaios, 1936, 25-40).

In the 1970s, the Lemba Archaeological Project (LAP), directed by Edgar Peltenburg started excavating sites in the Ktima Lowlands to improve the chronological understanding of the Chalcolithic. A third-millennium chronology was created by making use of the multi-phase sites of Lemba-*Lakkous*, Kissonerga-*Mosphilia* and Kissonerga-*Mylouthkia* (Bolger and Webb, 2013, 39-40). These excavations renewed the interest in

Chalcolithic pottery and resulted in several publications by Jennifer Stewart, Diane Bolger and Jennifer Webb (Stewart, 1985, 59-69; Bolger et al., 1998, 93-147; Webb et al., 2014).

LAP processed their ceramic material by focusing on wares, which formed the core of their processing. At Kissonerga-*Mosphilia* alone, a total of twenty wares were identified. After sorting the material into wares, another selection was made based on shape (Steward, 1985, 59-61; Bolger et al., 1998, 95-96). At Lemba-*Lakkous*, LAP would also weigh each individual sherd, but they abandoned this process because it was too time-consuming (Steward, 1985, 60; Bolger et al., 1998, 93). Finally, the sherds were selected to keep for drawing, photography, further analysis or sent to the museum. Only sherds good for reference or unusual sherds were kept, and the rest was disposed of (Steward, 1985, 61).

Recently, Diane Bolger and Jennifer Webb created an improved overview of Chalcolithic pottery in the Cyprus ARCANE volume, listing the various wares and shapes present in the current record in a more refined way (Bolger and Webb, 2013, 39-127). Palloures does not make use of this typology but uses a different system that was created by Paraskeva, the ceramic specialist of the project, to fit the assemblage of Palloures (Düring et al., 2016, 27-28).

The ceramic typology of Palloures differs from the typology of the Lemba Archaeological Project. Many wares have been grouped together, such as Red Monochrome Painted A and B Ware becoming just Red Monochrome Ware. Distinctions within these broader ware groups are made by looking at fabric and surface characteristics (e.g., Monochrome Painted A has a different surface colour than Monochrome Painted B). By combining ware groups with separate fabric and surface groups, a better-detailed documentation can be made for each sherd recorded (Düring et al., 2016, 28). This attribute-based approach will be discussed in detail in Chapter 3.3. The table below provides an overview of the Palloures typology as shown in the database and defined by Paraskeva (Table 1).

Table 1: Overview of the Palloures wares as defined by Paraskeva (after Hadjigavriel, 2019, 65).

Main Wares	**Main Characteristics**
Coarse Ware (CW)	Special purpose ware for cooking pots.
Dark Monochrome (DM)	Minor ware with blackened surfaces, maybe due to misfire.
Red Monochrome (RM)	Major ware type present in all phases of the Chalcolithic, but gradually presenting different fabric and surface treatments. Its main feature is the red monochrome or quasi-monochrome visual result of the vessel.
Reduced Red Monochrome (RRM)	Similar to Red Monochrome but with reduced surfaces.
Plain White (PW)	Sherds slipped in white colour. Might be a ware of its own or just parts of Red-on-White vessels that were not decorated.
Red-on-White (RW)	White slipped surfaces decorated with red painted patterns.
Spalled Ware-Variant (SWV)	Same as the Spalled Ware found at Kissonerga-Mosphilia, or a local variation. (Thin red to grey and black surface, unslipped, pock-marked from spalling of limestone inclusions.)

During the Early and Middle Chalcolithic, the most frequently encountered ware is Red-on-White Ware. It is characterised by a buff to off-white slip, covered by an orangey-red to reddish-brown paint, usually applied in geometric, (curvi)linear or lattice-based motifs and is sometimes lightly polished**.** The use of modelled or incised decoration is rare. This is only recorded on anthropomorphic and zoomorphic vessels found at *Kissonerga* and *Souskiou* and the building model of Kissonerga-*Mosphilia*, all of which are rare finds (Bolger and Webb, 2013, 45). The fabric of Red-on-White Ware is soft to medium-hard and has a buff to light reddish-brown colour (Bolger and Webb, 2013, 41).

The other ware worth mentioning is Red Monochrome Ware, derived from Red Monochrome Painted Ware as described by Bolger and Webb (2013, 41). This ware has a lot of variety but has the main characteristic of having a red monochrome or quasi-monochrome visual on the exterior and sometimes interior of the vessel. Paraskeva grouped many of the Red Monochrome-like wares together under the main category 'Red Monochrome' (Table 2) and divides them further based on surface treatment and fabric (Düring et al., 2016, 28-29).

Table 2: Typologies grouped by Paraskeva under Red Monochrome Ware (after Düring et al., 2016, 29).

Palloures Red Monochrome	**Kissonerga-Mosphilia Wares**
Red Monochrome (RM) Characteristic: Exterior and/or interior surface monochrome painted or slipped with red colour.	Red Slip, Red Monochrome Painted A, Red Monochrome Painted B, Red Monochrome Massive, Coarse Painted Monochrome, Red and Black Stroke Burnished (not presenting mottling or smudging), Glossy Burnished Ware.

Chalcolithic pottery appears in various shapes throughout the period, with platters, bowls, jars, flasks and trays all present in the archaeological record (Bolger and Webb, 2013, 43-44). There is, however, a difference between Middle and Late Chalcolithic finds when looking at the previous excavations of the Lemba Archaeological Project.

The Middle Chalcolithic is marked by the introduction of a great variety of shapes, such as the deep bowl and the hemi(spherical) bowl, a small to medium bowl which can vary in deepness and is characterised by its hemispherical shape (fig. 9) (Bolger and Webb, 2013, 42). Furthermore, large storage jars are introduced, which become the first *pithoi* in Cyprus (fig. 9) (Bolger, 1991, 85). Middle Chalcolithic jars are simple holemouth jars and are deep vessels, usually characterised by their globular bodies with a base diameter that is smaller than their maximum diameter (fig. 9) (Bolger and Webb, 2013, 43-44).

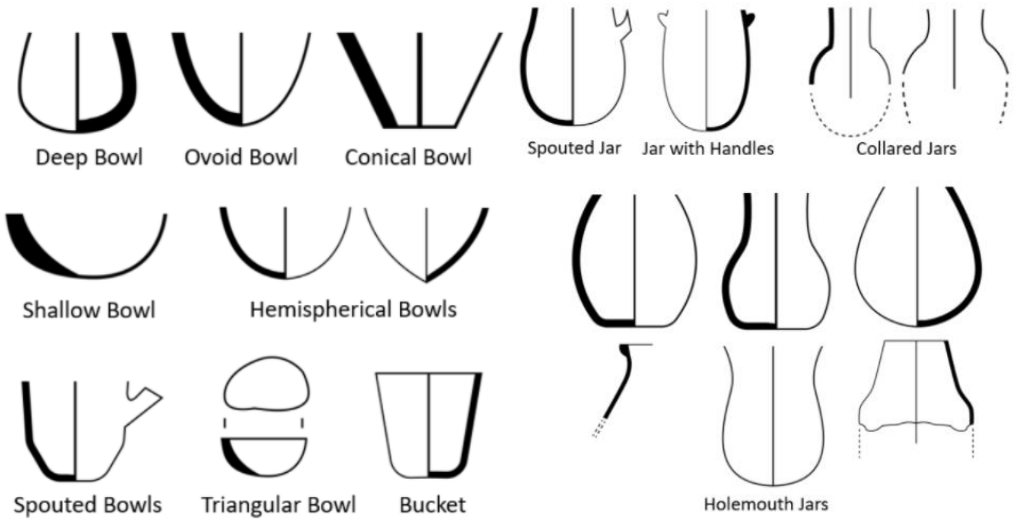

Figure 9: Overview of the bowl and jar shapes of the Chalcolithic (after Hadjigavriel, 2019, 83).

The platter, a prominent shape during the Early Chalcolithic, is still present during the Middle Chalcolithic but become less popular (Bolger, 1991, 85). Platters are characterised by their sharply flaring walls and relatively shallowness (fig. 10) (Bolger and Webb, 2013, 43). Trays are also a common find and are medium to large-sized open vessels with vertical walls and usually a flanged base (fig. 10). Underneath the rim are often two vertical lugs present (Bolger and Webb, 2013, 43). While platters become less common, flasks become more popular (Bolger, 1991, 85). Flasks are usually found with a pointed base and are medium, closed vessels with a globular body, a cylindrical neck and an everted rim (fig. 10). Flasks with spouts are also found at sites such as *Souskiou* and dated to the Middle Chalcolithic (Maier and Karageorghis, 1984, fig 2).

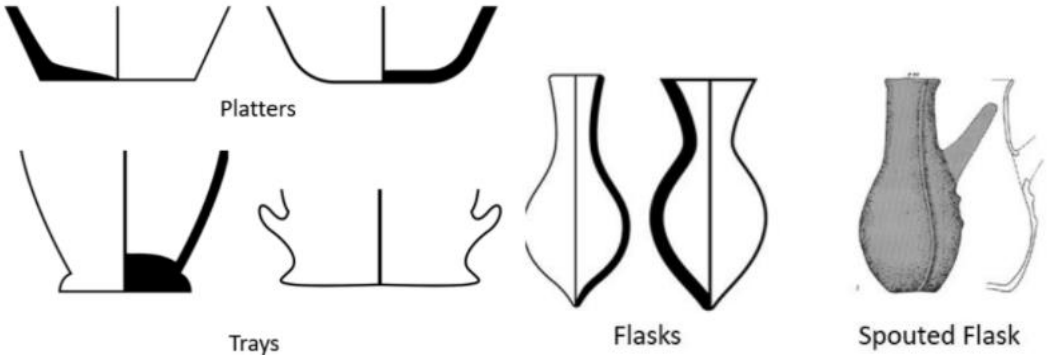

Figure 10: Overview of the platter, tray and flask shapes of the Chalcolithic (after Hadjigavriel, 2019, 84)

Decorations, mainly on Red-on-White Ware, become complex and frequent, especially on exterior surfaces of open vessels (Bolger, 1991, 85-86). In Kissonerga-*Mosphilia* a total of 26 and at Lemba-*Lakkous* a total of 25 different patterns were recorded, showing the complexity of these decorations as present during the Middle Chalcolithic (Bolger, 1991, 86).

The Late Chalcolithic is marked by an advance in ceramic technology and increasing homogenisation of wares, surfaces and shapes. Especially smaller bowls and platters become highly homogenous. Pottery production in general increases in quality, with fabrics becoming harder as the clay is better levigated and the temper becoming denser and more uniform in size. Production furthermore shifts from the use of calcareous to non-calcareous clays and temper becomes less organic, with angular inclusions (Bolger, 2007, 174). Late Chalcolithic pottery is also characterised by newly introduced techniques,

such as the use of relief decoration (small knobs, small dots, linear strokes), mottling and burnishing in strokes (Bolger and Webb, 2013, 45).

The prominent Red-on-White Ware across the island during the Middle Chalcolithic is being replaced by monochrome wares, characterised by their finer fabrics and thinner walls. In the Paphos area, the most popular is the Red and Black Stroke Burnished Ware (RB/B). This ware has been found at the various Ktima Lowland sites and is characterised by its orangey-pink to light red slip that is highly burnished. This often results in crazed surfaces with burnishing marks clearly visible. The fabric of RB/B Ware is also highly characteristic, as it has an orangey-pink to light red colour with blue and red angular inclusions present as a temper (Bolger and Webb, 2013, 42).

Besides the frequently occurring hemibowl, there are also other bowls introduced, such as bowls with tab handles, spouted bowls and ovoid bowls (fig. 9). Jars and other closed vessels start to occur with long narrow spouts for pouring (Bolger and Webb, 2013, 42-44). Storage vessels become more frequent and become generally larger than Middle Chalcolithic vessels. On the other hand, anthropomorphic vessels that sometimes occurred during the Middle Chalcolithic are no longer found (Bolger and Webb, 2013, 45).

3.3 Methodology

The analysis presented in Chapter 4 will make use of a dataset derived from the excavations of trench BU13 at plot 568 during the 2015-2017 seasons (fig. 11). As shown in the figure below, the plot is divided into 5 by 10 metre squares and given a name according to its position (Düring et al., 2016, 15). To make sure that finds are documented as clearly as possible, trenches are further divided using a unit-lot system. Units can indicate a stratigraphic layer, a pit or a unique feature such as a wall, a burial or a pot cluster. Each trench has its own separate unit list, with number 1 being the first discovery, continued by each new feature receiving the next available number. Lots are specified areas or features excavated during a specific day. All the finds discovered within these lots are given that specific lot number. When the same area or feature is excavated the next day, it receives a new number. In contrast to units, lot numbers are unique across the excavation.

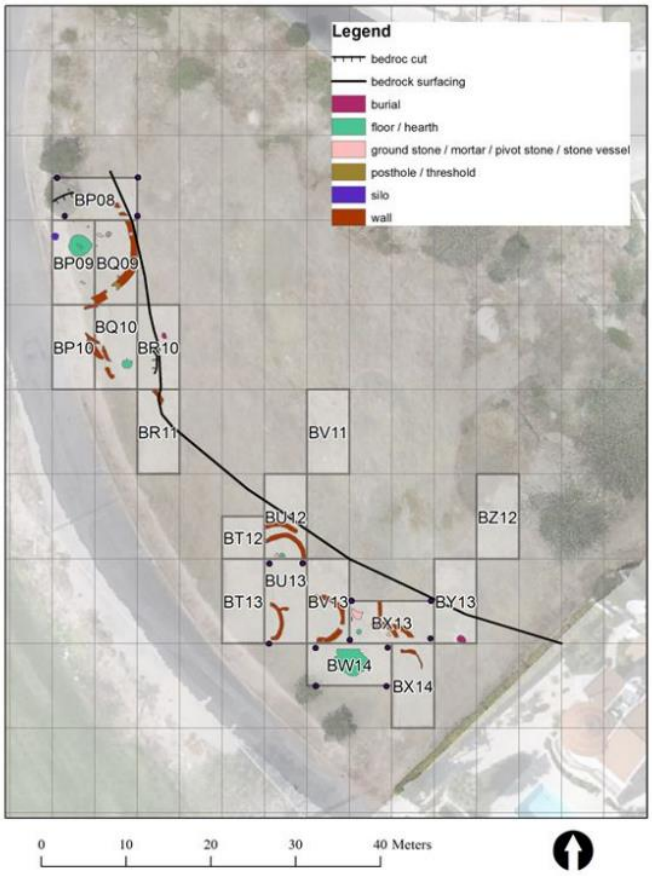

Figure 11: Plot 568 and the 5 x 10 m trenches on a grid, Palloures (Düring, 2017, 4)

All the excavated pottery sherds are registered according to this system, after which they are brought to the project base, where they are washed, dried and then put in separate bags according to their unique unit-lot combination. After that, the bags are handed over to the ceramic specialists. They sort the pottery according to a system developed by Paraskeva. Sherds are first divided into fabrics (table 3) and then further divided based on their ware and surface treatment. Furthermore, the number of bodies, rims, bases, handle/lug and spouts are counted. Besides that, the specialists look for particular features, such as decoration or anything that makes deeper analysis worthwhile. Then, from every bag, a few sherds are selected as diagnostic material to be the subject of further study (Düring et al., 2016, 27-28). The dataset used for this thesis is such a diagnostic selection from trench BU13.

For the process described above, a custom-made database is used created by Paraskeva. This database contains all the pottery data as documented during the

excavation, as well as all the information input given by the specialists. The diagnostic selection has its own section in the database, where more detailed information can be entered. However, such a deep analysis was not done yet prior to 2021. During the 2021 season, I was given the task to analyse all the diagnostics of trench BU13. I analysed this dataset according to various categories present in the diagnostic section of the database.

The database is divided into several categories of which the most relevant are ware, surface treatment and fabric. An overview of the database is presented in Appendix A. The first tab includes data such as main typology (e.g., Red Monochrome), shape and possible use of the pot (fig. A1). It also includes information about the custom ware-fabric-surface combination as developed by Paraskeva (Düring et al., 2016, 28). The ware groups serve a general, overarching purpose and make grouping and statistical analysis easier. This is because each ware (and ware name) is based on a set of distinctive characteristics. Therefore, wares are based on surface treatment and fabric. By looking at the wares only, it gives a general idea of the characteristics. These characteristics are then elaborated further in the surface and fabric sections of the database. This method leads to fewer ware groups compared to that of the Lemba Archaeological Project and, therefore, reduces nomenclature (Düring et al., 2016, 28).

An overview of the wares is already given in the previous chapter. However, the fabric/surface groups require further explanation. The fabric groups are formed based on polythetic characteristics (e.g., colour, core, texture) and are given a letter (A, B etc.). An overview of the most common fabric groups is provided in the table below (table 3). Surface groups work in a similar way and are given a letter corresponding to characteristics, such as colour and technique (Düring et al., 2016, 28).

As already mentioned, the sorting process at Palloures starts with the fabric, which forms the core of the ceramic analysis. This is different from earlier LAP research, where sorting started by looking at ware (Steward, 1985, 59-61). Based on the fabric and surface treatments, the ware group is determined. Ware is, therefore, intrinsically connected to, and dependent on fabric and surface treatment.

Table 3: The most common fabric groups used for Palloures pottery (after Hadjigavriel and the project's database).

Fabric Group	General Description	Photo Example
A - Buff	Low fired buff-coloured fabric White, yellow, buff Soft and medium A lot of inclusions and blackish cores	
AA - Coarse	Coarse variation of Fabric A More organic inclusions Usually used for big vessels Very soft	
B- Buff/Orange	It has the same traits as Fabric A but the clay forms clear colour layers with sharp margins Soft to medium	
C - Orange/Brown	Shades of orange and brown Inner or biscuit cores Medium-soft to hard. When the clay is finer and well-levigated, the hardness increases, sometimes considerably	
CC - Coarse	Coarse variation of Fabric C More organic inclusions Usually used for big vessels	
D - Dark Brown	Shades of brown Always has a core, usually biscuit Hard Fewer inclusions, usually organic ones	
EE - RB/B Variant	Bright orange to pinkish red Lot of inclusions, such as bluish chert, and a red grit Hard	
G - Pink/Grey SW	Brown to grey and pink Light greyish cores and limestone inclusions which often spall on the surface during firing Very hard	
H - Red Coarse	Chunks of almost unbaked red clay with several organic inclusions. It was placed on use surfaces; hence surface marks are evident on one of its surfaces	

The surface treatment and fabric sections of the database both serve to analyse the sherds in a more detailed and elaborate way. In the surface treatment section (fig. A2), both the interior and exterior sides of the sherd are observed, and all the various treatments are documented. Frequent treatments that are present are applications of slip paints and polishing/burnishing of the surface. The former gives the surface a certain colour and is applied in varying thicknesses. The colours are noted using the Munsell colour system according to hue, value and chroma (see munsell.com). The latter treatments are techniques to give the surface a shiny or glossy look, often leaving marks that can be observed using the naked eye or with a magnifying glass. Sometimes, almost exclusively on Red-on-White Ware, decorative patterns are present and require documentation as well. The most frequently occurring patterns are already placed in the database and selectable from a list.

The fabric section of the database provides a detailed analysis of the fabric characteristics (fig. A3). This includes in-depth descriptions of texture, hardness, core (if present) and the various colours of the matrix and the inclusions. The texture is analysed using a magnifying glass and is used to observe the coarseness of the clay. This is often predictable because the fabric groups as shown in table 3 are usually tied to one or a few texture options. The same can be said about the hardness, however by using a small clipper, a small bit of the sherd can be cut off to check this hardness. The colour of the fabric, including the core, is once again analysed using the Munsell colour system. The core is usually, but not exclusively blackish or darker than the rest of the fabric and is created during the firing process of the pot. Together with the surface treatment section, this section forms the core of the deep analysis part of the database and serves to observe technological changes in pottery making during the Chalcolithic.

For this research, the analysed diagnostic assemblage of BU13 will be placed alongside the stratigraphy of this trench. The aim of this strategy is to combine the 'what' (wares, fabrics, shapes, surfaces) with the 'where' (units) and create an overview. This overview can then be compared to the current division of Middle and Late Chalcolithic pottery as derived from previous excavations. By having data on both these periods in the form of a diagram, the (sub)research questions can be investigated, and more light can be shed on the transition between the periods at Palloures.

Chapter 4: Analysis & Results

This chapter focuses on the research question: *how does the pottery assemblage of Chlorakas-Palloures change over time from the Middle to the Late Chalcolithic and how does this improve our understanding of this transition?*

This is done by looking at how the diagnostic assemblage of trench BU13 changes from the Middle to the Late Chalcolithic in terms of the different pottery features described in the previous chapter: ware, shape, fabric and surface. These features are related to the sub-questions presented in Chapter 1 and will be analysed in their own sections and presented in diagrams to approach this analysis in a structured manner. However, to make sense of these diagrams, it is necessary to go over the BU13 documentation and look at its stratigraphy first. The unit-lot system of Palloures is important for understanding the diagrams, as this system forms the vertical (chronological) part of the dataset.

4.1 Case Study: BU13

The dataset used in this thesis comes from trench BU13 excavated during the 2017 season at plot 568 of Palloures (fig. 11). Initially, the reason for opening this trench was to uncover a possible continuation of the walls present in the adjacent trenches of BU12 and BV13, as shown in figure 11 in the previous chapter. However, this continuation could not be found, as these walls did not continue into the newly opened BU13. During the excavations, a preserved wall was discovered in the southwestern part of the trench. Inside the building associated with this wall, two separate surfaces were discovered on top of which was an occupational layer. This layer was highly compacted and contained remains of charcoal and many pottery sherds. In the north-western corner of the trench, a hearth feature was excavated. The excavation team was not able to associate any surface or other feature of BU13 with it.

To investigate the relation between BU13 and the neighbouring trenches, a deep and narrow sounding was made in the western part of the trench. This enabled the team to observe the stratigraphy in more detail. This led to the discovery of a posthole and a large quantity of pottery, lithics, animal bone and ground stone. Despite this, a good understanding of a relationship with the surrounding trenches was not achieved during

the time of the excavation. During the sounding process several burials were discovered, mostly containing the skeletal remains of female infants, but also one adult grave was found, all of which were poorly preserved. No notable finds were recorded that were associated with the graves.

The trench has a total of 43 units that were assigned during the excavation. However, it is important to note that not every unit contains ceramic material. Some units consist of cuts, which cannot contain anything in general and from the topsoil unit finds are usually not collected or reliable. Furthermore, some units contain very little material, which makes them unreliable. Higher units correspond to deeper locations in the stratigraphy. It is also worth noting that BU13 was part of a rescue excavation. Therefore, the documentation is not perfect, as the excavators had to deal with time pressure. The project leaders made a broad overview of the stratigraphy to create a better picture of the most important units of the trench, which is shown below (fig. 12).

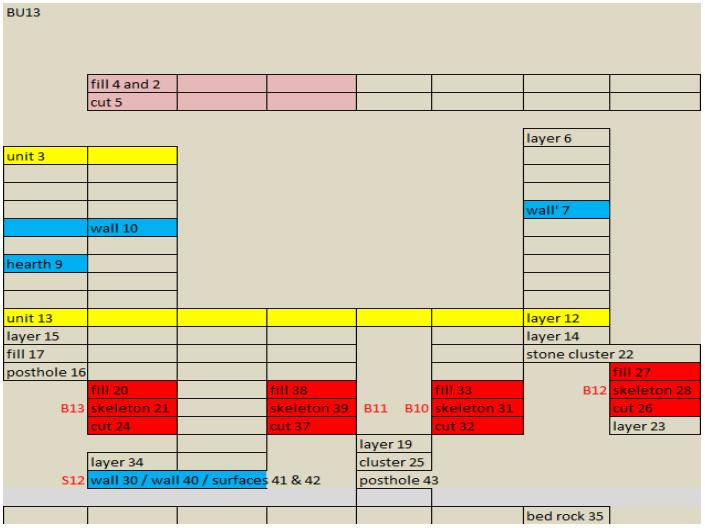

Figure 12: Scheme of BU13 with the units and their stratigraphic position (From the Palloures database).

4.2 Dataset

Before delving into the detailed, diagnostic dataset it is important to also look at the entire collection to see the exact concentration of the sherds. The figure below shows this entire collection and for each unit, a distinction is made between Middle Chalcolithic (MChal), Late Chalcolithic (LChal) and 'other'. 'Other' in this case means either non-Chalcolithic or unknown (fig. 13). Units that do not contain any ceramic material are left out to make the diagram clearer.

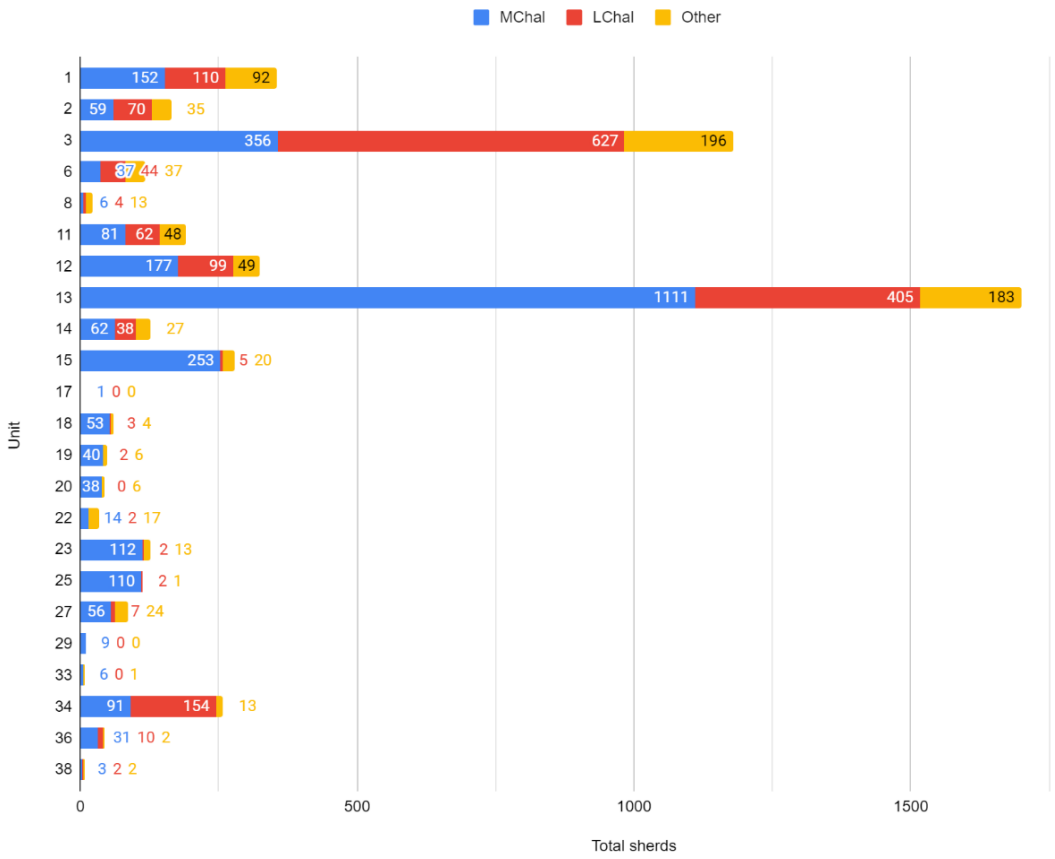

Figure 13: Overview of the sherd division of trench BU13 of Palloures. 'Other' is non-Chalcolithic or uncertain (Created by Paul van 't Hof after the Palloures database).

Out of the 5295 sherds from this trench, units 3 and 13 contain by far the most material, with 1179 and 1699 sherds respectively. These two midden deposits contain a mix of Middle and Late Chalcolithic material. Unit 3 consists of 356 MChal sherds (30.2%), 627 LChal sherds (53.2%) and 196 other sherds (16.6%). Unit 13 has a total of 1111 MChal sherds (65.4%), 405 LChal sherds (23.8%) and 183 other sherds (10.8%).

Looking at the units with at least 250 sherds, some are worth noting. Unit 12, just like its succeeding unit 13, is a midden deposit with a total of 325 sherds, of which 177 (54.5%) are MChal, 99 (30.5%) are LChal and 49 (15.1%) are other. Unit 15 is a surface layer that was located underneath unit 13 and has a total of 253 MChal (91%), 5 LChal (1.8%) and 20 other sherds (7.2%). Finally, unit 34 is important, for it is the occupational layer of the stone building located in the southern part of the trench. This unit has a total of 258 sherds, of which are 91 MChal (35.3%), 154 LChal (59.7%) and 13 other sherds (5%). Unit 1 also has a relatively large number of sherds, but since this is a topsoil unit it cannot be dated reliably and will therefore be left out. The mentioned units are also shown in the

stratigraphy overview of the excavation as shown in figure 12. This overview shows a clear order of these units, with unit 34 being the earliest and unit 3 the latest. Therefore, the focus of the rest of the analysis will be on units 3, 12, 13, 15 and 34. It is important to note that for the wares, the entire pottery assemblage is used, while for shapes, fabric and surface only the diagnostics are included.

4.2.1 Wares

What now follows is an overview of the division of wares among the sherds found in the five units of focus. It is important to note that this division is based on MChal and LChal wares only. The 'other' group as presented in figure 13 was not part of the diagnostic analysis and is therefore omitted here. Furthermore, for the analysis of the wares, the entire pottery assemblage is used.

A few wares require a brief explanation. Ware X is assigned when it is unknown whether a sherd belongs to Red Monochrome (RM) or Red-on-White (RW) due to various reasons. TLC (transition to LChal) is a rare kind of ware assigned by Paraskeva that deserves further analysis due to it having certain transitional characteristics. This ware is rare and will therefore not impact this analysis much at this stage. The division of wares is presented below and is followed by a brief overview of each unit (fig. 14).

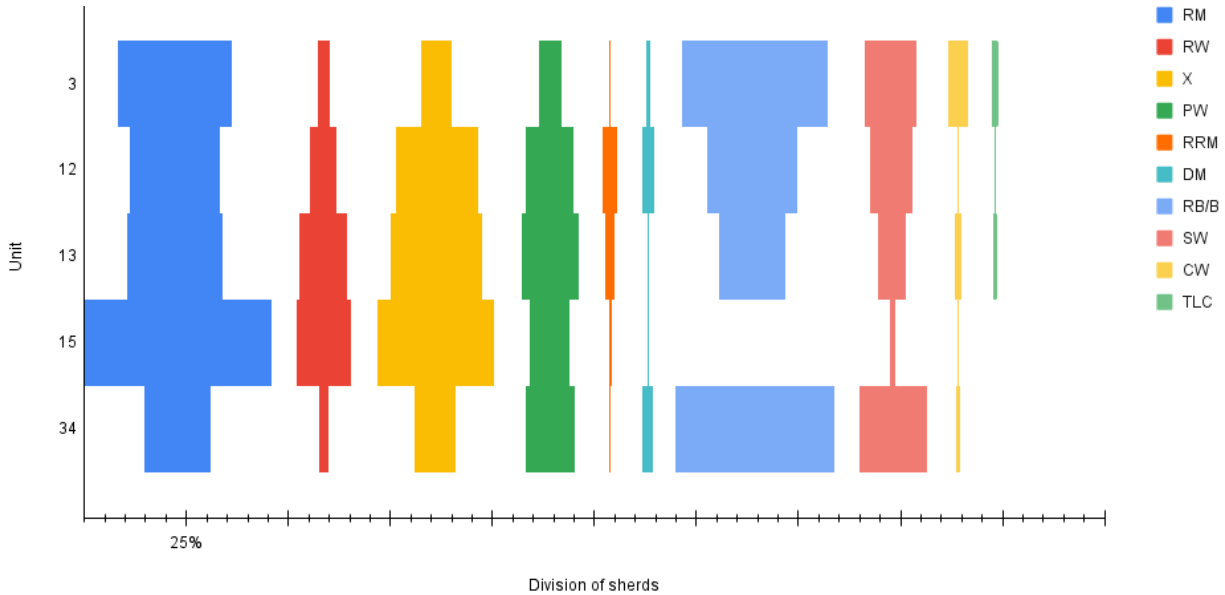

Figure 14: Division of the different wares of BU13, including the entire ceramic assemblage (Created by Paul van 't Hof after the Palloures database).

Unit 3 shows a wide variety of wares, of which Red and Black Stroke Burnished Ware (RB/B) is the most prominent with 348 out of 978 (35.6%). Red Monochrome Ware (RM) comes second, with 273 sherds (27.9%) present. Third, comes Spalled Ware (SW), a ware typical of the Late Chalcolithic with 123 sherds (12.6%). SW in combination with RB/B Ware makes up the majority of the wares present in this unit. Furthermore, there is also a large number of Middle Chalcolithic Wares present, such as other RM Wares, Red-on-White Ware (RW), Plain White Ware (PW) and X Wares, which make up 43.8%.

Looking at units 12 and 13 reveals that a large percentage of wares are a combination of Middle Chalcolithic RM, RW, PW and X Wares; 60.5% of 276 sherds and 71.9% of 1535 sherds respectively. At the same time, RB/B Ware and SW are less present in these units than in unit 3. Unit 12 consists of 22.1% RB/B Ware and 10.1% SW, while for unit 13 this is 16.4% RB/B Ware and 6.8% SW. These lower-lying middens show a clear decrease in LChal Wares and an increase in MChal ones compared to unit 3.

Unit 15 interestingly does not contain a single RB/B sherd and only 3 SW ones. Out of the 259 sherds, 45.9% are RM Ware, 13.1% are RW Ware, 9.7% are PW Ware and 28.6% are X Ware. As can also be seen in figure 13 above, this unit is almost exclusively Middle Chalcolithic. Again, a decrease in Late Chalcolithic wares is visible compared to the unit lying above.

Finally, there is unit 34, the occupation layer of the building associated with unit 30, located in the southern half of the trench. This unit has a large majority of Late Chalcolithic wares present. Out of the 247 sherds, 96 are RB/B (38.9%) and 41 are SW (16.6%). RM Ware, on the other hand, only makes up for 16.2% of the sherds, which is the lowest out of the five units discussed. Combined with RW, PW and X there are a total of 100 sherds (40.4%) present.

4.2.2 Shapes

For the analysis of the shapes, only the diagnostics studied in the summer of 2021 are used, as these sherds are selected for their usefulness for this analysis. Out of the 116 diagnostics of BU13, 85 sherds were assigned a shape, while for the other 31 determining a shape was not possible. When focussing only on the units discussed above, there are a total of 86 diagnostics, of which a total of 69 shapes remain. Presented below is the

division of shapes amongst the diagnostics of the dataset, including a visual reminder of what the shapes look like (fig. 15).

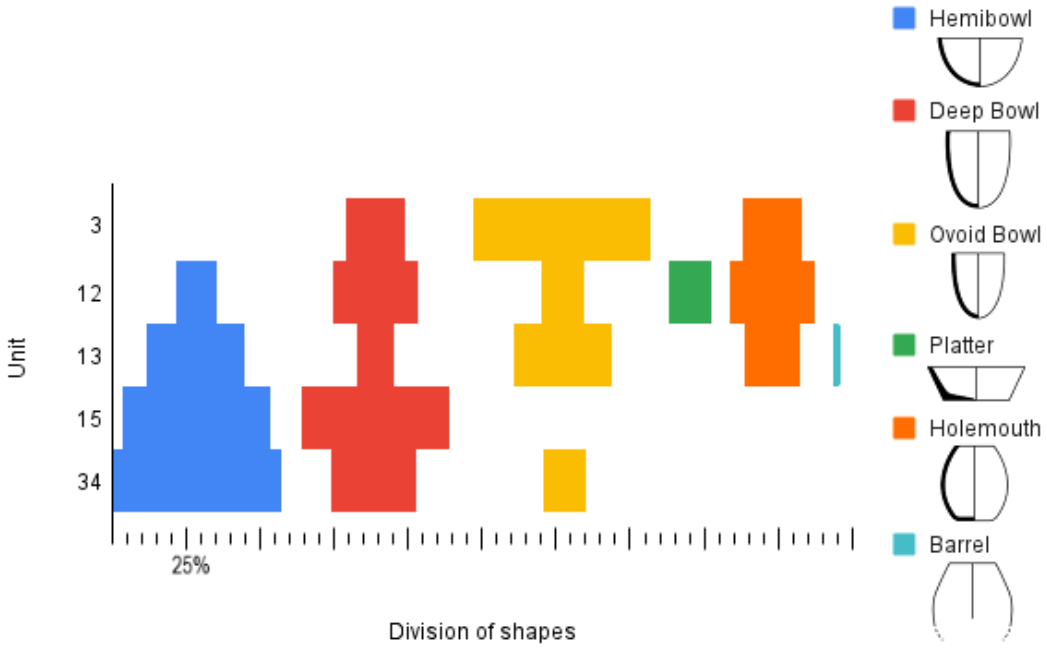

Figure 15: Division of the shapes of BU13's diagnostics (Created by Paul van 't Hof after the Palloures database).

Starting with unit 3, a total of three kinds of shapes can be observed. Out of the 5 diagnostics of this unit, there is 1 deep bowl, 3 ovoid bowls and 1 holemouth. The lower-lying unit 12 shows more diversity, with 1 hemibowl, 2 deep bowls, 1 ovoid bowl, 1 platter and 2 holemouths out of the 5 diagnostics.

Moving further, unit 13 has by far the most diagnostics with a total of 48 sherds. The majority of these are hemibowls and ovoid bowls, both of these shapes occur 16 (33.3%) times. Furthermore, there are 6 (12.5%) deep bowls, 9 (18.8%) holemouths and 1 (2.1%) barrel present. Unit 15 only has 2 diagnostics, 1 being a hemibowl and 1 a deep bowl. Unit 34, the last unit associated with the stone building has a total of 7 diagnostics of which 4 (57.1%) are hemibowls, 2 (28.6%) deep bowls and 1 (14.3%) ovoid bowl.

4.2.3 Fabrics

For the fabrics, again the diagnostic selection is used and the analysis is based on three categories as stated in the research sub-question. The first one is the fabric type based on the system created by Paraskeva and shown in table 3. The other two are texture and

hardness and are based on personal analysis conducted over the summer of 2021. An overview of the fabric type divisions is presented below (fig. 16).

Out of the 86 diagnostics of these five units combined, ten different fabric types could be determined. Fabric EE, associated exclusively with RB/B Ware, is by far the most frequent one, with 40 out of 86 present. The other types, on the other hand, are more mixed.

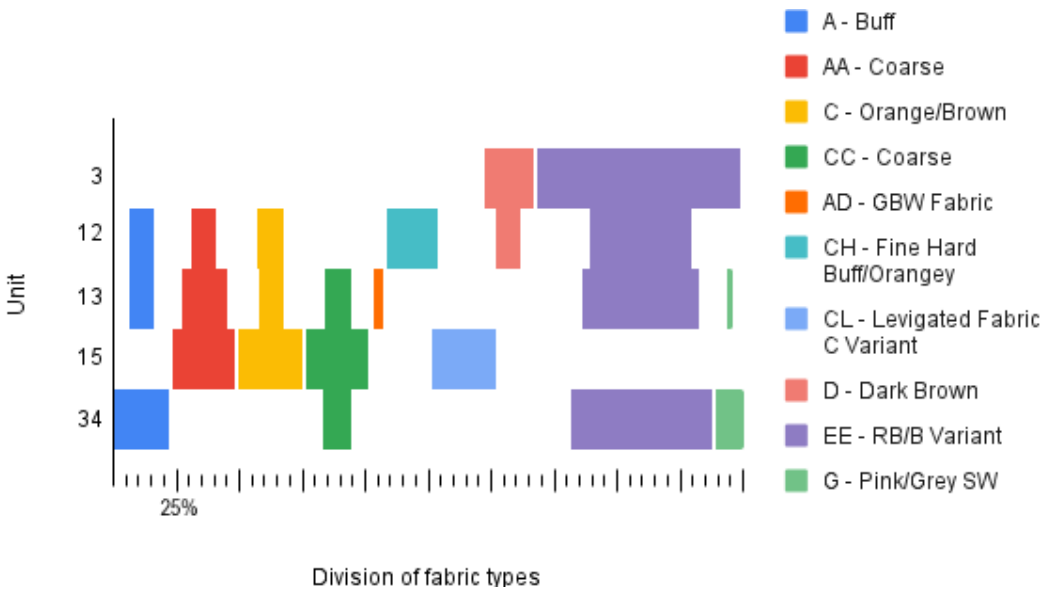

Figure 16: Division of the fabrics of BU13's diagnostics using Paraskeva's method (Created by Paul van 't Hof after the Palloures database).

Unit 3 has a total of 1 fabric D sherd and 4 fabric EE sherds. Unit 12, just like with the shape divisions, has more variety. Out of the 10 sherds present 4 are fabric EE, while the other types occur only once, except for fabric CH, which occurs twice. Unit 13, which has the most diagnostics, 58 in total, has a clear majority of fabric EE sherds present: 27 out of 58 (46.6%). The other half consists of 6 fabric A (10.3%), 10 fabric AA (17.2%), 6 fabric C (10.3%), 6 fabric CC (10.3%), 2 fabric AD (3.4%) and 1 fabric G sherd (1.7%).

Just like in the previous diagrams, unit 15 has a small number of diagnostics. The division of fabric types is perfectly even, with 1 fabric AA, 1 fabric C, 1 fabric CC and 1 fabric CL sherd. The final unit 34 has a total of 9 diagnostics, with the majority of them being fabric EE: 5 out of 9 (55.6%). Furthermore, there are 2 fabric A, 1 fabric CC and 1 fabric G sherds present.

Moving further to the fabric texture, the diagnostics are divided into four groups depending on the coarseness of the fabric. For this dataset, four groups can be observed: Coarse, Medium-coarse, Medium and Medium-fine. A diagram is shown below (fig. 17). Considering the texture, unit 3 has out of its total diagnostics 4 sherds that are medium-fine and 1 that is medium-coarse. The next one, unit 12 has 2 medium-coarse, 4 medium and 4 medium-fine sherds out of 10. In both units, no coarse diagnostics were recorded.

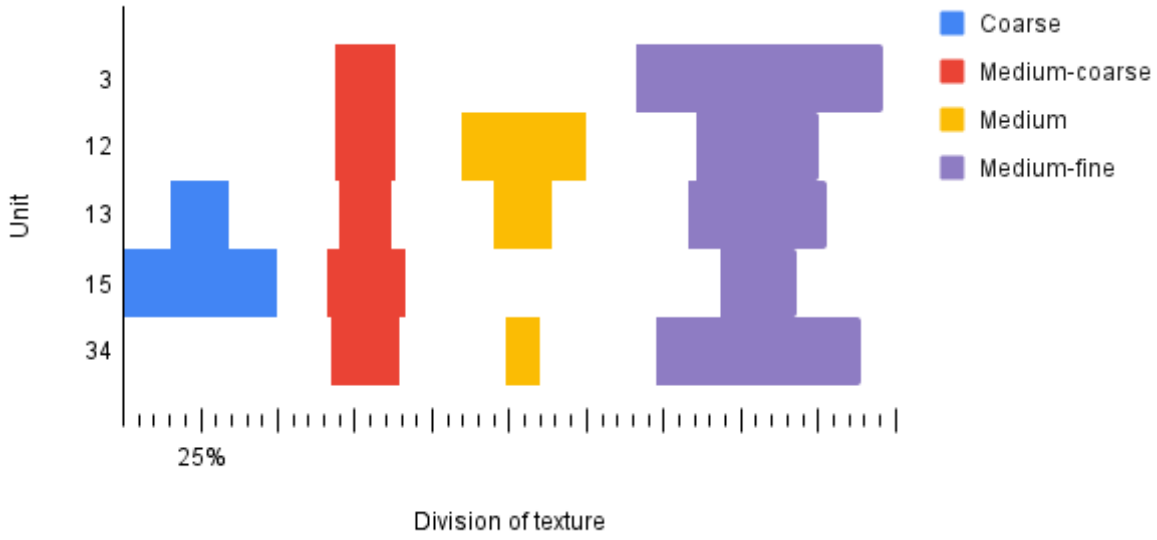

Figure 17: Division of texture in terms of coarseness of BU13's diagnostics (Created by Paul van 't Hof after the Palloures database).

Moving to unit 13, coarse sherds are now also present, with a total of 11 out of 58 (19%). Furthermore, there are 10 medium-coarse (17.2%) and 11 medium (19%) diagnostics. Together these three categories make up more than half of the diagnostics in this unit. Lastly, there are a total of 26 out of 58 sherds that are medium-fine (44.8%). Unit 15, with only four diagnostics, consists of 2 coarse, 1 medium-coarse and 1 medium-fine sherd. No medium ones were recorded. The final unit, number 34, has a majority of medium-fine sherds, with 6 out of 9 (66.7%). The other diagnostics are 2 medium-coarse and medium ones.

The final analysed fabric category is hardness and follows a similar system as the texture one. All the diagnostics are divided based on their hardness into soft through hard groups. This was determined by both experience, certain fabric types have a certain hardness, and by clipping a bit off the sherd if needed. Below is once again presented a diagram of the dataset (fig. 18).

Overall, the majority of the diagnostics are medium-hard and also in unit 3 this is the case. Here 4 out of 5 (80%) sherds are medium-hard, while 1 sherd is medium-soft. For unit 12, the pattern is similar, with 8 out of 10 (80%) diagnostics being medium-hard, while 1 sherd is medium-soft and 1 is medium. Unit 13, the largest one in terms of diagnostics also has a majority of medium-hard sherds, with 29 out 58 (56.9%). Out of the other diagnostics, all the hardness groups are present at least once. 3 (5.9%) sherds are soft, 14 (27.5%) are medium-soft, 4 (7.8%) are medium and lastly, 1 (2%) sherd is hard.

Moving to the final two units, unit 15 only has soft and medium-soft diagnostics present. Out of the 4 sherds, 1 is soft and 3 are medium-soft. Lastly, unit 34, with a total of 9 diagnostics, has a majority of medium-hard sherds. 6 (66.7%) are medium-hard, while 2 (22.2%) are medium-soft and 1 (11.1%) is medium.

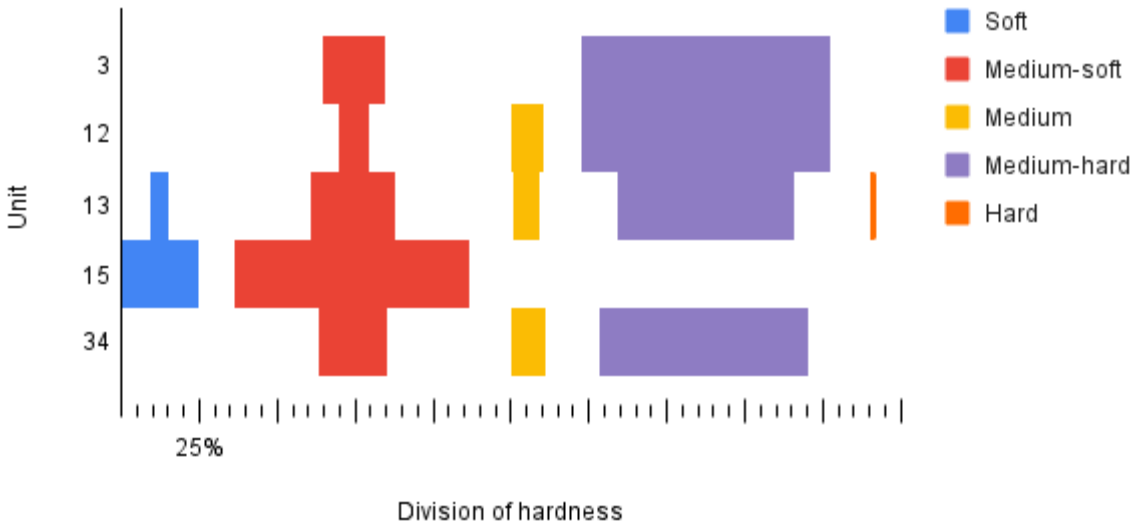

Figure 18: Division of the hardness of BU13's diagnostics (Created by Paul van 't Hof after the Palloures database).

4.2.4 Surfaces

The surface analysis is based on a similar approach as that of the wares, except that only the diagnostic selection is used. Sherds are divided according to their surface type, which is largely based on colour and its relation with a ware. For instance, surfaces G and J are intrinsically tied to RB/B Ware, while surfaces AP and BP are tied to RW Ware. Again, only the diagnostics are used for this case study and are presented in the diagram below (fig. 19).

Looking at unit 3, a total of two surface types can be observed. 1 diagnostic has surface A and 4 (80%) have surface J. Next, unit 12 has out of its 10 diagnostics a total of 3 surface A, 1 surface B, 1 surface F, 1 surface AP and 4 (40%) surface J sherds.

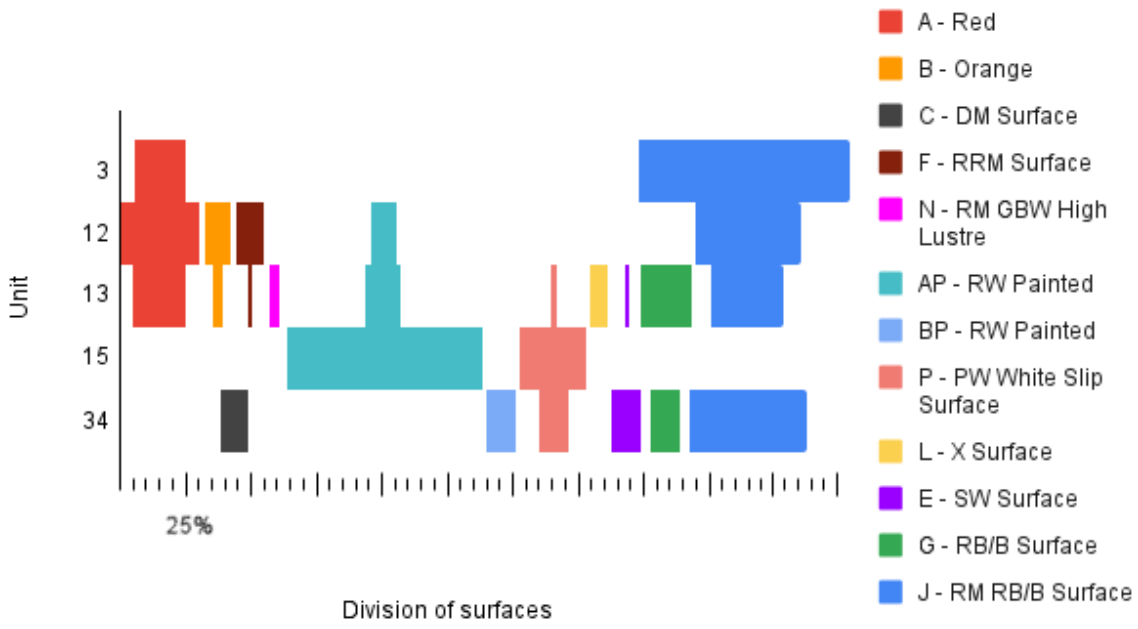

Figure 19: Division of surface types of BU13's diagnostics using Paraskeva's method (Created by Paul van 't Hof after the Palloures database).

The bigger unit 13 shows more diversity but has a majority of G and J (RB/B related) surfaces. These two surfaces are divided into 11 (19%) surface G and 16 (27.6%) surface J sherds. Another surface that is present frequently is surface A, with a total of 12 out of 58 (20.7%) sherds. The rest of the diagnostics of unit 13 are divided as followed: 2 (3.4%) surface B, 1 (1.7%) surface F, 1 surface N, 8 (13.8%) surface AP, 1 surface P, 4 (6.9%) surface X and 1 surface E.

The smaller unit 15, with four diagnostics, has 3 surface AP and 1 surface P sherd. Finally, unit 34 has a majority of RB/B related surfaces present, with 4 out of 9 (44.4%) surface J and 1 (11.1%) surface G sherd. The other four diagnostics are divided equally, with 1 surface C, 1 surface BP, 1 surface P and 1 surface E sherd.

The use of seriation as a method for this analysis reveals, for the largest part, logical patterns in the change of Chalcolithic pottery. The lower stratigraphic units show older material (e.g., Red-on-White Ware) that is coarser and softer, while units closer to the surface show more later material (e.g., Red and black Stroke Burnished Ware). A combined diagram of the complete analysis is presented below (fig. 20).

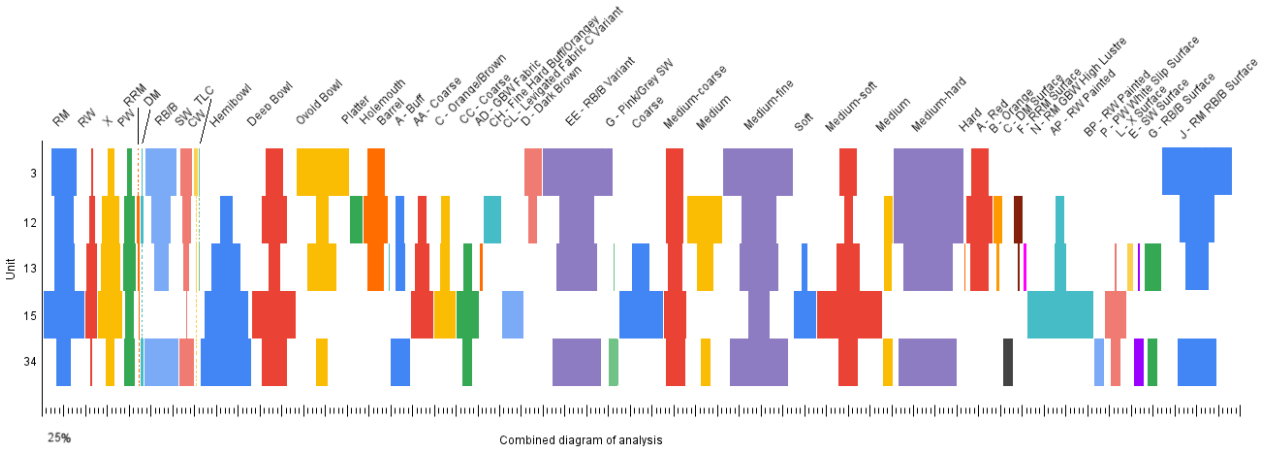

Figure 20: Combined diagram of the ware, shape, fabric and surface analysis of BU13, Palloures (Created by Paul van 't Hof after the Palloures database).

However, despite the logical patterns, unit 34 seems to be an anomaly in this analysis. This unit, which is supposed to be the earliest unit, shows the complete opposite of what one would expect; Late Chalcolithic material that matches with a much higher stratigraphic layer. One reason for this could be that during the rescue excavations, a form of disturbance, such as a pit was missed. This could explain the later material in a lower-lying unit.

Another factor to take into account is the use of a diagnostic selection. A large part of the analysis was based on such a selection. An overrepresentation of a certain characteristic in the diagnostics would create a result that does not necessarily represent the unit. However, as figure 13 already showed, unit 34 has a clear majority of LChal sherds (154 out of 258) of which 96 is RB/B Ware. On the other hand, unit 15 is a good example of the issue of overrepresentation. This unit only has four diagnostics, while the entire assemblage consists of 278 sherds. Therefore, it is important not to focus too heavily on the diagnostics, but also to look at the total picture when drawing conclusions.

Overall, the use of seriation for this analysis seems to have been successful. It not only confirmed expected changes in the ceramics of Palloures, but it also revealed an anomaly that can be further analysed. This means seriation can be applied to other trenches of Palloures as well to investigate complicated stratigraphies and highlight possible anomalies.

Chapter 5: Discussion & Conclusion

The aim of this analysis was to shed light on the Middle to Late Chalcolithic transition of Palloures by looking at how the ceramic assemblage of the site changes between these two periods.

In an attempt to achieve this, the focus was on a detailed dataset from one specific trench of the site: BU13. This trench showed stratigraphic layers of both the Middle and the Late Chalcolithic, which makes a transitional analysis possible. The dataset itself is a selection of diagnostic sherds that were analysed based on kind of ware, determined shape, fabric (in terms of type, texture and hardness) and surface. These characteristics were then placed alongside the stratigraphy of BU13 according to the documentation of this trench. For the analysis, seriation diagrams were used to visualise and interpret the data in a meaningful way and to reveal possible patterns in the dataset.

5.1 Reflecting on the Research Questions

The central question for this research was: *How does the pottery assemblage of Chlorakas-Palloures change over time from the Middle to the Late Chalcolithic and how does this improve our understanding of this transition?*

Four sub-questions as described in Chapter 1 were selected to answer this question and will be addressed here:

I. *What kind of pottery wares can be observed and how does this change from the Middle to the Late Chalcolithic?*

For this question, the entire pottery assemblage of BU13 was used to also get a better insight into the chronology and the different wares of the trench as presented in the documentation and shown in figure 14 of Chapter 4.2.

Looking at the five biggest units in terms of ceramic content, a great variety of wares can be observed. Nine different wares (Ware X not included) are present: Red Monochrome Ware, Red-on-White Ware, Plain White Ware, Reduced Red Monochrome Ware, Dark Monochrome Ware, Red and Black Stroke Burnished Ware, Spalled Ware,

Coarse Ware and Transition to Late Chalcolithic Ware. Out of these wares, the two that are most present are Red Monochrome and Red and Black Stroke Burnished Ware.

When observing the change of these wares over the five biggest units, a general increase of RB/B Ware can be seen, while Red Monochrome Ware and Red-on-White Ware seem to be slightly decreasing. A similar pattern can be seen between the other Middle and Late Chalcolithic wares; Plain White Ware seems to decrease, while Spalled Ware seems to increase.

However, unit 34, which is the earliest unit according to the documentation, shows the complete opposite. Here RB/B is present the most, while Red Monochrome and Red-on-White are a minority. When following the general pattern, it is almost as if unit 34 belongs at the top, or somewhere between units 3 and 12. This could have something to do with the fact that this unit belongs to the house, while the others are mainly midden deposits. Disturbance, either recent or not, could also play a role here.

II. *What kind of pottery shapes can be observed and how does this change from the Middle to the Late Chalcolithic?*

For the next research question only the diagnostic assemblage is used, for only these were analysed in terms of shape. Observing the five biggest units of BU13 revealed a total of six different pottery shapes: the hemibowl, deep bowl, ovoid bowl, platter, holemouth and barrel. Out of these shapes, bowls, in general, occur the most, while platters and barrels occur very little.

Focusing on change, it is noticeable that unit 34 has over 50% hemibowls among its diagnostics. This clear majority seems to decrease when moving to the upper units. In these units, a larger diversity can be seen. Deep bowls and ovoid bowls stay relatively steady between the units, except for the most recent unit 3. Here the percentage of ovoid bowls is much bigger compared to the other units.

Interestingly, unit 34 does not contain any holemouth jars, while units 3, 12 and 13 do have a noticeable percentage of these vessels. This could once again have to do with unit 34 being from a house context, where holemouths were not kept. Both barrels and platters occur only a few times and are also not present in unit 34. Barrels could be

missing for tor reason described above, while platters, in general, seem to become less prominent from the Middle Chalcolithic onwards (Bolger, 1991, 85).

III. ***What kind of fabric characteristics can be observed in terms of type, texture and hardness and how does this change from the Middle to the Late Chalcolithic?***

For the fabric analysis, three aspects were selected as points of focus: fabric type, as proposed by Paraskeva (table 3), texture and hardness. Colour was excluded here, for it deserves a separate and extensive analysis that falls out of the scope of this research.

Among the diagnostics, a wide variety of fabric types are present, a total of ten different ones: A-Buff, AA-Coarse, C-Orange/Brown, CC-Coarse, AD-GBW, CH-Fine Hard Buff/Orangey, CL-Levigated Fabric C Variant, D-Dark Brown, EE-RB/B Variant and G-Pink/Grey SW. Out of these types, fabric EE is majorly present in all the five units, except for unit 15. The other types are fairly mixed and are never overly represented compared to the rest. Change-wise it is hard to see a clear pattern, except for fabric EE always being represented as a major type. This is not surprising, however, as fabric EE is exclusively tied to RB/B Ware, while the other fabrics can be seen in different wares. Furthermore, the three middle units, 12, 13 and 15, show more fabric diversity compared to the outer two units.

Moving to the texture, four groups can be observed: coarse, medium-coarse, medium and medium-fine. Most of the diagnostics here have a medium-fine texture, especially in the outer units 3 and 34. Just like with the first sub-question, it feels that unit 34 is out of place and chronologically belongs more between units 3 and 12. In that case, an increase in fineness of texture can be observed, with the coarse group disappearing after unit 13.

The final selected aspect, that of hardness, has a total of five groups: soft, medium-soft, medium, medium-hard and hard. However, the hard category only occurs a single time. The hardness that is present the most among the diagnostics is medium-hard, which makes up for over 50% of the sherds present in these units, except for unit 15. Following the same trend as with texture, sherds seem to become slightly harder, while the presence of soft and medium-soft sherds decreases.

IV. *What kind of surfaces can be observed and how does this change from the Middle to the Late Chalcolithic?*

The final sub-question proved to be a tough one to answer, as surface types are often intrinsically tied to their ware. This makes this hard to find new patterns that were not already observed yet. Again, an extensive colour analysis would be of merit here, but more on that in the future research section of this chapter.

Among the diagnostics of BU13, a great variety of surface types can be observed: twelve in total, which includes surface X (part of unknown ware X) and two kinds of RB/B surfaces. A complete list of these surfaces is as followed: A-Red, B-Orange, C-DM Surface, F-RRM Surface, N-RM GBW High Lustre, AP-RW Painted, BP-RW Painted, P-PW White Slip Surface, L-X Surface, E-SW Surface, G-RB/B Surface and J-RM RB/B Surface.

As expected, the surface types associated with RB/B Ware are highly present in the units. With the exception of unit 15, at least 40% of the surfaces are of these types. The remaining sherds have a variety of surfaces. This variety decreases when moving to the later units, to the point where unit 3 only has surface A-Red and J-RM RB/B present and no Red-on-white surfaces at al. Unit 15 is a bit of an oddball, as it shows the complete opposite of the pattern just discussed; here, only RW and PW surfaces are present. However, it should be noted that the number of diagnostics is small and patterns could be completely different when this size increases.

5.2 Conclusions

In an attempt to shed more light on the Middle to Late Chalcolithic of Chlorakas-*Palloures* and its transition, a small-scale pilot study was conducted that focused on a single trench named BU13. The sub-questions discussed above served to aid this research and contribute to the ongoing research of Palloures. Given the small size of this analysis, however, it should be noted that greatly contributing to the understanding of the transition proved to be difficult.

The results of this analysis show that many aspects of ceramic material can be used to observe changes and patterns when placed alongside a stratigraphic context. The diagnostics of trench BU13 point towards change in terms of ware, shape, fabric and surface, even though these changes are small. Pots become harder and finer in texture

and coarser wares are replaced by the typical Late Chalcolithic RB/B Ware. A change in shapes is harder to see, but it is interesting to note that in this context, bowls always are majorly present over the other shapes.

Following the analysis, unit 34 often feels out of place and does not match the patterns of the other units. Despite being placed as one of the earliest units in terms of chronology, the analysis suggests the complete opposite. The stratigraphy of BU13 already proved to be complicated and perhaps needs to be revised.

"*How does the pottery assemblage of Chlorakas-Palloures change over time from the Middle to the Late Chalcolithic and how does this improve our understanding of this transition?",* was central to this research and the analysis of the selected ceramic aspects showed in which ways the assemblage changes over time. It did not significantly improve our understanding of the Middle to Late Chalcolithic transition yet but shows that researching the various aspects of ceramic material and analysing it chronologically has great potential.

5.3 Limitations & Future Research

The methodology and dataset for this research did not come without limitations. BU13 proved to have a complicated stratigraphy and the documentation was not always clear. The trench was part of a rescue excavation and, therefore, certain relational data was lacking. This is especially clear in the case of unit 34, which seems to feel out of place. Besides the trench, there were also limitations with the pottery. The dataset was small and often units contained few diagnostics, which led to small diagrams. This made it hard to observe meaningful patterns chronologically.

For future research, it would be of benefit to excavate the surrounding trenches of the site to get a better picture of the unit relations and stratigraphy. This will increase the accuracy and understanding of the chronology, which will subsequently increase the value of an analysis as shown in this paper. Furthermore, this research was small and only a number of pottery aspects were analysed briefly. Expanding on these aspects and adding more will increase the potential to discover patterns in pottery development. By both expanding our knowledge of the stratigraphy and its ceramic assemblage, even more light can be shed on the Middle to Late Chalcolithic of Palloures, and of Cyprus in general.

Abstract

The Chalcolithic on Cyprus (ca. 3900-2400 BCE) is an important period for the research of key developments taking place on the island, such as social differentiation, craft specialisation and long-distance trade. With extensive excavations at the sites of Lemba-*Lakkous*, Kissonerga-*Mosphilia* and Kissonerga-*Mylouthkia*, the Chalcolithic is generally well investigated (see Peltenburg, 1985; 1998; 2003). The poorly investigated transition between the Middle (ca. 3400-2900 BCE) and the Late Chalcolithic (ca. 2800-2400 BCE), on the other hand, still leaves a research gap. The currently ongoing excavations at the site of Chlorakas-*Palloures* revealed remains of both the Middle and Late Chalcolithic and, therefore, have great potential to close this gap.

This research involves analysing the ceramic assemblage of trench BU13 at Chlorakas-*Palloures* by investigating how this assemblage changes from the Middle to Late Chalcolithic. This leads to the following research question: *How does the pottery assemblage of Chlorakas-Palloures change over time from the Middle to Late Chalcolithic and how does this improve our understanding of this transition?* The analysis is conducted on the basis of four categories: ware, shape, fabric and surface and the results will be displayed using seriation diagrams. For this, a diagnostic selection was made consisting of 116 sherds, which was studied during the summer of 2021. This selection is placed alongside the stratigraphy of trench BU13 to create a chronological overview of the ceramic material.

In this thesis, I show that the use of seriation to create a chronological overview of how pottery changes over time is a success. The ceramic assemblage of case study BU13 changes as expected. Moving from the Middle to the Late Chalcolithic, earlier wares get replaced by later ones and pottery becomes harder and more refined in texture. However, this research also importantly reveals an anomaly in the trench. Material belonging to one of the earliest units of BU13 actually matches the characteristics of that of Late Chalcolithic pottery, while Middle Chalcolithic pottery would be expected. It indicates that the trench needs to be investigated further and current interpretations perhaps need to be re-evaluated. This not only merits the ongoing excavations at Chlorakas-*Palloures* but the method can also be applied to other trenches and sites on the island to improve the knowledge of Cypriot Prehistory.

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List of Figures

Figure 1: Map of Cyprus, with its proximity to the mainland (Bolger, 2013, 3)..... 8

Figure 2: Divisional plan of the Chalcolithic house (Steel, 2004, 28). 11

Figure 3: Plan of Kissonerga-Mosphilia and the elevated ceremonial area. Highlighted are the house model (bottom right) and one of the figurines (top right) (Peltenburg, 2014, 256). 12

Figure 4: 'Lemba-Lady'. Cruciform figurine made of Limestone, 36 cm tall (Peltenburg, 1977, 139). 13

Figure 5: A representation of the Pithos House (Steel, 2004, 111). 13

Figure 6: The Chalcolithic sites of the Ktima Lowlands (Düring et al., 2018, 12). 14

Figure 7: Contents of the jar found at Palloures, including the copper axe (Düring et al., 2018, 15). 16

Figure 8: Example of a seriation diagram. Values of 1% are displayed by a solid line and of less than 1% with a broken line. Presence is shown by a dotted line (Orton et al., 1993, 231 after Perrin 1990). 17

Figure 9: Overview of the bowl and jar shapes of the Chalcolithic (after Hadjigavriel, 2019, 83). 22

Figure 10: Overview of the platter, tray and flask shapes of the Chalcolithic (after Hadjigavriel, 2019, 84) 23

Figure 11: Plot 568 and the 5 x 10 m trenches on a grid, Palloures (Düring, 2017, 4) 25

Figure 12: Scheme of BU13 with the units and their stratigraphic position (From the Palloures database). 30

Figure 13: Overview of the sherd division of trench BU13 of Palloures. 'Other' is non-Chalcolithic or uncertain (Created by Paul van 't Hof after the Palloures database)..... 31

Figure 14: Division of the different wares of BU13, including the entire ceramic assemblage (Created by Paul van 't Hof after the Palloures database)..... 32

Figure 15: Division of the shapes of BU13's diagnostics (Created by Paul van 't Hof after the Palloures database)..... 34

Figure 16: Division of the fabrics of BU13's diagnostics using Paraskeva's method (Created by Paul van 't Hof after the Palloures database)..... 35

Figure 17: Division of texture in terms of coarseness of BU13's diagnostics (Created by Paul van 't Hof after the Palloures database)..... 36

Figure 18: Division of the hardness of BU13's diagnostics (Created by Paul van 't Hof after the Palloures database). 37

Figure 19: Division of surface types of BU13's diagnostics using Paraskeva's method (Created by Paul van 't Hof after the Palloures database). 38

Figure 20: Combined diagram of the ware, shape, fabric and surface analysis of BU13, Palloures (Created by Paul van 't Hof after the Palloures database). 39

Figure A1: Layout of the identification tab of the Palloures database (Screenshot taken by Paul van 't Hof). 55

Figure A2: Layout of the surface tab of the Palloures database (Screenshot taken by Paul van 't Hof). 56

Figure A3: Layout of the fabric tab of the Palloures database (Screenshot taken by Paul van 't Hof). 57

List of Tables

Table 1: Overview of the Palloures wares as defined by Dr Charalambos Paraskeva, including a brief description of the characteristics (after Hadjigavriel, 2019, 65)..... 21

Table 2: Typologies grouped by Dr Paraskeva under Red Monochrome Ware (after Düring et al., 2016, 29)..... 22

Table 3: The most common fabric groups used for Palloures pottery created by Dr Charalambos Paraskeva, (taken directly from the project's database)..... 27

Appendix A. Database Layout

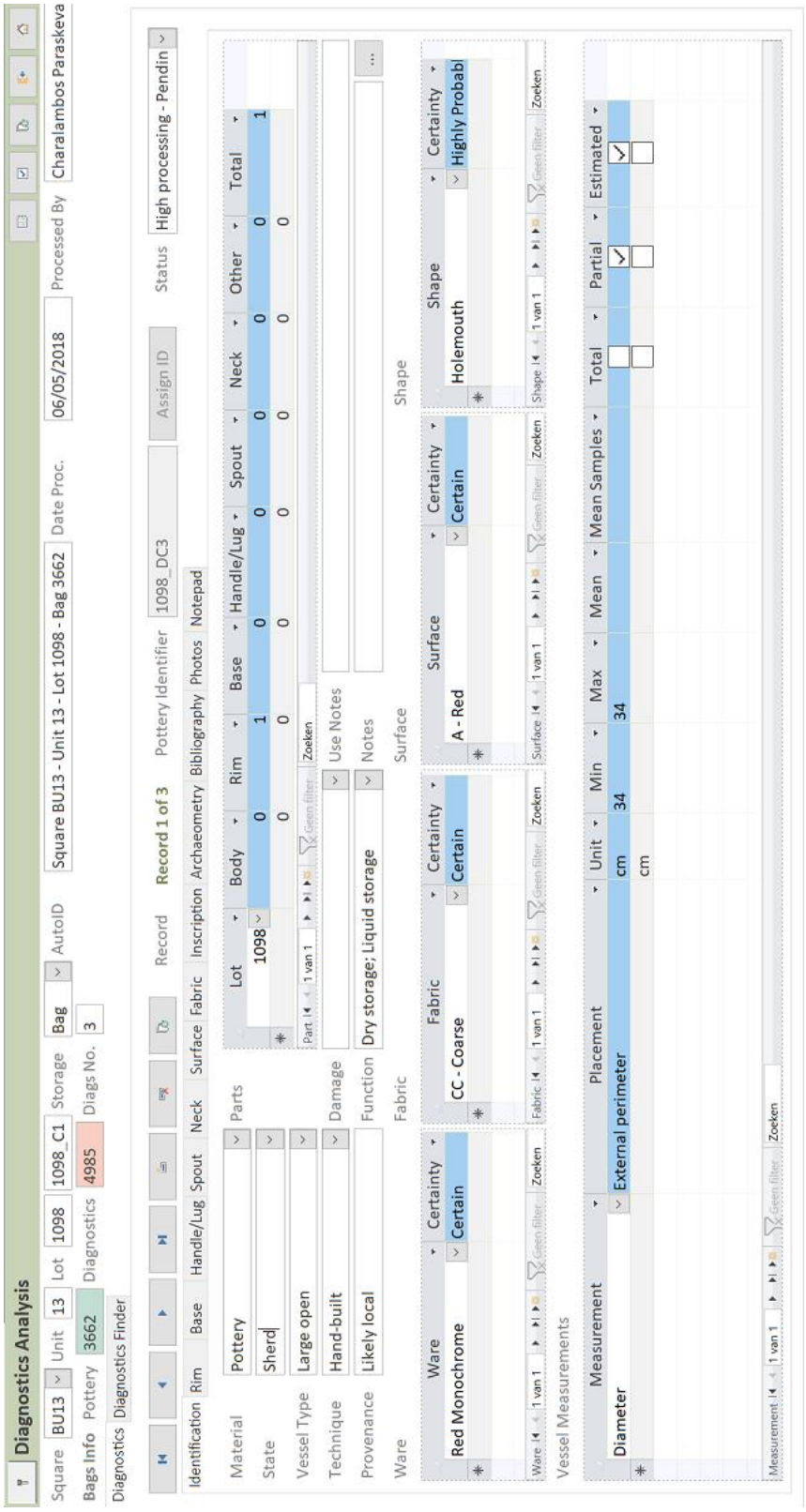

Figure A1: Layout of the identification tab of the Palloures database (Screenshot taken by Paul van 't Hof).

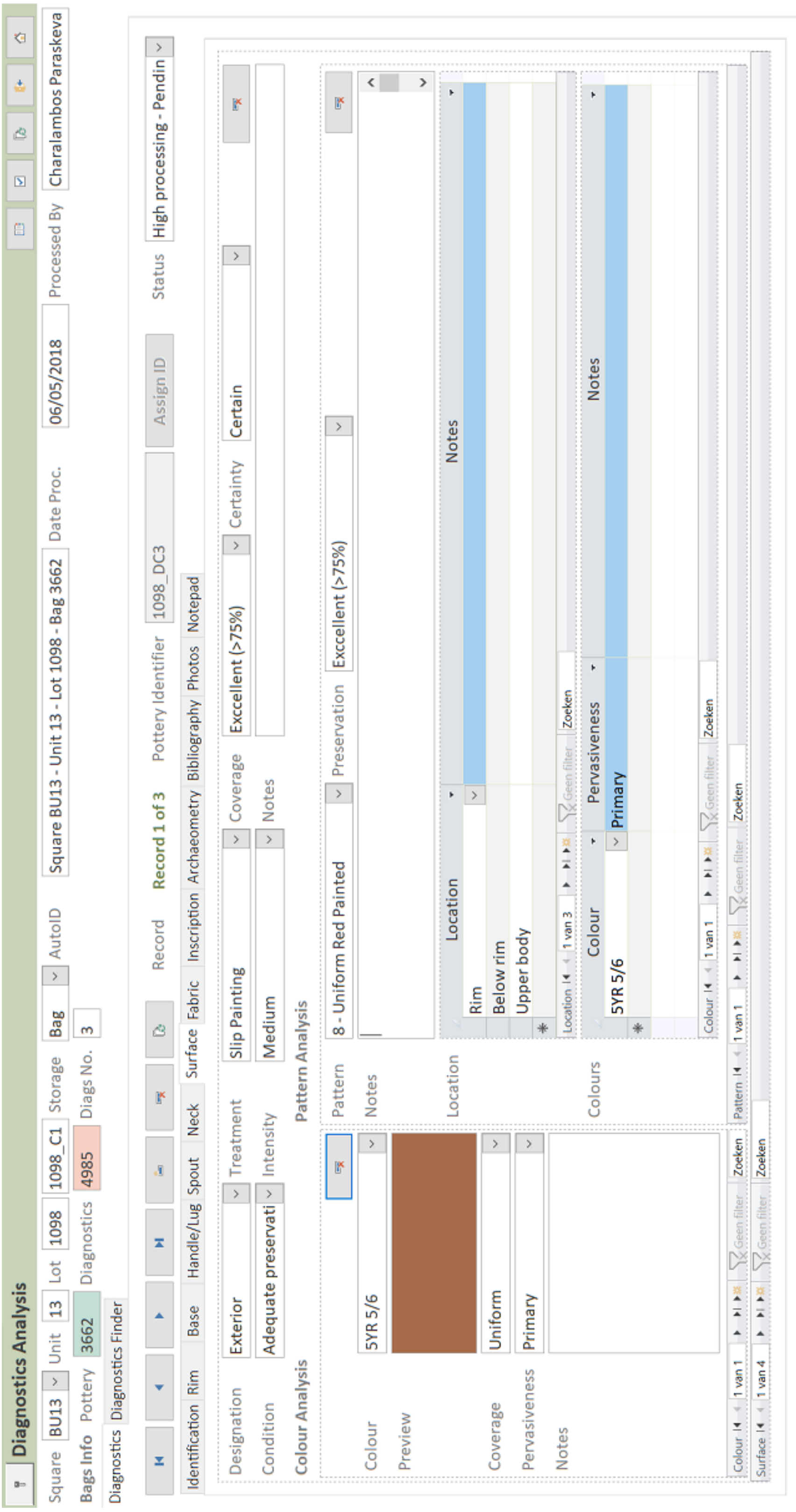

Figure A2: Layout of the surface tab of the Palloures database (Screenshot taken by Paul van 't Hof).

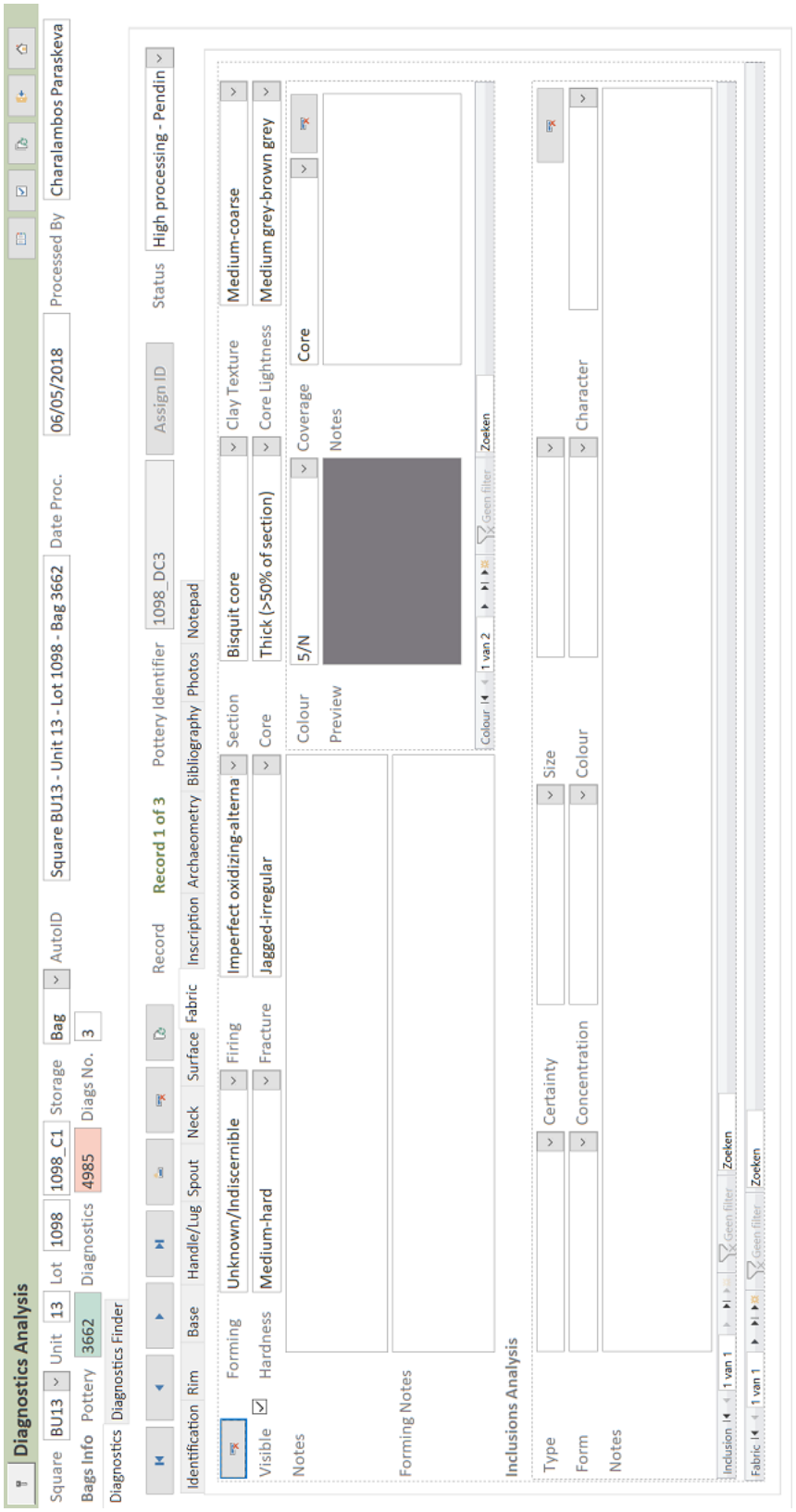

Figure A3: Layout of the fabric tab of the Palloures database (Screenshot taken by Paul van 't Hof).