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# THE 2015-2017 EXCAVATIONS AT THE CHALCOLITHIC SITE OF CHLORAKAS-PALLOURES ON CYPRUS

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## ABSTRACT

From 2015 to 2017 the first three excavation seasons took place at Chlorakas-Palloures, a Chalcolithic site in western Cyprus. Here we present the site stratigraphy, and the structures and burials, excavated at the site. We also introduce the ground stone, figurines and chipped stone found during these first seasons. We also introduce the ground stone, figurines, and chipped stone found during these first seasons. We discuss the raw materials used, the formal and informal tool types, and the context in which these objects were found, as well as how they fit into the broader knowledge of the period. Finally we present the faunal evidence. The aim is to provide colleagues with a first assessment of our results rather than a final report. Not all our assemblages have been fully processed, and inevitably our interpretations of the site and its assemblages will change in future seasons, as we excavate additional trenches and analyse further assemblages. Nonetheless we feel that our data are providing a significant addition to our knowledge of Chalcolithic Cyprus that should therefore be published in this interim report.

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**KEYWORDS:** Chalcolithic Cyprus; Chlorakas-Palloures; Buildings; Stratigraphy; Burials; Ground Stone; Chipped Stone; Faunal Remains

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## 1. INTRODUCTION (BSD)

This paper presents the main results of the first three excavation seasons at *Chlorakas-Palloures*, a Chalcolithic site in western Cyprus, which took place between 2015 and 2017. The focus in this report is on presenting the stratigraphy, structures and burials, excavated at the site, to introduce the material culture uncovered so far, and to briefly present what data we have on subsistence economies. The pottery will be published separately in a paper by Charalambos Paraskeva.

### 1.1 Location

*Chlorakas-Palloures* is located on the slope of a terrace edge overlooking the coastal plain about 3 kilometres north of the modern city of Paphos. It is one of a series of sites situated along this escarpment at more

or less regular distances: to the north of *Palloures* is the site of *Lemba-Lakkous*, which is only a kilometre away as the crow flies; and beyond are the sites of *Kisonerga-Mosphilia* and *Kisonerga-Mylothkia*. Further north still, Early Chalcolithic remains have been found at *Pegia-Maa-Paleakastro* (at Coral Bay), and at *Geronisos* Island, opposite *Agios Giorgos* (Fig. 1). Clearly this part of Cyprus, was well populated in the Chalcolithic, and many additional (smaller) sites have been documented in the mountainous hinterlands of the region and around *Polis* (Bolger, *et al.* 2004; Maliszewski, 2013), although it is possible that not all of these sites were inhabited contemporaneously. Among the known Chalcolithic settlements, those along the coast are relatively large, which might be related to their proximity to the sea and the resources it provided.

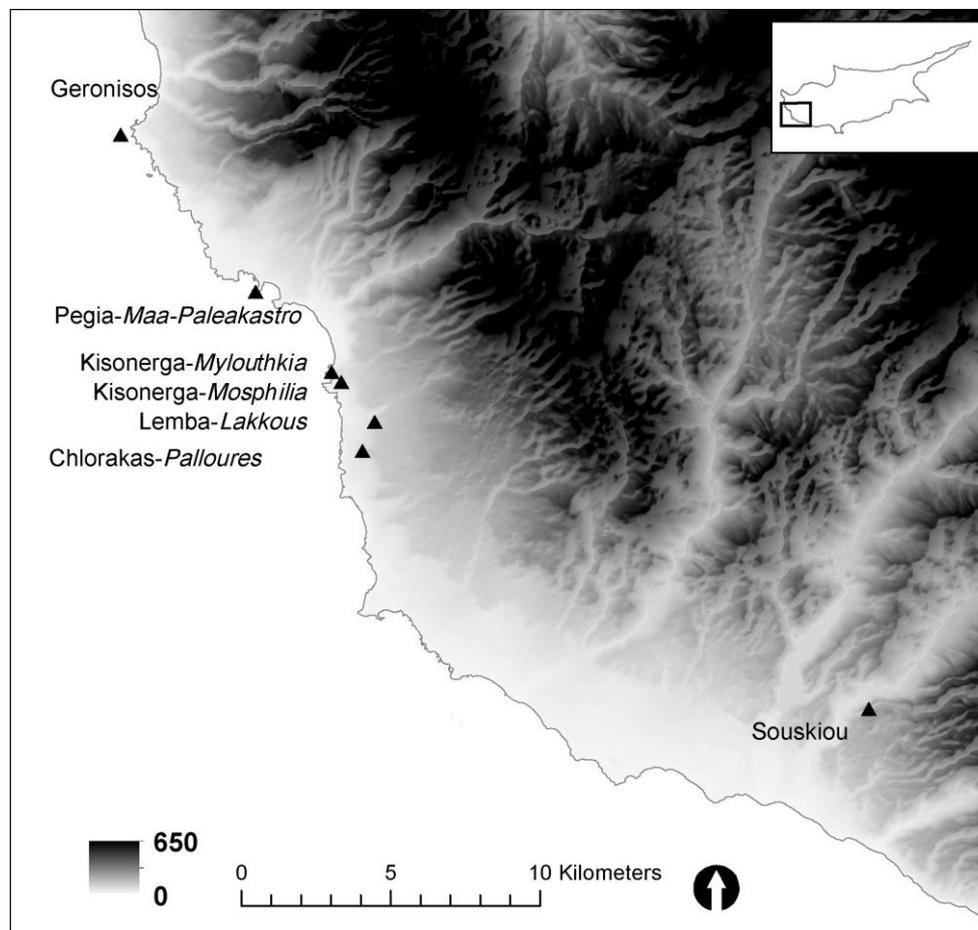


Figure 1. Map of southwestern Cyprus showing excavated Chalcolithic Sites. Produced by Victor Klinkenberg.

The site of *Chlorakas-Palloures* is situated directly below a limestone outcrop and is relatively close to the sea. It would thus have been in an ideal location to tap into the resources of the sea, the coastal lowlands, and the upslope terraces, each of which would have provided different ecological resources. It has been suggested that farming in prehistory mainly took place on the coastal plain (Xenophontos, 1985, 6).

With about 300-400 mm of precipitation per annum (measurements 1960s-1980s) rain fed agriculture is viable in the direct surroundings of the site (Christodoulou, 1959; Xenophontos, 1985). Good climate proxies for prehistory are lacking for Cyprus, but the broader evidence from the eastern Mediterranean suggests favourable climatic conditions during the Chalcolithic (Roberts, *et al.* 2011; Langgut, *et al.* 2015;

Clarke, et al. 2016). It is plausible that the uplands of southwestern Cyprus were in part forested during the Chalcolithic, remnants of which were still visible in the 1960s (Peltenburg, ed. 1985, plate 1), and would thus been a source of timber and a shelter for the deer and, possibly, wild boar that occur in our faunal assemblages. One of the names for the locality in which Palloures is situated is *Vrysoudhia*, which translates as 'small springs'. It is reported that there used to be a water well at this location (Bolger, et al. 2004, 122). This seems plausible, given the absence of a nearby river, and the presence of a substantial settlement at Palloures. Thus, Palloures was probably situated in an ideal location with access to different ecological zones, farmland, and with its own water source.

## 1.2 The Palloures Archaeological Project

The Palloures Archaeological Project was first conceived of as a result of an email exchange with the late professor Edgar Peltenburg, who suggested the excavation of this endangered site in November 2013. In December of that year Bleda Düring visited the site and had a meeting with the Department of Antiquities staff in Nicosia. These discussions were fruitful and it was decided to initiate excavations. For legal reasons the actual excavations could not start before the summer of 2015.

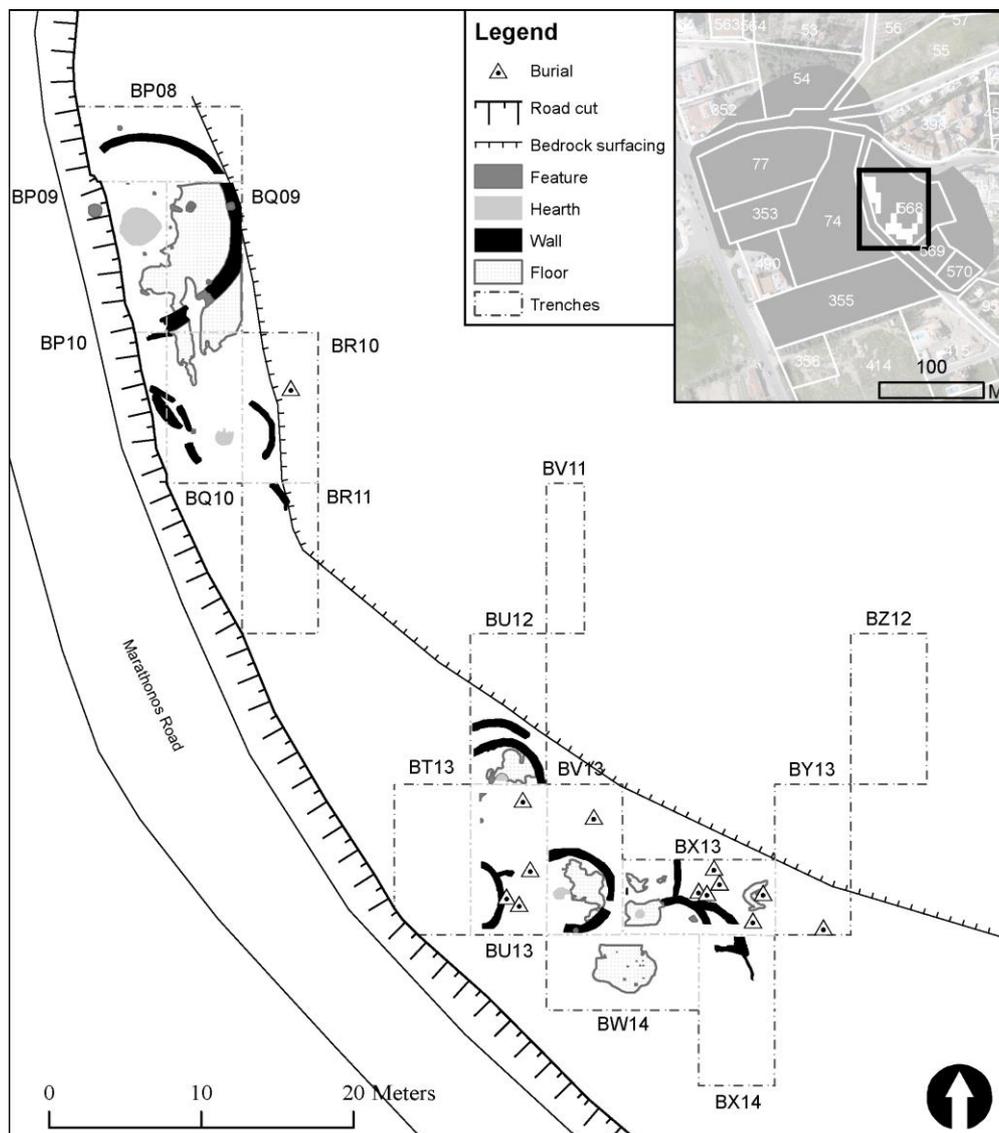


Figure 2. Plan of the excavation trenches at Palloures on plot 568 showing the main structures and burials exposed and the edge of the bed rock. Produced by Victor Klinkenberg.

Given that we had three years to establish the significance of the site, and that there was constant pressure from the landowners for the release of the land,

the priority of the excavations was to produce a comprehensive understanding of the archaeological re-

mains on this plot and their importance. Failure to deliver significant results would very likely have led to the release of the land for development and there was a good probability that archaeological work would be restricted to the three years during which the plot was expropriated. Therefore we decided to excavate relatively rapidly, although we did of course excavate, sieve, and sample carefully when particular contexts required this.

A total of 17 trenches measuring five by ten metres were opened up and an area of about 810 m<sup>2</sup> was excavated (Fig. 2). This constitutes about 16% of the plot under investigation. However, the larger part of the plot does not have well preserved archaeological strata as far as we can establish. The eastern part of the plot had seen considerable down cutting into the hill by bulldozers, and the trenches we opened in this upper part of the site (BZ12; BY13; BU12; BV11) invariably yielded bed rock directly below top soil and deposits of modern rubble. Thus archaeological deposits have been preserved only in the (south)western part of the site, along Marathonos Street, in an area of about 1000 m<sup>2</sup> in size. Of this area with preserved archaeological strata we investigated about 66%. However, this excavation has not been exhaustive, as there are deep sequences of archaeological stratigraphy with over two metres of depth in some places, and our excavations have mostly been confined to the uppermost archaeological levels. Thus, much more work can be done both on this plot and on other parts of the site.

### 1.3 Excavation Methods

The Chlorakas-Palloures excavations have adopted a methodology that combines standard excavation and finds processing procedures with digital recording methodologies. Excavations took place in trenches measuring 5 by 10 metres, which are identified by a letter-number combination in the site grid (eg BU13). In these trenches four to five excavators worked, all students in archaeology or graduates, with the more experienced fieldworkers directing the others. Except for deposits of building debris covering parts of the site, which were in part removed mechanically, all deposits were excavated manually using pick axes, shovels and trowels. Whereas in mixed contexts, such as the top soil, finds were handpicked during excavations, when reaching undisturbed deposits, finds were measured, and sieving and sampling for botanical remains was undertaken.

Unit numbers were assigned to all stratigraphic remains, which may consist of a deposited layer, a built structure (eg a wall or floor), a find cluster, or a cut. The properties of each unit were recorded in a database and were input via a tablet in the field. All finds and samples are collected as lots, which are part of a

layer or cluster unit. Additional information is recorded digitally in daynote forms, structure forms (which combine related units), burial forms, and field drawings. Drone photos are regularly taken during excavation and annotated on a daily basis to record the progress of excavations, and where necessary, 3D orthophotos are taken to record burials and structures. All units and lots are electronically measured with the total station and immediately processed into our site GIS.

In the field, sampling is of key importance. We take microstratigraphy samples inside buildings at regular intervals to investigate building construction and (re)use. We take 40 liter flotation samples for botanical research regularly, and we dry sieve contexts from within buildings and selected contexts outside buildings. We took residue and C14 samples where possible.

At the project base finds processing and data management took place. The finds processing follows standard procedures. Finds are split into various categories (ceramics, chipped stone, ground stone, miscellaneous), washed if necessary, input into the database, and when necessary, they are drawn and photographed. The recording and analysis of collections is done through the analysis of a series of characteristics of artifacts, rather than by lumping artifacts into a priority types. This allows us to query variabilities in our assemblages most adequately (for example whether firing techniques and vessel shapes are correlated). Data management is a key component of our excavations procedures. The regular integration of disparate database files from the field and finds recording, field measurements, GIS files, photo files, 3D models, and the archiving of processed collections, requires sophisticated data management and back up procedures.

## 2. THE PALLOURES SETTLEMENT REMAINS (VK/BSD)

The 2015-2017 excavations seasons at Chlorakas-Palloures on plot 568 yielded the remains of thirteen (parts of) buildings and many associated features and surfaces, located both within and outside these buildings. These structures were found in a northern and southern excavation area, but settlement remains no doubt also exist in the unexcavated area in between. We will present these two excavation areas separately, but in future aim to link up the stratigraphy of the two areas. The northern excavation area is comprised of seven trenches of 50 m<sup>2</sup>, some of which had been truncated by the road to the west, whereas in the southern area we dug a total of ten trenches, of which the three upslope trenches had no preserved archaeological strata, apart from one burial in trench BY13 (see below).

## 2.1 Stratigraphy and Structures of the Northern Area

The road section in the west of plot 568 provides a good guide to the stratigraphy of this area, from the top soil down to the bedrock. At the base of the sequence, starting just above the level of the road, is a series of deposits that can be dated to the Middle Chalcolithic, and which abuts the bed rock cropping up in the northern part of the plot. These deposits have so far not been reached in the excavations of the northern area.

The excavated sequence starts with four pits that were dug through the bedrock, and in part deepened existing depressions in the undulating bedrock (BP08\_14/BQ09\_41; BP09\_18; BP09\_20; and BQ09\_40). These large pits were generally of irregular shape as they followed the eroding outline of the bed-

rock. They most likely initially served for the extraction of *havara*, a material used for the construction of the white floors and wall plaster commonly used in Chalcolithic houses, presumably in this case for floor and wall plaster elsewhere in the settlement.

In one of the pits (BP09\_18) a round silo was later constructed with a stone paving at the base. The silo unit BP09\_31 was dug into an existing natural depression, is approximately 50 cm deep, and largely cylindrical with a diameter of 90 cm at the top and 70 cm at the bottom. Flat stones with a thickness of around 7 cm were placed on the bottom and the inside wall of the silo. Judging by the quantity of stones in the pit fill, the silo was originally probably lined with flat stones from top to bottom. There was no sign of any plastering of these surfaces, nor was any residue discovered which could hint at the products that were stored.

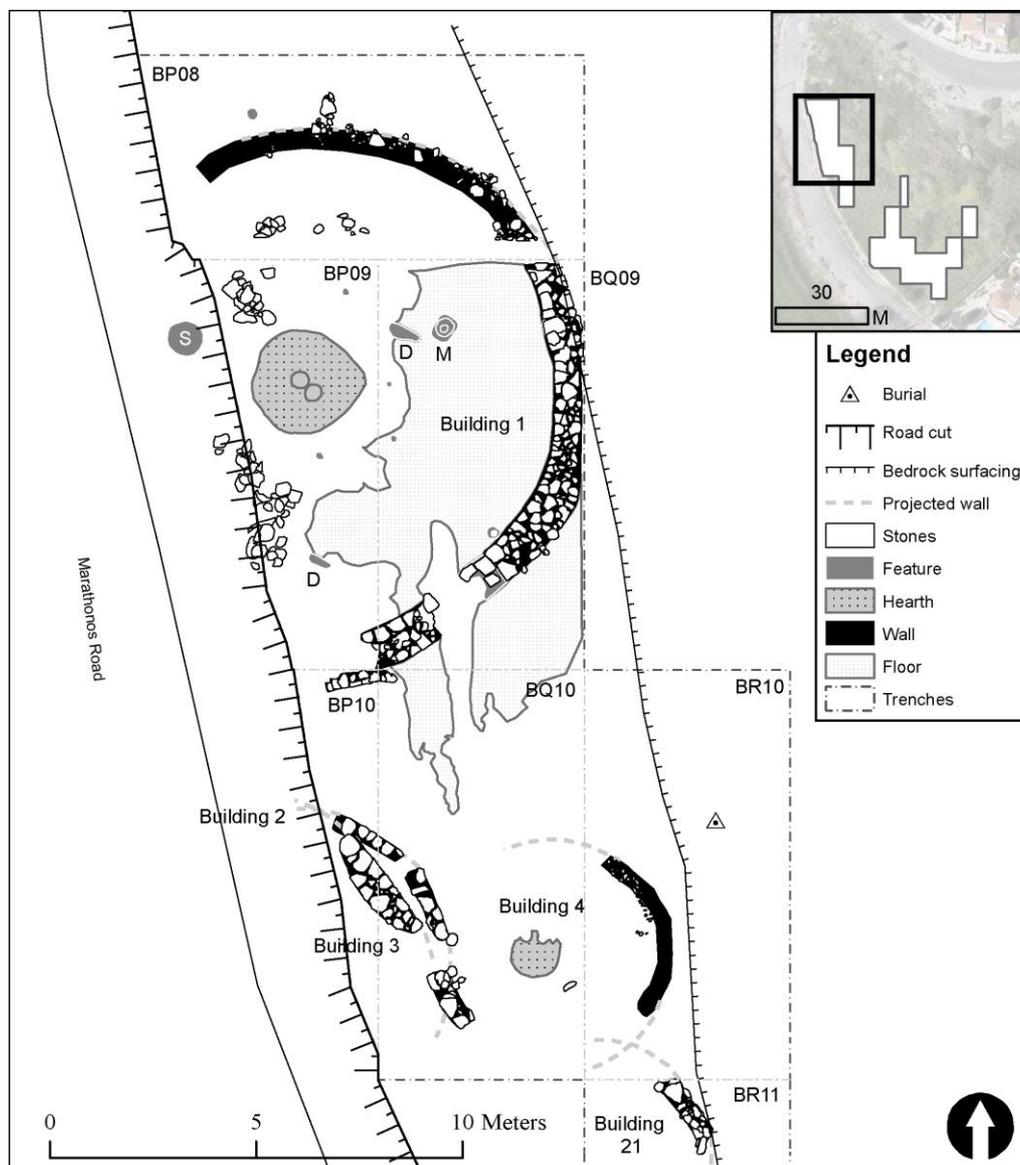


Figure 3. Plan of the Chalcolithic buildings and structures in the northern trenches of plot 568 at Palloures. Produced by Victor Klinkenberg.

In a later stage the large pits were rapidly infilled, most likely as a preparation for the construction of Building 1. This rapid infilling is indicated by the presence of large rocks in unstable positions which were situated in a matrix of loose deposits, which lacked any horizontal layering or differentiation in matrix. In the pit fills there was a moderate quantity of lithic and bone material as well as some pottery. This fill dates predominantly to the Late Chalcolithic, providing a *terminus post quem* for the date when these pits were infilled (not of course for the moment when they were dug). This can be concluded on the basis of the presence of a substantial proportion of Late Chalcolithic sherds, as well as from radiocarbon dates retrieved from the pits. A radiocarbon date taken from the fill of one of these pits (unit 17) yielded a date of 2876-2835 / 2817-2666 Cal BC at 95.4% confidence (GrM-10998, all dates calculated with OxCal 4.3.2), so within the earlier part of the Late Chalcolithic. The date matches well with another radiocarbon date taken from a charred post that was part of Building 1 (see below).

The pits under discussion were succeeded by the construction of Building 1 (Fig. 3). However, this is not the oldest building in the north area of plot 568. To the south of Building 1, four more, partially preserved, buildings were found. All five buildings in the northern area were discovered close to the surface and have been affected by various disturbances, including ploughing, roadworks, and later pits. There is only partial direct overlap between structures, and working out their sequence was not straightforward, but can be reconstructed through analysis of the intermediate deposits. Building 1 had an exterior plaster floor in front of its entrance, probably below a covered portico area, which extended several meters to the south. This plaster surface overlies the foundation remains of Building 4 and is therefore younger. Building 21, situated to the south of Building 4 and incompletely preserved, originally intersected with Building 4. As the wall of Building 21 sits higher than the remains of 4, it is assumed that 21 is the younger one. Likewise, the walls of Building 2 intersected and post-date those of Building 4. The wall of Building 3 cuts

and overlies Building 2 and is therefore younger. It is possible that Building 3 constitutes a renovation, in which case a new building was constructed within the older one, using the demolished rubble of the older as construction material. We have similar sequences in our southern trenches. Given that there is no direct stratigraphic relationship between the southern buildings and the pits under building 1, it is possible that they partially co-existed in time with the pits to the north. Indeed there are no conclusive data that these buildings are all to be dated to the Late Chalcolithic, and it is possible that Building 4 in particular could date to the end of the Middle Chalcolithic. None of the later three buildings (2, 3 and 21) can be directly linked stratigraphically to Building 1, and we assume for now that they are all more or less contemporary. Unfortunately, later disturbances in this area are substantial and make it impossible to reconstruct the sequence of these buildings more precisely.

The oldest structure in the north area is Building 4. Apart from its partially preserved wall, it is relatively well preserved (Fig. 4). The central hearth platform measures some 80 cm in diameter and has two clear indentations in the north where pots were once probably dug in. To its southwest a one and a half metre stretch of wall is the only standing part of the building. To the west and north, the bedrock was levelled out for the construction, and on its upstanding edge there were concentrations of pebbles and small boulders, which most likely served as the foundation of the continuing wall, which would have measured 5.8 metres in outer diameter. Throughout the building, a floor of compact earth mixed with lime was discovered. That the building had at least a second phase of use is evidenced by a renovation phase of the hearth, which was located ten cm above the older hearth platform. A final interesting feature of this building is an 'edge set stone', located south east of the hearth, which was probably used in conjunction with the entrance (Thomas 2005, 58). This could indicate therefore that the entrance was located in the southeast, which is common for this period (Schubert 2018, 81).

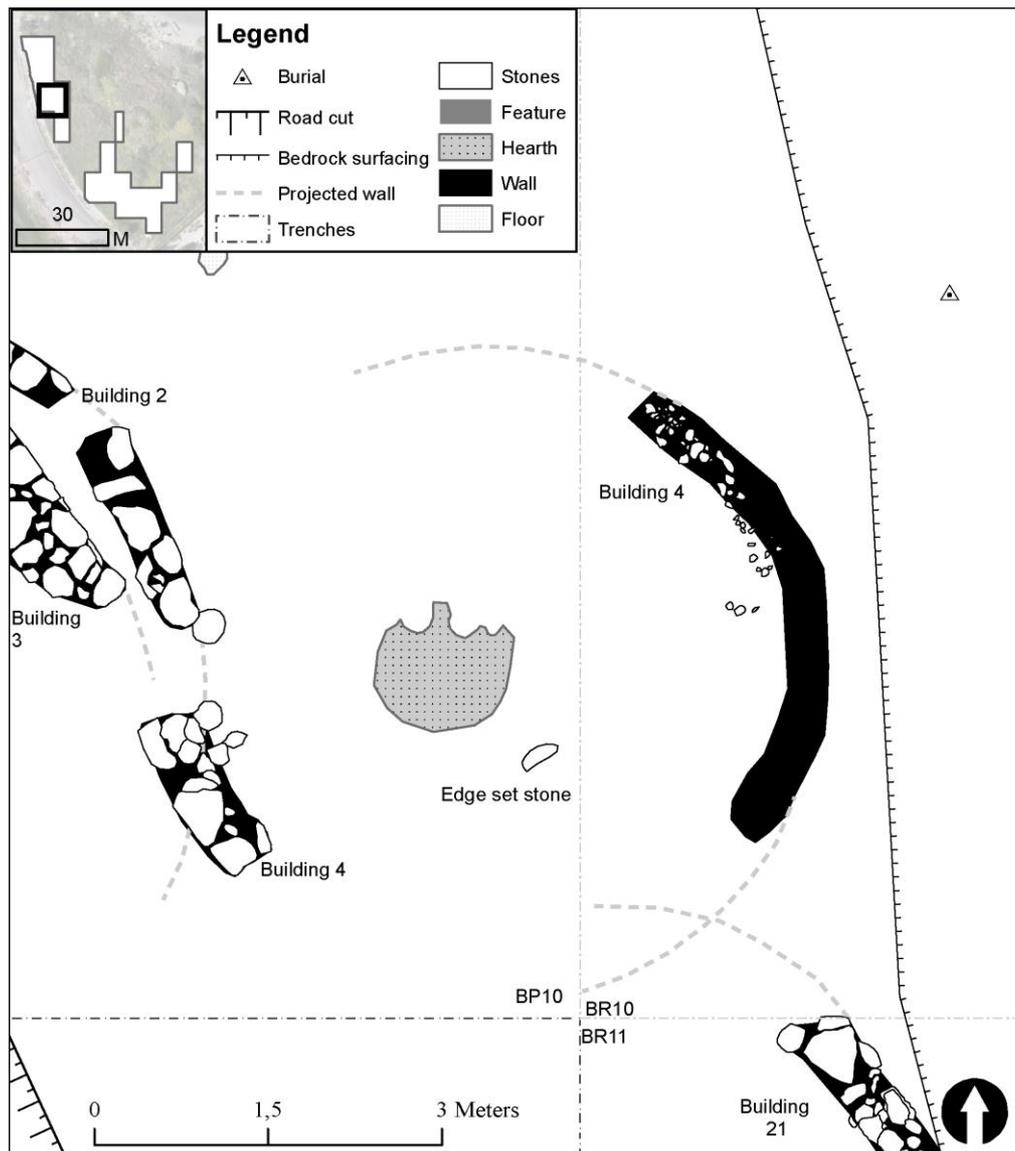


Figure 4. Overview of Building 4 and its features. Produced by Victor Klinkenberg.

Building 21, which probably postdates Building 4, was originally not defined as a structure because of its limited state of preservation. Only two metres of a poorly built wall, perched against a bedrock outcrop, remained of this building. On both sides of the wall surfaces with burnt features and pottery were discovered. During excavation of these features, their 'dirty' appearance suggested that they represented outside surfaces. Alternatively, they might have been inside Building 21, and the structure might have been used for non-domestic activities. A coarse ware cooking tray was placed against the exterior, western side of the wall. These cooking trays are generally considered to have been used indoors as cooking installations, so perhaps this area was also roofed at some point.

As was the case for Building 21, Buildings 2 and 3 are preserved only in the form of wall segments of limited extent (Fig. 3). The wall of Building 2 has an arc which, in the case of a perfect circle, would have had an outer diameter of about 7.7 metres, which is a conventional size for Late Chalcolithic buildings. The scant remains of its successor Building 3 are too limited to provide a reliable estimate of its original full size, but its straight course would suggest a diameter of over ten metres. The surface outside these houses to the north consisted of beaten earth in which the poorly preserved remains of several ceramic containers were placed (Lot 48 on top of wall Building 2, Lot 49 in surface north of 3), which were probably associated with Building 3.

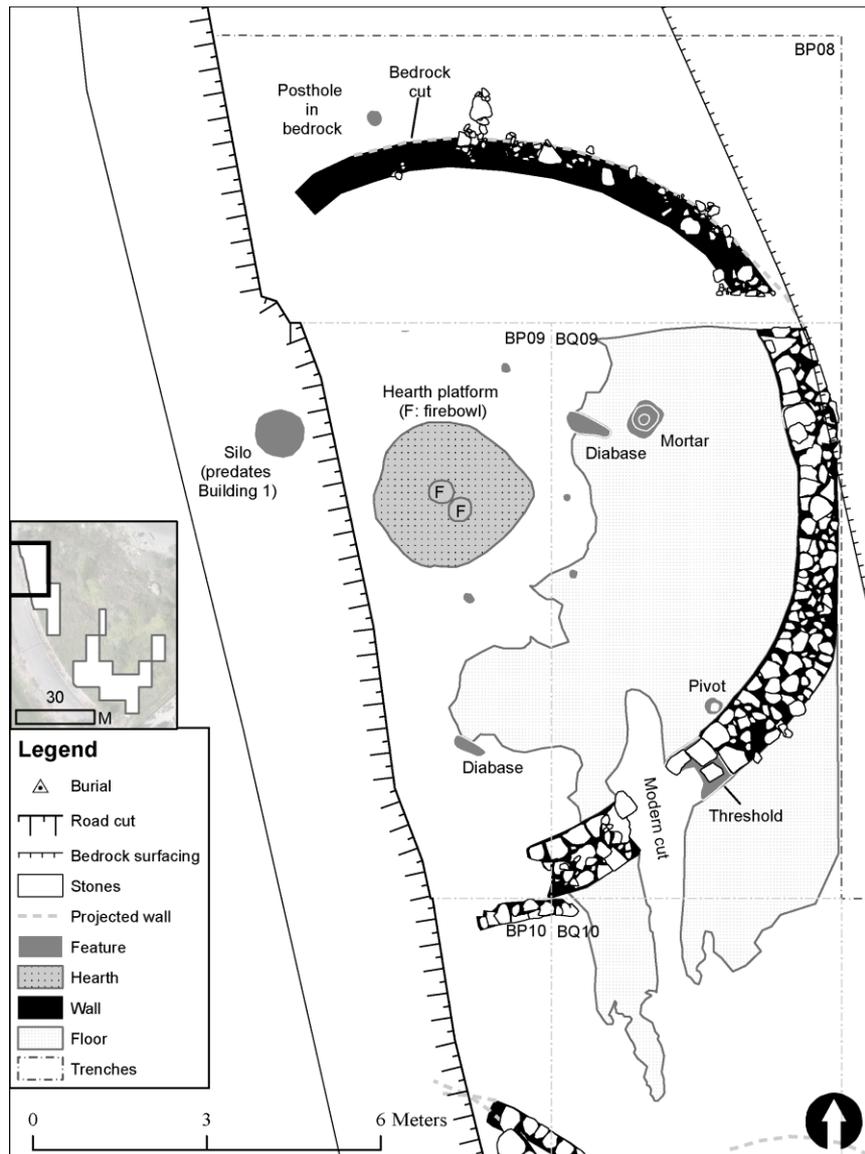


Figure 5. Overview of Building 1 in its main use phase and its features. Produced by Victor Klinkenberg.

By far the most impressive building excavated in the northern trenches is Building 1. This structure measures 14 metres in outer diameter, and has a wall thickness of about a metre. This wall is carefully faced on both sides and the stones used are larger and flatter than those used in other buildings. This is the largest and most impressive building discovered thus far in Late Chalcolithic Cyprus (Fig. 5), although similar sized buildings have been documented previously for the Middle Chalcolithic levels at the nearby site of Kisonerga-Mosphilia (Peltenburg, *et al.* 1998: 32). Two distinct phases of use of Building 1 were identified during excavation. The first phase is characterized by a thick white floor, which was present both on the interior and the exterior of the building. The second use phase is characterized by a series of burnt clay floor patches inside the building, sitting on top of a layer of

soil and large boulders, which has been interpreted as a collapse layer.

As has already been discussed, the construction of Building 1 commenced with the levelling of the bedrock in the north and east, and with the rapid infilling deposition of pits and depressions. The first course of the wall was laid directly on this levelling layer. The entrance, in the southeast of the building, was paved with large flagstones similar to the corner stones used in the wall next to the entrance. A well-made floor was placed over the flagstones and continued both to the interior and exterior of the building. The outer floor is 40 centimetres higher than the inner floor, and the threshold slopes inward significantly. Directly on the outside of the wall refuse material was found pressed, probably trampled, into the outside plaster. Amongst these were numerous pig mandibles, pressed into the plaster, teeth up.

A pivot stone placed in the floor to the right of the entrance upon entering indicates that one door pivoted inward to the right. Whether or not this pivot stone had a counterpart on the opposite side cannot be established due to modern disturbance. Considering the substantial size of the building, a door construction of substantial width can be expected to have been present.

The centre of the building is taken up by a very large circular hearth platform. Its core is made up of cobbles and clay, and it has a white plaster coating on top. The platform is 2.5 metre in diameter and had two clay fire bowls in the middle. The two plastered fire bowls overlap and were thus constructed in sequence. The first fire bowl was placed exactly in the middle, within a circular stone setting. The second fire bowl was placed off-centre, adjacent to the earlier one. This renovation destroyed the features' symmetry. Various post and stake holes were found surrounding the hearth, which most likely served to support the roof. One of these posts was partially preserved in charred condition. We took a radiocarbon

date from it, which yielded a date of 2875-2835 / 2815-2665 cal BC (at 95.4% confidence (GrM-10998)). This provides a direct date for the structure in the earlier part of the Late Chalcolithic.

On the floor of the building three remarkable stone objects were discovered, which, like the building and its features, were of substantial size. Two elongated smooth diabase boulders (see section 4.2 below) were placed on top of the floor, and one large mortar with a double dip was sunken into the ground (Fig. 6), but has been dislocated and damaged by the plough. All three objects were integral parts of the internal organization of the building as is evidenced from the solid dug-in state of the mortar and from floor plaster running up against the other two stone fittings. The practical function of the objects is unclear. The double dip mortar is of particular interest as it resembles a similar installation found in the Late Chalcolithic *pithos house* (Building 3) at Kisonerga-Mosphilia, which has been interpreted as an olive press (Peltenburg ed., 1998, 42). Future residue analysis of the inside of the mortar may indicate what it was used for.



Figure 6. Large mortar installation in Building 1. Photograph by Ian J. Cohn.

The monumental appearance of Building 1 was further enhanced by the white plaster on the walls and floor. The floor material on the inside of the building was characterized through micromorphological analysis as crushed and powdered local *havara* limestone. Although the presence of quicklime could not be established directly from these slides, it is possible that some was used to consolidate the mixture. In any case, the floor material is different from known

and described floor materials from surrounding contemporary sites (Thomas, 2005, 49). The best preserved floor parts from Building 1 are two centimetres thick and consist of loosely packed bedrock fragments in a powdery matrix (Fig. 7). Compared to some floors at contemporary Kisonerga-Mosphilia, this is a very poorly constructed surface. It is perhaps due to its brittleness and later erosion that the flooring could not be easily identified during excavation. None of the thin sections revealed evidence for renovation

phases of this floor. Instead, the depositional sequence in thin sections of the floor does not exhibit any traces of activities in the form of residues or trampling, suggesting that the floor was only briefly in use. The material deposited on top consists of the heavily bioturbated brown soil which is encountered in thin sections throughout the site.



**Figure 7.** Thin section L735 of floor and overburden material in building 1. The floor material consists of grey lime stone fragments, the insert shows two fragments of intact limestone skeletons (s), indicating that these are unfired rock fragments. The overburden is constituted of homogenized dark soil, containing organics and artefacts such as a 2 cm long flint fragment (f), which has a mudcoating (arrows), indicating that the clast was deposited in a muddy environment. Indications of significant bioturbation are the homogenized nature of the soil, the openwork fabric with numerous channels, and recent insect burrows (b).

*Produced by Victor Klinkenberg.*

That the appearance of the inner wall was deemed important is illustrated by the stone mortar which was used in its construction. Its rounded edge protruded beyond the arc of the wall, interrupting the straight wall surface. The protruding part was therefore trimmed, restoring the smooth wall surface, and covered with the same white plaster as the floor. The outer walls were also plastered; this large, white building, located at the edge of the settlement, would probably have been clearly visible from afar.

The duration of use of the building with its original layout and floor cannot be precisely established,

but two aspects offer contrasting hints. Firstly, the renovation phase of the central hearth indicates that the building was definitely used for a prolonged period of time, and that the building perhaps even witnessed a change in status or use. The myriad post- and stake holes around the hearth also suggest that the internal arrangements were remodelled. The thin sections, however, show that the floor of the building was never renovated and that the overburden material was probably dumped on the floor soon after its construction, possibly due to collapse of the roof. It is of course possible that the floor was cleaned rigorously, and that any evidence for renovations and activities were thus removed. However, sweeping and cleaning of the floor would have left their traces on the ground surface, for example in the form of micro residues trapped in small cavities. The poor strength and consistency of the construction material further illustrate that it did not endure intensive or long lasting use, which would have resulted in a more compacted floor. Thus it would be possible to interpret the floor as a deposit that was constructed relatively late in the use life of the building or even as part of the closure of the building rather than as a floor for use.

After the building was no longer in use, the floor was covered with a ten centimetre thick layer of soil mixed with some large stones. Micromorphologically this soil layer can be characterized as a result of mass dumping, perhaps caused by the collapse of the roof. On top of this soil layer several burnt surfaces were observed. These surfaces and fireplaces signify that the building was inhabited and used for some time in a state of dilapidation. It is difficult to establish whether Building 1 was renovated or kept up in any way during this phase as the deposits are generally shallow and poorly preserved. The undulating and patchy nature of the surfaces, could indicate that the building was no longer in use for ostentatious purposes. On top of these burnt surfaces another layer of soil and stones was deposited, interpreted as a 'collapse' layer. On top of some of these stones we discovered three complete deer antlers, which might have been attached to the wall or roof during the collapse event.

That the building was still highly valued in the latter phases of its existence and use is evidenced by the deposition of a cache of lithic flakes in a crevasse in the wall, placed next to the entrance (Fig. 8, see section 4.3 below).



Figure 8. Lithic cache placed in a wall crevasse due east of the door and above the pivot stone. On the upper right is a close up of the lithic cache. Photo by Ian J. Cohn.

Finally, following this Late Chalcolithic occupation, there is a rather ephemeral Hellenistic period occupation, which takes the form of various pits and a small wall feature in the north of BP10 (Fig. 3). Finally, the area has been disturbed by various modern period pits and cuts, as well as deep ploughing, the effects of which can be seen up to about 50 centimetres below the surface.

## 2.2 Stratigraphy and Structures of the Southern Area

Ten trenches of 50 m<sup>2</sup> were excavated in the southern part of the plot at Chlorakas-Palloures. The three

upslope trenches (BV11, BZ12 and BY13) had no preserved archaeological strata, apart from one burial in trench BY13 (see below), which was preserved due to the fact that it was dug into the bed rock. In general, the upper trenches yielded only bed rock deposits covered by top soil and building rubble.

Across the southern trenches, ploughing, modern pits and soil formation caused the top 30 centimetre of each trench to be disturbed and homogenized. This, combined with the general shallowness of the walls and floors which were encountered, often hampered efforts to establish stratigraphic relations between trenches.

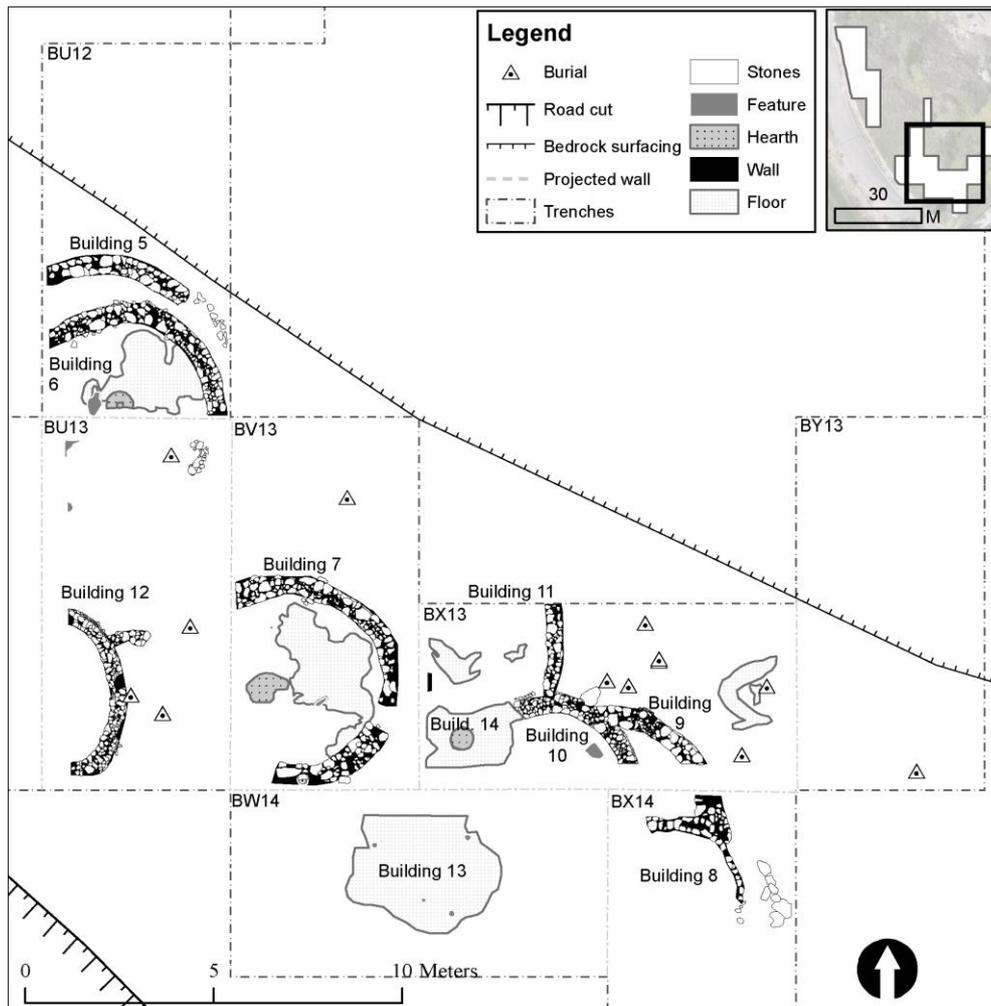


Figure 9. Overview of the southern trenches on plot 568 at Palloures and the main structures and features found in them. Produced by Victor Klinkenberg.

The oldest deposits were found in trenches BU13, BX14, and BW14, where Middle Chalcolithic strata were encountered (Fig. 9). In BX14 a sounding was dug through midden deposits Units BX14\_8 and BX14\_12 which yielded a transition from the Late into the Middle Chalcolithic, a transition that is not well known from the other Lemba region sites, where a gap between the two periods was previously postulated (Peltenburg, ed., 1998, 249; Peltenburg, 2007, 144). Although recent dates from sites further afield at Politiko-Kokkinorotsos and Souskiou-Laona have started to fill this gap (Peltenburg, et al. 2013, 335; Webb, et al. 2009; Paraskeva, 2019), the transition between the two periods remains poorly known. In trench BU13 Building 12, exposed in the final days of the 2017 season, also dates to the Middle Chalcolithic. In trench BW14 we likewise have a transition from Late Chalcolithic (Unit 3) into Middle Chalcolithic (Unit 6) that seals a series of surfaces and floors. For the most part, however, these dates rely on preliminary (and incomplete) analysis of pottery fabrics,

which can only be dated to sub-periods of the Chalcolithic approximately, as there is considerable overlap in the fabrics between periods (Bolger, et al. 1998, 8-12; Paraskeva, 2016), and the proportions of diagnostic shapes and decorations are relatively small in most contexts. The problem is compounded by the fact that the transition between the Middle and Late Chalcolithic wares remains poorly known.

In trench BU13, however, we are on firmer chronological ground. Here the sequence starts with a Middle Chalcolithic roundhouse (Building 12), with associated surfaces (Units BU13\_41 and BU13\_42). In deposits postdating this building a series of burials (Burials 10, 11, 12, and 13) were dug, which likewise are of Middle Chalcolithic date. These are in turn overlain by a surface (Unit BU13\_15) from which we obtained a radiocarbon date of 3078-3073 / 3025-2912 cal BC (at 95.4% confidence (GrM-10997)), which suggests that this layer and those below are Middle Chalcolithic in date. This is then overlain by a midden deposit (Unit BU13\_13), the ceramics of which can be characterised as Middle Chalcolithic. A later midden deposit (Unit

BU13\_3), which yielded another radiocarbon date of 2916-2885 cal BC (at 95.4% confidence (GrM-10997)), is sitting more or less at the chronological boundary between the Middle and the Late Chalcolithic (assumed to have been around 2900 BC). The pottery from this midden deposit is predominantly Late Chalcolithic in date.

This midden deposit in trench BU13 continues in trench BV13 (as Unit BV13\_5), which abuts Building 7 in that trench, which thus predates the midden deposit. The same midden deposit also occurs in trench BU12 (Unit BU12\_8), which overlies buildings 5 and 6, the latter of which contained a complete jar (see below) containing a barley seed that was radiocarbon dated to 2855-2810 / 2745-2485 cal BC (at 95.4% confidence (GrM-68670)). Thus this stratigraphically earlier date on an annual seed seemingly postdates the charcoal date from the overlying midden deposit. Therefore, either the charcoal sample from the midden suffers from the old wood problem, or there is a discontinuity in our stratigraphic deposits we have failed to notice during excavations. The sudden end of the walls and floors of Buildings 5 and 6 close to the southern baulk of trench BU12 seems to indicate the latter.

All remaining prehistoric structures and deposits in the southern trenches are most likely to be dated to various phases of the Late Chalcolithic. These include four buildings in trench BX 13, and one in BX14, as well as burials in BV13, BX13, and BY 13. As in the northern trenches, many buildings intersect, revealing their construction sequences, presented below (Fig. 11). The burials, often dug into the bed rock at the edge of domestic deposits, are often less easily tied into the overall sequence, as they cannot always be unequivocally linked to stratigraphic deposits abutting or underlying buildings.

The (partial) remains of ten buildings were found in the southern trenches (Fig. 9). These buildings are diverse in terms of construction technologies. Seven of the buildings documented adhere to the typical characteristics of Chalcolithic roundhouses, with a circular stone foundation / wall footing that we assume would have supported a loam superstructure. Buildings 13 and 14 lack such stone foundations, however, and Building 13 seems to have been a dug in structure. Finally, Building 12 appears to have been completely stone built, with walls preserved up to a metre in height.

This section of the Chlorakas-Palloures settlement was built up against the undulating bed rock which slopes down towards the southwest, in some places at angles of up to 45 degrees. Many buildings were constructed against this bedrock hillside, and in some areas were cut into the rock on the upslope end to create solid wall foundations. This proximity to the bed

rock, and the fact that walls were in part dug in, has shielded the upper part of these structures from erosion. In many instances, therefore, only the upslope side of these buildings was preserved, whereas the lower sections were not. It seems plausible that most of this erosion postdates the Chalcolithic period, and some of the erosional gullies were subsequently filled up with stone packings in the Hellenistic era, when the site might have been first converted into agricultural land.

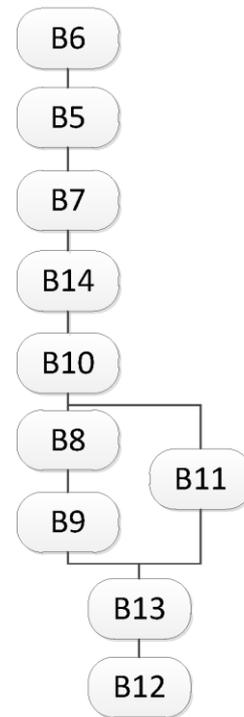


Figure 10. The stratigraphic sequence of buildings in the southern trenches at Chlorakas-Palloures. Produced by Victor Klinkenberg.

The southern trenches show a palimpsest of buildings, which were built partly over older buildings, and in some cases pre-existing walls were partly demolished to provide building material for the new structures. In trenches BX14 and BX13 a palimpsest sequence of five buildings and associated plaster surfaces and hearths was found, and in trench BU12 a sequence of two buildings was found. This reworking of older structures unfortunately leaves us with fragmented remains of buildings, making their reconstruction more challenging. Typically, the younger buildings were constructed downslope of pre-existing buildings, and in many cases, sections of older walls and floors were removed in the process.

The best preserved building of the southern trenches is Building 7 (Fig. 11). It is a round house with a 5.4 metres outer diameter. Multiple floors as well as postholes, plastered pits, potstands and hearths were discovered inside. Together with some

later disturbances of the archaeological layers, these testify to the continuing renovations which took place in this building. Two significant features are the raised central hearth, of which the upper surface and fire bowl were not preserved, and a vertically placed stone adjacent to a posthole. We assume that the door

was located in the south, where there appears to be a gap in the wall. Interestingly, there is another break in the wall in the southwest of the building, which is paved with small cobbles. It is possible that both were doors, perhaps used in sequence.

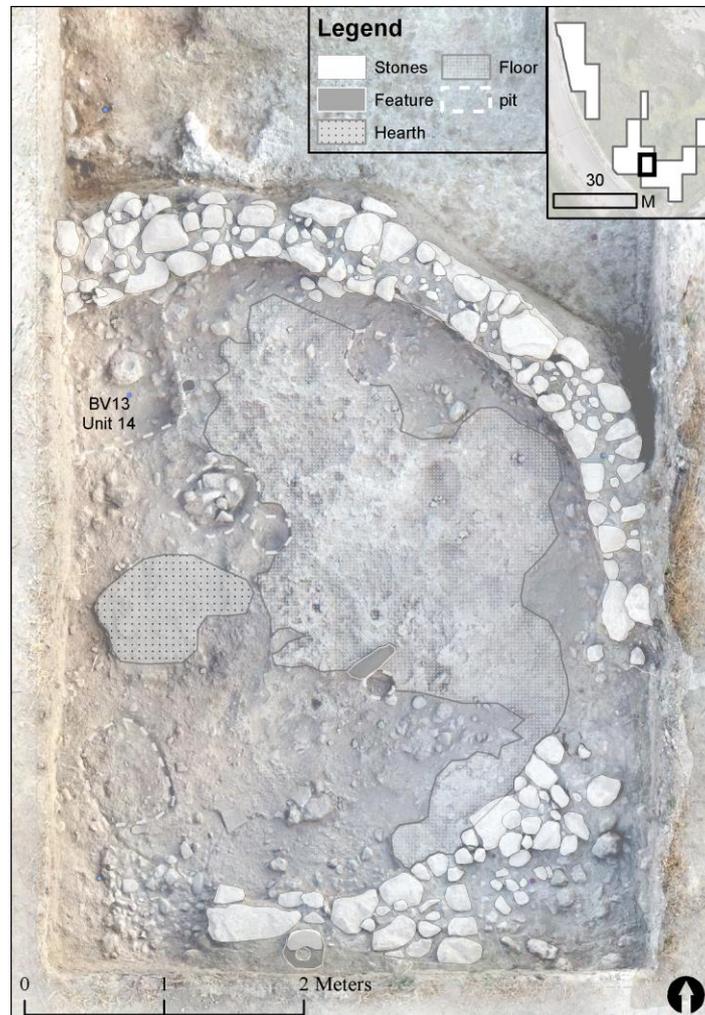


Figure 11. Overview of Building 7 and its features. S: upright stone. Produced by Victor Klinkenberg.

In the north of Building 7, in a sharply defined pit, a cluster of ground stone objects and raw material and one picrolite blank were discovered (Unit BV13\_14). This cache of material, left behind in such an inconspicuous place, could be interpreted as the remains of workshop storage or cache deposit. The pit was dug through the floor of the building, and is covered by the collapse layer which covered nearly the entire house. Another curious find was a cluster of fragmented shells in a dip of the floor of the building, near the postulated southern entrance. What these were used for is not known. Among the rubble of the collapse layer, four intact antlers were found. Similar to Building 1, these were probably hanging from the ceiling or the walls of the building prior to its collapse.

To the north of Building 7 are the remains of Buildings 5 and 6, which are located in trench BU12, of

which Building 6 is the younger structure (Fig. 12). Set into the bed rock, in a cut to create a solid footing, is the wall of Building 5, which would have been about eight metres in outer diameter. The wall is well built and stands four courses high. This wall ends in the east, probably at the time of the construction of subsequent Building 6.

Probably associated with this wall / building is a plastered raised hearth (Unit BU12\_23) found in the south of BU12, and a compact earth floor surrounding it. In association with this floor surface a cluster of ground stone objects was found, which included a large, finely made pestle of 47 cm in length. As this object was probably (much) too large to be functional and showed no traces of use, it was likely a prestige object. Overlying this floor was a collapse deposit.

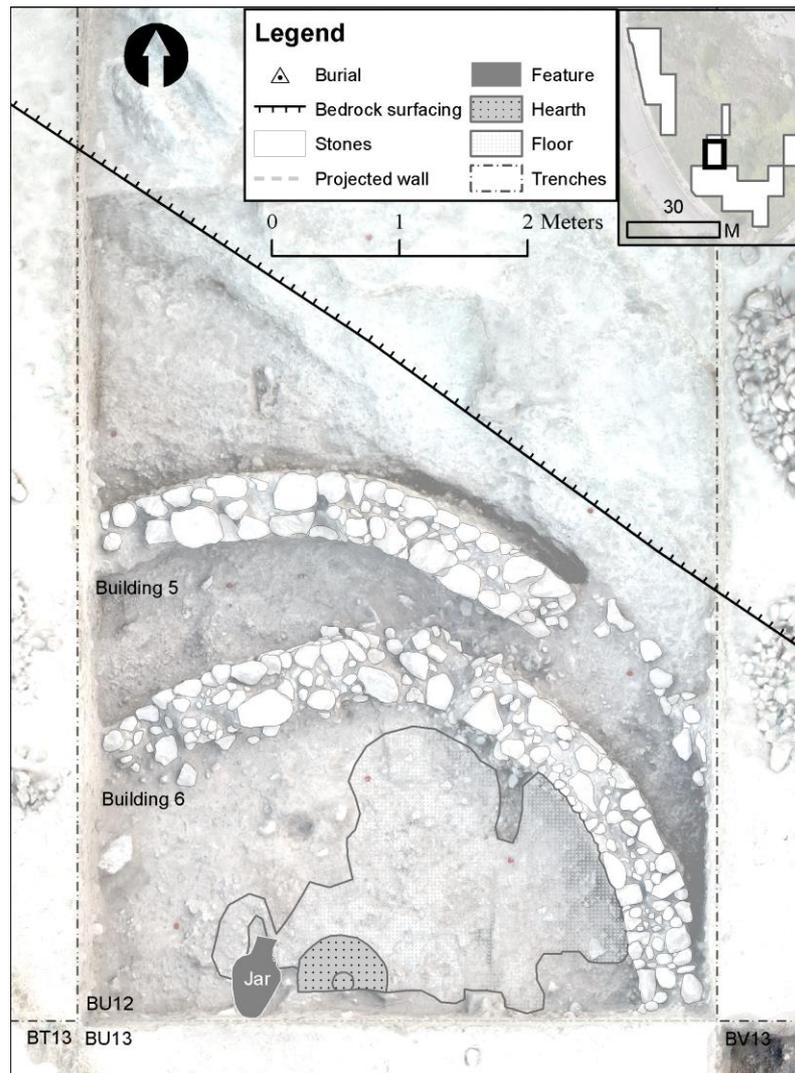


Figure 12. Overview of Buildings 5 and 6 and their features. Produced by Victor Klinkenberg.

Later in time, Building 6 was constructed inside the remains of Building 5. This new building measured about 5.6 metres in outer diameter. Its wall is not as well built as its predecessor, and it is plausible that some of its stones were scavenged from the older wall of Building 5, as the walls would otherwise have intersected. No clearly associated floor surface was preserved, which would have been located within the current plough horizon, but we found bits of plaster relatively high up as well as an almost complete large jar lying on its side, that was probably located on the floor of Building 6.

This large necked jar has three lugs at the bottom of the collared neck and has clear parallels at Late Chalcolithic Kalavassos-Pamboules (Dikaios, 1962, 135-6). The jar contained a remarkable collection of artefacts (Fig. 13) that included five hooks made of boar tusks, a flat stone axe, of a type that was postulated to imitate metal prototypes (Croft, et al. 1998, 188), and the oldest securely dated copper axe known from Cyprus, radiocarbon dated to 2855-2810 / 2745-2485 cal BC (at 95.4% confidence (GrM-68670)). The latter is of course, a very significant find, and throws new light on early metallurgy on the island (Düring, et al. 2018; 2021).



Figure 13. Collection of artefacts found in the jar. Photos by Ian J. Cohn (and Andreas Charalambous (copper axe/adze)).

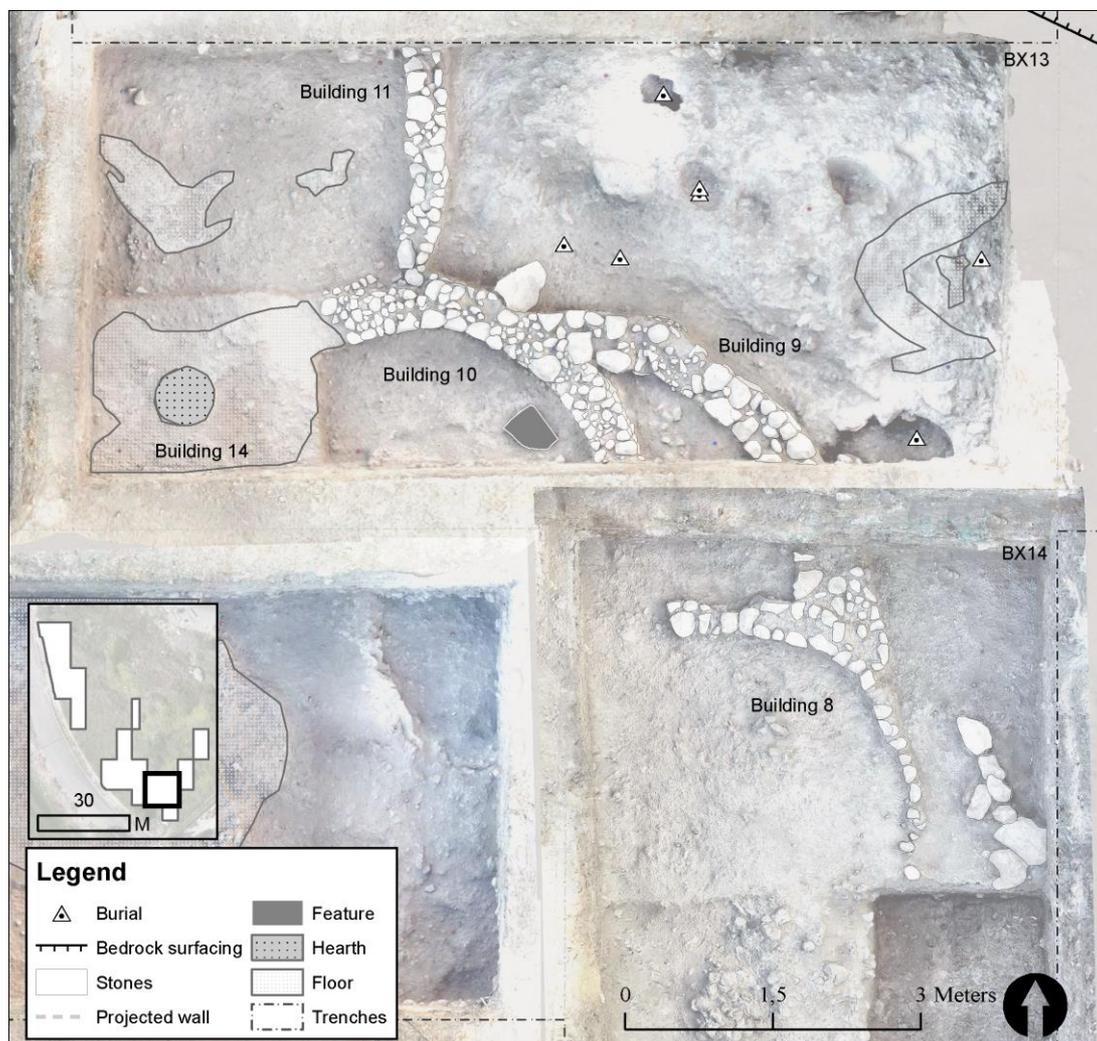


Figure 14. Buildings and features found in trench BX13 and BX14. Produced by Victor Klinkenberg.

An especially complex sequence of construction was encountered in trench BX13 (Fig. 14). The oldest buildings encountered are 11 and 9. Building 11 consists of a partially preserved white plaster floor (Unit BX13\_53) and a wall (Unit BX13\_46). It is not entirely

clear whether Building 11 constituted a round or rectangular structure; the extant wall segment is too short to establish this. Possibly contemporary to Building 11 was Building 9, which is represented by an arc shaped wall (Unit BX13\_35), and a small patch of associated surface (Unit BX13\_50). This building

was initially cut by Building 8, located to the south in trench BX14, and only preserved as a single row wall forming a partial arc. Both Buildings 8 and 9 were subsequently cut by Building 10, during the construction of which segments of walls of Buildings 11, 9 and 8 were removed. Finally, Building 10, and a section of the plaster floor of Building 11 were cut by Building 14. This building lacks an outer stone foundation, but cut through other walls and surfaces. A surface (Unit BX13\_47) connects to a nice hearth structure (Unit BX13\_27). Thus, within a small area we have a sequence of no less than five buildings, all of which are only partially preserved. The sequence suggests that there was a relatively dense occupation in this part of the settlement and that the interval between construction episodes was not long enough for buildings to be covered by erosional deposits. However, one wonders exactly why new structures were created and

older buildings were not renovated, given that they were still exposed.

Another building without an outer stone wall was found in trench BW14; this structure predates all the buildings discussed so far. This Building 13 not only lacks a stone wall footing, but also does not have a hearth or other installations. Instead a series of superimposed floors was encountered. In the northern profile section, it could be observed that the structure was dug at least 20 centimetres into the surrounding deposits. Although other buildings, such as Buildings 1 and 7 were also dug into the ground in part, in these cases a stone outer wall secured the edge of the cut. If a stone wall base was ever present in the case of the building in BW14, it was located at least twenty centimetre higher than the lowest floor and is no longer preserved.

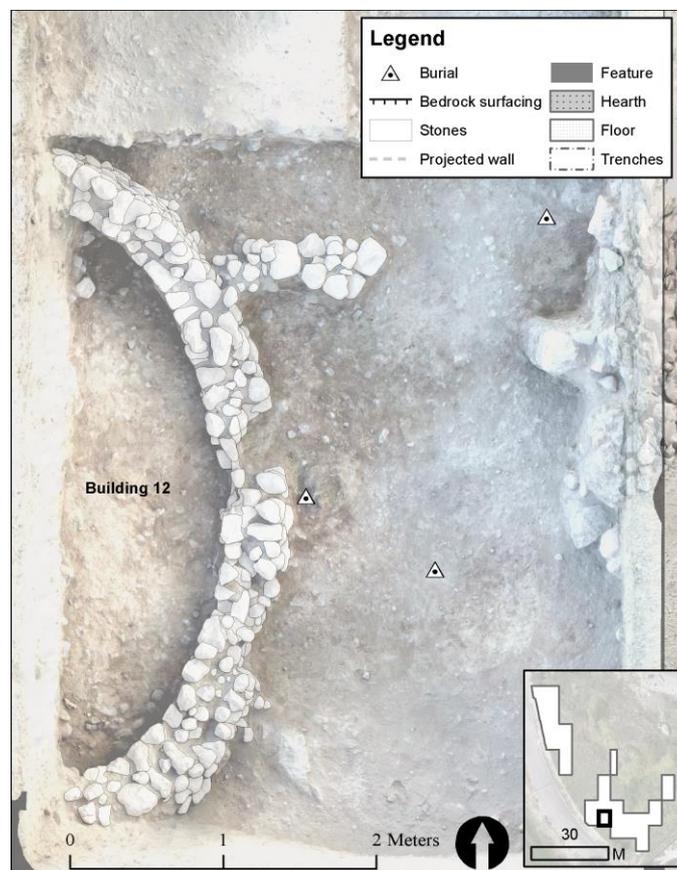


Figure 15. Overview of Building 12. Produced by Victor Klinkenberg.

In contrast to this dug-in structure, trench BU13 yielded the remains of a building with a wall which was preserved up to 8 courses high, with a maximum height of 80 cms (Fig. 15), which would have measured about 5 metres in diameter. Despite the relatively low quality of the stone masonry used in the structure, this wall is among the highest preserved Chalcolithic walls currently known from the island. The next highest stone walls were documented for Late Chalcolithic

Building 3 at Kisonerga-Mosphilia, of which the walls stood 70 cms high (Peltenburg, et al. 1998, 38). However, in that building large quantities of burnt mud wall collapse were found, whereas Building 11 at Palloures was filled with large volumes of stone collapse. It is therefore possible that Building 11 was entirely built of stone. The wall tapers inwards as if the structure had a conical shape. This could be a result of the pressure of upslope deposits, but it is also possible

that the original structure resembled a tholos building. Careful excavation of the western half of the structure in the near future will hopefully reveal the remainder of the structure, and will help in identifying the function and construction method of the building. As already stated, at present this is our only unequivocal Middle Chalcolithic building so far excavated.

Finally, various cuts with fills including Hellenistic materials were found also in the southern trenches (BV13\_U43; BU13\_U5; BT13\_U7). Especially in trenches BT13 and BU13, these pits were very large, and they might have been natural gullies that were deliberately filled up in the Hellenistic era, probably to consolidate agricultural fields. Finally, numerous modern pits were also encountered in the southern trenches.

### 3. THE BURIALS (MG / BSD)

Over the course of the three years of rescue excavation at Chlorakas-Palloures 15 burial contexts were documented. Not all of them are complete inhumations: we have instances of individual body parts – a lone articulated hand (Burial 13), cranial fragments (Burial 4), and a discrete mandible (Burial 15). These remains could represent burials that were disturbed by later pits, as seems likely for the articulated hand, or human remains that were reburied, as might have been the case for the cranial fragments and mandible. There is no evidence at present for the intentional secondary retrieval or manipulation of human bones, and it is most likely that burials were disturbed accidentally. Such events might also explain the residual presence of small quantities of human bones in non-funerary contexts such as midden deposits at Palloures.

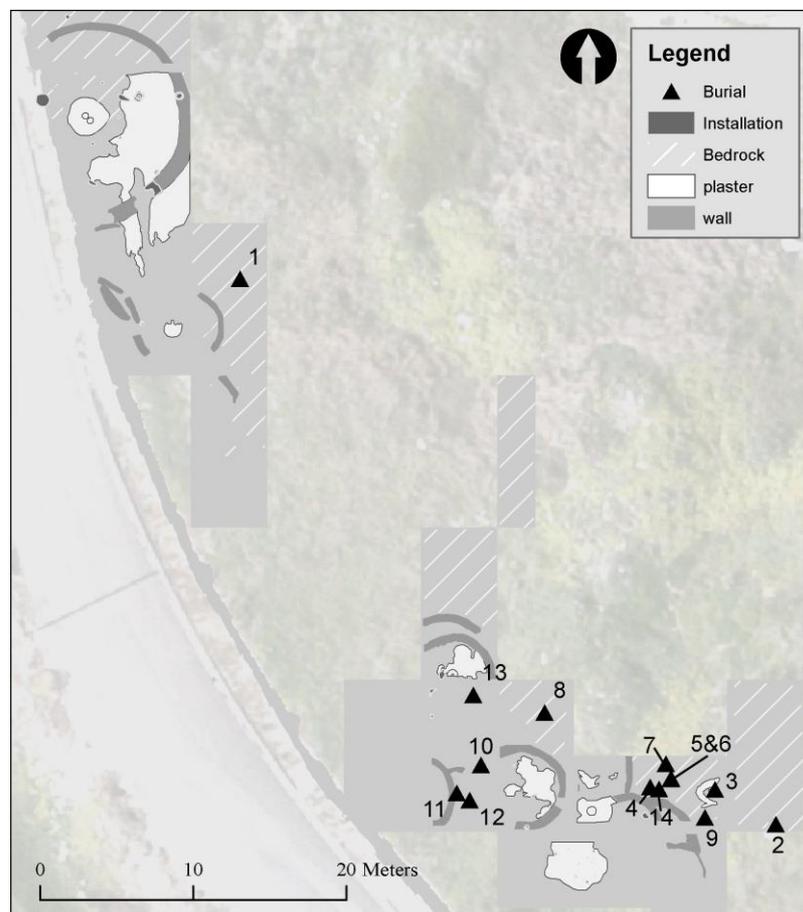


Figure 16. Map showing the locations of the burials at Chlorakas-Palloures excavated between 2015-17. Produced by Victor Klinkenberg.

The burials were mostly found at the edge of the settlement and dug into the bed rock or sediments overlying it. Isolated burials of this type were found in trench BR10, where a poorly preserved child burial was found (Burial 1), in BV13, where an infant burial was found under a capstone, mixed with the partial

remains of a second subadult individual (Burial 8), and in BY13, where a young adult probable female was found in a cut in the bed rock (Burial 2).

The largest concentration of burials was found in trench BX13. Here a total of 7 burials was recorded (Burials 3-7, 9, 14), although it should be noted that

Burial 4 contains only partial cranial remains, and Burial 9 is an unusual deposit of a highly fragmented cranium with evidence of thermal application and a single long bone. Three infant graves were found in BX13 (Burials 5, 6, and 7) of which burials 5 and 6 were placed in the same cut sequentially. Finally, Burial 3 contained the partial remains of an adolescent individual, and Burial 14 the remains of a young adult probable female.

Apart from the burials located along the edge of the settlement, in trench BU13 we also found a number of burials within a sequence of archaeological deposits. Here, there were two infant burials (Burials 10 and 11 – the latter of which was disturbed and included animal and adult bones), a middle aged adult female (Burial 12), as well as the articulated hand with several axial skeletal fragments (Burial 13) and partial mandible (Burial 15) already mentioned.

The standard burial type at Palloures consists of inhumations in pits (Type 1 – Lunt, et al. 1998, 68). In some cases, cap stones were placed over these burial pits (Burials 5, 7, 8, 10 and 11), probably to mark their location or facilitate later additional burials in the same graves (Type 2 – Lunt, et al. 1998, 68). Skeletons were typically placed in flexed positions, with some lying on their right side (Burials 1, 2, 5, 10, and 11), and others on their left (Burials 3, 8, 12, and 14). No grave goods were found in any of the burials.

### 3.1 The Skeletons

A total of 653 bones, teeth, or bone groups (such as indeterminate long bone fragments) were examined. The minimum number of individuals (MNI) within a burial was determined by counting the number of the same bone present taking side, portion present, age, and sex into account. A total of 17 individuals were identified in the 15 burials.

Bone preservation ranged from extremely poor to good, but most bones were in poor condition and the primary limiting factor for osteological analysis was the high level of fragmentation of the skeletal material. Very few bones were preserved intact, with virtually no epiphyseal ends present. This report will focus on age estimation, sex assessment, and pathological changes or non-metric traits observed. Three bones show signs of burning, but it cannot be determined whether this was intentional.

Age estimation methods were used, defined by Buikstra and Ubelaker (1994) and Schaefer *et al* (2009). Table 1 provides the general age groups and the number of individuals from each age group. These results roughly correspond to the results from the nearby settlement sites of Lemba-Lakkous and Kisonerga-Mosphilia, with just over half of the individuals aged under 18 years-at-death (Gamble, 2011; Lunt, 1985, 54; Lunt et al. 1998, 73-83).

Table 1. Age distribution of the human remains from Chlorakas-Palloures.

Age Category	Number	%
9 - General subadult	2	11.8
8 - General adult	3	17.6
7 - Senior Adult (50+ y)	0	0.0
6 - Adult (36-50 y)	1	5.9
5 - Young Adult (19-35 y)	2	11.8
4 - Adolescent (13-18 y)	2	11.8
3 - Child (4-12 y)	1	5.8
2 - Infant (neonate – 3 y)	6	35.3
1 - Prenatal (foetus)	0	0.0
<b>Total</b>	<b>17</b>	<b>100.0</b>

Sex determination of adult human skeletal remains are based on the shape of the *os coxae* (Phrenice, 1969; Schwartz, 1995), which was used in conjunction with sexually dimorphic features of the skull (Buikstra and Ubelaker, 1994; White and Folkens, 2005). Table 2 provides the sex determination of the adult and older adolescent individuals. Once again, the greater proportion of females, and lack of males, corresponds to the data collected at Lemba-Lakkous and Kisonerga-Mosphilia (Gamble, 2011; Lunt, 1985: 54; Lunt, et al. 1998, 73-83).

The pathological analysis of the Palloures skeletons revealed very few anomalies, which is likely due to a combination of factors – the heavy fragmentation of the skeletal material, and the young age of the majority of the individuals present (Table 1). Where pathologies are observed and discussed on this skeletal material, it is on a bone element basis as this sample is too small for any statistical analysis.

Table 2. Sex distribution of the adult and adolescent individuals at Chlorakas-Palloures.

Sex	Number	%
5 - Male/ 4 - Possible Male	0	0.0
1 - Female/ 2 - Possible Female	4	50.0
3 - Indeterminate/ 0 - Cannot be assessed	4	50.0
<b>Total</b>	<b>8</b>	<b>100.0</b>

In Burial 2, the young adult and probably female skeleton displays evidence of mild periodontal disease with some alveolar recession observed on the right maxilla. Only one carie was observed on the maxillary left second molar, and the left first maxillary incisor crown is missing with wear into the root, suggesting the crown was lost in life and the tooth was still used. Calculus has accumulated on the lingual side of the mandibular first incisors, and the third molars are most likely congenitally absent. The cervical vertebrae show evidence of degenerative disc disease with erosion of the vertebral bodies on the superior and inferior aspects. No laminar osteophytes on the thoracic vertebrae and no indication of osteoarthritic changes were observed. The spinous processes of the first through fourth thoracic vertebrae

show alterations, angling the process to the right, likely due to tension on the erector spinae muscles.

In Burial 10, the only pathology observed on the mostly complete infant skeleton was a possible localised infection on the right femur.

In Burial 11, the partial infant skeleton displays new bone growth on the superior aspect of the orbit, with some possible slight bone erosion/porosity; this was also observed in small patches near the sutures of a couple small fragments of calvarium. The left radius displays mild porosity and bone growth in a small patch near where the radial tuberosity would be, which may represent a localised infection. However, taken with the new bone growth on the cranial fragments, a more systemic disease could have been the cause, such as scurvy or anaemia. However, the poor preservation and heavy fragmentation make a specific diagnosis impossible at this time.

In Burial 12, the middle aged female skeleton displays a suspected well-healed Colles' fracture on the distal end of the right radius.

In Burial 14, the partial remains of the young adult probable female skeleton contains two teeth with mild dental calculus accumulation. The left humerus displays a large septal aperture in the olecranon fossa

and a rather rugged and robust deltoid tuberosity, reflecting possible heavy use of this arm. The hand phalanges also show raised and prominent insertion points (lateral ridges on the palmar aspect).

## 2.2 The Palloures Burials in Context

Thus far, the burials recorded at Chlorakas-Palloures seem to adhere to known Chalcolithic patterns for western Cyprus. Previous research indicates that males are not regularly buried within settlements, and that subadults comprise the greatest proportion of the burials, with few adult females (Gamble, 2011; Lunt, 1985: 54-58, 150-153; Niklasson, 1991; Lunt, et al. 1998: 65-86). Given the relatively small area of excavation in relation to the overall size of the site, it indicates that, like at Kisonerga-Mosphilia, burials occur in some density within the settlement, and that over the coming seasons more graves and skeletons can be anticipated. There are still a number of questions regarding burial practices which need to be examined in the Chalcolithic period and, with detailed recording and excavation, the Palloures data will add to our understanding of developments in burial practices during the middle and late Chalcolithic periods.

**Table 3.** All the burial contexts examined with demographic information, palaeopathology, and completeness recorded.

Burial	Trench	Unit	Age	Sex	%
1	BR10	21	child; dental age - 5-7 y	subadult	50%
2	BY13	16	young adult (19-35)	Female; Mandible = 3, mastoid = 4, sciatic = 1, pubic sym = 2	90%
3	BX13	16	adolescent?	indeterminate	15%
4	BX13	6	general adult; cranial thickness	Indeterminate; only partial frag of occipital	1%
5	BX13	25	infant; Ubelaker - 1y+/-4m-18m+/-6m	subadult	60%
6	BX13	30	infant; Ubelaker - 6m+/-3m -9m+/-3m	subadult	20%
7	BX13	26	infant; birth+/-2m - older based on post cranial bone	subadult	25%
8	BV13	41	infant; Ubelaker - Birth - 6m+/-3m	subadult	85%
9	BX13	45	general subadult	subadult	1%
10	BU13	31	infant; 6m+/-3m	subadult	85%
11	BU13	39	infant; Ubelaker - Birth - 6m+/-3m	subadult	55%
12	BU13	28	adult (36-50); Auricular surface = Phase 5 40-44y	female; partial sciatic notch = 1, generally small individual	70%
13	BU13	21	adolescent		4%
14	BX13	15	young adult (19-35)	probable female; mental trigon = 2	30%
15	BU13	29	general adult; 3rd molar erupted	female; gonial angle and ascending ramus = 1	1%

## 4. GROUND STONE INDUSTRIES (ES)

This discussion provides a brief overview of the ground stone collection recovered from the 2015-2017 seasons of excavation at Chlorakas-Palloures (Total = 1,180 artefacts). As is the case in many 'ground stone' reports, the material discussed here covers a diverse range of differently modified artefacts, including tools, vessels, figurines, ornaments, architectural elements, some enigmatic object classes and evidence for stone working.

Past ground stone reports on Cyprus have focused on assigning typologies that are predominantly based on object form (Elliott, 1985; Swiny, 1986; Elliott-Xenophontos, 1998; Mogelonsky, 1996; Swiny, 2003; though also see Frankel and Webb, 2006 for 'expedient' vs. 'curated' classes). Although these typological classifications are referred to here, analysis of the Palloures ground stone industry instead concentrated on the treatment of objects throughout their use life (from collection to deposition), with the ultimate goal of elucidating the social role of these artefacts. Here,

the aim is to present some preliminary comments on the ground stone industry, rather than fully publish the results of this biographic analysis. The first two sections characterise the Palloures ground stone assemblage and the following discussion highlights some exceptional ground stone contexts on the site. It is argued that the Palloures ground stone industry contributes greatly to our understanding of shared and creative ground stone practices in the Chalcolithic period.

#### 4.1 Ground Stone Categories: Classes and Types

Of the total 1,180 objects recovered from the site, most were tools, with other artefact categories occurring in lower frequencies (Table 4). Many of the diagnostic object types present within the assemblage are fairly typical of the Chalcolithic period. As a result, the terminology, classifications and typologies referred to here are largely borrowed from the Lemba Archaeological Project.

The chopping and planing tool industry (*nee*. Cutting tools) particularly exhibits characteristic Chalcolithic elements. Alongside axes, adzes and cigar-shaped chisels also occur, which are types largely limited to the Late Neolithic and Chalcolithic periods (Dikaios, 1961, 192-5; Mantzourani, 2003, 90; McCartney, 2007b, 82). The finely worked, geometric axe and adze styles found at Palloures are reminiscent of objects from Chalcolithic contexts elsewhere. Furthermore, miniature (Type 5 axes: Elliott-Xenophontos, 1998, 169, Fig. 8.9-11) and over-sized renditions of these tools, which fluoresce in the Late Chalcolithic (Elliott-Xenophontos, 1998, 181), are also present (See Fig. 17). These diverse shapes are achieved by various combinations of splitting, flaking, pecking, rough grinding and polishing, which are techniques witnessed by the author on other Chalcolithic chopping and planing tools. In addition, several of the axes at Palloures exhibit incised notches on their sides (GS 9.1, 197.1, 1006.1 and 1150.4); an enigmatic, non-functional feature which is shared with other axes from this time period.

Table 4. Categories and classes of ground stone objects present at Chlorakas-Palloures.

Artefact Category	Artefact Category 2	Classes	Number	Relative frequency (%)
Tools	Chopping & Planing	Adze, Axe, Chisel	143	12.12
	Grinding	Grinder, Rubbingstone, Rubber, Quern	252	21.36
	Percussive	Hammerstone, Pecking stone, Pounder, Anvil	276	23.39
	Crushing	Mortar, Pestle	44	3.73
	Fine Abrasive	Abrader, Burnisher, Polisher	76	6.44
	Multiple use tools	Mixed	197	16.69
Total tools			<b>988</b>	<b>83.75</b>
Vessels		Bowl	10	0.85
		Dish	1	0.08
		Jar	2	0.17
		Jar stopper	1	0.08
		Unidentifiable	19	1.61
Total vessels			<b>33</b>	<b>2.3</b>
Figurines	Anthropomorphic		8	0.68
	Zoomorphic		1	0.08
Total figurines			<b>9</b>	<b>0.76</b>
Ornaments	Perforated	Bead	7	0.59
		Pendant	4	0.34
	Unperforated		2	0.17
Total ornaments			<b>13</b>	<b>1.10</b>
Architectural	Pivot stone		1	0.08
	Post pad		5	0.42
Total architectural			<b>6</b>	<b>0.51</b>
Other	Conical stone		27	2.29
	Cupped stone		44	3.73
	Grooved stone		3	0.25
	Palette		2	0.17
	Perforated stone		16	1.36
Multiple use artefact			1	0.08
Miscellaneous			36	3.05
Working debris			2	0.17
<b>TOTAL</b>			<b>1,180</b>	



Figure 17. Selection of axes (top row), adzes and a chisel (left to right, bottom row; Photos by Ian J. Cohn).

The pestle collection from Palloures also exhibits known Chalcolithic types. Of note is the presence of large, skittle-shaped pestles, which are typical of the latter half of the Chalcolithic (Type 5: Elliott, 1985, 177, Fig. 72.6-8; Elliott-Xenophontos, 1998, 172, Fig.

91.4). GS\_776.7, recovered from Building 5, is significant in being the largest stratified example of its type, at a length of 47.7 cm (Fig. 18). The occurrence of this type demonstrates a wider preference for distinct handles, which is a common feature of the Chalcolithic pestle industry.



Figure 18. Large, skittle-shaped pestle GS\_776.7 (length 40 cms). Photograph taken by Ian J. Cohn.

Characteristic Chalcolithic forms are also found within the figurative and ornamental stone assemblage from Chlorakas-Palloures. These include variations on finely made picrolite, anthropomorphic cruciforms (GS\_1085.1; For closest parallels see KM27 and KM124: Peltenburg, ed., 1998, Fig. 83.2 and 4) and less well-executed 'gingerbread man' figurines, made from calcarenite (GS\_896.1 and GS\_957.1: Fig. 19). Although these are known from most nearby sites, close parallels for the latter type can be found at Period 3B, Kisonerga-Mosphilia (Peltenburg, ed., 1991,

Fig. 21, Pl. 5; Peltenburg, ed., 1998, Fig. 80.8, 81.3 and 82.1; Plate 31.4). Several examples of pendant Type 4 are also found at Palloures (GS\_365.1, 507.3 and 1288.1; Peltenburg, ed., 1985, 284), as are oblate and globular bead types noted at Mosphilia and elsewhere (Croft, et al. 1998, 236, Fig. 99.1-4; Peltenburg, ed., 1998, Fig. 99.7; Plate 37.1). Perhaps the most diagnostic Chalcolithic ground stone objects are those of uncertain function, such as conical, cupped and grooved stones, which also occur at the site.



Figure 19. Roughly executed calcarenite figurine GS\_896.1. Photograph taken by Ian J. Cohn.

Palloures also exhibits shared practices with specific Chalcolithic sites. Mosphilia provides a close parallel for many of the object types outlined above, and the large double-bowl mortar GS\_818.1 from Building 1 (Fig. 6) is resonant of the suggested olive press found within the Pithos Building at Mosphilia (Peltenburg, et al. 1998, 42-3, Fig 3.10). As the Mosphilia object went missing from the site during excavation, it is hoped that future analysis of GS\_818.1 can shed light on the function of this tool. Furthermore, a finely crafted, sub-triangular burnishing tool GS\_1286.1, is very similar to formal burnishing tools recovered from Mosphilia (See Type 2; Elliott-Xenophontos, 1998, 174, Fig. 92.16, Pl. 33.10-12). The Palloures collection also echoes traditions at Mosphilia in exhibiting stones that were chosen for qualities other than functionality. Specifically, chisel GS\_1158.1 is made of an unusual white stone (perhaps chalcedony). Like chert chisel KM1976 and jasper adze KM765 from Mosphilia, the material is visually appealing but would have been more prone to

fracture than commonly used igneous stone types. This, alongside the diverse array of differently coloured and textured stones utilised at Chlorakas-Palloures, reflects wider trends in raw material expansion and creative manipulation of stone types, suggested to be driven by heightened social display and competition over this time period.

Several of the ornamental and figurative objects from Chlorakas-Palloures have parallels at Souskiou. Of note is partial cross-shaped bead GS\_485.1, which is of a form common at Souskiou-Vathyrkakas, being of Type 13 within this repertoire (Peltenburg, ed., 2006, 91; Pl. 17.4). Picrolite cruciform figurine GS\_667.1 is of a type that is also found at Souskiou but is not as clearly paralleled at either Lemba or Mosphilia (Fig. 20) (SVP 82/1, SVP 86/2-4 and 8-9; Peltenburg, ed., 2006: Pl. 26, Pl. 28.4-5 & 7, Pl. 29.2-3; Fig. 23). Furthermore, the dark green picrolite from which this object is made is regularly utilised at the Souskiou sites (Paraskeva, 2018, personal comment).

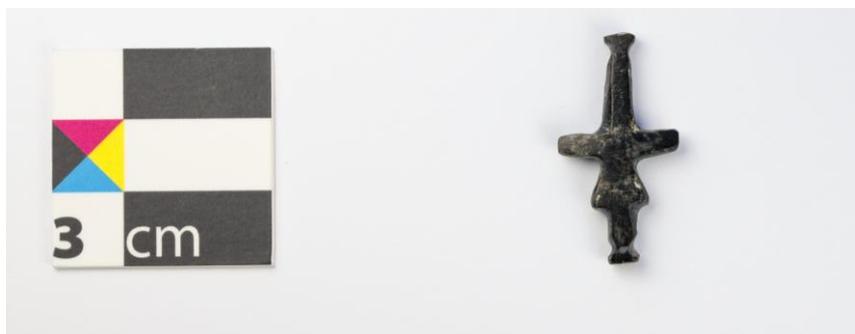


Figure 20. Dark green picrolite cruciform figurine GS\_667.1. Photograph taken by Ian J. Cohn.

There are also objects from secure Chalcolithic contexts at Palloures, which are of known artefact categories but are of unique styles. Only the head of picrolite figurine fragment GS\_1378.1 was preserved (See Fig.

21); however, it is rendered in a more three dimensional way than most picrolites; the nose and the hair or head covering is emphasised in relief, while the oval eyes are executed fairly simply in carved outline. GS\_246.1 is also unusual in representing a headless

quadrupedal animal (See Fig. 22). It has a biconical perforation drilled obliquely between the front and back of the figure, where the head should be. The wear appears fairly typical of suspension, however, it cannot be discounted that a head may have been attached here, which has since been lost. Another perforation occurs through the belly of the animal. This is wider and the interior of the perforation is highly

polished, suggesting that this may represent a fixture for a moveable part. Although zoomorphs are found at Mosphilia and Souskiou this style is unique. These objects represent originality and creativity in the figurative stone repertoire at Palloures, with the latter particularly contributing to research on the tactile aspects of figurines (Goring, 1998, 162-3).



Figure 21. Head of figurine GS\_1378.1. Photograph taken by Ian J. Cohn.



Figure 22. Headless zoomorphic figurine GS\_246.1. Photograph taken by Ian J. Cohn.

Although the majority of objects found from the site fit comfortably within types used in the Chalcolithic period, there are indications of earlier activity. GS\_842.5 represents a small rim fragment of a diabase vessel type found only in the Pre-Pottery Neolithic period. As this object was recovered in a slopewash deposit, no in situ evidence for Pre-Pottery Neolithic activity exists on the site. There is also no clear evidence from the ground stone industry for later activity. However, we cannot rule out that some of the less formal objects found in disturbed levels may be of historic date as there is stratigraphic and ceramic evidence for Hellenistic, Roman, Byzantine and Modern activity on the site.

#### 4.2 The Ground Stone Tool Industry in Regional Context

This section aims to briefly investigate the composition of the Palloures ground stone tool assemblage in light of other Chalcolithic collections in the region. Fig. 23 below shows the relative percentages of different tool categories within the stratified assemblages

from Palloures, Mosphilia and Lemba-Lakkous (Henceforth Lemba). Given the proximity of these sites and lack of evidence for site specialisation, it might be expected that they would have similar tool assemblages. However, there exists a fair deal of variation, which requires closer attention. Of note is the low number of tool classes at Chlorakas-Palloures which are always crafted prior to use (about 20% at Palloures and closer to 40% at Mosphilia and Lemba-Lakkous). It is thought that this may partly be due to differences in collection strategies between the Palloures project and the Lemba Archaeological Project. The Palloures project aimed to collect as many stones as possible on site, which were then cleaned and macro- and microscopically inspected by the ground stone team. This increases the potential for less readily identifiable ground stone tools to be recovered, such as non-crafted and lightly used polishing, grinding and percussive tools. These results, therefore, may be more representative of divergent field methods, rather than truly representing site di-

versity in the past. The differences are fairly significant, however, and it is possible that some of the variation witnessed reflects real contrasts in everyday practices, perhaps pertaining to curation and deposition, industrial and domestic activity and/or investment in stone working. Given the potential for collection strategies to have reduced the comparability of these assemblages, it is hoped that future analysis of tool biographies from all three sites can shed further light on site differences.

As is observed elsewhere, some buildings at Palloures are abandoned with a high quantity and/or quality of ground stone objects on or associated with their floors (Peltenburg, ed., 1985, 38; 1998, 234). At Palloures what is of particular note is the assemblage of objects recovered from within a storage vessel in Building 6 (Düring, et al. 2018). The ground stone adze/axe recovered from this context (GS\_571.1) was

found in close association with the earliest metal axe thus far found on Cyprus, and it mimics the form of this object. This supports the suggestion that metal types were being emulated in stone and suggests a close relationship between the two technologies (Croft, et al. 1998, 188). The stone adze/axe is made from a fairly striking greenish basalt with patches of white, chilled dyke margin and has finely ground, flattened facets. It is also exceptional in displaying very little evidence for direct or indirect use (hafting, reworking). These features of the stone axe, the associated assemblage and its seemingly purposeful deposition within an abandoned building perhaps suggests a more symbolic explanation for this assemblage. This collection echoes traditions of caching high quality, non-exhausted adzes and axes elsewhere during the Chalcolithic period.

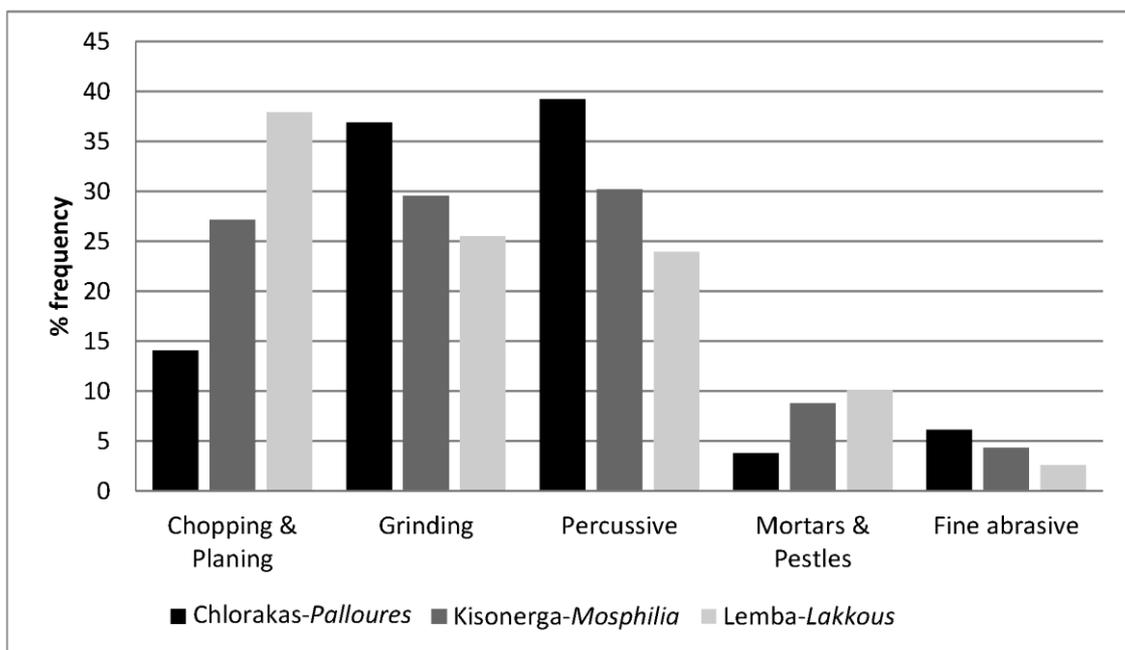


Figure 23. Bar chart showing the relative frequencies of different tool categories from stratified Middle to Late Chalcolithic deposits at Chlorakas-Palloures, Kisonerga-Mosphilia and Lemba-Lakkous. (Results from Mosphilia and Lemba based on Peltenburg, ed., 1985; 1998). Produced by Ellon Souter.

Further evidence for deposition of ground stone beyond the discard of everyday refuse is also tentatively suggested for deposits within Building 7. A total collection of 81 ground stone objects were recovered from a pit in the northwest of this building (Unit BV13\_14). This is the highest number of ground stone objects found from a discrete Late Chalcolithic context on Cyprus and exceeds figures recovered from most catastrophically destroyed building phases at Lemba-Lakkous, Mosphilia and Kisonerga-Mylouthkia. It may, therefore, be considered as representing a collection beyond the average household toolkit. Although the pit contained many object types which

would traditionally be considered 'expedient' (small, handheld percussive and abrasive tools), formal crafted tools also occur (16.25%), as do objects which exhibit evidence of shaping, despite being of a class normally categorised as 'expedient' (Frankel and Webb, 2006). Furthermore, many of the objects are complete and few are in an exhausted state. Although the large picrolite figurine GS\_732.1 is broken, it represents a sizeable slab of utilisable picrolite (7.5 x 6.9 x 2.6cm), which would not have been locally available and could have been curated for reuse. Another notable aspect of this assemblage is the presence of materials adhering to several of the tools, including lime

plaster on hammerstone/grinder GS\_733.22 and red ochre on pestle GS\_734.28. The deposition of caches of mixed object types within buildings is echoed particularly in traditions at Lemba (Buildings 3 and 10; Peltenburg, ed., 1985, 109-10 and 118-21). In light of evidence elsewhere for structured, symbolic deposition in settlement contexts, these mixed object stone caches require further interpretive consideration.

As is also the case at other Chalcolithic sites, many of the buildings at Chlorakas-Palloures contained few artefacts associated with their floors. This suggests that diverse deposition strategies were at play when buildings were vacated, with some being the focus of object deposition and others seemingly cleared on abandonment. This seems to be the case for Building 1 at the site, which, despite having little left behind, had a fairly unique ground stone collection. As well as containing the oversized, double-bowled mortar, GS\_818.1 (detailed above), this building was fitted with two stone benches, with one of these exhibiting polish, probably from this use, and light use as a percussive anvil (GS\_299.1). As well as having over-sized ground stone items inside, this building has a very large (as yet unregistered) stone vessel incorporated into its wall and, unusually, the door pivot was composed of a sizeable perforated stone within a small hole in the floor. These unusual forms and applications of stone suggests that Building 1 may not represent an average domestic unit, which may be supported by the considerable size of this structure.

It has been previously noted that most ground stone objects are recovered from within domestic structures during this time period (Elliott, 1985, 271-3; and Elliott-Xenophontos, 1998, 182). In contrast, a number of artefact rich midden deposits have been excavated thus far at Chlorakas-Palloures. Features of the ground stone assemblages recovered from these areas suggest that they may not only have been dumps for domestic refuse but could also have functioned as fairly active, external work spaces within the settlement. Future investigation of the site and analysis of objects from these levels hopes to further reveal the nature of these deposits.

## 5. CHIPPED STONE INDUSTRIES (VK)

Most lithic assemblages from Chalcolithic sites in the western Cyprus consist of mostly blank flakes, blades and chips, with a low proportion of (formal) tools of about 10-20% (McCartney, 2013, 311). The reduction strategy is characterized by a simple core technology, with cores with multiple reduction planes and variable flaking directions (McCartney,

1996). Variation in tool classes and reduction techniques is limited between sites and within the Chalcolithic. The largest differences in assemblages is between separate periods. Since the Neolithic a sharp decline of blade technology is observed and after the Chalcolithic glossed tools are strongly prevalent as opposed to Chalcolithic lithic assemblages (Finlayson, et al. 1998). A notable difference between Chalcolithic sites in western Cyprus is in raw material proportions. Following previous work on lithic assemblages from Prehistoric Cyprus, four main chert types are recognized on the basis of geological origin and visual characteristics of colour, inclusions and granularity (Rupp, et al. 1985; McCartney, 2007a, 307-9; Table 5).

The occurrence of 'Moni' chert appears to be unique and typical for western Cyprus (McCartney, 2007a, 310). However, amongst the sites in southwestern Cyprus the proportion of Moni chert is variable. The proportion of Moni chert is high at Souskiou-Laona, which is located near the chert source at Kholetria, and the same is true at Palloures, whereas Moni chert is rare at Lemba-Lakkous and Kisonerga-Mosphilia. The high proportion of Moni chert at Palloures was noted already during surveys of the area (Bolger, et al. 2004), and was interpreted as the result of either a preferential trade network with the Souskiou region, or, as Moni is observed to be preferred for the production of scrapers, as evidence of specialized tool manufacture at Palloures. That the high proportion of Moni at Palloures is not the result of its relative proximity to Souskiou-Laona, is indicated by the low proportion of this material group at the Chalcolithic site of Ayios-Savvas, which is located near the source area (Bolger, et al. 2004, 120).

At Politiko-Kokkinorotsos and Souskiou-Laona specialist toolkits were observed in the lithic material, in their case characterized by a propensity of so called *pieces d'esquillées*: bipolar knapped wedge shaped tools, possibly used for antler or wood working (Le Brun-Ricalens, 2006; McCartney, 2013, 312). Chipped stone artefacts are generally of poor craftsmanship at Chalcolithic sites compared to the ground stone component, which could signpost an insignificance of the material at these settlements. The occurrence of 'wedges', however, indicates that chipped stone artefact were crucial for specific crafts. The site-specific focus on these artefacts, in turn, indicates a local specialization in these crafts. It illustrates that, despite the limited current knowledge of the use of lithic artefacts at Chalcolithic sites, they can be key indicators of crafts and activities, and future use-wear studies may reveal and specify more of these.

Table 5. Characteristics of the four main chert types found at Palloures. For each chert type the main identifying characteristics are underlined.

Lithic raw material	Characteristics (after McCartney 2007A)
Lefkara Basal	<u>Opaque</u> slightly granular chert with colours ranging from white to dark red. At Palloures, most examples are <u>light yellow</u> .
Lefkara Translucent	<u>Translucent</u> , homogeneous chert with many <u>chalk inclusions</u> , colour varies from bright red to blue grey.
Translucent	High quality chert, <u>highly translucent and highly lustrous</u> . The material is very smooth and brittle. Colours range from bright reds to yellow and greens.
Moni	Variable quality, opaque, <u>grey to black</u> coloured chert, ranging from smooth and lustrous to mottled, granular surfaces.

### 5.1 The Palloures Chipped Stone Industries

The lithic assemblage collected during the 2015-2017 excavation seasons at Palloures comprises approximately 8.000 in total, of which 4365 have been analysed. The lithic assemblage was mainly studied by Victor Klinkenberg, Lily Graham-Stewart, and Catriona Ewing. The investigation focused on technological analysis, to identify the assemblage make up and large scale patterns. The study functioned as lithic analysis training for BA and MA students from Leiden University.

Possibly because many excavated deposits were within the plough zone, the assemblage is somewhat mixed in nature, and a more specific temporally delimited signature assemblage can perhaps be detailed in future seasons. For the current study the assemblage is described as a whole.

The material was divided in raw material categories, and then in technological types (core, flake, tool, etc). All artefacts which were retouched after flaking are considered a tool, these comprise 18% of the total assemblage. Tool type was defined by the type of retouch (steep, surface, notches). In addition we recorded cortical surfaces, thermal modification, patina and completeness of the pieces. The dimensions of all pieces were recorded, except for those flakes and

blades with a maximal dimension of less than 20 mm. Of these chips, we recorded the raw material, thermal modification and percentage of outer surface. In total we analysed 4365 artefacts of which 1975 were smaller than 20 mm and were mostly retrieved from sieving (45%).

As noted in the earlier surveys of the site (Bolger, et al. 2004), the lithic assemblage is dominated by nearly 50% Moni chert, followed by 34% Lefkara basal, 10% Lefkara translucent and 7% fine grained translucent (Table 5; Fig. 24). The size classes per raw material type indicate that the fragile translucent artefacts are generally smaller, while the Moni group contains the largest items. All raw material types display similar reduction techniques, based on multi-directional cores and direct percussion, yielding mainly short flakes. The proportion of artefacts with cortical surfaces varies slightly from 13% for translucent and 16% for Moni and Lefkara translucent. This, and a small percentage of core preparation elements indicates that the nodules were brought into the site at a similar reduction stage, probably as prepared cores. That the translucent artefacts are frequently at one end of the scale –slightly smaller in size, slightly less cortical surfaces, slightly more efficient reduction techniques– may indicate that this material was chipped more carefully.



Figure 24. Selection of chipped stone artefacts from Palloures. 1, 2: retouched flakes of Lefkara flint; 3, 6: retouched flakes Translucent flint; 5: core fragment Translucent; 4, 7, 8: flakes of Lefkara Translucent; 9: Scraper Moni flint; 10: retouched blade Moni flint.

Chert was used at Palloures to produce scrapers, burins/perforators and various notched cutting tools. With nearly 60% of all tools, the most frequent tool type in the Palloures assemblage is the ‘retouched piece’. This term was given to all pieces which were retouched after flaking, but which lacked defining features such as steep retouch or notches. Informal tools such as these and ‘utilised pieces’, flakes or blades without deliberate retouch but with use traces such as edge wear or use retouch, compose the majority of our sample.

Compared to other Middle Chalcolithic and Late Chalcolithic sites, this number is remarkably high (Fig. 25). There are two potential explanations for this high proportion. First, it is possible that the inhabitants of Palloures were simply not concerned with the production of formal tools and worked the material in an *ad hoc* manner. Second, there may be a discrepancy between how tools were classified in the excavation projects under consideration, and what were regarded as *ad hoc* tools, might have been classed elsewhere as formal tools. For the moment we expect that our interpretations do not diverge that much from the

lithic analysis of the Kisonerga material, but future research will help clarify with more certainty the origin of this difference between lithic assemblages.

To understand the changing tool strategies at Kisonerga-Mosphilia better, Carole McCartney calculated the ratios between several artefact types such as blank, core, and tool (Finlayson and McCartney, 1998, 253). These ratios taken together were used to “evaluate the underlying structure of the chipped stone industry”. To compare our dataset with this important site, Fig. 26 displays the ratios from both Palloures and the separate phases of occupation at Mosphilia. The figure illustrates that in most accounts, the ratios for the Palloures lithics are similar to those of Mosphilia. The most apparent differences are that at Palloures: first, there are more tools as opposed to chips; and second, a significantly low proportion of core trimming elements (CTE) were recorded. Especially the high ratio of tools in our assemblage indicates that the available material was used economically and that few artefacts went unused. This is also corroborated by the small size of cores, which are generally completely exhausted.

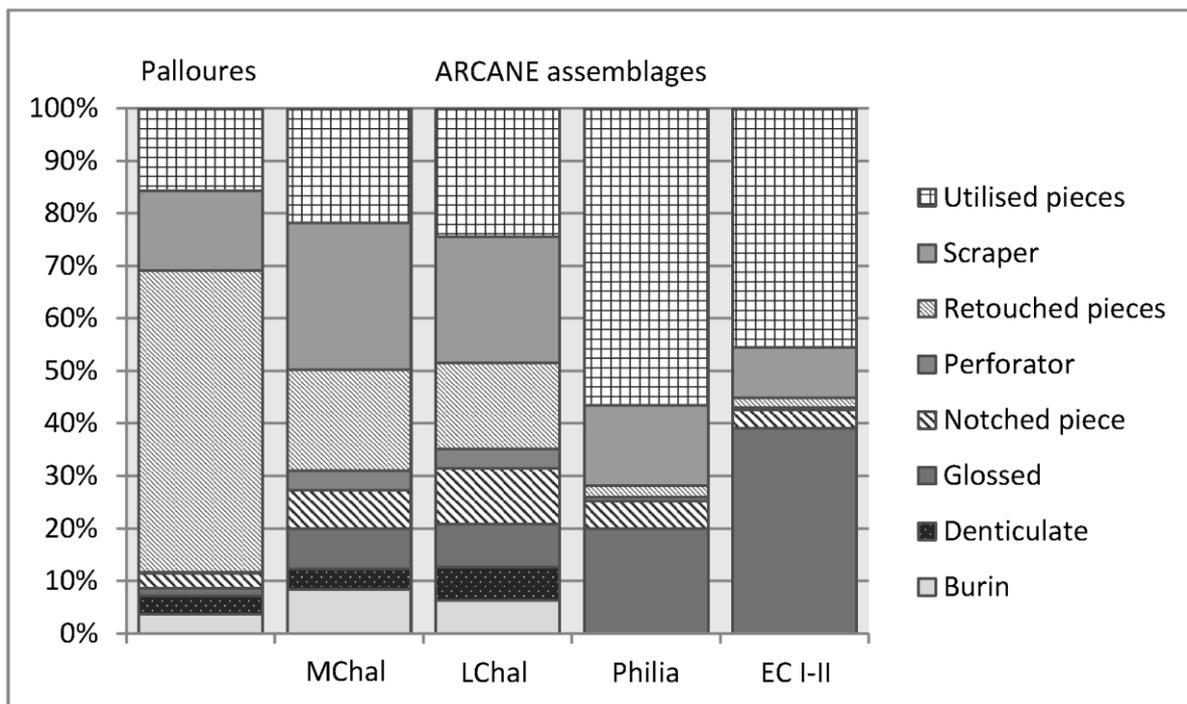


Figure 25. Ratios of main tool types from Palloures (left) and from assemblages recorded in the ARCANE database per archaeological period (McCartney, 2013; Peltenburg, et al. 2013). Produced by Victor Klinkenberg.

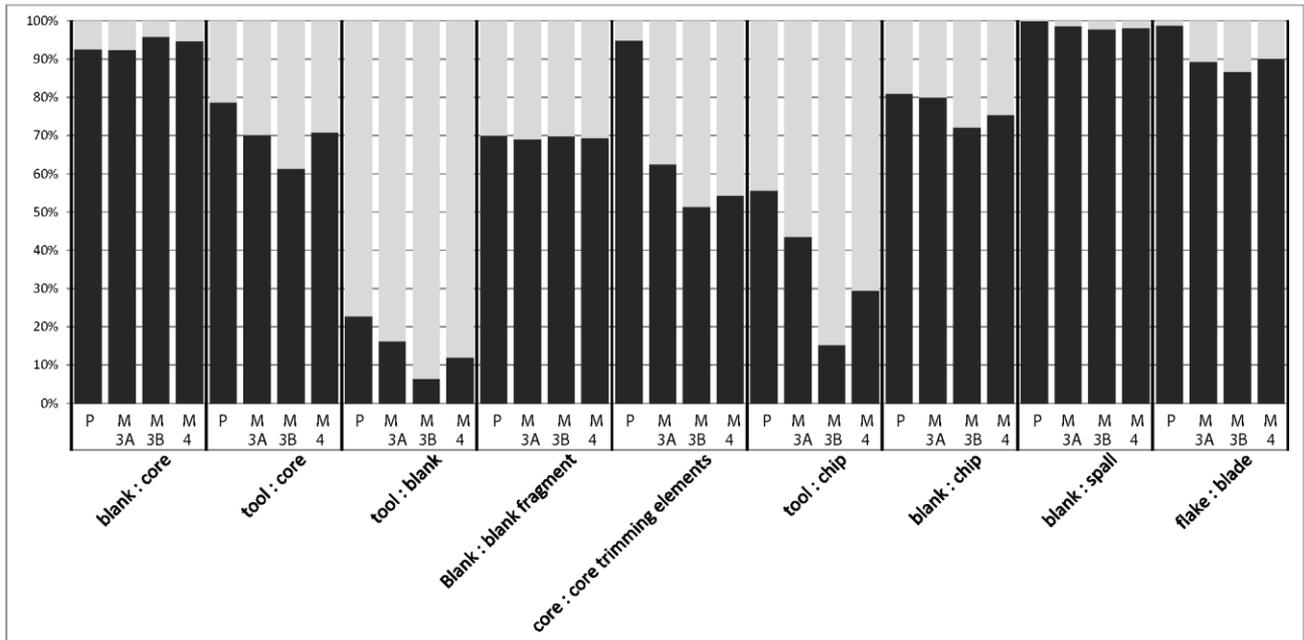


Figure 26. Artefact ratios from Palloures (P) and Kisonerga-Mosphilia phases 3A, 3B and 4 (M3A, M3B, M4). The black bars indicate the relative proportion of the first category, compared to the grey bars which indicate the proportion of the second category. Produced by Victor Klinkenberg.

An unusual collection of eight large Moni flakes was discovered in a notch in the wall located due east of the entrance of Building 1 above the pivot stone (Fig. 8). The artefacts measure between 55 and 125 mm in maximal dimension and all exhibit steep re-touch on one side. The flakes and the blade vary in size and morphology but are flaked in a similar manner, with direct percussion, from a large core using a single reduction surface with a parallel flaking direction. The striking appearance of these blanks is all the more significant considering the generally poor craftsmanship or expedient strategies of the Palloures knappers, as manifested in the chipped stone assemblage at large. The artefacts display no obvious signs of use or retouch after the initial steep retouch was applied. As these Moni blanks were imported from some distance it is likely they were partly produced near the source, and it is possible that the cache represents the final shape in which these artefacts were transported to sites such as Palloures. The skilled production of these blanks may indicate that they were produced by an experienced knapper responsible also for the extraction of the material at the source. The use of large flakes as cores has been suggested before for Mylouthkia and Palloures, and this practice would explain the relatively small size of artefacts and the discoidal and multidirectional reduction strategies used at these sites (Bolger, et al. 2004, 119). Considering the transport effort involved in acquiring the tools and the fact that the 'scrapers' were probably unused,

the context in which they were found can be interpreted as a cache which was left behind as a material stash or for ritual purposes.

## 5.2 The Palloures Chipped Stone in Context

The vast majority of chipped stone at Palloures was discovered in sediments which were often within the reach of ploughs. A contextual or spatial analysis of tool types and reduction methods is therefore not yet feasible for this site. The currently investigated assemblage displays a remarkable homogeneity from one trench to the next, in terms of raw material, thermal modification, artefact type, and cortical surface proportions.

The chipped stone assemblage from Palloures is in most regards similar to that of contemporary, neighbouring sites in the southwestern Cyprus. The assemblage is characterized by a high proportion of informal tools, which emphasizes an apparently *ad hoc* attitude towards tool production. Apart from the proportion of informal tools in Chalcolithic contexts, a further problematic issue is that, due to a lack of use wear studies on this material, it is unclear what the lithic artefacts were used for. A test study into the feasibility of microscopic use wear analysis for chipped stone from Kisonerga-Mosphilia indicates that these traces are well preserved and can be recorded, which may inspire future studies (Finlayson and McCartney, 1998, 239).

One reason for the high proportion of informal tools may lie in the available cores. If the large flakes from the hoard in Building 1 were typical cores for the

inhabitants, the poor quality of the end products is somewhat excused. This core type does not facilitate efficient parallel knapping, or the production of uniformly shaped flakes.

Despite the unattractive appearance of most chipped stone material from Palloures, it was likely an important material for the occupants of the site. What activities were aided with the material is for now unclear, but examples from other Chalcolithic sites have shown that the chipped stone component may demonstrate the presence of specialized craft activities, and therefore holds key information for daily life and domestic economy of Chalcolithic Cyprus.

## 6. ANIMAL REMAINS OF CHLORAKAS-PALLOURES (PC)

Consideration of the faunal remains from the first three seasons of work at Palloures is necessarily limited here to a brief overview. At the time of writing the results of the ceramic analysis are incomplete, but it seems likely that even if a minority of contexts are Middle Chalcolithic, at least the great majority of the animal bones come from contexts that are of Late Chalcolithic date, and it is assumed for present purposes that all Chalcolithic animal bone is Late Chalcolithic. Although superficial contexts are not reliable, they yielded a large proportion of the animal bone that has been recovered from Palloures during these initial seasons of excavation. Since it is probable that this material is overwhelmingly of the same date as the underlying archaeology, that is Late Chalcolithic, it has been included in this general overview. A very limited quantity of material came from post-Chalcolithic (Hellenistic to Byzantine and modern) contexts and is not considered here. Additionally, the comparatively fresh condition of a small quantity of animal bone found in both superficial and stratified Chalcolithic contexts indicates that it is at least very probably intrusive and not ancient, and this material has also been excluded from consideration.

The Palloures animal bones were mainly well-preserved, but often covered with a mineral encrustation that created difficulties for identification, recording and measurement. Three seasons of excavation have yielded a total of 58.252 kg of animal bone of which 63% could be identified. Numbers (NISP) and weights (g) of identified fragments are presented in table 6. NISP and weight figures for deer exclude numerous pieces of antler that amount to 4.172 kg in weight. Also excluded are two equid teeth (weighting 68g) from topsoil contexts that appear ancient but are almost certainly post-Chalcolithic, and two mouse bones that are likely to be intrusive. In addition to the mammals, birds (7 fragments), crabs (11 fragments), fish (8 fragments), and marine turtle (1 fragment) have been identified.

**Table 6. Numbers (NISP) and weights (g) of identified mammalian fragments from Late Chalcolithic Palloures. The caprines include 62 goat and 30 sheep.**

species	NISP		Weight	
	No.	%	kg	%
Deer	860	37.0	17.872	49.0
Pig	1090	46.9	14.234	39.1
Caprine	341	14.7	4.282	11.7
Fox	32	1.4	0.044	0.1
Dog	1		0.007	
Cat	1		+	
<b>total</b>	<b>2325</b>	<b>100</b>	<b>36.439</b>	<b>99.9</b>

### 6.1 The Animals

The Palloures assemblage is dominated by the remains of fallow deer (*Dama mesopotamica*) and pig which, together, account for 84% of identifiable fragments or 88% of bone by weight. It should be noted that whilst deer bones are somewhat less abundant than pig bones amongst the identified fragments, their remains are more abundant than pig remains when the weights of identified material are considered; the average weight of an identified deer fragment is 21g compared with 13g for pig. This is due to the larger body size of deer. Caprines are far less abundant by either means of assessment, and included around twice as many goats as sheep. The deer would have been free-living, hunted animals, whilst it is presumed that at least the majority of the pigs were husbanded swine. Goats and a smaller number of sheep are also likely to have been herded stock. Fox may have been hunted for its pelt and it is no surprise to find that that domestic dog and cat are present.

An equid is represented by two upper teeth that come from superficial levels in two adjacent grid squares (BQ10 & BR10). Although both teeth are encrusted and clearly not recent intrusions, it is highly unlikely that they date as early as the Chalcolithic period since equid has not been securely identified in Cyprus prior to the Bronze Age.

Seven bird bones encompass several species. A distal tarsometatarsus may confidently be attributed to a stork (*Ciconia cf. ciconia*). The proximal half of a humerus shaft is probably also of stork, and a very damaged proximal tarsometatarsus may possibly be so. Two coracoids may confidently be attributed to crane (*Grus grus*) and to woodpigeon (*Columba palumbus*), a proximal carpometacarpus is confidently attributed to crow (*Corvus corone*), and a distal ulna is fairly confidently identified as redwing (*Turdus iliacus*).

A few remains of marine creatures include eight fish bones, two claws of a marine crab, and an ulna of a marine turtle. These marine species are poorly represented at Palloures. One of the marine crab claws is

a substantial specimen that has been ground down at both ends so that it could have been threaded as a bead. This is a highly unusual artefact in the writer's experience of Cypriot faunal remains and may be unique. Both this and the other marine crab claw most probably derive from *Eriphia verrucosa*, the warty or yellow crab, which occurs throughout the Mediterranean and makes good eating.

A few other crab remains are of the freshwater crab *Potamon potamios*. Of 8 claws attributed to this species, three are burnt, clearly suggesting that they had been cooked. A final fragment of a crab claw is burnt and may well be of *Potamon*.

## 6.2 The Palloures Animal Remains in Context

Since it is expected that Palloures will eventually yield a greatly expanded faunal sample, and that intended future work will come to deal increasingly with contexts that are datable and of higher integrity than most of those that were investigated during these first three seasons, it would seem premature to offer more than a minimum of interpretation or discussion here. Perhaps the main point that may be

stressed at this early stage in the work is that the taxonomic composition of the Palloures bone assemblage that has been retrieved so far appears to fall into a regional pattern that has been established by the previous work of the Lemba Archaeological Project at nearby sites in the coastal lowlands of western Cyprus.

It will be clear from table 7 that Chalcolithic bone assemblages from Chlorakas-Palloures, Lemba-Lakkous and the Kisonerga sites of *Mosphilia* and *Mylouthkia* all include large proportions of both deer and pigs which together account for 77-87% of the remains of the main animals. Caprines are the remaining taxon amongst the animals that are commonly represented at these sites, and these consist mainly of goats with only a minority of sheep; accounting for around a third of caprines, sheep seem particularly prominent at *Palloures*. The overall similarity between *Palloures* and the period 4 (LChalc) and period 3B (MChalc) samples from *Mosphilia* is particularly close, with pig remains somewhat outnumbering deer remains in all three instances, and the occurrence of caprine remains restricted within the range of ca 15-19%.

Table 7. Identified remains of the main animals (NISP) in several Chalcolithic bone assemblages from southwestern Cyprus (Figures for the Kisonerga sites and Lemba taken from Croft, 2003, table 20. 14 (*Mylouthkia*); Croft, 1998, table 22. 10a (*Mosphilia*); Croft 1991, table 2 (*Lemba*)).

Site / level	deer		pig		caprines		Total	
	No.	%	No.	%	No.	%	No.	%
Chlorakas-Palloures (LChalc)	860	37.5	1090	47.6	341	14.9	2291	100
Kisonerga-Mosphilia period 4 (LChalc)	2497	37.7	2877	43.5	1241	18.8	6615	100
Kisonerga-Mosphilia period 3B (MChalc)	483	37.1	626	48.1	191	14.7	1300	99.9
Lemba-Lakkous (M-LChalc)	546	42.7	437	34.2	295	23.1	1278	100
Kisonerga-Mosphilia period 3A (Initial MChalc)	409	55.5	196	26.6	132	17.9	737	100
Kisonerga-Mylouthkia period 2 (EChalc)	1217	57.1	536	25.1	380	17.8	2133	100

The faunal evidence from Lemba-Lakkous and *Mosphilia*, along with that from Early Chalcolithic Kisonerga-Mylouthkia, has long been understood to indicate a decline in deer, and increasing reliance on pig in the region during the Chalcolithic period (Croft, 1991, 72). These changes probably reflect the diminishing contribution through time that hunting was able to make to the subsistence of an expanding human population in the region (Croft, 1991, 75). Intended further work at *Palloures* should provide additional Late Chalcolithic faunal material to document the nature of the animal economy during this period, and if a significant quantity of Middle Chalcolithic material also emerges in due course this will enable not only an assessment of subsistence stability/change at this particular settlement but also enhance our understanding of developments within the broader regional economy.

## 7. THREE SEASONS AT PALLOURES: A FIRST ASSESSMENT (BD)

Given decades of systematic and well published research by the Lemba Archaeological Project on the nearby Chalcolithic sites of Lemba-Lakkous, Kisonerga-Mosphilia, and Kisonerga-Mylouthkia, one could ask – issues of heritage and salvaging archaeological data aside – what yet another excavation of a Chalcolithic site in the relatively small region of southwestern Cyprus could possibly add to our knowledge of this period. The answer is: surprisingly much. After only three seasons of excavation at Chlorakas-Palloures, a series of finds have started to add significantly to our understanding of the period.

First, of great significance is the find of the monumental Late Chalcolithic Building 1, which its 14 meter diameter, well-built walls, a large double dip mortar and two stone benches, a gigantic hearth platform,

and an thick white plaster covering the floor, walls, threshold and portico areas. The scale of this building is unparalleled in Late Chalcolithic Cyprus, and suggests that house elaboration might have been more important in social competition than so far apparent (Klinkenberg 2022). A similar differentiation of houses was of course, previously established for the Middle Chalcolithic, in particular at the site of Kisonerga-Mosphilia, but not for the Late Chalcolithic.

Second, the find of a significant number of copper artefacts, including the first axe that clearly predates the Philia period, suggests that metal artefacts of substantial size were important in Cyprus already in Chalcolithic societies, and provide crucial evidence on the initial stages of metal consumption (and possibly production) in Chalcolithic Cyprus. That the Chlorakas-Palloures community was involved in trade networks is also suggested by the presence of relatively high quantities of Moni chert and pottery imported from other parts of the island. This conclusion is, of course, one that fits with similar observations of imports at sites such as Kisonerga-Mosphilia and Souskiou-Laona, and earlier non-ornamental metal finds at for example Erimi-Pamboula and Lemba-Lakkous.

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## REFERENCES

- Bolger, D. (2013) A matter of choice: Cypriot interactions with the Levantine mainland during the late 4th-3rd millennium BC. *Levant*, Vol. 45, pp. 1-18
- Bolger, D., Manning, S. W., and Peltenburg, E. J. (1998) Multiperiod Kissonerga: The sequence. In *Excavations at Kissonerga-Mosphilia 1977-1995*, E. J. Peltenburg, Jonsered, Paul Åströms Förlag, pp. 5-21.
- Bolger, D., McCartney, C., and Peltenburg, E. J. (2004) Regional interaction in the prehistoric west: Lemba archaeological project western Cyprus survey. In *Archaeological Field Survey in Cyprus. Past History, Future Potentials*, M. Iacovou (ed.), London, British School at Athens, pp. 105-123.
- Buikstra, J. E. and Ubelaker, D. H. (1994) *Standards for Data Collection from Human Remains*. Fayetteville, Arkansas Archaeological Survey.
- Christodoulou, D. (1959) *The Evolution of the Rural Land Use Pattern in Cyprus*. London, Geographical Publications Limited.
- Clarke, J., Brooks, N., Banning, E. B., Bar-Matthews, M., Campbell, S., Clare, L., Cremaschi, M., di Lernia, S., Drake, N., Gallinaro, M., Manning, S., Nicoll, K., Philip, G., Rosen, S., Schoop, U.-D., Tafuri, M. A., Weninger, B., and Zerboni, A. (2016) Climatic changes and social transformations in the Near East

- and North Africa during the 'long' 4th millennium BC: A comparative study of environmental and archaeological evidence. *Quaternary Science Reviews*, Vol. 136, pp. 96-121.
- Croft, P. W. (1991) Man and beast in chalcolithic Cyprus. *Bulletin of the American Schools of Oriental Research*, Vol. 282/283, pp. 63-79.
- Croft, P. W. (1998) Animal remains: Discussion. In *Excavations at Kissonerga-Mosphilia 1979-1992 II*, E. J. Peltenburg (ed.), Edinburgh, University of Edinburgh, pp. 295-316.
- Croft, P. W. (2003) The animal bones. In *The colonisation and settlement of Cyprus. Investigations at Kissonerga-Mylouthkia, 1977-1996*, E. J. Peltenburg (ed.), Sävedalen: Paul Åströms Förlag, pp. 225-237.
- Croft, P. W., Peltenburg, E. J. and Tite, M. (1998) Other artefacts. In *Excavations at Kissonerga-Mosphilia 1979-1992 II*, E. J. Peltenburg (ed.), Edinburgh, University of Edinburgh, pp. 188-201.
- Dikaios, P. (1961) *Sotira*. Philadelphia, The University Museum, University of Pennsylvania.
- Dikaios, P. (1962) The stone age. In *The Swedish Cyprus Expedition IV*, P. Dikaios J. R. B. Stewart (ed.), Lund: Swedish Cyprus Expedition, pp. 1-204.
- Düring, B. S., Klinkenberg, V., Paraskeva, C., Kassianidou, V., Souter, E., Croft, P. W. and Charalambous, A. (2018) Metal artefacts in chalcolithic Cyprus: New data from western Cyprus. *Mediterranean Archaeology and Archaeometry*, Vol. 18, pp. 11-25.
- Düring, B. S., De Ceuster, S., Degryse, P. and Kassianidou, V. (2021) Transformative copper metallurgy in Chalcolithic Cyprus: a reappraisal. *Antiquity*, Vol. 95, No. 381, pp. 670-685.
- Elliott, C. (1985) The ground stone industry. In *Excavations at Lemba-Lakkous, 1976-1983*, E. J. Peltenburg (ed.), Göteborg, Paul Åströms Förlag, pp. 70-93 and 161-195.
- Elliott-Xenophontos, C. (1998) Ground stone tools. In *Excavations at Kissonerga-Mosphilia 1979-1992*, E. J. Peltenburg (ed.), Jonsered: Paul Åströms Förlag, pp. 168-187.
- Finlayson, B. and McCartney, C. (1998) The chipped stone report. In *Excavations at Kissonerga-Mosphilia, 1979-1992*, E. J. Peltenburg (ed.), Edinburgh, University of Edinburgh, pp. 249-294.
- Finlayson, B., Gratuze, B. and McCartney, C. (1998) The chipped stone assemblage. In *Excavations at Kissonerga-Mosphilia, 1979-1992*, E. J. Peltenburg (ed.), Jonsered, Paul Åströms Förlag, pp. 202-206.
- Frankel, D. and Webb, J. M. (2006) *Marki Alonia: An Early and Middle Bronze Age settlement in Cyprus, Excavations 1995-2000*. Sävedalen, Paul Åströms Förlag.
- Gamble, M. (2011) *Health and Disease in Chalcolithic Cyprus: A Problem-Oriented Palaeopathological Study of the Human Remains*. Newcastle University, unpublished PhD thesis.
- Klinkenberg, V. (2022) Building biographies of the Cypriot Chalcolithic. *Levant*, pp. 1-14.
- Langgut, D., Finkelstein, I., Litt, T., Neumann, F. H., and Stein, M. (2015) Vegetation and climate changes during the bronze and iron ages (~3600-600 BCE) in the southern Levant based on palynological records. *Radiocarbon*, Vol. 57, pp. 217-235.
- Le Brun-Ricalens, F. (2006) Les pièces esquillées: état des connaissances après un siècle de reconnaissance. *Paléo*, Vol. 18, pp. 95-114.
- Lunt, D. A. (1985) Report on the human dentitions. In *Excavations at Lemba-Lakkous, 1976-1983*, E. J. Peltenburg (ed.), Göteborg, Paul Åströms Förlag, pp. 54-58 and 150-153.
- Lunt, D. A., Peltenburg, E. J. and Watt, M. E. (1998) Mortuary practices. In *Excavations at Kissonerga-Mosphilia 1979-1992*, E. J. Peltenburg (ed.), Jonsered, Paul Åströms Förlag, pp. 65-92.
- Malizewski, D. (2013) *Chalcolithic and Bronze Age Pottery from the Field Survey in Northwestern Cyprus, 1992-1999*. Oxford, Archaeopress.
- Mantzourani, E. (2003) Kantou-Kouphovounous: A late neolithic site in the Limassol district. In *Le Néolithique du Chypre*, J. Guilane and A. LeBrun (ed.), Paris, De Boccard, pp. 55-98.
- McCartney, C. (1996) *The Analysis of Variability in 'Simple Core Technologies': Case Studies of Chipped Stone Technology in Post-PPN Assemblages from the Levant*. University of Edinburgh, unpublished PhD Thesis.
- McCartney, C. (2007a) Prehistoric chert use in Cyprus. In *Chert Availability and Prehistoric Exploitation in the Near East*, C. Delage (ed.), Oxford, Archaeopress, pp. 304-326.
- McCartney, C. (2007b) Lithics. In *On the Margins of Southwest Asia*, J. Clarke, C. McCartney and A. Wasse (ed.), Oxford: Oxbow, pp. 72-90.
- McCartney, C. (2013) Lithic artefacts. In *Associated Regional Chronologies for the Ancient Near East and the Eastern Mediterranean I: Cyprus*, E. J. Peltenburg (ed.), Turnhout, Brepols, pp. 299-312.
- Mogelonsky, M. K. (1996) Ground stone. In *Alamra: A Middle Bronze Age Settlement in Cyprus*, J. E. Coleman, J. A. Barlow, M. K. Mogelonsky and K. W. Schaar (ed.), Jonsered: Paul Åströms Förlag, pp. 143-176.
- Niklasson, K. (1991) *Early Prehistoric Burials in Cyprus*, Jonsered, Paul Åströms Förlag.

- Paraskeva, C. (2016) *Chronology, Topography and Social Change: A Multi-Linear Perspective on the Chalcolithic to Bronze Age Transition in Cyprus*. University of Edinburgh, unpublished PhD thesis.
- Paraskeva, C. (2019) Chronology. In *Figurine Makers of Prehistoric Cyprus*, E. J. Peltenburg, D. Bolger, and L. Crewe, (ed.), Oxford, Oxbow Books, pp. 7-46.
- Peltenburg, E. J. (2007) East Mediterranean interaction in the 3rd millennium BC. In *Mediterranean Crossroads*, S. Antoniadou and A. Pace (ed.), Athens, Pierides Foundation, pp. 139-159.
- Peltenburg, E. J. (ed.) 1985. *Excavations at Lemba-Lakkous, 1976-1983*. Göteborg, Paul Åströms Förlag.
- Peltenburg, E. J. (ed.) 1998. *Excavations at Kissonerga-Mosphilia 1979-1992*. Jonsered, Paul Åströms Förlag.
- Peltenburg, E. J. (ed.) 2003. *The Colonization and Settlement of Cyprus: Investigations at Kissonerga-Myllouthkia, 1976-1996*. Sävedalen, Paul Åströms Förlag.
- Peltenburg, E. J. (ed.) 2006. *The Chalcolithic Cemetery of Souskiou-Vathyrkakas, Cyprus: Investigations of Four Missions from 1950 to 1997*. Nicosia, Department of Antiquities.
- Peltenburg, E. J. (ed.) 2013. *Associated Regional Chronologies for the Ancient Near East and the Eastern Mediterranean I: Cyprus*. Belgium, Brepols.
- Peltenburg, E. J., Peters, C., Thomas, G. and Tipping, R. (1998) Structures and other occupational evidence from the Aceramic Neolithic to the Early Bronze Age. In *Excavations at Kissonerga-Mosphilia 1979-1992 II*, E. J. Peltenburg (ed.), Edinburgh, University of Edinburgh, pp. 22-64.
- Peltenburg E. J., Bolger D., Kinsey M., McCarthy A., McCartney C. and Sewell D. (2006) Investigations at Souskiou- Laona settlement, Dhiarizos Valley, 2005. *Reports of the Department of Antiquities of Cyprus*, Vol. 2006, pp. 77-105.
- Phrenice, T. (1969) A newly developed visual method of sexing in the os pubis. *American Journal of Physical Anthropology*, Vol. 30, pp. 297-301.
- Roberts, N., Brayshaw, D., Kuzucuoğlu, C., Perez, R., and Sadori, L. (2011) The mid-holocene climatic transition in the Mediterranean: Causes and consequences. *The Holocene*, Vol. 21, pp. 3-13.
- Rupp, D. W., Sørensen, L. W. King, R. H. and Fox, W. A. (1985) Canadian Palaipaphos (Cyprus) survey project: Second preliminary report, 1980-1982. *Journal of Field Archaeology*, Vol. 11, pp. 133-154.
- Schaefer, M., Black S., and Scheuer L. (2009) *Juvenile Osteology: A Laboratory and Field Manual*. London, Elsevier.
- Schubert, B. K. H. (2018) *What is in a House? An Investigation on the Differentiation of Chalcolithic Architecture in Cyprus*. Lei den University, unpublished MA Thesis.
- Swiny, S. (ed.) (1986) *The Kent State University Expedition to Episkopi-Phaneromeni II*. Nicosia, Paul Åströms Förlag
- Swiny, S., Rapp, G., and Herscher, E. (ed.) (2003) *Sotira Kaminoudhia: An Early Bronze Age Site in Cyprus*. Boston, American School of Oriental Research.
- Thomas, G. (2005) *The Prehistoric Buildings of Chalcolithic Cyprus: The Lemba Experimental Village*. Oxford: Archaeopress.
- Todd, T. W. (1920) Age changes in the pubic bone I. The white male pubis. *American Journal of Physical Anthropology*, Vol. 3, pp. 285-334.
- Xenophontos, C. (1985) Environment and resources. In *Excavations at Lemba Lakkous 1976-1983*, E. J. Peltenburg (ed.), Göteborg, Paul Aström Förlag, pp. 6-8.