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THE MYCENAEAN SITE OF KASTROULI, PHOKIS, GREECE: THIRD EXCAVATION SEASON, JULY 2018

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ABSTRACT

The paper deals with the results of the third consecutive season of excavations in the Late Helladic site of Kastrouli, southern Phokis, during summer 2018. Excavations resumed and concluded in the Building 1, which dates in the LH IIIC Early. Research has been conducted as well in three more buildings (2a, 2b, 3), and in the looted chamber Tomb B. A survey in the plane of Miteles identified drainage works of later dates, which however may represent improvements and adaptation of works conceived already in the Mycenaean times. Finally, some considerations are advanced on the labour investment for the Kastrouli fortifications and its implications for its population calculation, and a brief overview of the results achieved thus far by the entire project.

KEYWORDS: Kastrouli, Late Helladic III, Mycenaean, chamber tomb, ceramics, excavation, survey, drainage work.

1. INTRODUCTION

The systematic archaeological excavation in Kastrouli settlement (Desfina, near Delphi, Phokis, southern Greece; phase 1 2016-2021) of the first phase has been completed. Previous archaeological works and a chronicle of research have already been published (Sideris et al., 2017; Sideris and Liritzis 2018; Koh et al., 2020; Liritzis 2021). The archaeometrical work regarding dating by C14, luminescence, the characterization and provenance, aDNA etc have also been reported in various journals (see: Liritzis 2021).

The third season of archaeological and archaeometric research in the Mycenaean site of Kastrouli, near Desfina and south of Delphi in Phokis, took place between 9 and 27 July 2018. As during the previews seasons, the direction of the archaeological excavations was entrusted to Dr. Athanasios Sideris and the archaeometric studies, as well as the overall coordination of the project, to Prof. Ioannis Liritzis, both of the Department of Mediterranean Studies of the University of the Aegean, Rhodes. During this season, in the excavations participated as well Asst. Prof. Andrew Koh of the Brandeis University, USA, and Asst. Prof. Kate Birney of the Wesleyan University, USA, with twenty students from both universities. Further participants included Argyro Maria Boutsi for the topographical drawings, Miranda Apostolakou for other architectural drawings, and Anastasia Blazevi as management assistant. Five workers and a guardian were all locals from the village of Desfina and had participated in the previous seasons as well. The georeference system has been set up by Prof. Andreas Georgopoulos of the National Technical University, Athens. The air photography and orthophotography with drone is due to Ian Roy of the Brandeis University. Further detailed credits for specific tasks are given in a previous publication (Koh et al. 2020, 70) (see also www.kastrouli.org). The conservation of the finds was entrusted to Dr. Christos Karydis and Dr. Manto Panagopoulou of the University of the Ionian Islands. Anthoula Tsaroucha supervised the works on behalf of the Archaeological Eforeia of Phokis.

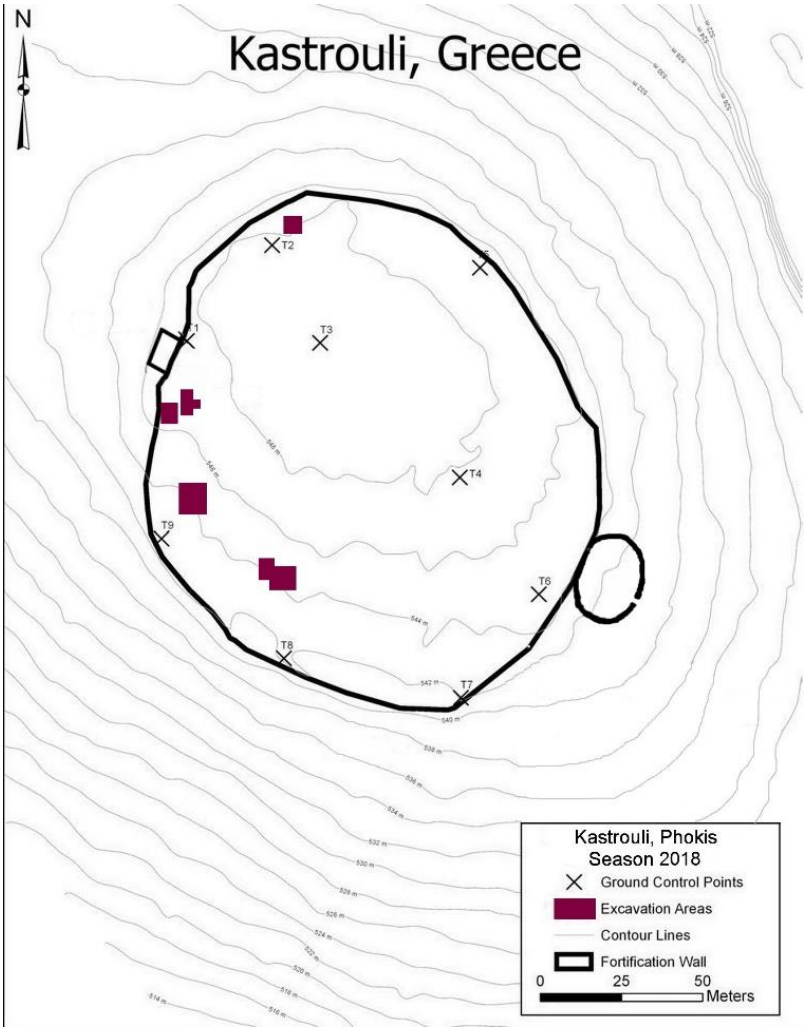

Figure 1. The Kastrouli site with the fortification wall and the areas of excavation in 2018. Map by A. Sideris adapted from Levy et al. 2018, fig. 9.37.

Excavations have been conducted in five different trenches, all of which are located near the inner face of the fortification wall of Kastrouli, as planned (**Fig. 1). T**he archaeological research comprised also of a survey of the Miteles small depression, in the south of the Kastrouli promontory.

- We continued and concluded the excavation of the Building 1 on the south-western part of the site.
- We started the excavation of the long Building 2, identified as such during the 2017 season and now proven to be composed of at least two different buildings, located on the southern terrace of the site.
- We cleaned up and excavated the looted Tomb B, located just in the south of the Tomb A and close to the western side of the fortification wall.
- We continued the excavation of the Building 3, identified and partly excavated since the 2016 season, and located immediately on the east of the Tombs A and B.
- We made a test trench in a pile of stones close to the north-western side of the fortification wall, as it has been suspected that another tomb might have been located there, but with negative results.

We also conducted a survey of the Miteles plane and documented two drainage structures.

2. BUILDING 1

The excavation of the Building 1 (**Figs. 2-4**) continued on from the southern corner, where a destruction layer has been discovered, comprising large undecorated sherds from oversized vessels (most probably pithoi), as well as some sherds of fine table ware. Among the large sherds, some of which are tile-thick, there is a noticeable out-turned rim of a small pithos or a chytra, presumably burned, with its inner side turned black and the outer one vivid red. Among the fine pottery we encountered rims from kylikes and alabastra, as well as at least two U-shaped kylix handles. At the same spot we located a shell of the marine gastropod *Conus mediterraneus*. From other locations in the building, mainly from its western and central areas, shells of other molluscs (*Patella vulgata*) and gastropods (*Cerinthium vulgatum* and *Spondylus gederopus*) have been collected, all very common on the shores of the Corinthian Gulf and all of them perfectly edible.

Figure 2. The Building 1 from SW.

Figure 3. Drone photography of the Building 1. Photo by I. Roy

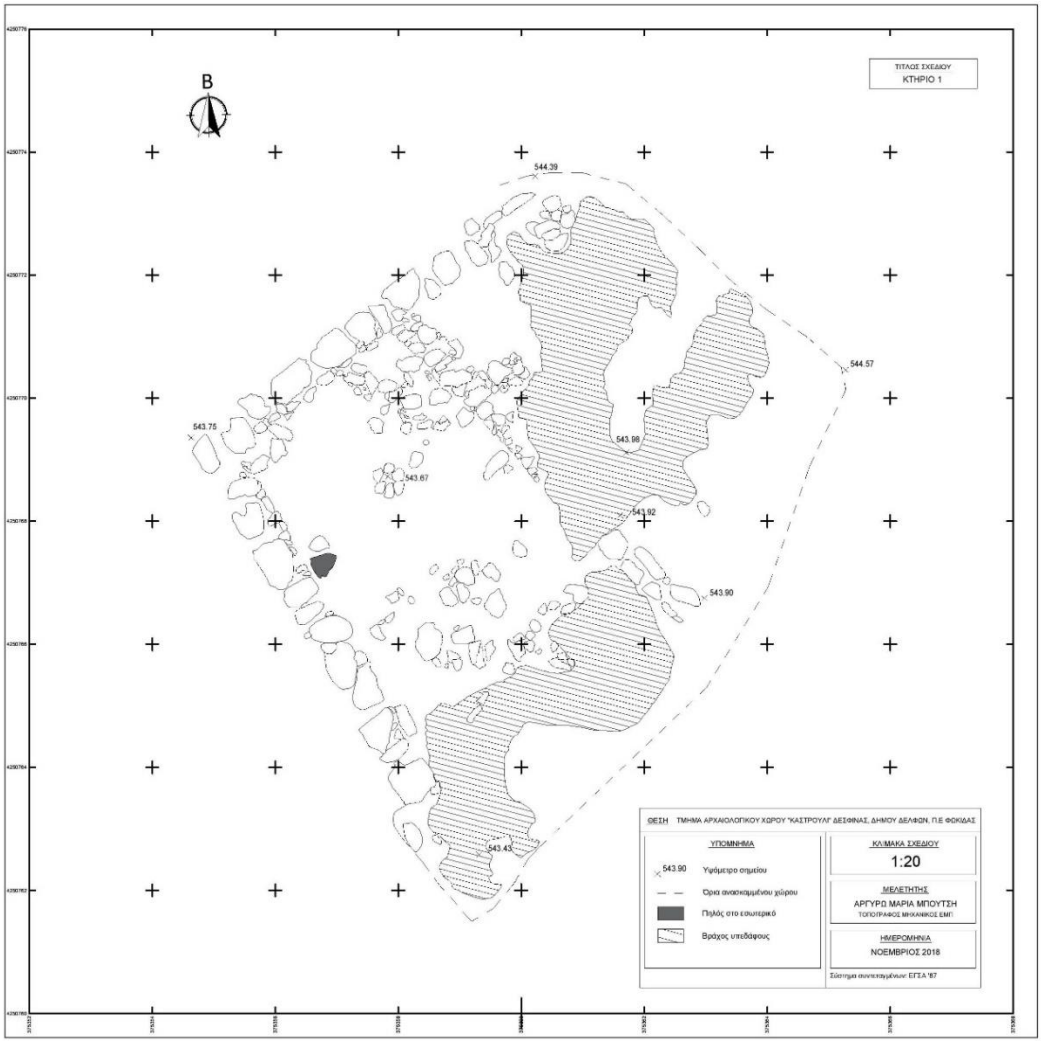

Figure 4. Plan of the Building 1. Drawing by A. M. Boutsi.

From the centre of the south-eastern area of the building we collected large fragments of burnt clay, some of which bore branch imprints on one side, while others were smooth on both sides. Their clay is rose-yellowish with very few organic inclusions. Their considerable thickness, ranging between 7 and 11 cm, seems prohibitive for the hypothetical covering of a roof made of branches. They represent most probably fragments of wall coating, while those with both sides smooth may have belonged to a storage structure in contact with the south-western wall, near the foundation of which they have been located. Some traces belonging to the base of this structure have been found 2.30 m east of the western inner corner of the building, in a depth of 40 cm. It was presumably a rectangular structure, with at least its three corners smoothened and rounded. If it does not represent the lower part of a storage facility, then it might have been the rim of a hearth, although the number of clay fragments and especially those pieces with both sides smooth, favour the former hypothesis. From the same location comes as well a large sherd of pithos with an incised linear motif.

In the south-eastern area of the building a wedge-shaped instrument with rounded one side has been found; it is made of a hard dark-green to olive-green stone and may have been used as a grindstone. Charcoal in considerable quantity has been collected from three different locations in the southern and south-eastern areas of the building, in a depth of 30 to 40 cm below the surface. It must represent the final destruction of the Building 1 by fire. Its concentration in the southern parts of the building, together with its nearly total absence in the northern parts, indicates that it has been washed there due to the slight declivity of the terrain.

Approximately 0.5 m NNE from the centre of the Building 1 and in 40 cm of depth, we discovered a high stemmed kylix broken in pieces, from which is now restored (Figs. 5-6). It is made of beige-brown clay, has a lipless, nearly conical bowl with very slightly inturning rim, and was entirely covered by a red-brown buff slip, now mostly warn out (FS 274). It measures 16.7 cm in height, 15.4 cm rim diameter, and 6.8 cm base diameter. Similar kylikes are known from Korakou in Corinthia (Mountjoy 1999, 230-231, fig. 74, nos. 185-186), Phylakopi in Melos (Mountjoy 1999, 918, fig. 373, no. 149), and Astypalaia in the southern Aegean (Mountjoy 1999, 1144, fig. 470, no. 11), all dated in the LH IIIC Early. Comparable versions with handles somewhat closer to the wall or with a wide preserved band under the rim are known from Lefkandi in Euboea (Mountjoy 1999, fig. 274 nos. 72-73 and fig. 168 no. 83), Mygdalia in Achaea (LH IIIC Middle; Papazoglou & Paschalidis 2017, 455, pl. CLXXVIII a-b), Teichos Dimaion in Achaea and Kephalonia (LH IIIC Late; Moschos 2009, 259, fig. 28). The kylix was located less than half a meter in the north of the large hydria excavated during the 2017 season (Sideris & Liritzis 2018, 216, fig. 19). The hydria, found in pieces, is now restored but it misses its rim and bottom (Fig. 7). It is made of red-orange clay, its surface does not preserve any painting or slip, and it measures: maximum belly diameter as restored 35 cm, preserved height 28 cm. Its profile compares better with some four-handled jars from Asine in Argolis (FS 58), from Achaea and Thessaly, all dated in the LH IIIC Middle (Mountjoy 1999, 159-161, fig. 42, no. 323 Asine; p. 425, fig. 140, no. 85 Achaea; p. 849, fig. 344, no. 110 Thessaly). However, the horizontal handles on these jars are placed, as a rule, slightly lower than on our hydria. Its elegant dumpy shape with a slightly concave neck (FS 128) may indicate an earlier date and represent a local production, especially since a hydria with very similar profile comes from Delphi and dates in the LH IIIC Early, while another of the same date comes from Korakou in Corinthia (Mountjoy 1999, 775, fig. 303, no. 181).

Figure 5. A stemmed conical kylix in situ.

Figure 6. The stemmed conical kylix from Building 1 restored.

When cleaning the area around the kylix we realized that the transversal wall NW-SE, excavated during the 2017 season, continues well into the eastern part of the building. The eastern section of this wall, which is separated from its western section by a protruding part of the natural bedrock, measures 2.25 m in length, 0.50 m of regular width and 0.52 m preserved height. Subsequently, we investigated the foundation of the transversal wall on the entire length of its southern side. The eastern part was founded upon the bedrock and gave some sherds of band-handles, probably from kantharoi. In the western part, under a thin layer of charcoal and ashes (<1 cm thick) we discovered a layer of burnt soil or pressed clay of vivid orange to reddish colour, a hue achieved usually when the clay is exposed to very high temperatures. A test mini-trench on the northern side of the transversal wall did not give any pottery sherds at all. This observation, combined with the evident declivity of the terrain, led us to the conclusion that the floor north of the transversal wall was approximately 25 cm higher than that south of the wall.

Figure 7. The hydria found in the Building 1 in 2017 restored.

Figure 8. Sherd with mastoid protuberance from the Building 1.

We cleaned the north-eastern visible border of the Building 1, and we discovered that a more recent retaining wall has been erected directly upon the initial north-eastern wall of the building, the lowest course of which is still visible in its original position. It remained impossible to locate the wall that should connect the north-eastern to the south-western corners of the building, because the entire south-eastern side of the building is now covered by large piles of stones and thick vegetation of Palestine oak (*Quercus calliprinos*). The preliminary dating of the Building 1 based on its pottery indicates that it was in use during the LH IIIC Early and possibly Middle periods. A single sherd from a handmade vessel with a mastoid protuberance, typical of the Protogeometric pottery (PG), which has been found close to the entrance of the building, near its south-eastern corner (Fig. 8), does not seem to come from the building itself. It must have been moved there by the intensive ploughing activity, which took place for long periods of time on this terrace. At the end of the excavation the entire Building 1 has been covered with geotextile and a thin layer of soil for protection.

3. BUILDING 2 (BUILDINGS 2A AND 2B)

A very long wall, made of large stones in the E-W direction and visible for nearly 38 m, has been cleaned during the 2017 season in the southernmost terrace of the fortified area of Kastrouli. Its westernmost 6 m section presented a slight inclination towards the North. The excavation started from this section and it has been organized in three square trenches, each with a side of 5 m (Figs. 9-10). During the excavation all three trenches have been extended 2 m to the North. What it has been thus far labelled as a continuous long wall, now appeared to belong to at least two different buildings, which we named conventionally Building 2a for the easternmost one and Building 2b for the western one, divided by a narrow alley approximately 1 m wide (Sideris & Liritzis 2018, 213-214, figs. 10-11; Koh et al. 2020, 61-67, figs. 20-22, 24-31). We decided to avoid the easier denominations 2-East and 2-West for the two buildings, used in another preliminary publication, in anticipation of more possible buildings to be recognized during future research as constituents of what was initially believed to be a continuous long wall.

Figure 9. Drone photography of the Buildings 2a and 2b. Photo by I. Roy.

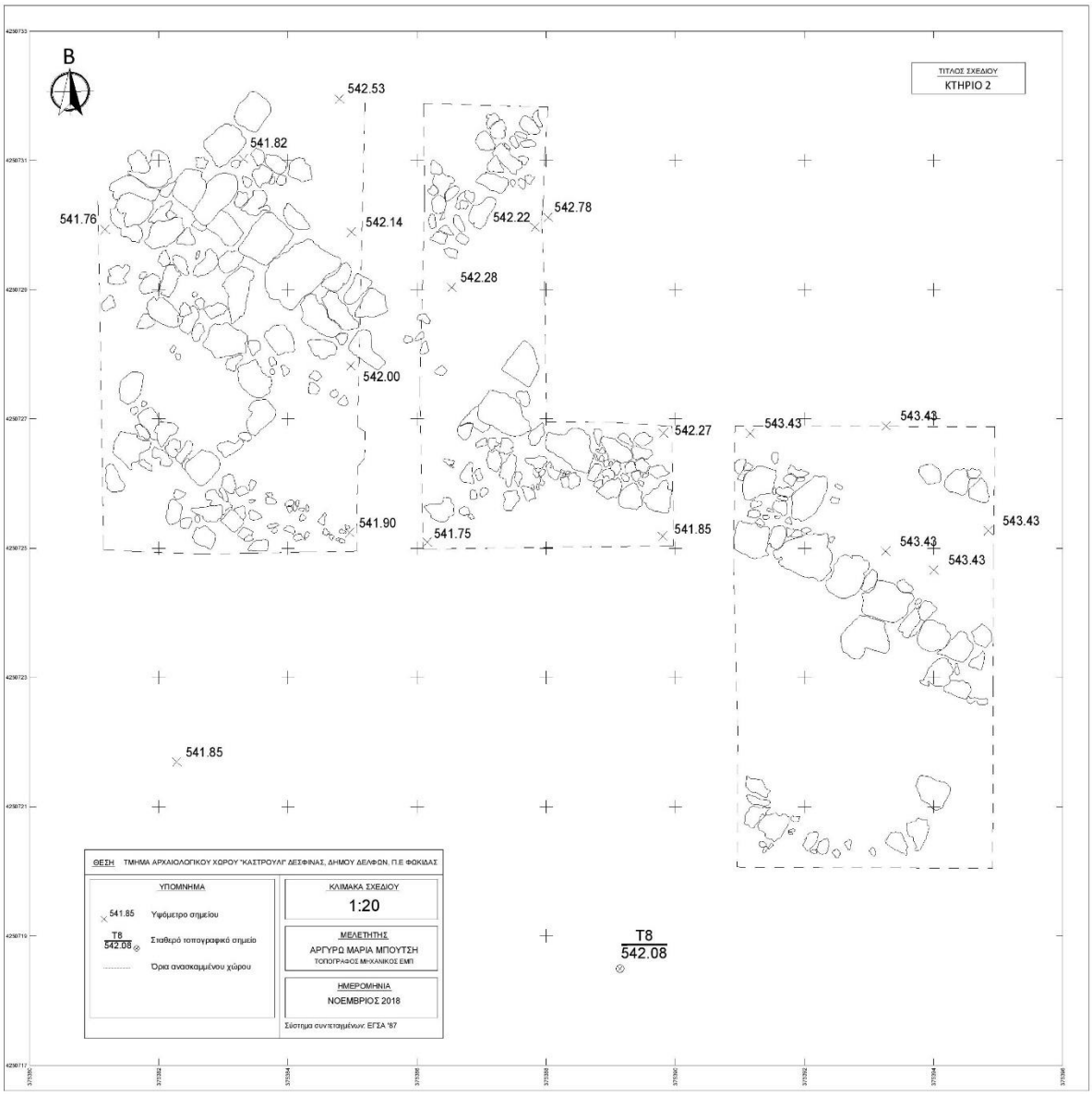

Figure 10. Plan of the Buildings 2a and 2b. Drawing by A. M. Boutsi.

From the Building 2a we discovered two parallel walls with direction N-S, while from the Building 2b only one wall with the same direction. The narrow alley between the two buildings has been closed at a later period with a wall made of small rough stones preserved to a height of three courses and a thickness of two rows. The Building 2a had an entrance from its southern side, of which the lintel and a step are preserved, as well as part of the floor pavement in its interior (**Fig. 11**). Inside this building, a pile of sherds belonging to at least three different unpainted vases have been found. These vases are a hydria, an oinochoe and a chytra, none of which can be restored in its full profile (**Figs. 12-13**). The sherds may represent a secondary deposit during the cleaning of the floor at an ulterior time or during the later periods of ploughing and cultivation of the terrace. Bones collected from an unspecified location inside this building, initially thought to be animal bones, after the osteological examination proved to belong to two prenatal individuals. It is well known the custom of the ancients to burry aborted embryos and infants inside the house, in order to keep them in proximity of the mother. Near the southern wall of the Building 2a a head of a zoomorphic figurine, probably a bull made of orange clay (**Fig. 14**), has been unearthed, and close to it a black steatite biconical spindle whorl. Another similar but smaller steatite spindle whorl has been found in the Building 2b (**Fig. 15**), from where comes as well as small fragment (2.7 x 2.9 cm) of a cast lead object with relief on both sides (**Fig. 16**). Near the eastern edge of the trench C, which coincides with the edge of the excavated area, a stone-encircled hearth has been excavated under a 5 cm layer of ashes.

Around it were scattered sherds of chytrae and undecorated lekanae or kylikes. A small pottery sherd (3 x 2.1 x 1 cm) with an incised liner motif has been collected from the surface layer between the trenches B and C (**Fig. 17**). The motif consists of four or five parallel lines terminating in a perpendicular line, on the other side of which there is yet another slanting line. None of these lines terminates within the preserved part of the sherd. It has been suggested that the motif resembles the ideogram/logogram for cloth of the Linear B script (Koh et al. 2020, 68). However, neither the location of the find, nor the size and the clay of the sherd (which comes certainly from a vase, not from any sort of tablet), nor the partly preserved motif itself, can confirm that it is a logogram rather than a simple incised ornament.

Figure 11. The southern wall and part of the paved interior of the Building 2a.

Figure 12. Pile of sherds in the Building 2a.

Figure 13. A jug partly restored from the Building 2a.

Figure 14. Head of an animal clay figurine from the Building 2a.

Figure 15. A biconical spindle-whorl of black steatite from the Building 2b.

Figure 16. A relief lead fragment from the Building 2b.

Figure 17. A sherd with linear incisions from the Building 2b.

The destruction layer by fire is better visible in the Building 2b, within which charcoal and ashes have been found, as well as a large chunk of carbonized wood, possibly belonging to a roof beam. The burnt clays from the wall coating (**Fig. 18**) are less thick (2-3 cm) than those found in the Building A. The entire area south of the two buildings has been seriously altered and damaged by deep and repeated ploughing, to the point that today it is very difficult to correctly identify and correlate the few remaining structures. Two rows of stones just south of the Building 2a create a right angle and they resemble a cist grave. However, the hypothesis that they really represent a cist grave of the Protogeometric period, in spite of being attractive, does not find convincing support in the very scanty finds (only two and far apart Protogeometric sherds from the entire site thus far) and it will need to be confirmed or rejected by future excavations. The general image suggests that both Buildings (2a and 2b) date from the LH IIIB and they were still in use in at least two different phases during the LH IIIC. Their continuous use during the Submycenaean and Protogeometric periods, conjectured on the basis of a single sherd of burnished handmade pottery, which besides is a surface find (**Fig. 19**), remains to be confirmed by future excavation.

Figure 18. Clay fragments from the wall revetment of the Building 2b.

Figure 19. Sherd from a handmade vase with burnished surface from the Building 2a.

4. THE LOOTED TOMB B

Just south of the Tomb A there is a second Tomb B (**Figs. 20-22**). It was possibly larger than the former one, but its looting, for which heavy machinery and

explosives have been used, caused extensive destruction and rendered very difficult the reconstruction of its plan and the calculation of its exact measurements. We do not have direct information about its looting, but in all probability it happened at the same time with that of the Tomb A, possibly in two phases, during the early 1970s and the middle 2000s. From the eastern rim of the trench left behind from the illegal excavation several small sherds with painted spirals and linear decoration have been collected (**Fig. 23**). Then, its interior has been excavated and three large stone blocks have been pulled out and placed in the stone pile in its south. Another, much larger block (length 1.45 m, width 0.95 m, height 0.60 m) fallen in the centre of the chamber from its original position, has been deemed impractical to move because of its excessive weight and the limited means in our disposal at the time. It may have been placed originally in the eastern wall of the tomb, where a few blocks remain in situ. The larger of them measures 1.16 m in length, 40 cm in width, and 65 cm in height, and it may represent the southern door sill of the chamber, if we admit that the entrance of the tomb was in its eastern side. The natural bedrock, only partly carved, serves as floor of the chamber. The plan of the structure must have been rectangular, judging by its south-eastern corner, the only one preserved nearly intact. Its original interior dimensions would have been approximately 4.5 m (E-W) to 4 m (N-S), although, as stated above, the current state of preservation does not allow absolute certainty for these measurements. The western and northern sides of the tomb have not been fully investigated since they consist of stone piles connected respectively with the fortification wall and the southern wall of the Tomb A. The tomb belonged in all probability to the chamber type and it must have been covered with large slabs.

The human bones scattered all around and collected from the most distant areas of the tomb belong, according to the anthropological study, to a single adult male individual. A prenatal individual identified from a single fragment of a right femur does not relate necessarily to the original burial, since a prenatal individual has been identified in the adjacent Tomb A as well and part of its contents, no doubt, have been scattered around during looting (Chovalopoulou et al. 2017, table 2; Sideris et al. 2017, 277). Besides, the proximity of a house (see here below, Building 3) may be another source of interference, since as we have seen in the case of Building 2a aborted embryos were often buried under the floor of the houses. This may have been, in all likelihood, as well the origin of two marine shells of the species *Cerinthium vulgatum* collected from the eastern part of the tomb, and of a boar tusk (5.6 cm long and 1 cm thick) found in its south-eastern side.

The awful damage caused by the looting activities did not left any pottery in its original position. Among the collected sherds from the floor and the slopes of the trench there are S-profiled rims of cups and lekanae, bases of cups, U-shaped handles and high stemmed bases from kylikes, sherds of at least four stirrup jars, large sherds from pithoi with relief bands decorated with incised chevrons (**Fig. 24**), and at least five differently profiled rims of pithoi. The fine pottery is not very numerous, but there are several sherds of plain and coarse ware, mostly covered by a white thick and hard sediment (especially those found in the western slope of the trench). A fragmentary *Psi* figurine of yellow clay has been found near the middle of the eastern wall, between two stone blocks (Figs. 25-26). It misses the head and the right hand; its painted ornaments, consisting of curved lines following the outline of the body, have been documented during its discovery, but they could not be preserved during conservation. All the finds from the Tomb B suggest a date in the LH IIIC (Early?). It has been constructed for its single occupant, who was almost certainly a very prominent member of the Kastrouli community, in striking contrast with the much earlier Tomb A and its 19+ individuals. The Tombs A and B have been fenced together for their protection at the end of the season.

Figure 20. Tomb B seen from the East.

Figure 21. Tomb B seen from the South-West.

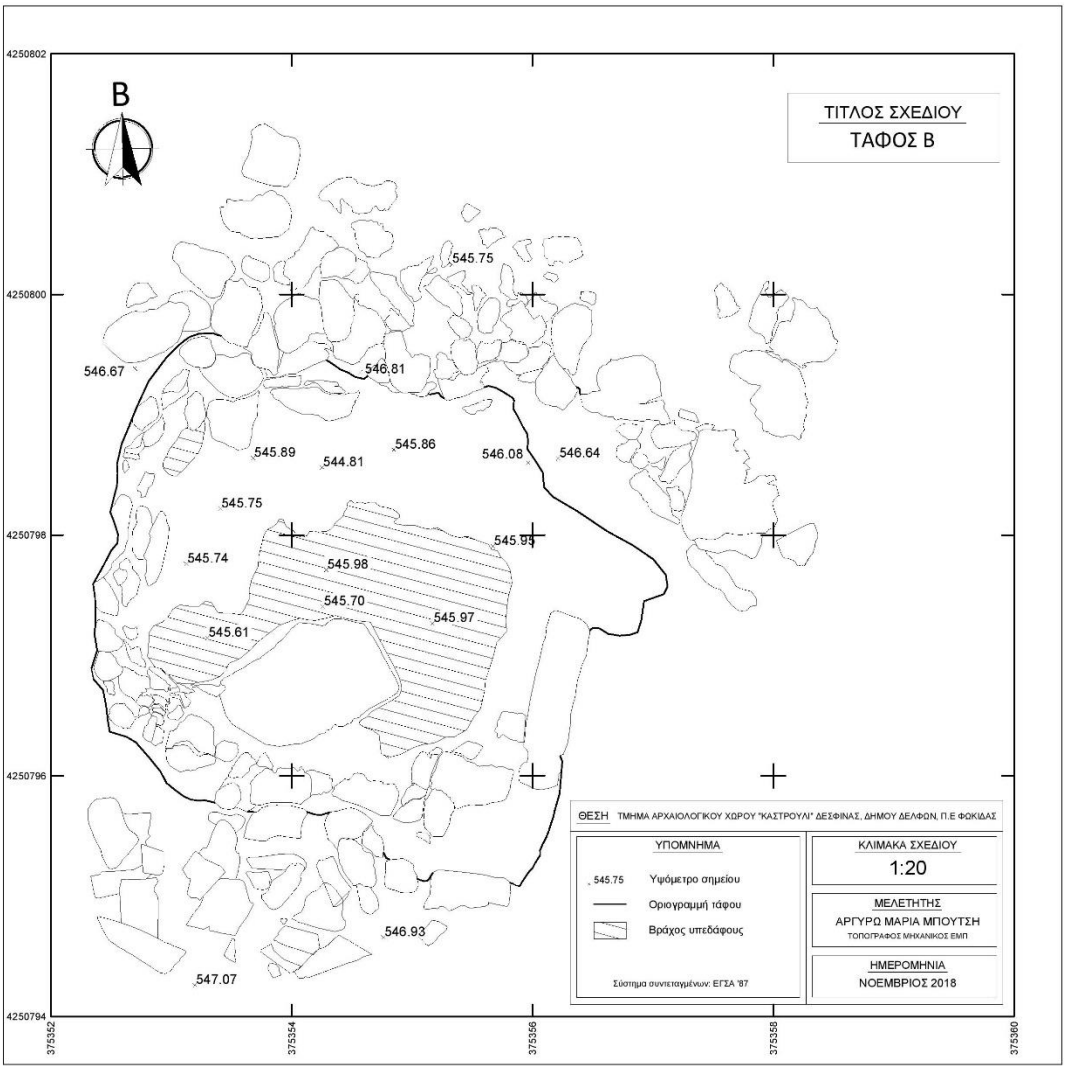

Figure 22. Plan of the looted Tomb B. Drawing by A. M. Boutsi.

Figure 23. Pottery sherds from the looted Tomb B.

Figure 24. Sherd from a pithos with incised chevrons from the Tomb B.

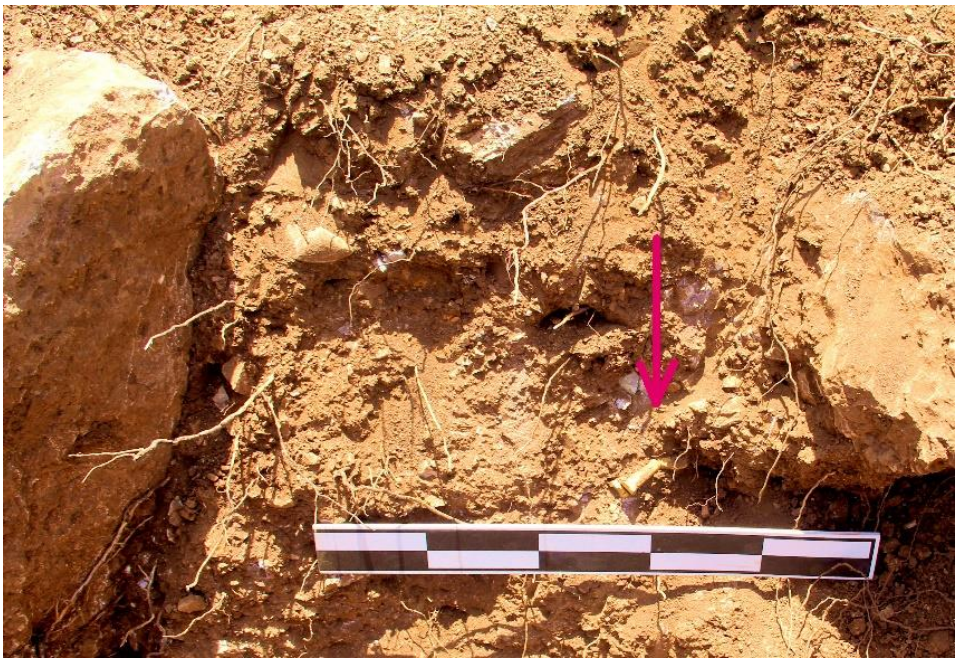

Figure 25. The Psi figurine of the Tomb B in situ.

Figure 26. The Psi figurine before and after restoration.

5. BUILDING 3

In the east and south-east of the Tombs A and B (in a distance of 5 and 2 meters respectively) a well-built wall has been unearthed. For most of its length it is directly founded upon the natural bedrock, it runs in the N-S direction for 6.65 m, and it is 60-70 cm wide and preserves one or two rows of blocks attaining respectively a high of 35 to 70 cm (**Figs. 27-28**). From its middle projects eastward a thinner and shorter transversal wall, which defines also the inner space of the structure, conventionally named Building 3. This building has been encountered already during the July 2016 season, but it has not been labelled back then (Sideris et al. 2017, 280-281, figs. 24-27). Near a wall section, parallel to the transversal one excavated now, we discovered in 2016 a small stone-clad hearth and a few sherds of handles and bases from kylikes. Unfortunately, these features have been destroyed during an attempted illegal excavation in the spring of 2017 (Sideris & Liritzis 2018, 210-211, figs. 4-5), despite them being covered by plastic foil and a relatively thick layer of soil. Thus, their precise connection to the presently excavated parts of the Building 3 can be deduced from the earlier photographic and topographic documentation.

During the excavation of the Building 3 we found a fragmentary headless zoomorphic figurine (possibly a bull, **Fig. 29**) near its southernmost external extremity and in a depth of 20 cm. The figurine may, however, relate either to the building or to the adjacent Tomb B, much of the content of which has been scattered during the looting. From the interior of the Building 3 come a few fine pottery sherds including the spout of a stirrup jar, a pithos sherd with incised chevrons, and another with parallel incisions possibly for the adhesion of a now lost handle. A definitive dating of the Building 3 is not yet possible, but it could have remained in use for a long period, since the pottery found in 2016 dates in the LH IIIA 2, whiles that found during the 2018 season cannot be dated earlier than in the LH IIIC. At the end of the season the walls of the Building 3 have been covered with geotextile and a layer of soil.

Figure 27. The Building 3 seen from South-West.

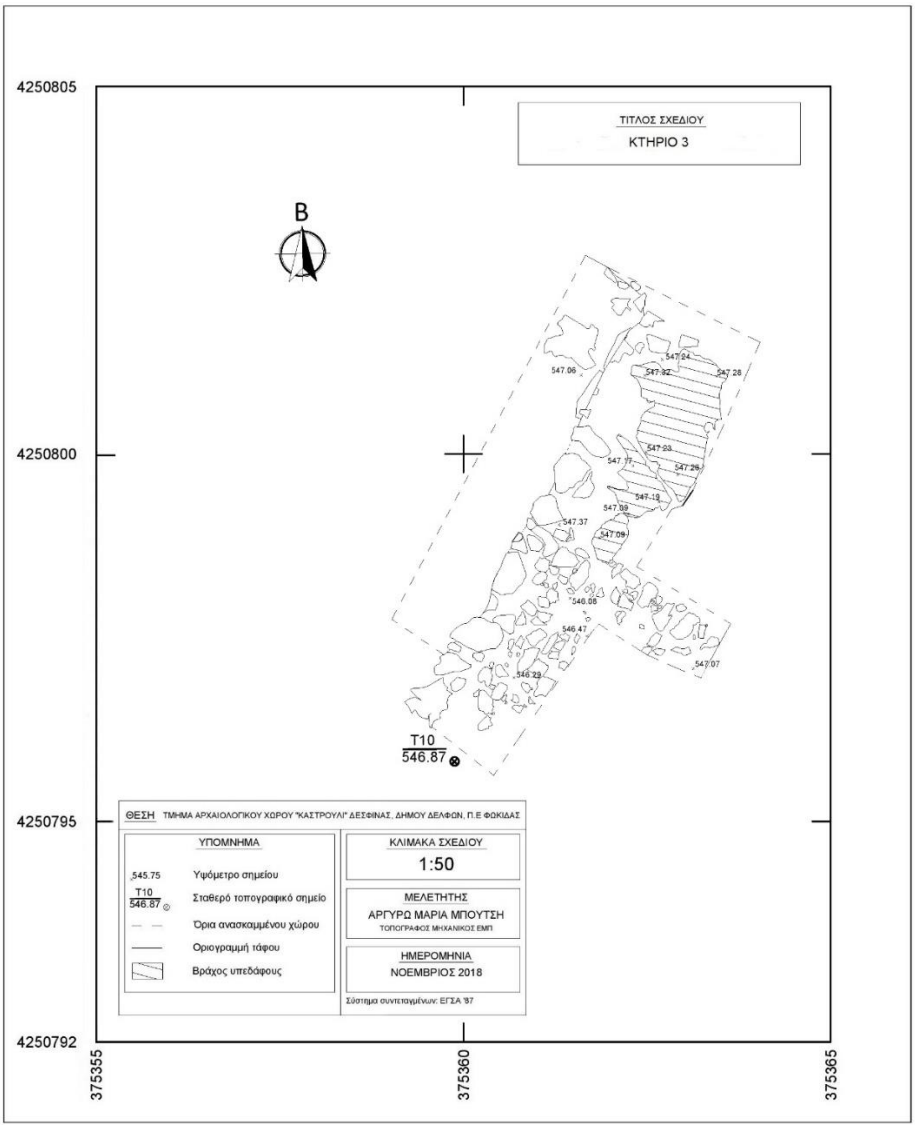

Figure 28. Plan of the excavated part of the Building 3. Drawing by A. M. Boutsi.

Figure 29. Fragmentary clay animal figurine from outside the Building 3.

6. STONE PILE ON THE NW FRINGES OF THE FORTIFICATION WALL

After the end of the works in the Building 1 and before starting the excavation of the Tomb B, we investigated an unusual pile of stones near the inner side of a northwestern section of the fortification wall (**Fig. 30**). We had some indications that the pile could have covered yet another tomb, but the displacement of stones (because no excavation was necessary at the end) has proven that the pile was entirely accidental and it extended down to the virgin soil. It may have been caused by a fall of stones from the fortification, or more probably as the result of intentional human action (stones piled up as a result of cleaning of the adjacent terraces in order to be cultivated), but in any case it does not represent a structure. Afterwards, the stones were returned to their original position and the intervention was no more visible.

Figure 30. The stone pile on the north-western fringes of the fortification wall.

7. SURVEY OF THE MITELES PLANE

On Monday, July 16 we made a survey of drainage works in the small plane of Miteles, located in the south of the Kastrouli promontory. Its importance for the Kastrouli settlement is obvious. According to the testimony of local shepherds during heavy rain the Miteles plane, which is rather a shallow basin, can be filled with water attaining a depth of approximately 4 meters in its centre. The water allegedly may cover a wild-pear tree (Pyrus amygdaliformis) of this height growing today near the centre of the plane. At this location there is a drainage cesspool, which combines a man-made structure with a natural crevice in the bedrock (**Figs. 31-32**). In its current state the sink has a built rim/entrance of ellipsoidal plan measuring 1.30 x 0.50 m, five stone-built steps descending to a depth of 1.70 m, and a low underground tunnel aiming eastward for at least 3.5 m. The entrance to the steps from the western side is now protected by an iron railing. The depth and length of the tunnel may be greater than measured because the sink has not been cleaned for several years. The walls on either side of the steps and in the outer part of the tunnel are made of small rough stones and they include fragments of tiles in their upper courses. The lower courses, without ceramic tiles, may be older. A precise dating of the structure is not yet possible, but its lower part may date in the Antiquity, while the courses with tiles date either from the Middle Ages or the Modern times. Another larger structure is situated in the northern borders of the small plane, exactly at the foothill of the Kastrouli promontory. The structure combines a cistern with a drainage sink (**Fig. 33**). The visible part of the cistern measures 4.90 m (E-W) x 2.70 m (N-S). The probable drainage point is now covered by sediments and plants and its function cannot be ascertained without excavation works. It seems, however, that at this location water was running for long periods of time, to the point that the construction of a small single-arched bridge became necessary (**Fig. 34**). The bridge is 1.10 m high, with only 1 m long crossing surface, and 0.80 m opening at the base of its arc. It is made from a single large block looking very much like a lintel, on the southern side of which there is a rudimentarily carved face. Both structures, the cistern and the bridge, make use of rough stones and tiles, and the cistern is waterproofed with hydraulic mortar (kurasani), typical for the Byzantine and Modern periods. It must be noticed, however, that given that the Kastrouli site was inhabited since the Mycenaean times, its inhabitants would have two significant reasons to care about the drainage of the Miteles basin. The first would have been the safeguard of a cultivable land of vital importance, and the second and far more important, the prevention of a swamp formation and its dangerous accessorial malaria literally in front of their doors. These are good reasons to believe that the present drainage structures in the Miteles plane may represent later repairs or adaptations of a system conceived already by the Mycenaean inhabitants of the Kastrouli fortified settlement.

Figure 31. The sinkhole in the centre of Miteles plane.

Figure 32. The interior with steps of the Miteles sinkhole.

Figure 33. The cistern at the northern edge of the Miteles plane.

Figure 34. The small bridge near the cistern with the sculpted mask.

8. FORTIFICATIONS AND POPULATION

The exact size of the fortified ellipsoid in Kastrouli is 164 m N-S and 143 m E-W (not including the Eastern precinct or the Western 'tower'). The total length of the fortification walls is around 550 m (490 m for the main wall and 60 m for the Eastern precinct). The surface of the fortified area is slightly above 18 stremmata or just under 2 hectares (18,368 m^2). These figures come under the following reasonable assumptions:

i) Both the main fortification and the Eastern Precinct date from the Mycenaean period.

ii) They existed already in their full length and height in the Mycenaean period, no matter how many repairs received in later times.

iii) The Western Precinct or Tower does not date from the Mycenaean period. However, even if it should be dated in the Mycenaean period, its small size (its outer perimeter is 20 m) does not affect radically the calculations here below.

iv) The original height of the defensive wall should be calculated between 3 and 4 m (the preserved parts are between 2 and 3 m). The width wherever measurable is between 2 and 3 m.

v) The stone, which is a relatively hard local limestone, was carried locally within less than 300 m need of transportation. The faction is cyclopean in lower courses and at some places on the entire height indicating that this is the original faction.

The manpower needed should be then calculated somewhere between 15.000 and 20.000 man/workdays. The main source for such calculation is Cook (2014), who provides earlier bibliography and sources concerning quarrying, transport, and construction rates. Consequently, there would have been working at minimum either 100 men for 1 year or more probably 50 men for 2 years. Given that not all the labour force could be occupied in the construction of the wall since other needs were unavoidable, such as construction and maintenance of houses, cultivation, stock

raising, trade, crafts, defence, we may suppose that just 1/2 of the working force of the population was occupied constantly in the wall construction. That makes 100 working men and the total population around 500 inhabitants (if 1 working man per family of 5 for two years construction period) or 1000 inhabitants (if again one construction worker per family of 5 but just within one year construction time). A more plausible situation would be to calculate households of seven (= 2 grandparents + 2 parents + 3 children) which provide two working men (either a still active grandfather or an already mature for work adolescent). This in turn would give 700 inhabitants living in 100 houses for a construction in a single year, or 350 inhabitants living in 50 houses for a construction in two years. The surface of the fortified area could accommodate enough houses as large as the Building 1 or even larger for both options.

Even without knowing if the Building 1 is a typical house or a larger one, and moreover even without knowing its exact surface due to the unexcavated south-eastern wall (but we conjecture its position near to the excavation line from the house plan), still we may infer that within its surface of 70 m^2 it could accommodate 7 people (4 adults and 3 children), especially if we admit that there has been some wood-constructed mezzanine or flour on part of its ground-plan surface. The Buildings 2a, 2b, and 3 are not excavated in their entirety and their surface cannot be calculated. Some 350 inhabitants would be a reasonable calculation of the population of Kastrouli. The longer in time one extends the construction effort, the smaller will be the number of needed workforce for its accomplishment, resulting thus in a lower estimation for the entire population. However, this kind of defensive construction works represented usually an effort concentrated in time, even when executed in relatively peaceful conditions and not under the pressure of an imminent danger. Thus the assumption of one or two years for the Kastrouli wall seems fairly reasonable and consequently its estimated population as well.

Now, another issue would be if there have been houses outside the fortified area. If this is the case in Kastrouli, it must have been rather limited, since the hill slopes are rocky on the northern, eastern and southern sides and could have not accommodated houses without extensive levelling works and the creation of terraces. On the southern side, however, where quarrying took place in considerable scale (Petrocheilos 2012), this possibility cannot be entirely excluded and further research is needed to confirm or reject it. On the western side of the hill the terrain is more or less flat, but still unlikely to have had any dwelling and without pottery finds. The situation is entirely different in Steno, where there is a relatively well fortified acropolis of slightly smaller total surface, but as well clear indications of dwellings on the entire southern and western slopes of the hill, until down to the seashore, although not all of them date to the Mycenaean period. More or less the same situation occurs in the Vroulia settlement as well: the fortified acropolis encloses a significantly smaller area, yet several dwelling remnants are observable mostly on the southern and north-western slopes.

9. RESEARCH HISTORY AND CONCLUSIONS

The research in Kastrouli started back in 1978 following a suggestion of Prof. Petros Themelis, then ephore of the 10th Ephorate of Prehistoric and Classical Antiquities (FEK - Official Government Gazette 172/B/10-9-79, p. 6667, no. 6, following the suggestion made on 3 March 1978 by Petros Themelis). Further surveys have been conducted by the archaeologists of the Ephorate Despoina Skorda (1985), Fotis Dasios (1992), and Sotiris Raptopoulos (2002), who also conducted limited research of the looted tombs (Ephorate of Phokis archive document: Φ. 27/3/2028 dated 1 July 2002. Dasios 1992, 84, no. 109; Raptopoulos 2005; Raptopoulos 2012). These investigations resulted in the official designation of Kastrouli as an archaeological site in 2012 following the suggestion of Nikos Petrocheilos (Decision of the Minster of Education, Culture and Sports, protocol number: ΥΠΑΙΘΠΑ/ΓΔΑΠΚ/ΔΙΠΚΑ/ΤΑΧ/Φ43/123451/36 119/7118/5569 dated 8 November 2012).

During the five years of our Kastrouli research project (2016-2020), of which excavations have been conducted only during the first three seasons (2016-2018), much archaeometric and environmental research has been accomplished as well with fascinating results (Levy et al. 2018). Luminescence and C14 dating provided indications for later repairs of the Kastrouli fortifications during the Archaic and Classical periods and suggested that there must have been at least one more grave, dating roughly to the Middle Geometric period (810-760 BC) and not yet identified (Liritzis et al. 2019, 83-84; Liritzis et al. 2016, 248). The investigation of clay sources in the vicinity of Kastrouli resulted in the identification of at least three of them as the source for various fabrics of coarse ware, plain and painted fine ware, and figurines found in the site (Bratitsi et al. 2018; Xanthopoulou et al. 2021). The attribution of some figurines in a local workshop gets further support in their – thus far unattested from elsewhere – decoration with dotted lines alternating with continuous ones. The clay deposits are located in Aghia Irini on the slopes of Kirphis Mountain, north of Kastrouli, in the Miteles plain just south of the Kastrouli hill, and on the banks of the Limnos seasonal lake, on the west of Kastrouli (Liritzis et al. 2020,

73-75). The study of the bones found in the Tomb A provided unexpected information about the food resources available to the Kastrouli population, by adding next to the regular land-food and the expected sea food, an impressive 30% of food with lake- or river-provenance (Chovalopoulou et al. 2017; Kontopoulos et al. 2019), indicating that the seasonal lake of Limnos might have been permanent back then. An alternative source for this kind of food could have been the marshland created on the west of Steno promontory by the small sources called Potamoi, in which eels were living and have been fished by the locals until recent times. Eels were fished there until the early 1980s with baskets used as sieves and placed in the estuaries of the small streams. Today the marshland has been drained and planted with halophytes.

The relation of Kastrouli with the fortified settlement in Steno, which possibly identifies with the Homeric Kyparissos or the Naulochon, is beyond doubt, but since we do not possess excavational data from Steno, the nature of this relation remains hypothetical. In the light of preliminary surveys in Steno, however, which show a more extended inhabited area than that of Kastrouli and higher frequency of painted pottery on the surface, it seems premature to qualify Kastrouli as the principal post-palatial site of southern Phokis (Knodell 2021, map 15 on p. 123). Kastrouli, in any case, was not simply a military fort, but a rather well organized small settlement, a fact confirmed by the rich tombs, the prenatal bone remains buried under the floor of houses, the locally produced pottery, and the loom weights and spindle whorls, which indicate domestic textile production. The two tombs, in spite of being looted, provided important material, marginally before been endangered again by repeated looting activity. Four buildings of residential character have been identified and partly excavated, all of which are located near the fortification periphery. Additional and possibly more important buildings should be expected in the central area of the settlement. The so-called peripheral Mycenaean world of Phokis does not seem so much peripheral or cut-off from the great centres. The imported pottery from Argos and Boeotia, as well as the evident connections with the Achaean creations, and the archaeometrically documented local pottery production betray a small but thriving community with internal hierarchy, close relations with other neighbouring Mycenaean communities (Antikyra, Vroulia, Steno, Sykia, Kirrha), access to precious metals, and great differentiation of its food resources.

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CREDITS: All pictures are by A. Sideris except if stated otherwise in the caption.

REFERENCES

Bratitsi, M., Liritzis, I., Vafiadou, A., Xanthopoulou, V., Palamara, E., Iliopoulos, I., Zacharias, N. (2018) Critical assessment of chromatic index in archaeological ceramics by Munsell and RGB : novel contribution to characterization and provenance studies. *Mediterranean Archaeology and Archaeometry*, Vol. 18, No 2, pp. 175-212

Chovalopoulou M.-E., Bertsatos A., Manolis S. K. (2017) Identification of skeletal remains from a Mycenaean burial in Kastrouli-Desfina. Greece. *Mediterranean Archaeology and Archaeometry*, Vol. 17, pp. 265–269.

Cook Ph. S. (2014) *The "Energetics"of Mycenaean Defense Works: Assessing Labour Investment for Fortification Construction During the Late Helladic Period (ca. 1600-1200 B.C.).* Master Thesis, Trent University, Peterborough, Ontario, Canada, September 2014.

Dasios F. (1992) Contribution to the topography of ancient Phokis (Συμβολή στην τοπογραφία της αρχαίας Φωκίδας), *Fokika Khronika* 4, pp. 18-97 (in Greek).

Jacoby F. (1923) *Die Fragmente der griechischen Historiker* (=FGrHist), Berlin.

Knodell A. R. (2021) *Societies in Transition in Early Greece: An Archaeological History.* Oakland, California.

Koh A.J., K.J. Birney, I.M. Roy, I. Liritzis (2020) The Mycenaean citadel and environs of Desfina-Kastrouli: a transdisciplinary approach to southern Phokis. *Mediterranean Archaeology and Archaeometry* Vol. 20, No 3, pp. 47-73.

Kontopoulos, I., Penkman, K., Liritzis, I., Collins. M. J. (2019) Bone diagenesis in a Mycenaean secondary burial (Kastrouli, Greece). *Archaeological and Anthropological Sciences* 11, pp. 5213–5230.

Lazaridis et al. (forthcoming): Lazaridis I., Alpaslan-Roodenberg S., Liritzis I., Sideris A. and another 201 co-authors: The genetic history of the Southern Arc: a bridge between West Asia and Europe (to be published in *Science* in 2022).

Levy, E.T., T. Sideris, M. Howland, B. Liss, G. Tsokas, A. Stambolidis, E. Fikos, G. Vargemezis, P. Tsourlos, A. Georgopoulos, G. Papatheodorou, M. Garaga, D. Christodoulou, R. Norris, I. Rivera-Collazo, and I. Liritzis (2018) At-Risk World Heritage, Cyber, and Marine Archaeology: The Kastrouli–Antikyra Bay Land and Sea Project, Phokis, Greece, Springer International Publishing AG. In T.E. Levy, I.W.N. Jones (eds.), *Cyber-Archaeology and Grand Narratives*, One World Archaeology, pp. 143-230.

Liritzis, I., Zhengyao Jin, Anchuan Fan, A. Sideris, A. Drivaliari (2016) Late Helladic and later reuse phases of Kastrouli settlement (Greece): preliminary dating results. *Mediterranean Archaeology and Archaeometry*, Vol. 16, No 3, pp. 245-250.

Liritzis, I., G.S. Polymeris, A. Vafiadou, A. Sideris, T.E. Levy (2019) Luminescence dating of stone wall, tomb and ceramics of Kastrouli (Phokis, Greece). Late Helladic settlement: case study. *Journal of Cultural Heritage* 35, pp. 76-85.

Liritzis, I., Xanthopoulou, V., Palamara, E., Papageorgiou, I., Iliopoulos, I., Zacharias, N., Vafiadou, A., Karydas, A. G. (2020) Characterization and provenance of ceramic artifacts and local clays from Late Mycenaean Kastrouli (Greece) by means of p-XRF screening and statistical analysis. *Journal of Cultural Heritage* 46, pp. 61-81.

Liritzis, I (2021) Kastrouli fortified settlement (Desfina, Phokis, Greece): a chronicle of research *SCIENTIFIC CULTURE,* Vol. 7, No. 2, pp. 17-32, DOI: 10.5281/zenodo.4465472.

Moschos I. (2009) Western Achaea During the Succeeding LH III C Late Period – The Final Mycenaean Phase and the Submycenaean Period. In S. Deger-Jalkotzy – A. E. & Bächle (eds.), *LH III C Chronology and Synchronisms* III. *LH III C Late and the Transition to the Early Iron Age*. Proceedings of the International Workshop held at the Austrian Academy of Sciences at Vienna, February 23rd and 24th, 2007. Wien, pp. 235-288.

Mountjoy P. (1999) *Regional Mycenaean Decorated Pottery,* Rahden/Westf.

Papazoglou-Manioudaki L. & Paschalidis C. (2017) A society of merchants and warriors to the east of the west. The case of the Mycenaean settlement on Mygdalia Hill, near Patras, in Achaea. In Fotiadis M., Laffineur R., Lolos Y., Vlachopoulos A. (eds.), *Hesperos. The Aegean seen from the West*. Proceedings of the 16th International Aegean Conference, University of Ioannina, 18-21 May 2016. Leuven-Liège, pp. 452-461.

Petrocheilos, N. (2012) Ephorate of Phokis archive document: Φ. 13/2/Γ/756, dated 9 March 2012.

Raptopoulos S. (2005) Phokis (Φωκίδα), *Arkheologiko Deltio* 60, pp. 463-464 (in Greek).

Raptopoulos S. (2012) Mycenaean tholos tomb in Desfina of Phokis (Μυκηναϊκός θολωτός τάφος στη Δεσφίνα Φωκίδος), *Arkheologiko Ergo Thessalias kai Stereas Elladas* 3, 2009 (2012), pp. 1071-1078 (in Greek).

Sideris, A., I. Liritzis, B. Liss, M.D. Howland, T.E. Levy (2017) At-risk cultural heritage: new excavations and finds from the Mycenaean site of Kastrouli, Phokis, Greece. *Mediterranean Archaeology and Archaeometry* Vol. 17, No 1, pp. 271-285.

Sideris, A. & I. Liritzis (2018) The Mycenaean site of Kastrouli, Phokis, Greece: second excavation season, July 2017. *Mediterranean Archaeology and Archaeometry* Vol. 18, No 3, pp. 209-224.

Xanthopoulou, V., Iliopoulos, I., Liritzis, I. (2021) Mineralogical and Microstructure Analysis for Characterization and Provenance of Ceramic Artifacts from Late Helladic Kastrouli Settlement, Delphi (Central Greece). *Geosciences* 2021, 11, 36. https://doi.org/10.3390/geosciences11010036.