

## *The intra-site topography and standing remains of Kastro Apalirou*

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### **Abstract**

Το άρθρο παρουσιάζει την αστική τοπογραφία και τα οικοδομικά δεδομένα του Κάστρου Απαλίρου με βάση την έρευνα πεδίου, που πραγματοποιήθηκε κατά τη διάρκεια της πρώτης φάσης εργασιών, και η οποία συμπεριέλαβε την αποτύπωση και τεκμηρίωση των ορατών οικοδομημάτων της θέσης. Η έρευνα οδήγησε στην εκπόνηση του πρώτου πλήρους σχεδίου κάτοψης του χώρου, γεγονός που παρείχε καίρια δεδομένα για τη συζήτηση της λειτουργίας, των φάσεων και της φύσης του οικισμού. Ερευνήθηκαν συνολικά πενήντα τέσσερα κτήρια, εκ των οποίων τα τριάντα οκτώ ήταν οικίες ή οικιακού χαρακτήρα κτίσματα, τρία μεγαλύτερα κτήρια θεωρήθηκαν ότι συνδέονται με δημόσιου χαρακτήρα χρήσεις, ενώ ταυτίστηκαν τρία άτεχνα, βοηθητικά κτήρια. Επιπλέον, ερευνήθηκαν τριάντα περίπου ακόμη οικόπεδα, τα κτίσματα των οποίων δεν στάθηκε δυνατό να διασαφηνιστούν. Ωστόσο, το μέγεθος και η τοποθεσία των εν λόγω οικοπέδων είναι παρόμοια με αυτή των αγρών με οικίες. Οι στέρνες, οι οποίες είναι πιο ευδιάκριτες κατασκευές λόγω της εκτεταμένης χρήσης κονιάματος στο χτίσιμό τους, διακρίνονται σε δύο κατηγορίες: Η πρώτη περιλαμβάνει πέντε μεγάλες κοινοτικές στέρνες, οι οποίες δεν συνδέονται με κάποιο συγκεκριμένο κτήριο. Η δεύτερη κατηγορία περιλαμβάνει πενήντα δύο ιδιωτικές στέρνες, οι οποίες χτίστηκαν ως μέρος μιας οικίας ή ενός κτηρίου, οι οποίες βρίσκονται συνήθως μέσα στο υπόγειο του κτίσματος και η πρόσβαση σε αυτές γίνεται εσωτερικά από τον υπερκείμενο όροφο. Επιπροσθέτως, υπάρχει ένας μικρότερος αριθμός εξωτερικών στερνών, που είναι τώρα ελεύθερα ιστάμενες, και οι οποίες εφάπτονταν σε κτήρια που έχουν πλέον καταρρεύσει, καθώς και στερνών ενσωματωμένων σε κενά μέσα στους τοίχους ή και συνδεδεμένων με τον Άγιο Γεώργιο. Ο μεγάλος αριθμός οικιών και σχετικών κτισμάτων και ο χαμηλός αριθμός μεγαλύτερων κτηρίων, που πιθανώς συνδέονται με δημόσια χρήση, κατατείνει έντονα μάλλον προς την κατεύθυνση μιας αστικής κοινότητας παρά ενός φρουρίου. Σε γενικές γραμμές διακρίνονται δύο φάσεις. Η πρώτη φάση περιλαμβάνει τη χάραξη των οδών και την κατασκευή των οικιών, ενώ η δεύτερη φάση περιλαμβάνει μεγαλύτερα επίπεδα επένδυσης σε οχυρώσεις, μεγαλύτερα κτήρια και κοινοτικές στέρνες, καθώς και την επέκταση του συγκροτήματος του Αγίου Γεωργίου.

### **Introduction**

Kastro Apalirou is situated to the southern tip of Naxos on a prominent and steep mountain, with challenging access from the Sangri Plain below. The defences and larger structures are visible from a distance though the individual houses and scale of the settlement can only be appreciated once the observer has entered the walls. The majority of the structural remains have collapsed over time and the site has been plundered for building stone in the centuries following its abandonment in the early 13th century. Mak-

ing sense of the chaotic nature of the remains has been a challenging task, but one which has produced valuable new data on this important Early and Middle Byzantine site.

### *Methodology*

It became clear from the early stages of the survey that the site was much larger and more complex than previously thought. Kastro Apalirou, mainly due to its modern name and standing defences had been seen as a fortified refuge, and perhaps largely as a result of this definition did not receive the attention of archaeologists beyond sporadic visits and local interest.

The survey began by mapping the circuit walls, the church complex of Agios Georgios and the largest and most visible cisterns. In later seasons the smaller structural remains and the internal street and terrace system were mapped. A digital grid was laid across the site and a systematised recording sheet was used to document contextual data (e.g. mortar, stone-work, and building type). Two teams recorded visible remains by grid square, whilst the survey team refined the plan. The working conditions at Apalirou are challenging as structures have collapsed upon themselves and loose stones and rubble often obscure the extent and plan of the structures. We chose only to plan those structures whose outlines were visible, and many edges of walls and corners were not included in the plan, as it was often unclear what they represented; whether they were the remains of structures or terraces, or indeed which level within a building (cellar, first or second floor) that the fragments of walls related to. We chose therefore to leave these remains to later campaigns when rubble could be moved and when context could be assigned. We can now state that almost the entire area within the curtain wall was filled with structures, and it is estimated that there are up to three times as many buildings at Apalirou than are shown in the plan (**fig. 1**). Generally it can be said that the empty spaces visible in the plan between buildings and streets were occupied by structures.

### *Site topography*

The conditions for creating an urban settlement at Apalirou were challenging and topography was the single greatest variable influencing the design and construction of the town. The highly defensible location with restricted access would have affected the decisions taken by those who designed the site, carried out the construction work, and lived within the walls. The intra-site terrain is made up of rocky outcrops and weathered limestone formations; there are no level areas and no sources of water (**fig. 2**). Access to the site is impossible for any form of wheeled transport; everything that would have been required during construction, and otherwise by the community, would have had to be carried by mule, horse or by human. As such there are many signs of compromise being made in the choice of materials used and in the size of buildings. The clearest example of this is in the use of mortar, which was generally reserved for the cisterns, defensive walls and the churches. Whilst pink hydraulic mortar with brick inclusions was used in the cisterns, grey lime mortar was used in the defensive walls and the churches. The key variable in the early phases of construction would have been the availability of water when cistern capacity was at its lowest. We assume that in the early phases water represented the greatest challenge influencing mortar use, though sand and lime would have also required transportation up to the site. It may be the case that lime mortar was slaked below and brought up to the site before cistern capacity was at a level that gave a supply of water for this purpose. We suggest that construction using mortar would have increased as cistern capacity increased. Clay and earth were used as bonding materials in many of the domestic structures, and in some cases mortar was applied on the external face

of a building to seal clay and earth bonding within<sup>1</sup> (**fig. 3**). The majority of domestic buildings were constructed using drystone techniques. When the settlement at Apalirou fell out of use, those buildings where mortar was not used collapsed first, and as such what is visible today as standing architecture are those structures that used bonded masonry, which are largely the high-status houses, cisterns, the defensive structures and the churches.

Spatial organisation at Apalirou can be seen as having created a division of the site into two parts; an ecclesiastical complex at the northernmost part, containing large community cisterns and a greater number of non-domestic buildings and structures, whilst the remaining part of the site is dominated by domestic structures and houses laid out across a system of street terraces.<sup>2</sup> There is some evidence to suggest that a small wall may have created a physical division between the ecclesiastical complex and the domestic section to the immediate south. The partial remains of the wall can be seen running from the defensive wall to the southeast of Agios Georgios where its visible traces stop. We expect that the line of the wall continues and that it should not be seen as being defensive in form, but rather as a formal boundary dividing the ecclesiastical complex from the rest of the town. With the data currently available to us the term *citadel* cannot be used to describe this situation.

### *Phases*

There are a number of signs that indicate two broad phases at the site. The first phase is the construction of the defensive walls and the laying out of a terrace and street system. This phase would have been carried out over an extended period and included the construction of the individual buildings on the plots. This phase should be seen as a period of stone cutting, terracing and construction and would have involved private individuals and families as well as ecclesiastical, insular, regional and imperial authorities. A second phase is apparent in the decision to alter and significantly upgrade the site through the construction of the round tower and bastion and the shifting of the line of defences, which would have extended the area of the city at the northern tip<sup>3</sup> (**fig. 4**). It is clear that these changes also led to a substantial increase in the capacity of the community cisterns through the construction of a large cistern to the south of the round tower, and the construction of another cistern within a structure to the north of the stepped entrance. It can be conjectured that the larger community cisterns to the southwest of the Agios Georgios complex were also constructed in a later phase and they must relate to the construction of large (no longer visible) structures behind them. Agios Georgios was also significantly extended and developed in later phases.<sup>4</sup> These observations carry implications for how we should interpret the function and role of Apalirou, and point to investment and infrastructure beyond the initial construction phase. We have no data that could be used to suggest the chronology of phase two, though there are several historical contexts. In particular they may be associated with campaigns associated with the re-conquest of Crete, culminating in Nikephors Phokas' successful campaign in 961 for example.

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1. Clay or earth bonding rather than mortar has been seen as being more common in peripheral regions in churches and fortified settlements from the 5th and 6th centuries, and mortar is used more sparingly, Dinchev (on Thrace and in Dacia) (2007), p. 503. The same trend of reduced use of mortar and cement at sites on the periphery has been noted in Italy from the 5th-6th centuries, Frankovich and Hodges (2003), p. 71.

2. Note that the early phase of the site may not have had such a clear spatial division as the ecclesiastical complex was extended later, and the round tower and large community cisterns were also subsequent additions. Therefore the spatial division would not have been so pronounced in the earliest phases.

3. See Roland on the defences in this volume.

4. See Aslanidis in this volume who suggests an initial construction phase in the second half of the 7th century, followed by a vaulted roof and the construction of a dome in a later phase, see also Ødegård on the churches of Apalirou in this volume

### *Terraces and street system*

All construction at Apalirou would have required terracing; there are few level areas on which to build. The only level area that can be seen today is a smaller area to the east and northeast of the Agios Georgios church complex; however, this has been achieved through stone cutting and by filling in the areas between the curtain wall and the church and connected rocky outcrops after the major structures had been laid out. This narrow level area immediately to the east of the church was left open and not built upon. On the basis of its proximity to the church, and that this is the only area with any depth of soil, we can conjecture that it may have been used for burials, however this has yet to be confirmed. Due to the uneven and rocky nature of the mountain, builders and architects would have needed to place walls onto crags and outcrops and follow the contours of the terrain. Whilst such situations could have led to a chaotic and organic urban plan, it is clear that an element of control has been applied at Apalirou within the constraints of the topography. The intra-site topography excludes a regular grid, but N-S terraced streets, between 2-3 m wide, were laid out with an aim to control movement across the hillside and to create streets onto which buildings could front. These terraces were not wide enough to build upon, and buildings needed therefore to compensate for slope within their basements and plots. The terraced streets run parallel to each other without strictly following the contours of the slope, their aim was to fill the space within the walls and manage N-S movement across the town. An important observation to make here is that the street plan did not need to cater for wheeled transport as only pack animals would have been able to climb the site. As such, oblique angles and terrain-based streets are more normal as planning would not have needed to consider the needs of wheeled transport.

In order to manage E-W movement between the terraces, a number of narrow stepped streets connect the terraces to each other, and demarcate the sides of houses and structures. Of interest here is the presence of gutters and drains on each side of the stepped streets to lead runoff water downslope and onto the N-S terraces, where it was channelled into cisterns. The overall result is of a controlled and structured settlement plan that responds to the constraints of a challenging site with a large degree of organic and individual solutions. A high level of investment has been made at Kastro Apalirou that sought to create functional urban space at a remote and inaccessible location. It should be noted that these observations are based upon detailed survey across a site that has been subject to the removal of stone and material over many centuries.<sup>5</sup> As a result the appearance of a collapsed and chaotic urban community on top of a wild and windy mountain is the reality that meets the visitor and influences the observer today.

### *House types*

The identification of building types at Apalirou is central to discussing the function, role and status of the community. As a result of the survey the project was able to redefine Kastro Apalirou as an urban community rather than a fort or a refuge based upon the scale of the settlement and that there were a large number of domestic houses within the walls. This allows us to recognise the complexity of the site and its diversity. In addition to the two main phases, we have noted a large number of changes and adaptations made to individual buildings indicative of private and individual interests and a longevity of activity. A further element to defining Apalirou as a normally functioning community (rather than

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5. Two decorated architectural elements have been found down slope, presumably having been left by those attempting to remove them. Also we can see that dressed stone from gutters and steps is absent from key areas, and that identifiable stones from the gutters have also been left along the path presumably during removal. It is clear that the removal of attractive architectural material began immediately after the desertion of the site in the early 13th century, continuing into recent times.

a fortress) was the identification of cultivation terraces below the walls as being contemporary with the settlement, and the discovery of a stone base of an olive or wine press in connection to one of the houses, which shows that the processing of agricultural produce took place within the walls. (fig. 5) A threshing floor connected to the cultivation terraces below the walls has also been identified.<sup>6</sup>

The project has yet to excavate or clear collapse from any domestic house and as such the material and discussion presented here is based upon visible traces on the ground. In many cases details such as doorways and connecting entrances between rooms remain obscured by collapsed material. Those few houses where detail is visible all have doors that open to the west indicating that the houses faced down-slope and fronted onto the terraced streets. We assume also that most buildings had two storeys, and some had three (including cellars); this is based upon visible slots for beams. There is so far little evidence for roofing materials. The only structure to have been cleared down to natural bedrock is the smaller church, which had a vaulted roof that spanned four metres and that was made from the local grey limestone found on the mountain. This vaulted roof used mortar between the split stone slabs; we note that otherwise only churches and cisterns had vaulted roofs at Apalirou. Roofing material would have needed to be compatible with water harvesting and collection. Tile is rarely found at Apalirou; the 2015 to 2016 campaign of systematic surface collection that recovered ceramics from within the walls and outside noted that very little tile was logged.<sup>7</sup> Some tile was found at the small church during excavation but was seemingly used as fragments to level stones in the wall during construction and was perhaps also used in burials. Based upon these observations we assume that the roofing material was split stone or organic material, both of which are widely used in older traditional houses on Naxos today.<sup>8</sup>

The survey identified two types of buildings based upon construction type: linear terraced structures (18) constructed upon basement partitions, and 'block houses' (20), quadrilateral self-contained domestic units with up to three stories that contained internal cisterns located in the basement at the lowest part of the house. We identified a third group of buildings (4) that were defined by size and quality of construction rather than form, situated at roughly the mid-point of Apalirou just above the gateway to the town. They were more strongly constructed than the other domestic buildings, and up to three floors in height (fig. 6). There are a further nineteen as yet undefined buildings, whose architectural details remain obscure due to collapse. We tentatively suggest that fourteen of these are block houses, but until we can trace their outlines and identify the connected cistern we are unable to state that they belong to the block-house type. In addition, a smaller number of cruder structures were out-houses or ancillary buildings built into recesses in the cliffs left by quarrying, or against crags.

The S-N orientation of the topography and the steepness of the site has been a central variable in defining building design and construction technique. The dimensions of the buildings from W-E (front wall to back wall) range between 4.6-5.8 m with a mean of 5.3 m and are relatively similar for all structures, whether they appear to be domestic/private, or non-domestic in character. Slope therefore influences the depth of the buildings and limits construction type. There is greater variation in the length of the structures along the S-N dimension, and buildings are generally longer than they are wide. This aspect of S-N orientation may have limited church construction as well, as few locations offer suitably large W-E plots. This may explain why there is a large church outside the city walls, as constructing a building of that size within the settlement would have been impossible after Agios Georgios had occupied the most level area of the site. This point might also be valid in a discussion on the relative dating of the construction of the two churches and we expect that Agios Georgios will prove to be the earlier

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6. See Hill and Ødegård on the extra-mural remains in this volume.

7. A team is currently working on the ceramic material from this survey.

8. Reeds and thin branches are laid across beams in one direction, over which is a second layer in another direction, a pattern repeated over several layers, and upon this lime or clay is poured creating a flat watertight roof.

of the two.<sup>9</sup> So far a total of seventy houses have been identified, though a figure of up to two hundred houses/buildings within the walls can be expected.

### ***Block houses***

The survey created the term *block house* to describe this most numerous class of buildings, as we see these structures as being self-contained domestic blocks.<sup>10</sup> They were the easiest structures to define as a type, due to the cistern in the basement that also makes them visible. The heavy use of mortar in the cistern and its solid construction ensured its survival and in many cases led to the identification of the building. A basement enclosed cistern is clearly a private one and we assume that the room above it would have been a kitchen or a practical functional room with an opening for access into the cistern and through which a bucket could be lowered.<sup>11</sup> This type of structure is the clearest statement of domestic architecture at Apalirou. Cisterns and water harvesting strategies would have been vital at the site, and together with topography these two variables have strongly influenced the architectural types found within the walls. We can suggest that the lack of water supply through wells or pipe delivery led to the development of the block-house type with private basement cistern. In addition, the way that slope restricted building size along the W-E axis can be seen as having created this house type, which was perhaps not previously seen on the island. Although one must be careful in stating whether this building type was new to the island as very few Byzantine houses have been excavated on Naxos (or indeed anywhere); excavations from the Grotta area at Chora have revealed Late Antique to Byzantine houses to be larger structures with interconnected rooms situated around courtyards.<sup>12</sup> This building type known from many Late Antique and Early to Middle Byzantine sites both in urban and proto-urban village contexts can be seen as representing a norm for large households.<sup>13</sup> The contrast between courtyard houses and the block houses at Apalirou is that the houses within the walls had few rooms and space was at a premium. No courtyards are visible and how interior space related to exterior space is not yet clear.

Despite the scant evidence for domestic architecture on the island we can say that the block houses at Apalirou were constructed and organised differently to houses elsewhere on Naxos and make a strong case that they represent a new development necessitated by topography, location and context. We have as yet no information on the function or context of rooms within the houses, and we have not yet been able to observe any traces of storage vessels for grain or foodstuffs, apart from some very small niches in the wall of a cellar under one of the largest structures. The presence of an olive press within the walls clearly shows that the storage of foodstuffs would have been normal and that the houses and structures would have accommodated a room for this purpose, most likely in the basement.

We have observed consistently throughout the survey that dressed stone and other material has been removed. The excavation of the small church noted that the bones of a sheep or goat lay on the floor before the roof fell in. In other words, the church had been deserted and was no longer in use

9. See Ødegård on the churches at Apalirou in this volume.

10. Niewöhner refers to a 'block form' of early Byzantine houses evolving from the tradition peristyle house type, with examples from Cilicia, Lycia and Caria, see Niewöhner (2017), p. 112.

11. This type of internal cistern accessed from the rooms above is known from Byzantine contexts at Monemvasia, see Klaus and Steinmüller (2007), pp. 40-41. Cisterns had to be cleaned and as has been noted by studies elsewhere in the Mediterranean, this was usually undertaken at the end of the summer when the cistern was nearly empty, see Mantellini (2015), p. 420.

12. Lambrinoudakis in this volume.

13. For Middle Byzantine houses from Hierapolis, see Arthur (2006), p. 52; Rheidt (1991) for Pergamon; Romancouk (2000) for houses from Chersonesos. Similar domestic architecture is known from large village settlements in the Middle Byzantine period at Boğazköy from the second half of the 10th century to the early 12th century, which comprise a set of rooms constructed irregularly around a courtyard, and with covered water channels, see Beate Böhlendorf-Arslan (2017).

before it fell into ruin and collapsed. The church of Theoskepasti on the slope below has not been in use for a long time though the altar is still tended.<sup>14</sup> Based upon the way that the cisterns have been systematically destroyed and the fortifications apparently neutralised, we believe that the Venetian administration, after its take-over of the islands from 1207, forbade settlement within the walls after they themselves no longer had a use for the site, and had not desired that a fortified settlement remain intact.<sup>15</sup> It seems from our perspective logical to expect that household equipment was removed and that any and all useable building material was taken away by the inhabitants who salvaged what they could carry. It may be the case that the removal of wooden beams also occurred, which may have led to an acceleration of the processes of collapse. This removal of material would have also continued over many centuries and these aspects of the gradual deconstruction of the site have become increasingly clear to us during the course of the survey.<sup>16</sup>

### *Terrace houses*

The second identifiable house type at Apalirou is composed of a longer row of rooms on a terrace that does not always have a cistern in the basement and does not have the same room configuration as a block house. These are structures of at least two stories, and, as with block houses, the basement can be seen as providing a levelling function to carry the floor above and to compensate for slope and uneven terrain. The longest row is made up of five rooms, whilst terraces of two and three spaces are seen. The majority of houses of this type are situated to the southern part of the site and away from the larger military and ecclesiastic structures. Classifying these houses in a functional sense is not straightforward, though they should be seen as domestic structures due to the spatial division within Apalirou. It may be the case that further detailed study will result in some examples being re-defined as block houses if an internal cistern is found. This class of buildings may not differ functionally from the block houses, but rather only cosmetically due to the difficulties of terrain and construction at Apalirou.

### *Large houses*

There is one further class of building that is important. This group of four houses has not been defined by a specific construction type, but rather by status, size and quality of construction. There are two other variables connected to this type, and that is location and defensive aspect. The houses are located in the same area of the settlement, roughly twenty-five metres from the main gate (**fig. 7**). At least one example, which had arrow slits or loops in the wall, faces the gate, and may tentatively imply an internal defensive function. However, it should be noted that as these houses are more strongly built than others, more of their structure is visible today and we cannot rule out that other houses also had defensive aspects as part of their design, or indeed be certain that the loops are defensive in nature. Their proximity to the other domestic structures suggests that they were also private houses and not part of the military or ecclesiastic complex to the north, though again the survey notes that this division requires more data in order to be able to confirm these observations. Interestingly none of these buildings con-

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14. See Manolopoulou *et al.* in this volume.

15. Discussed in Hill, Ødegård and Roland in this volume.

16. We have received many reports and stories from locals concerning the removal of stone elements from Apalirou by previous generations; recently a so-far unconfirmed report was given concerning the transportation of a marble piece from Agios Georgios to the church of Agios Elefterios at Sangri in the 1960s. We note as well that many cut limestone blocks from the site can be seen along the path leading to the valley where they presumably were discarded by those who removed them on the descent from the site. See also Hill and Ødegård on the extra-mural structures and paths in this volume.

tain a cistern in the basement, though Structure 39 has a cistern abutting its back wall, and House 52 has a gutter running along the front of the building on the terrace against which it is constructed.

There are a further three buildings at the northernmost end of the site that are large and solidly built but which cannot be defined as domestic structures. Based upon their size and location close to the round tower we assume that they were military buildings. The basement of one was converted into a community cistern at a later phase and three buttresses added to support the wall. The conversion would have occurred after the fortification wall was extended and the round tower constructed. To the south of this building, on the other side of the stepped entrance, was another large structure that may also have had a military function as it also forms part of the defences. To the west of these buildings is a longer set of basement cisterns divided into seven compartments. There would have been an upper floor above these cisterns and their size also suggests an institutional function.

Fewer structures are visible in the northern section of Apalirou due to the build-up of soil on top of the collapse that obscures the features. Goats and sheep climb to the site at night and occupy this area before descending to the farm below for milking in the morning. Large amounts of manure have been deposited here over time and this has led to an accumulation of soil. There is a discrepancy therefore in visibility between the steeper parts of the site and this area. We have noted that the tops of structures lie just beneath the surface. When excavating the small church in 2015 we saw that the visible outline of walls represented their upper layers and not their base, and were surprised how much of the structure lay intact below the surface. This also suggests that the northern area is not as empty of structures as the present site plan of visible structures suggests.

Key aspects related to Kastro Apalirou that the project wishes to address concern what role Apalirou had within the political and economic life of Naxos, and who lived within the walls. At this stage of our investigations the houses offer therefore an important material for opening this discussion. There are a number of questions that need to be asked regarding the social structure of the community and those that either built or occupied the block houses and other houses. Were they single family units? Were the houses owned by an economic or social elite? Did the household maintain property elsewhere on the island? How large was the household? Of further importance is the relationship of the lower settlement to the upper settlement, an issue that will be approached in due course when the material is ready for analysis.<sup>17</sup> It is of interest that several building types appear to be unique to Apalirou, and that the community itself can also be seen as representing a new direction in social organisation of households and communities in Byzantine Naxos.

### *Cisterns*

There are very few urban communities that do not have access to springs, ground water through the digging of wells, and/or pipe- or channel-delivered water. The only solution in such a situation is water harvesting and storage. Naxos does not have much, or predictable rainfall; generally precipitation is greatest between November and April and episodes of heavy rainfall mostly occur in these months. The existence of a water harvesting and storage strategy at Apalirou was central to providing a viable source of water for the community. We noted that the needs for water coupled with the constraints of the topography of the site resulted in a new architectural type on the island - the town house with basement cistern adapted for steeply-sloped urban locations. At Chora, excavations have revealed both wells and an aqueduct system in the Classical and Late Antique period.<sup>18</sup> The large-scale use of cisterns

17. A village settlement at the base of Apalirou, Kato Choria, is currently under investigation by a team from Edinburgh and Newcastle universities, Crow and Turner work in progress.

18. Lambrinouidakis in this volume and Lambrinouidakis, Sfyroera and Bilis (2010), p. 9.



at Apalirou represents a new development on the island, and we can argue led to the development of new architectural forms.

Studies from waterless sites elsewhere in the Mediterranean show that compromise through sparse water use can be compatible with normal settlement.<sup>19</sup> There is also a strategic benefit linked to a water harvesting and storage system; a population that had developed an efficient and self-sufficient hydraulic strategy would also be able to withstand a siege. During a siege situation, where suitable areas for digging wells would be located in the lower, flatter areas, the besiegers would be further away from the site. Additionally, extra-mural water delivery systems can easily be cut off or contaminated and represent therefore a weak point in defensive strategies. We should also recognise that the hydraulic system at Apalirou was clearly a well-functioning and sustainable system for the community as the 600-year period of activity at Apalirou shows.<sup>20</sup> Moreover, the time needed to descend the mountain is only 20 minutes to the lower settlement and 40 minutes to the plains of Sangri and Marathos, so in periods of extreme drought the population could always leave. We would also expect that the scale of activity at Apalirou would fluctuate through the year and over time, dependent upon prevalent conditions. In total, fifty-one cisterns have so far been identified, by far the single largest structural group at Apalirou. We have chosen to divide them into two groups: private cisterns that relate to a single building, where we assume the water was not for sharing but for use by those within the building; and community cisterns where the water was collected and stored with the clear intention of sharing amongst a larger group, and which would have represented a strategic communal resource.

### *Private domestic cisterns*

There are in total forty-six private cisterns, each connected to a particular building and filled by the rainwater runoff from the roof of that building alone (**fig. 8**). These are mostly built into the basements of the buildings to which they belong, though in some cases they are attached to the outside of the building with abutting walls. The way in which runoff water was channelled into the cisterns is unclear as the upper floors and roofs of the buildings are not intact. However, two examples of stone-built gutters and a space in the design of a wall probably to hold a pipe show how this was achieved (**fig. 9**). At the small bath house connected to the Agios Georgios complex, ceramic piping leading into the heated bath is visible (**fig. 10**).<sup>21</sup>

The domestic cisterns were inserted into the basements after the houses were built and as such appear as a double wall in the basement. Cisterns needed to have a stronger construction and so had mortar to bind a more solid masonry than that used in the walls of the houses. In addition, a heavy layer of pink hydraulic mortar made from crushed tile and ceramics was used to seal the inside of the cisterns so that they would remain watertight. Vaulted roofs have been observed in all intact examples. We must assume that there was an opening for inspection and cleaning and also for a bucket to be lowered into the cistern. The larger cisterns have protruding stones as steps to allow access into them. So far we have not observed settling compartments for sediments in any of the cisterns, either community or private. There does not seem to have been any standard size or shape for cistern construction, but one common aspect is that cisterns were logically situated in the lowest part of each house.

19. Koutsoumpos and Galanidou (2015), Mantellini (2015).

20. Preliminary observations of ceramic material from surface collection note a spread of diagnostic material from the 7th to the end of the 12th century. How extensive the activity at Apalirou can be attributed to any particular period or century is still an open question.

21. Results are pending from a small investigation of the bath carried out by the 2nd Ephorate of Antiquities of the Cyclades in 2016 under the direction of Dr Dimitris Athanassoulis.

### *Community cisterns*

There are six large community cisterns at Apalirou situated at the northern end of the town in the vicinity of the Agios Georgios complex and the round tower. The scale of the cisterns clearly shows that there were larger buildings, no longer visible today, immediately up-slope of the cisterns with a roofed area to provide the runoff needed to fill them. The water that was collected from these structures was most likely for strategic storage and non-domestic use. Four of these cisterns were constructed after the round tower was built and the defences were extended, as they would otherwise have lain outside the walls. The large vaulted cistern immediately behind the rampart walk and round tower would not have been constructed before the improvements to the defences (A on **fig. 1**). The large vaulted cistern measures 11.4 m x 2.4 m x 2.3 m which gives a maximum storage capacity of 62.38 cubic metres (**fig. 11**).

In addition, the large cistern to the north of the stepped entrance is a later addition into what was previously a building without a cistern that formed part of the original defensive line (B on **fig. 1**). The construction of the round bastion and the extension of the defences placed this building firmly inside the walls and removed its defensive function. The structure's basement was converted into a large cistern through the strengthening of the inner wall and the addition of a vaulted roof above the basin (**fig. 12**). Three heavy buttresses were also added to the outside of the cistern to give additional support, which would not have been done when this wall made up part of the defences. The internal height of the basin was two meters and the larger compartment measured 11.7 m x 2.7 m, giving a maximum capacity of 72.6 cubic metres, while that of the smaller compartment was 27.6. This cistern could have held up to 100 cubic metres of water. We can interpret these changes as an increased need for strategic water storage at Apalirou perhaps in conjunction with a larger garrison that would have been required to man the tower and ramparts, and here we can argue that preparation for a possible siege situation may have been behind the decision to convert the structure into a cistern.<sup>22</sup> The long system of terrace cisterns to the southwest of Agios Georgios must relate to a roofed area immediately up-slope to the east that is no longer visible; this terrace of cisterns together would have had a capacity of 154 cubic metres, the largest capacity of all the cisterns at Apalirou (**fig. 13**).

The survey has also observed gutters and channels running down the E-W stepped streets and along the N-S streets; we believe that some runoff was channelled via the drains to the community cisterns which also lie at the lowest levels of the town. We have not been able to follow the channels in their entirety to the cisterns, however it is clear that the size of the community cisterns would have required considerable runoff in order to fill them.

In addition, there are a further six smaller cisterns that are inserted into sections of the walls, one as a false apse behind Agios Georgios, and two circular free-standing cisterns, one of which lies just inside the walls by the entrance. These smaller cisterns illustrate the organic way in which adaptations and improvements were made at Apalirou over time, and that at every opportunity, water runoff was not allowed to go to waste.

### *Summary and discussion*

Any presentation of Apalirou needs in some way to address the location and the constraints that come with it. Whilst it is important to stress the role of topography in determining urban layout and struc-

22. A logical historical context would be during the late 9th and 10th century in conjunction with the re-conquest of Crete, when we can assume investment in military infrastructure on Naxos would have increased. A later reference from around 1070 notes that the islands (the Cyclades?) were regularly used as stopover points for naval commanders who stayed for longer to train and organise troops. Kekaumenos II.1-5. Zarras (2016), p. 63 suggests that 'the islands' in the text may refer to the Cyclades.

ture, architectural design and choice of material, we should also note that the builders at Apalirou aimed to create a familiar and habitable townscape for the community that lived within its walls. The alternative would have been a refuge or heavily defended fortress where a community was not expected to live for an extended period of time. The results of the survey has shown that Apalirou was constructed for a viable community and inhabited for a long period of time. The six-hundred-year span of activity from the second half of the 7th century to the early 13th century is attested by ceramic and numismatic material, and the presence of many clear and visible adaptations.

Whilst the transitional Late Roman and Middle Byzantine periods have often been seen as a challenging and difficult period, Kastro Apalirou appears as an example of resilience and adaptation. The high number of churches founded on the island during this time and the rich iconographic material seen in the frescos also indicate a vibrant and dynamic society.<sup>23</sup> Kastro Apalirou was probably the single largest nucleated settlement on the island during the period and despite the lack of any documentary evidence we can assume it was the political centre of the island. A view therefore of a refuge is not tenable with the material from the survey.

The structural remains at Apalirou represent a unique material not only within the context of Naxos, but also within the frame of the Byzantine world. That Apalirou was built from scratch on a virgin site, and that the site was abandoned at the beginning of the Late Byzantine period in the early part of the 13th century has left us with a rare fossilised Middle Byzantine urban settlement. The location away from the coast, and the insular context leaves us with few clear parallels with which we can discuss the remains. Whilst Monemvasia has been mentioned (founded during the reign of Maurice at the end of the 6th century) it was a trading community, largely independent and heavily developed from the 12th century such that its architectural development would be formed by a different set of parameters, and altered through later use. Paliochora on Kythera offers a closer parallel as a fortified mountain town in an insular context, however the site was constructed later, perhaps from the twelfth century, and remained in use until the sixteenth century.<sup>24</sup> The sites in Asia Minor may offer some parallels, but the political and economic context that created them differs greatly from the Cyclades. The same can also be said for the fortified sites in the Balkans. The fact that Apalirou was constructed at a time when economy and society were evolving and adapting to new realities also requires us to consider the socio-economic organisation that formed the development of new architectural forms that differ from previous Late Antique traditions.

Long distance trade and contact decreased and insular communities would have found themselves in a cycle of transformation and adaptation. Piracy and sea-borne attacks might not have been a regular occurrence, but they did not need to be as the fear of that one attack where property and individuals become the goal of raiders would have been enough to motivate a movement from the coast to the interior. Furthermore, when long distance trade declined the economic motivation to remain by the shore would also have declined.

The site as a fortress is a modest one, and one that is set back from the coast. In order to find Kastro Apalirou you have to go looking for it. From the shipping lanes along the western and southern coast it is almost impossible to see the defences and structures as Mt Zas stands behind Apalirou and no silhouette or outline can be seen from the sea. Only when the sun is low in the evening and reflects on the walls is it possible to briefly make out the contours of the town. When climbing to the site from below, the first visible sign that a fortified urban settlement lies above is the round tower and bastion; the walls of the earliest construction phase are not visible before one is upon them. Apalirou did not try to be a visible symbol to the outside world, but perhaps rather a statement of continuity and control

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23. See Crow and Turner this volume.

24. Ince et al. 1987.

to the island, that politics and society on Naxos would continue even when the seaways had become dangerous. We must assume that the foundation of Kastro Apalirou necessitated radical changes in the infrastructure of the island. New roads and paths would have been needed to provide the town with basic needs, of which the copious amounts of amphorae scattered on the western slope below the town is visible evidence. Even though maritime trade may have become less important from the 7th century onwards, it is clear that Naxos still retained an important role in the commercial networks of the Aegean. Kastro Apalirou is, however, rather inconveniently placed in relation to the former important port at Chora. It is probable that the foundation of Apalirou would have shifted economic function to other harbours and landing places along the southern coast of Naxos. We still do not know much about this aspect, but the Southern Naxos Greek-Norwegian Underwater project, initiated in 2016, will hopefully shed much new light on this important topic.

In a wider context of the *longue durée* we can say that Kastro Apalirou as a defended hilltop community formed part of an adjustment in the pattern of urbanisation that took place in the Mediterranean from the end of Late Antiquity, which in this case is represented by a movement to defensible hilltop sites. This movement was not only a coastal phenomenon, but one that began to occur all across the Mediterranean for a number of different reasons; in Italy, the movement began early in the 6th century and has been seen as driven by local conditions.<sup>25</sup> In Byzantine-controlled areas, that movement came later and was driven to a greater degree by political structure and regional administrative policy. Further fieldwork and documentation will provide more data and material able to throw light on this important site.

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25. Francovich and Hodges (2003), p. 97.

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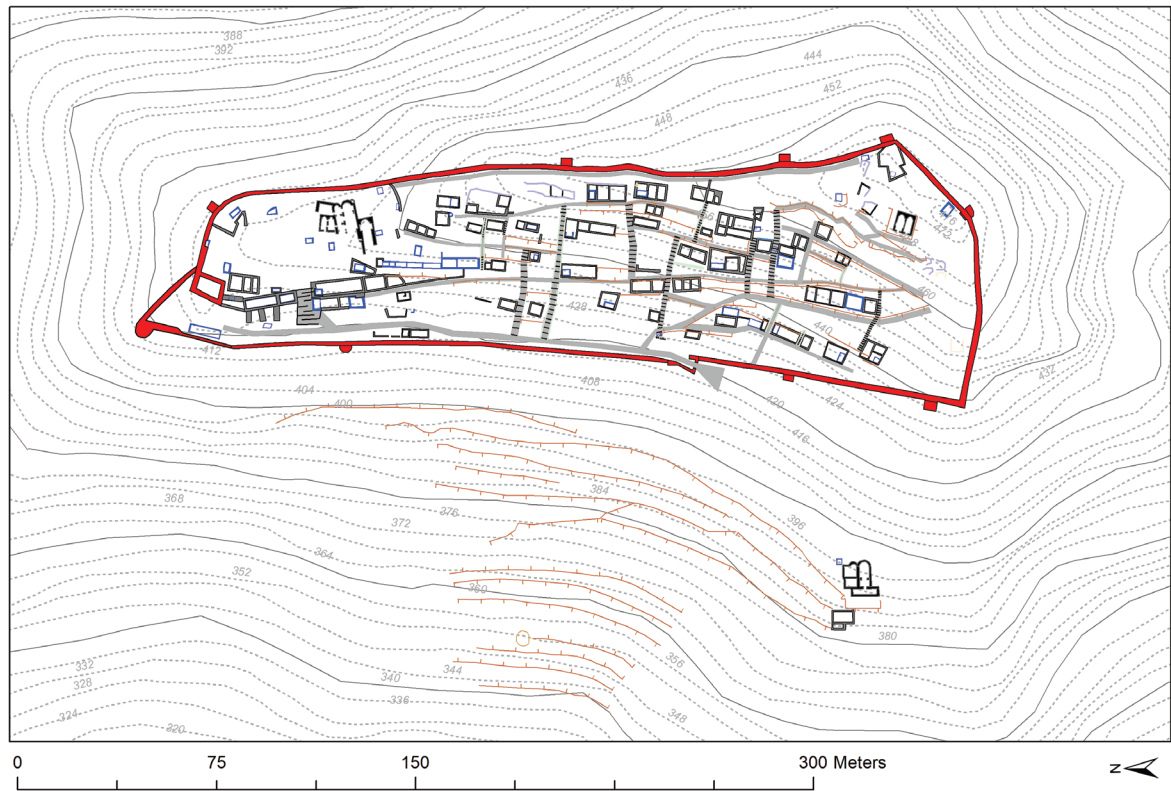


Figure 1. Plan of Kastro Apalirou.



Figure 2. Photo of Kastro Apalirou taken from the north showing the terrain and rocky nature of the site.  
Photo by Hallvard Indgjerd



Figure 3. Photo showing clay/earth bonding within a wall and the light use of mortar on its external face.

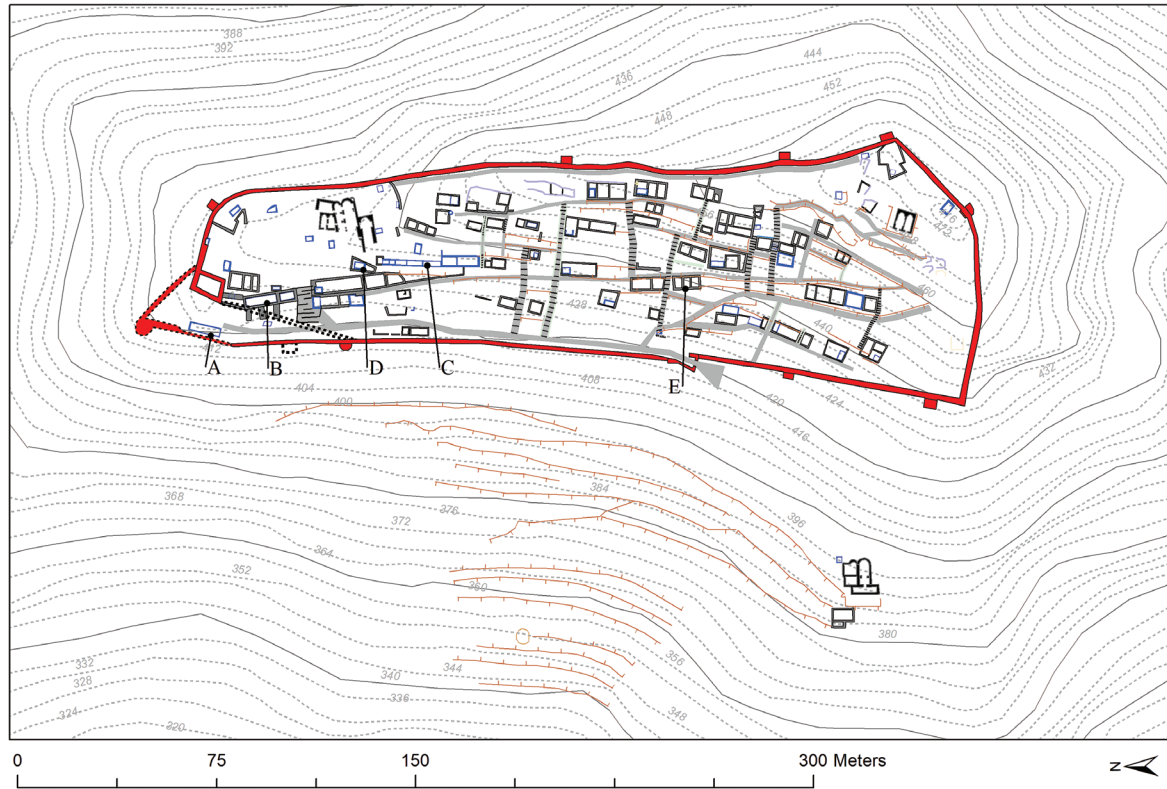


Figure 4. Plan of Apalirou showing phase 1 and phase 2 as indicated by dashed lines.



Figure 5. Olive press found in relation to Block House 59.



Figure 6. Photo of Terrace House 52 showing slots for the beams over the basement that carried the first floor, and an open area in front of the structure. In the upper left, beam slots for the second floor are visible in the back wall.



*Figure 7.*

Photo of House 01 showing arrow slits, beam slots above and the vaulted roof of the structure's cistern to the left. To the immediate right of the building a stepped street runs up to the terrace above.



*Figure 8.*

Photo showing the cistern within block house 01.



*Figure 9.*

Photo of Block House 49 showing the perpendicular space in the wall that would have held a ceramic pipe leading water down from the roof (marked as E on fig. 4).



*Figure 10.*

Photo showing the small bath house, note the opening in the wall for the oven (marked as D on Fig. 4).





*Figure 11.*  
The large vaulted cistern (marked as A on fig. 4).



*Figure 12.*  
Cistern to the north of the stepped entrance with supporting buttresses added later when the structure was converted to hold a cistern (marked as B on fig. 4).



*Figure 13.*  
The long terrace cisterns (marked as C on fig. 4).

