Donald C. Haggis and Carla M. Antonaccio
Classical Archaeology in Context

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Theory and Practice in Excavation in the Greek World

Edited by
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10 Exploring the Ancient Demos of Kymissaleis on Rhodes: Multdisciplinary Experimental Research and Theoretical Issues

Abstract: The Kymissala Archaeological Research Project (KARP) is a combined research effort of the Department of Mediterranean Studies, the University of the Aegean and the 22nd Ephorate of Prehistoric and Classical Antiquities, in collaboration with the School of Rural and Surveying Engineering of the National Technical University of Athens. This paper addresses various questions of research design and the implementation of field methods in the study of a classical Greek urban environment, the demos of Kymissaleis on the island of Rhodes, an archaeological site of ca. 10,000 square kilometers. We discuss a range of archaeological field methods, educational initiatives, topographical applications, and data management issues as they pertain to the documentation and study of a complex archaeological landscape.

Introduction

Archaeology as a discipline is deeply connected with the idea of experimentation. Yet, experiments in archaeology, such as excavations and surveys, cannot properly be repeated by others, at least as scientific method normally dictates. This idea prompts various theoretical questions concerning archaeological field methods, especially in cases of research dealing with large-scale samples, a site-wide research universe, and broad spatial analyses of an archaeological site. In classical and urban contexts, this normally encompasses multiple fields and diverse research contexts—urban planning; fortifications and monumental architecture; civic and domestic space; and cemeteries—that may reflect social stratification and social and political institutions spanning a broad range of periods, in many cases from the Bronze Age until Late Antiquity. Engagement of the idea of "classical" material culture as an historical, cultural, or chronological term, in such a broad timeline, is a complicated matter that depends as much on an understanding of a site's periods as on matters of scale and context. Furthermore, in handling complex urban sites, shaping an initial research design and sampling strategy to encompass various contexts is essential. It is true, of course, that preliminary study or stages of fieldwork might often lead to changes in research questions and recovery strategies, requiring one to engage diverse theoretical perspectives and levels of analysis. Since the final goal of most excavations is to understand a site's history—and different cultural contexts through time and space—a variety of approaches to data recovery and interpretation should be carefully examined and selected before implementation. It is the aim of this paper to discuss some issues that have been raised and addressed before and during the initial six years of the Kymissala Archaeological Research Project on Rhodes.

History of Research, and Historical and Geographical Context of Current Fieldwork

The ancient demos of Kymissaleis is located in the modern area of Kymissala (**fig. 1**), on the western coast, extending between the modern villages of Sianna and Monolithos, in the territory of Atavyros-Akramitis-Armenistis, which preserves virtually intact natural environment, protected by the European Project *Natura 2000* (code: GR 4210005, *Official Journal of the European Union* 2006, L 259, 1–104).

The identification of the region with the territory of the ancient demos of Kymisaleis has been confirmed by the existence of the ethnic epithet "Kymisaleus" on funerary stelae found in the area, as well as by the survival of the ancient name Kymissala into the recent modern period, forming compelling evidence of continuity in the region since Greek antiquity (Stefanakis and Patsiada 2009–2011, 85–86).

Demoi became the core of the administration of the pan-Rhodian state, after the founding of the city of Rhodes in 408–407. Although Ialyssia, one of the three large administrative regions of Rhodes in Greek antiquity, has been thoroughly studied (Papachristodoulou 1989; 1996; 1994, 157–168), Lindia and Kamiris have not been systematically explored. Kamiris may have consisted of nineteen demoi, twelve of which are placed on the island of Rhodes; six in the Rhodian Peraia on the opposite coast of Asia Minor, once controlled by the Rhodian State; and one on the island of Halki (Papachristodoulou 1989, 68, 72–74; 2009; 1994, 163–164; von Gaertringen 1917). Only four, however, can be placed on the map with relative certainty, with the demos of Kymisaleis, being the best documented today.

The extensive archaeological site of Kymissala attracted artists, topographers, and connoisseurs of Greek antiquity, especially from the nineteenth century onwards (Stefanakis and Patsiada 2009–2011, 67–69). In the early 1860s the British consul Alfred Biliotti and the French painter and photographer Auguste Salzmann, carried out the first excavations at the necropolis of Kymissala (Smith 1883, 136; 1885, 371; Maiuri 1916, 294; 1928, 84; Challis 2008, 146–147). After their expedition, the partially excavated necropolis was left to local looters, while the isolation and relative inaccessibility of the area led to unprecedented grave robbing (Maillis, Skandalidis and Salachouris 2002, 260. Also, Papaioannou 1991, 120–121; Sørensen and Pentz 1992, 125).

Subsequently, the known antiquities of the region attracted the attention of Italian archaeologists, and almost immediately after the Italian occupation of the Dodecanese, research was carried out by the Italian School of Archaeology at Athens in two expeditions, in 1913 and 1915 (Pernier 1914, 236–242; Maiuri 1916; Maiuri 1928). Apart

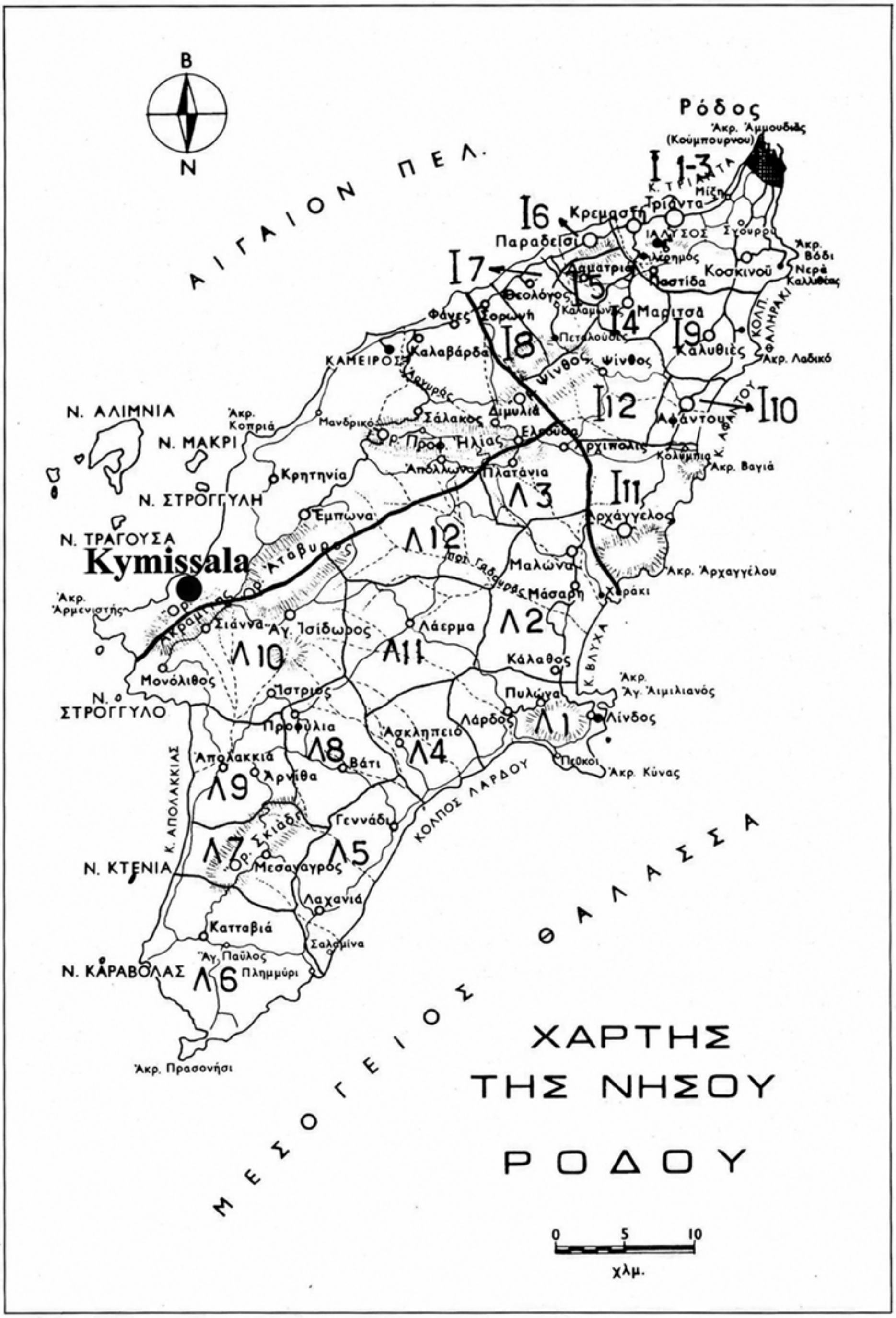

Figure 10.1: Map of ancient Rhodes (after Papachristodoulou 1989, 75, fig. 10.3).

from the Italian excavations, the Greek Archaeological Service conducted limited rescue excavations and surface clearance in the region during the last decades of the twentieth century (Konstantinopoulos 1969; Zervoudaki 1970; Patsiada and Filimonos 1987a; 1987b).

The first intensive archaeological research project in the region started in 2006, as a combined effort of the Department of Mediterranean Studies, University of the Aegean and the 22nd Ephorate of Prehistoric and Classical Antiquities, in collaboration with the School of Rural and Surveying Engineering of the National Technical University of Athens, and the participation of the Institute of Archaeology of the Nicolaus Copernicus University in Toruń, Poland. The main purpose of the project has been to determine and document the geographical extend and chronology of the ancient demos of Kymissaleis (Stefanakis 2009, 2010a, 2010b; Stefanakis and Patsiada 2009–2011).

Research Limitations

The research design for the past six years has been constrained by a number of difficulties in shaping a preliminary understanding the chronology, extent, and the spatial organization of the demos as the broadest scale of analysis (Stefanakis and Patsiada 2009–2011, 70–71). First, the mountainous and densely wooded region of Kymissala—dense vegetation, rugged terrain, and general lack of surface visibility—were significant obstacles, hindering our ability to get a sense of the ancient topography, and correlate the numerous sites comprising the demos; the extensive spread of pine forest in the region, an environmental condition of the last century, has resulted in many cases in the destruction of walls and foundations of buildings across the settlements and many of the tombs in the necropolis.

Second, the widespread looting of antiquities, which flourished in the area until the last decades of the twentieth century, is perhaps the most important obstacle in our understanding of the culture history of the area, not only because of the damage to archaeological contexts, but because we are still unaware of many of the locations of these intrusions, and the full extent of the artifacts recovered or destroyed (e.g. Furtwängler 1886).

Third, human activity from Medieval to modern periods has also caused irreversible damage to the archaeological landscape. During the period of the occupation of the island by the Knights of St. John (1309–1522 A.D.), material from the archaeological sites of Kymissala were, most likely, employed in the construction of the castles of Monolithos and Sianna, the four coastal observation towers (Stefanidou 2004; 2001a–c), as well as in the later constructions of the adjacent villages of Monolithos and Sianna. Finally, modern herding, beekeeping and agricultural activity have caused damage to various sites and monuments.

The Archaeological Topography of Kymissaleis

The archaeological topography of the demos (Stefanakis and Patsiada 2009–2011, 63–67, 86–92) may be visualized by following the ancient route, identified originally by the Italian team (Maiuri 1916, 285–288) (**figs. 2, 29**). The first archaeological site when entering the area of Kymissala is Alonia, named after the many threshing floors built in later years, often with ancient stones taken from nearby buildings—retaining walls that once supported the side of the ancient road are visible nearby. East of these walls there is a monumental tomb carved into the side of a huge rock, which had fallen into the ancient road. Both the tomb's entrance and the niche on its facade are surmounted by a carved pediment. In the chamber are two carved benches, one of which is decorated with images of a pillow and footstool.

The road continues to the site of Stelies, where, around an ancient spring, a small settlement was identified, preserving various constructions and foundations of monumental buildings. South of this settlement a second part of the retaining wall of the ancient road is preserved. The road then culminates at the site on the low hill of Marmarounia. On the southern slope of the hill, a localized scatter of rectangular stone blocks comprises the remains of monumental structures and walls at the location. At the northern edge of the hill, a relatively well-preserved enclosure built of polygonal masonry has also been found, with an entrance on its narrow east side. It could be a shrine, as one can infer from the large cylindrical altar in situ inside. The settlement at Marmarounia seems to be the place from where one can best gain access to the

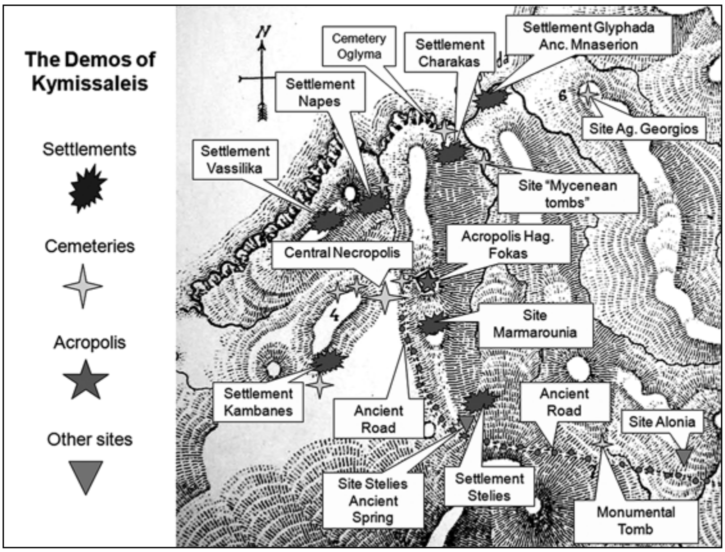

Figure 10.2: Map of the archaeological sites in the Kymissala area (drawing KARP).

acropolis of Kymissala, on top of Hagios Fokas, the highest hill in the area. On the slopes of the hill, extensive fortification walls are preserved while at the top of the acropolis there are the ruins of a temple. From the hill of Hagios Fokas the ancient route splits. One branch descends westwards and passes through the quarry of gray limestone, with which many of the ancient structures were constructed. At the west foothill of Hagios Fokas, the road enters the central necropolis of Kymissala, extending to the east and north slopes of the opposite hill of Kymissala.

Leaving the necropolis behind, the road tends to the northwest, to the site of Vassilika, which features the impressive ruins of the most extensive settlement of Kymissala, with substantial remains of ancient buildings, including a shrine, domestic quarters, a tower and parts of a perimeter wall. It is one of the most important sites overlooking the small plain of Vassilikos. Further east, at the site of Napes, on the slope of a small hill, stands one more settlement, with poorly preserved buildings, foundations, rectangular altars and various architectural remains. To the northeast of this site lies a small cemetery, probably connected with that settlement. The visible pottery from this area suggests a Hellenistic and Roman date.

Returning to the acropolis, the other branch of the ancient road turns northeast descending towards the small bay of modern Glyphada, identified by Strabo (*Geogoraphica* 14, 2.12.1) as Mnaserion, a settlement, which probably served as the harbor for the demos. Next to the sea, along the modern road, many walls and remains of ancient occupation—mainly Roman and early Christian—are visible, though partially destroyed by the modern road. At the west end of the bay are the ruins of two early Christian Basilicas.

Eastward from the settlement of Glyphada, on the slopes of a low hill, we identified a small cemetery with many looted shaft graves, most likely of Hellenistic date, while a second small cemetery is located to the south of the settlement, again severely looted. On the top of the hill of Charakas, which dominates Glyphada Bay from the west, one more extensive settlement was identified, with long walls, foundations of buildings and a number of natural or dug cisterns. On the north slope of the hill at the site Oglyma, there is yet another shaft-grave cemetery. Finally, at the site of Kampanes, on the southeast end of the plain of Kymissala, lies one more large settlement. Adjacent to it, there is a small cemetery of Hellenistic date, with remains of grave monuments scattered around the area.

Within this area of diverse, widely dispersed, and extensive archaeological remains, the sites of the acropolis and the central necropolis (**fig. 3**) were selected for initial investigation and intensive excavation.

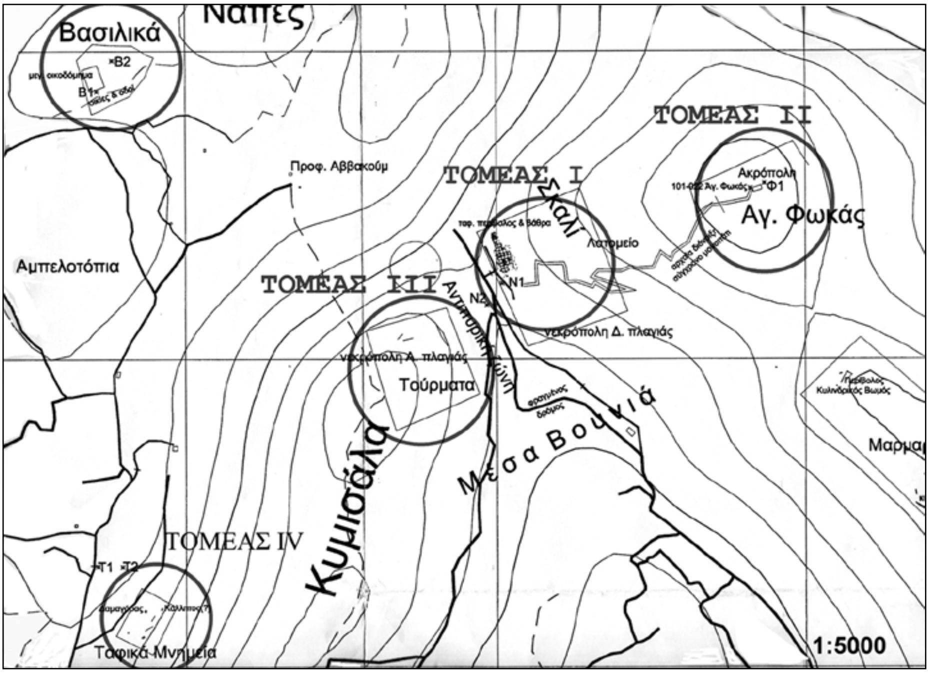

Figure 10.3: Topographical map of the main areas of excavation (drawing KARP).

The Acropolis (Hagios Fokas Hill)

On the peak of the acropolis of Hagios Fokas hill stands a temple (**fig. 4**) (Maiuri 1916, 285–298; 1928, 83–84; Sørensen and Pentz 1992, 126–128; Stefanakis and Patsiada 2009–2011, 72–74). The building's orientation is east-west, with the entrance to the west. It consists of a deep front room and a cella, with total external dimensions thirteen and a half by five and eight-tenths meters. Only the lower row of stones is preserved in situ, while slabs that originally formed the second course of the north wall have fallen into the interior. The preserved height of the wall was ca. 122–123 centimeters. The long walls of the temple terminate in both the front and back in a kind of semicircular portico at the four exterior corners of the building. Attached to the north portico on the front side, a large rectangular upright shaft is preserved in situ. Also preserved is a large threshold marking the entrance to the cella. According to the Italian archaeologists, the temple dates to the third or second century, while the deity to whom it was dedicated remains unknown.

On the west slope of the hill, west of the temple, a part of the defensive wall of the acropolis is well preserved. Especially interesting is the central part of this wall, which

Figure 10.4: The temple on the acropolis (Hagios Fokas hill) (photo KARP).

is preserved to a length of about eighteen meters, and three meters high at several points (**fig. 5**) (Berg 1862, 151; Biliotti and Cottret 1881, 86; Maiuri 1916, 289–290; Hope Simpson and Lazenby 1973, 146; Stefanakis and Patsiada 2009–2011, 74–76). The lower part of the wall is built of large polygonal blocks. The upper part is built according using irregular orthogonal masonry. The facade in the lower polygonal part is rather rough (quarry face), while the upper part is nicely dressed and decorated—the upper row is decorated with incised patterns, such as rows of diamonds, cross hatching, crooked lines and other motives. In 1853, Newton (1865, 203–4; Pernier 1914, 238) also observed traces of red paint, not visible today. The building styles and the technique of stone cutting suggest a date of this part of the fortification in the second half of the fourth century (Orlandos 1994, 214–15, 220, 248–50).

The Central Necropolis in the Kymissala Valley

The central necropolis occupies the valley between the hills of Hagios Fokas and Kymissala, extending to the north slope of the latter (Biliotti and Cottret 1881, 89; Furtwängler 1886, 131; Pernier 1914, 239–241; Maiuri 1916, 295; 1928, 84; Inglieri 1936,

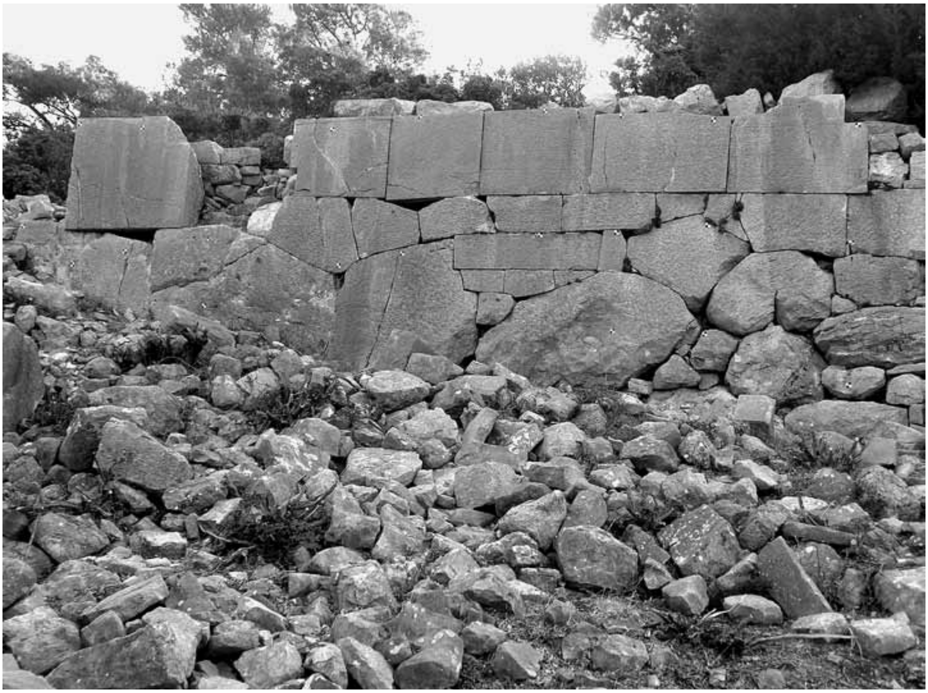

Figure 10.5: Central part of the west defensive wall of the acropolis (photo KARP).

53–4; Konstantinopoulos 1969; Hope Simpson and Lazenby 1973, 146–147; Sørensen and Pentz 1992, 124–125). For practical reasons the necropolis was divided into three sectors. A number of graves were investigated in various spots of the necropolis, in order to clarify its extent as well as the chronology of use (Stefanakis and Patsiada 2009–2011, 76–86). The tombs were mainly chambers dug into the rock, and fall into three major categories:

(1) Tombs previously investigated. These installations had been thoroughly cleared—the method and finds are not known—resulting in an empty chamber and antechamber, found filled in with slope wash debris. In these cases, only traces of skeletal remains have been detected, with no extant artifacts or sherds apart from the occasional small fragment.
(2) Looted tombs. In these cases, it is clear that looters had dug a deep channel or a pit leading directly to the chamber entrance; normally the grave marker has been displaced or broken. Skeletal remains, badly damaged, were normally left within the chamber, usually scraped to the side or in front of the entrance. Small terracotta vessels are often recovered, having been moved to the sides or corners of the chamber. Very often vessels broken during recovery are also found, either in situ or evidently discarded on the exterior of the chamber.
(3) Intact tombs. They account for only twenty percent of the graves investigated.

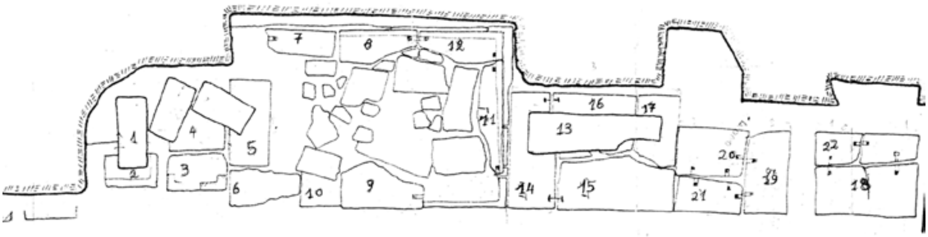

Figure 10.6: State plan (1968) of the funerary monuments (courtesy 22nd Ephorate of Prehistoric and Classical Antiquities).

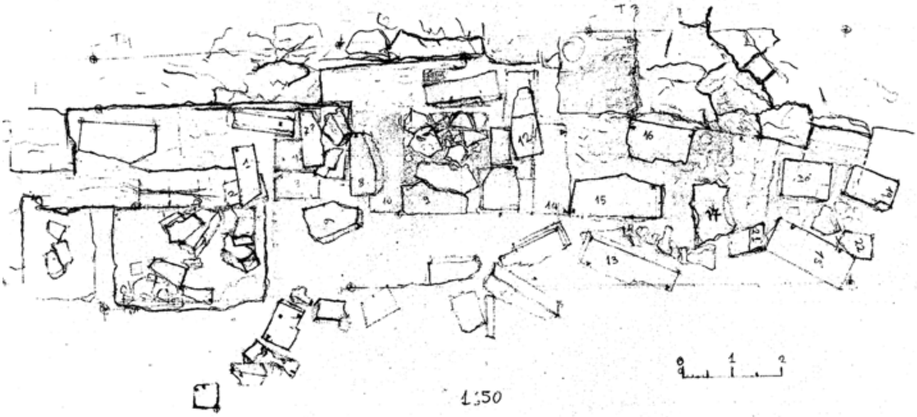

Figure 10.7: State plan (2008) of the funerary monuments present situation (drawing KARP).

Sector I covers the western foot of Hagios Fokas Hill. In 1968, the Greek Archaeological Service brought to light five contiguous grave monuments (**fig. 6**), built of large rectangular blocks, forming a total length of thirteen meters and maximum width of three meters (Konstantinopoulos 1969). Unfortunately these monuments were disturbed and dismantled some years later, in the 1970s, with the use of a bulldozer during illegal activities on the site (**fig. 7**). The southern monument was completely destroyed and the remaining four were partly damaged. In the area, eleven graves were investigated, of which two were found intact. All were chamber tombs, cut into the bedrock, and vary in dimension and shape (Stefanakis and Patsiada 2009–2011, 77–82).

Among the graves investigated in Sector I, some are outstanding, such as Grave 2/2006 (**figs. 8, 38a**), consisting of an antechamber with steps leading into the two chambers, one on the east wall and one on the north wall; and grave 4/2007

Figure 10.8: Grave 2/2006 (photo KARP).

(**fig. 9**), with a large—almost square—antechamber that has a 2.22 meter long stepped entrance leading down into the burial chamber. The entrance of the chamber was a natural opening in the rock, shaped by a neatly built wall, approximately half a meter wide. At the lower part of the facade there is a small square entrance sealed by a circular slab of stone. Both graves were looted, but small vases were left behind: in grave 2/2006, a black glazed kantharos, a small black glaze phiale, a black glazed askos of guttus type, and a plain dish (**fig. 10**); in grave 4/2007 a black glazed cup (**fig. 11**), a thurible, a lamp (**fig. 12**) and a lid of a cylindrical pyxis, dating to the end of the fourth century, as well as a cooking pot and two lamps of Late Antiquity (**fig. 13**) (Stefanakis and Patsiada 2009–2011, 79–80).

Figure 10.9: Grave 4/2007 (photo KARP).

Figure 10.10: Pottery from grave 2/2006, end of 4th century (photo KARP).

Figure 10.11: Black glazed cup (Π210–220) from grave 4/2007, last quarter of 4^{th} century (photo KARP).

Figure 10.12: Lamp (Π293) from grave 4/2007, end of 4^{th} century (photo KARP).

Figure 10.13: Lamp (Π209) from grave 4/2007, late 4th century C.E. (photo KARP).

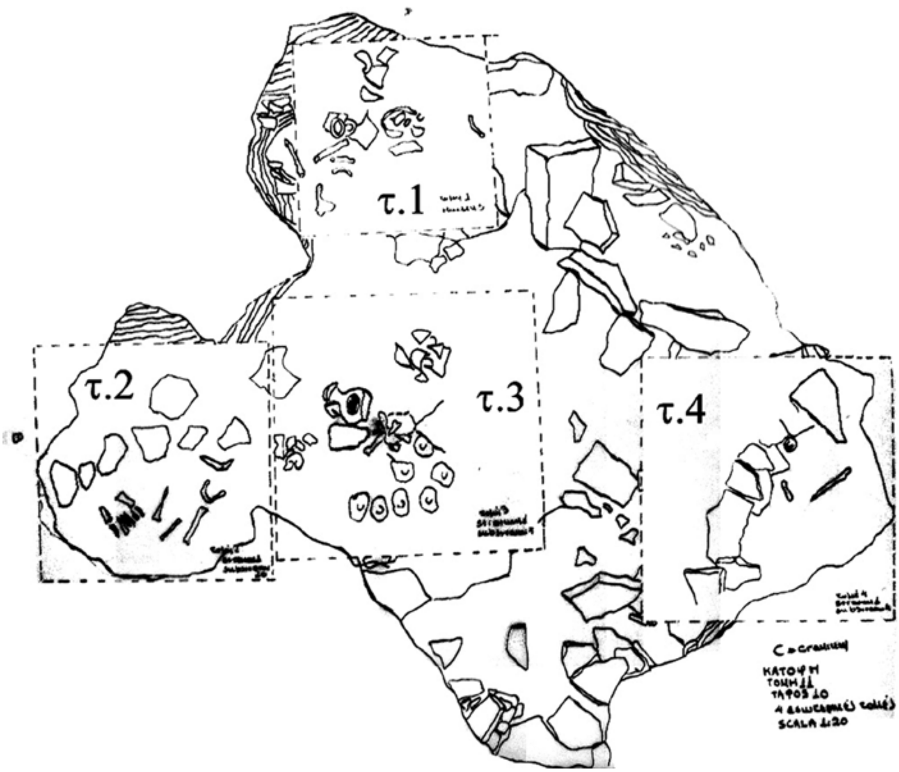

Figure 10.14: Plan of grave 10/2010 (drawing KARP).

In Sector I there is also a very large cavernous chamber tomb (10/2010), with a well-like opening in its roof. It is of irregular shape (**fig. 14**) with three distinct large niches at the north, east and southwest. The entrance, in the west wall of the chamber, was carefully built of medium-size stones. On the outside, slabs of stone indicated a kind of paved floor, while in the north quarter of the trench a few disturbed steps seem to lead from the paved court up to the top of the tomb and its opening.

The chamber contained a large number of sherds, broken vessels, and human bones (**fig. 15**). In the southwest niche, a stone wall-like construction contained an intact burial, accompanied by a black glazed phiale and a bronze coin of Agathocles king of Syracuse, ca. 290 (*SNG Copenhagen*, no. 779; Calciati 1986, no. 142), and dating the burial to the early Hellenistic period. The unstable condition of the tomb's walls however, precluded further investigation, and the tomb is now sealed.

Excavation within the chamber yielded at least twenty-five commercial amphoras (**fig. 16**), seventeen pithoid vessels (**fig. 17**), as well as dozens of smaller vases, which for the most part belong to Late Antiquity. Minor objects include part of a bone pendant, two burnished animal teeth, a discoid loom weight and a small bronze bell. As to the anthropological material, the first estimate suggests a minimum of fifty-three individuals. Apart from adults, subadults and infants were included.

Figure 10.15: Excavation stratum from grave 10/2010 (photo KARP).

Figure 10.16: Late Roman commercial amphora from grave 10/2010 (photo KARP).

It seems that the earliest use of grave 10/2010 dates to the early Hellenistic period and was reused in Late Antiquity, serving as an ossuary for many secondary interments, which, according to the pottery, date from the second to the fourth century

Figure 10.17: Late Roman pithoid vessel from grave 10/2010 (photo KARP).

A.D. During that period, the aperture in the roof was reopened, and bones from primary burials were deposited. In the earliest strata, there is a careful arrangement in the chamber, while the later layers suggest very little ordered placement (Stefanakis and Patsiada 2009–2011, 81–82). The part of the necropolis at the west foothill of Hagios Fokas (Sector I) seems to date to the Late Classical and Early Hellenistic years, with some re-use during Late Antiquity.

Investigation has been also been conducted on the steeper and forested east slope of the Kymissala hill (Sector III). The western part of the necropolis is known to have been excavated by Biliotti in the 1860s, and further explored by Pernier in 1912 and Maiuri in 1915, all of whom reported Late Mycenaean and Early Greek burials and finds (Maiuri 1916, 297; Sørensen and Pentz 1992, 125). This is also the area where Maiuri came across with the infamous funerary stele of Kymissala (AMP 3516) (**fig. 18**), (Maiuri 1916, 296–297, fig. 14; 1928, 84), most likely dating to the late eighth century, an early example of Rhodian Orientalizing art (Andronikos 1963, 192–194, pl. 88a–c; 1968, 120), but which may also suggest a relationship to earlier Mycenaean monuments (Mpakalakis 1974, 250–251; Sourvinou-Inwood 1996, 221–222, n. 455).

Twenty-one graves were investigated in Sector III, a majority of them cist graves and chamber tombs dug into the soft bedrock. Four of the chamber tombs proved to be intact (Stefanakis and Patsiada 2009–2011, 82–85). A few looted tombs yielded earlier finds such as part of an Archaic pithos with relief decoration of the seventh century, from tomb 2/2007 (**fig. 19**); parts of two Ionian cups of the seventh–sixth cen-

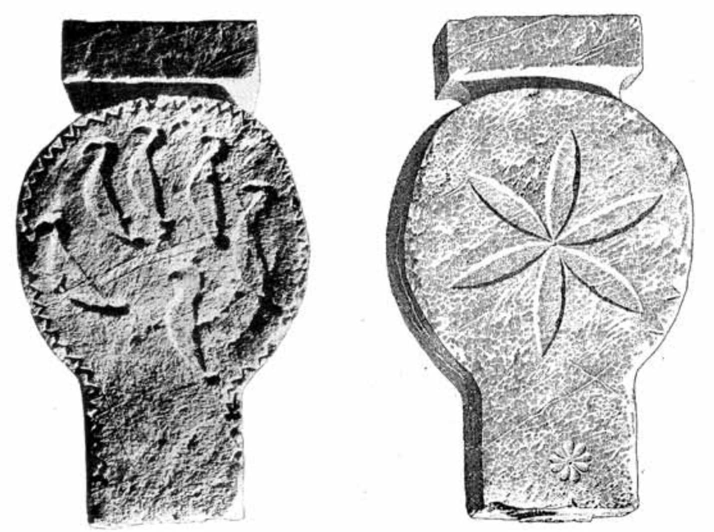

Figure 10.18: The funerary stele of Kymissala (AMP 3516) (photo after Maiuri 1916, Fig. 14).

Figure 10.19: Part of Archaic pithos with relief decoration (Π45) from grave 2/2007, 7th century (photo KARP).

Figure 10.20: Part of Ionian cup from grave 4/2007, 7th–6th centuries (photo KARP).

Figure 10.21: Trefoil oinochoe from grave 5/2009, 6th century (photo KARP).

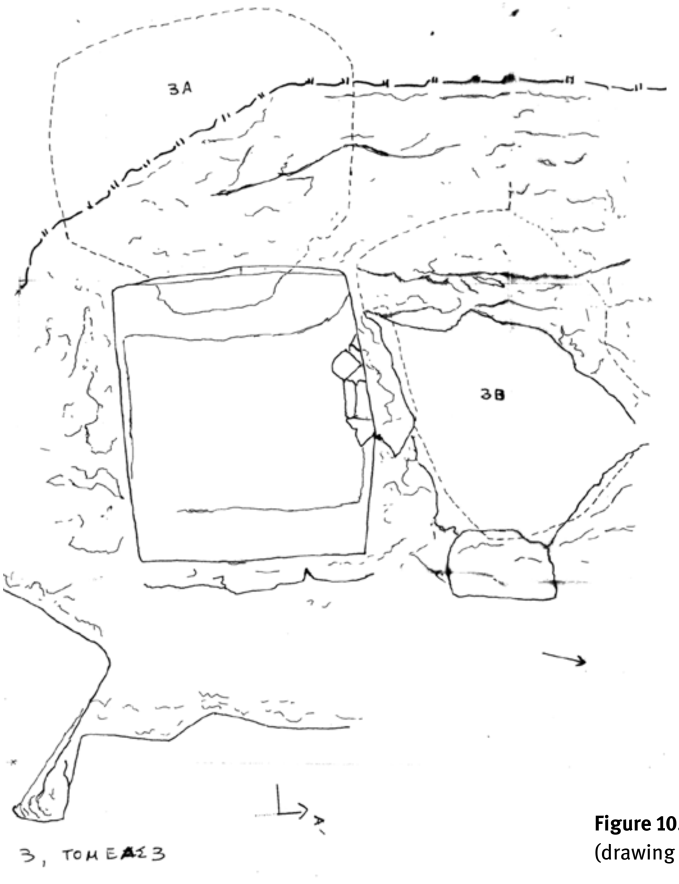

Figure 10.22: Plan of grave 3/2007 (drawing KARP).

turies (**fig. 20**) from tomb 4/2007; and a decorated trefoil oinochoe of the sixth century from tomb 5/2009 (**fig. 21**) (Stefanakis and Patsiada 2009–2011, 83).

One of the most interesting finds of Sector III was tomb 3/2007. It consisted of an almost rectangular antechamber (**fig. 22**), which led to two burial chambers, one on the west and one on the north side. The west chamber had been looted. In the disturbed stratigraphy of the antechamber, however, a black glazed olpe and sherds of a black glazed dish with impressed floral decoration on the bottom were collected. The second chamber, chamber B, was found intact. The entrance, on the north wall of the antechamber, was sealed with a stele and smaller rocks, and the roof had collapsed. Chamber B contained two individuals (**fig. 23**), placed next to one another with the heads oriented to the east. As grave offerings, two trade amphoras were placed in the chamber, along with two black glazed skyphoi of Bol-Sal type (**fig. 24**), and a black figure lekythos (**fig. 25**), decorated with a floral ornament, all dating to the first half of the fourth century (Stefanakis and Patsiada 2009–2011, 84).

Grave 19/2010 was also found intact, containing a single burial, accompanied by a transport amphora, a black glazed kotyle (**fig. 26**), a pyxis and a lamp, as well as two miniature amphoras (**fig. 27**), all dating to the first half of the fourth century (Stefanakis and Patsiada 2009–2011, 84–85).

Figure 10.23: Grave 3/2007, Chamber B, burials (photo KARP).

Figure 10.24: Black glazed skyphos of Bol-Sal type (Π104) from grave 3/2007, second quarter of 4th century (photo KARP).

The west part of the necropolis (Sector III) seems to date from the seventh to the fourth centuries, while earlier research (Konstantinopoulos 1969, 481) has shown that it may have been partially re-used during Late Antiquity.

In the north sector (IV) of the central necropolis (**fig. 3**), where only cleaning work has been conducted to date, there are visible various built grave monuments. Five such monuments—most constructed with isodomic masonry—have been cleared to date, (**fig. 28**). Among them, inscriptions engraved on stone blocks were recovered, such as the huge rectangular base with the inscription, ΚΑΛΙΠΠΟΥ; and a smaller

Figure 10.25: Black figure lekythos (Π103) from grave 3/2007, first half of 4[th] century (photo KARP).

block with the inscription, ΔΑΜΑΓΟΡΑ ΑΡΙΣΤΟΔΑΜΟΥ ΚΥΜ(ΙΣΑΛΕΩΣ)/ ΚΑΙ ΤΑΣ ΓΥΝΑΙΚΟΣ/ ΧΡΥΣΟΥΣ ΝΙΚΑΣΑΓΟΡΑ ΚΡΥΑΣΣΙΔ(ΟΣ) (Pernier 1914, 241; Tod 1921, 62, n. 129). These monuments seem to belong to a wealthier section of the necropolis, along the main route that leads from the acropolis to the important settlement of Vassilika (Maiuri 1916, 286, 295; Stefanakis and Patsiada 2009–2011, 85–86).

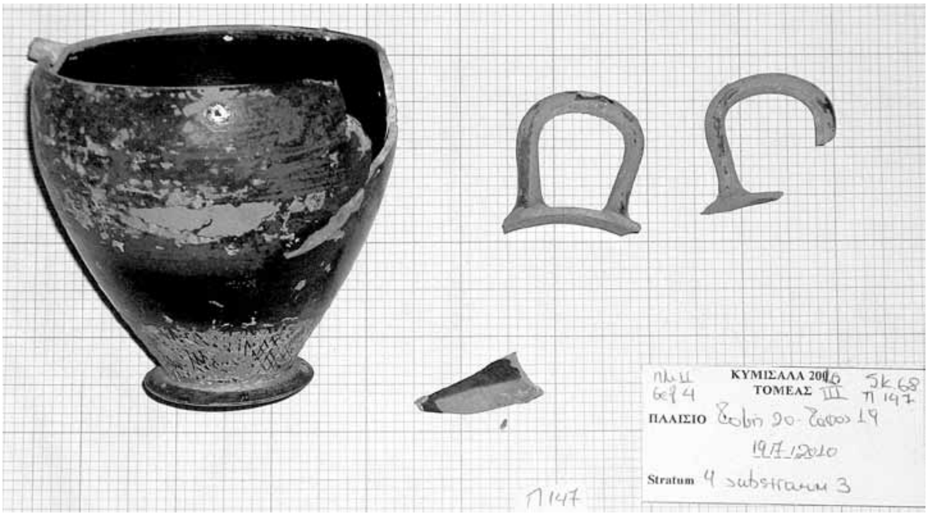

Figure 10.26: Black glazed kotyle (Π147) from grave 19/2010, second quarter of 4th century (photo KARP).

Figure 10.27: Burial of grave 19/2010 with two amphoriskoi (Π154, Π150), first quarter of 4th century (photo KARP).

Figure 10.28: Sector III, grave monument (photo KARP).

Preliminary Results

Despite the limitations, the extent of the demos has been determined by systematic surface survey and has yielded thus far, more than a dozen archaeological sites from Archaic until Late Antiquity scattered in the dense woodland covering an area of approximately 10,000 acres (**fig. 2, fig. 29**).

Our work to date has shown that Kymissala constitutes one of the most extensive archaeological sites and important networks of classical settlement known in the countryside of Rhodes. It had its own citadel on the hill of Saint Fokas, which dominated the region and no less than seven settlements that must have have belonged to its jurisdiction—namely the sites of Vassilika, Napes, Charakas, Glyphada/Monosyria, Stelies, Maramarounia and Kambanes. Furthermore, several cemeteries are associated with the settlements, at Napes, Charakas and Glyphada, while minor groups of graves have been also located at the sites of Alonia and Kambanes, with the most important and prominent—probably the main urban cemetery—the central necropolis on the foothills of Kymissala and Hagios Fokas.

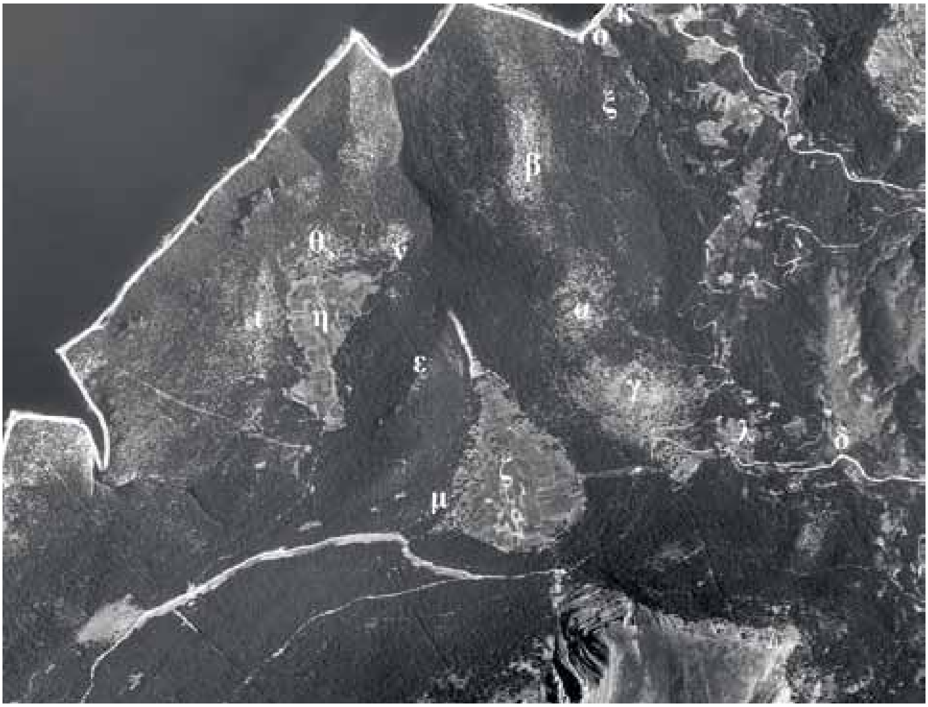

Figure 10.29: Aerial photograph of the Kymissala region: α) Hagios Fokas/Acropolis; β) Charakas hill; γ) Marmarounia hill; δ) Alonia; ε) Kymissala hill; ζ) Kymissala plain; η) Vassilikos plain; θ) Vassilika settlement; ι; Atoumas hill; κ) Glyphada; λ) Stelies settlement; μ) Kampanes settlement; ν) Nappes settlement; ξ) Aptetones settlement; ο) Oglyma cemetery (photo KARP).

It seems clear that the demos of Kymisaleis was a thriving settlement at least from the seventh century until Late Antiquity, as is verified by the excavation in the central necropolis, as well as by the sporadic archaeological finds that have come to light over the past century. Evidence of earlier periods reported by previous investigators has not yet been recovered in the present project (Stefanakis and Patsiada 2009–2011, 92–94).

Methodology and Field Practices

Archaeological research is a result of a combination of different categories of field practices and intellectual production (Gardin 1980, 13–18). These processes are linked to form a chain extending from basic data acquisition and resulting normally in final publication, the presentation of data and a narrative constructed through interpretive and theoretical frameworks. The fundamental link in this chain is inevitably the process of the acquisition of ever-expanding datasets. Our data collection is never complete, random, or objective, but is always determined by theoretical perspectives that are shaped by prior experiences and of course biases which cannot but affect our field methods, sampling decisions, scientific applications. The acquisition of new data and the development of fluid or changing narratives are inevitable but useful processes that are affected ultimately by theoretical frameworks and our changing knowledge and perception of data (Sullivan 1978, 189).

The first question that arose at the very beginning of the KARP was how to begin to define and approach Kymissala as a research universe. Actually as all archaeologists do, the Kymissala excavators deal with measurable characteristics of objects, features, and contexts, and structure their observation of empirical evidence systematically. On the other hand, any kind of interpretation involves personal perception, which is dependent on the cultural, social, political, experiential, intellectual, and psychological backgrounds of investigators. While interpretive frameworks help us to establish systems with which to analyze archaeological material and reconstruct the past, our efforts toward systematic documentation may inadvertently run counter to those theoretical constructs, even if this results in the reshaping of theoretical foundations or technological developments. That said, we took for granted that in order to advance our understanding of the site we needed to standardize language and recording methods in the documentation process.

The three basic processes in the chain of archaeological work in KARP are (1) the acquisition of elements—that is, the recovery of material; (2) the analysis—a multilayered and -staged process from the archaeological discovery to publication; and (3) strategies of observation and reasoning. These basic procedures and processes are subdivided, depending on the progress of excavation. The strategies of observation are related to how we conceive and perceive different phenomena at different stages of work; that is, how we select the phenomena or data in order to observe them. Observation and reasoning complement and supplement each other (Embree 1990, 30), creating the foundation of a series of practices, from initial recording to final publication. Employing also the principal of collective observation—research led us to the history of scientific observation and Edmund Halley's map compilation of 1686—we considered the implications of a multiple observers (Daston and Lunbeck, eds. 2011, 91). While Halley's role in establishing learned observation is generally accepted, we also considered that he did not constrain himself to a given hierarchy of informants—Halley himself was an active and "seafaring observer" and his informants were volunteers. Similarly, archaeologists require local informants, "volunteers" acting not only as informants but as promoters of the archaeological project to local communities, and national and international travelers. In general this idea has been followed for most of the twentieth century, as a way for researchers to gain an understanding of unrecorded sites, findspots, and monuments on a regional scale. In our case we developed this idea further with the establishment of the "Association of the Friends of Kymissala," a community of locals, scholars, students and interested individuals providing information about and support for the fieldwork.

A large part of our work before engaging in actual excavation was steered toward establishing systematic recording and documentation procedures, considering that accuracy in the recording of primary observation provides grounding for any kind of hermeneutic approach. That said, a multiplicity of observations of the same conditions and processes have been proposed as a factor of objectivity, thus engaging different observers in the process of recording. Every field supervisor working in a trench in Kymissala was thus required to observe work in other trenches, while engaging in open discussion of the process of excavation, context, or material. Our overall methodology thus tends toward positivism, though our purpose is not to engage the question of the role of archaeological practice as humanistic or scientific pursuit (Cohen and Maldonado 2007, 9).

Quantitative and Qualitative Approaches

In the social sciences the powerful effects of positivism have been largely rejected. Even supporters of this school of thought accept the inherent biases and prejudices of an observer (Gartell and Gartell 1996). Positivism generally is identified with quantitative research, and therefore inherently assumes theoretical or philosophical strands of a discourse often credited to P. Lazarsfeld (Wacquant 1992), a pioneer of large-scale opinion surveys and statistical methods of interpretation. This approach is linked to the middle theory of R. Merton, and the production of abstract concepts that are formed from partial hypotheses and empirical norms, rather than the abstract concept of a social totality (Boudon 1991).

A quantitative research method is based more on the collection and analysis of numerical and statistical data rather than on subjective observation, reports and small targeted samples. Especially in the context of social sciences, quantitative research is the systematic empirical investigation of quantitative properties of phenomena and their interrelationships. Quantitative attributes are innate in every measurable object, and the purpose of quantitative research is the development and use of mathematical models, theories and/or hypotheses pertaining to a given phenomenon. The process of measurement is the core of the quantitative survey and provides the fundamental relationship between empirical observation and mathematical expression of quantitative relations. Quantitative definition in the physical sciences is widely used in social sciences such as psychology, sociology, political science, anthropology and archaeology, although in a different contexts. Qualitative methods in turn produce information through the study of specific cases and creating relevant assumptions (cf. Hunter and Leahey 2008). Keeping this basic rationale in mind we concluded that definable quantitative and qualitative methods were needed in establishing a research design at KARP.

Horizontal and Vertical Sampling

A fundamental purpose of inductive statistics is the acquisition of reliable conclusions derived from various characteristics of statistical populations, based on information recovered by sampling. We considered the implications of random and grab samples in order to recover theoretically unbiased and thus representative datasets (Boxill, Chambers, and Wint 1997, 36). At Kymissala, we established a new topographical map and grid (see discussion below on technical issues) before excavation. In this grid, the variables (tombs, installations, artifacts, buildings, ecofacts, etc.) are given spatial and non-spatial attributes. This resulted in dividing the research universe into equidimensional units, and randomly selecting from among them. Samples of populations are used to gain a general impression of the area of interest, or in order to begin to define certain characteristics.

Even though the determination of a representative sample should require knowing the absolute or likely frequencies N_i *(i=1,2,3...r)* of the original population, our preliminary information on the distribution of those populations is not precise, so the application of sampling methods has no particular meaning. The solution to the problem of acquiring representative or unbiased samples was determined strictly with the repetitive implementation of a large number of experiments of chance. Using inductive statistics, conclusions are exported on the attributes of initial population and mainly by means of the distributional variables in horizontal samples. In terms of vertical sampling, or vertically stratified sampling based on archaeological strata, simple random selection was performed in each stratum recovered, in order to permit standardized and quantifiable results. Vertical sampling led to inferences on social hierarchies and culture patterning in general, especially in the case of the extensive necropolis of Kymissala and its bioarchaeological dataset.

Structuring the Data

Archaeological research requires activities in which the processing of archaeological evidence is structured into coherent groups, classifications, categories, or typologies. Structures like this are usually applied to artifacts, but they can be used in the analysis of context, or any part thereof. The methods that we used to create such structures constitute an important part of fieldwork in KARP, and established the groundwork for various forms of analysis. Groups, categories, or types of phenomena shape the body of material culture and the structure of analyses. What follows is the comparison, the search of particular cross-correlations or contradictions between various types or variables, uncommon regroupings in space and time or other models. The models in turn lead to conclusions, hypotheses on changes of human behavior, on resemblances and differences between groups of persons to the past, on the factors that influence the human behaviors, on the way with which they possibly contribute in the modern life.

Coombs (1964, 5) describes analysis as the detection of relationships of patterns in any given dataset. For example, one might detect a relationship between burial practices, stone carving techniques, resource availability and rates of manufacturing. The recovery of evidence for burial practices thus produces products (information, results, data), and archaeologists then categorize the products of their work in the field as either "compilation" or "interpretation." Compilation is a simple collection and presentation of data. The interpretation per se requires data processing so that conclusions may be reached on technology, symbolic action or representation, social organization and other aspects of cultural production.

Compilation as Symbolic Presentation

Compilations are undeniably the most visible result of archaeological fieldwork. Gardin determines compilation as a set of interrelated propositions that describe the material remains, with which any study of ancient populations is facilitated (Gardin 1980, 28). Such types of compilations are often symbolic constructions using a particular meta-language in order to represent their content. All drawings, maps, digitized illustration, even the code of a web-based application like "Digit" (see below, appendix 3), invariably and necessarily represent simplifications of reality, and in a sense, a symbolic depiction or representation. In order to derive meaning from compilations of information, archaeological science follows its own descriptive language of archaeological evidence, a language with rules of systematic description and measurements. One of the advantages of this language is that it allows the use of computers and relational databases for the management of vast quantities of information. Yet the drawings and the maps that accompany an archaeological publication are merely depictions or reflections of artifacts or archaeological installations. They are coded depictions that transmit a specific type of information and omit in most cases the "noise," or any other information that impedes the transmission of meaning that the excavator imposes on the dataset.

It is a fact that archaeological evidence, being in essence incomplete or fragmentary, does not embed or ascribe obvious meanings to itself. In order to create meaning out of the data chaos and thus produce reasonably intelligible information, it is sometimes necessary to decide which types of data, measurements, and analyses to use. In KARP we attempted to form combinations of absolute measurements and criteria to encompass and facilitate variable scales of analysis. Since the objective of archaeology today is actually the comprehension of general patterns, and the generation of macroscalar narratives, through data processing it is possible to conceive of repeated models in vast quantities of information in order to use them as effective, economical and manageable tools of analysis in our effort to interpret the patterns of information.

Interpretation as Reconstruction of the Past

Archaeological interpretation aims at the reconstruction of the past, including evaluation of change and stability; evolution and adaptation; resemblances and differences between population groups, and generally all elements that shape an archaeological culture or population. Most important in our case is that meaningful constructions are used in the process of interpretation—that is beyond simple compilations of information—that exceed the limits of descriptive attributes intrinsic to artifacts, buildings, constructions, and ecofacts. For example, while it is possible for an archaeologist working in laboratories to define the inclusions or chemical composition of clay that has been used in manufacturing an artifact, the process in and of itself actually does not offer an interpretation or reconstruction of the systemic context of production, distribution, or consumption of that artifact. If this method of evaluation or measurement is to be used in combination with other information on the source of raw material, it may, however, provide a means to map patterns of communication and interaction—even a specific commercial road with a sequence of places and environments whose geomorphology has the same chemical composition of the clay. Accordingly, we can produce explanatory compilations of meaning—meaningful constructions—in which the final proposal contains information that is not innate to the initial proposal (Salmon 1982, 33). Interpretation and comprehension is an objective of analysis, and the approach requires statistical methods that provide a picture of relationships between the intrinsic information provided by the artifact and all other available information related to context on multiple material and spatial scales.

The procedure of structuring and collecting data within analytical and interpretative frameworks is part of our attempt to identify and explain the multiscalar patterns implicated in a single object (Lock and Molynaux 2006, 5); a skeleton within a grave, a grave within a tomb, the tomb within a cemetery, a cemetery within a settlement, and settlements within the landscape of the ancient demos represent a chain of relationships between individuals and regional religious and ritual practices from the Archaic period to Late Antiquity. The requirements of interpretation, however, are not limited to context, but extend to a social and political unit related to ideologies and other social configurations, and the strict mathematic approach of a logarithm is thus not capable of giving answers to problems of social interpretation. It can only maintain given categorizations defined by archaeological method and theory.

In most sciences, research strategies include or are grounded in the process of experimentation. Assessing the duration of an experiment, certain factors may be seen to be maintained or stable, while others are altered, so that the effects of changes can be studied. In archaeological analysis, however, it is not entirely possible to make use of experimentation in the true scientific sense of the word, because while methods can be repeated, the context itself is unique; it cannot be reproduced; and it is normally destroyed during recovery—ultimately the method does not permit the experiment to be replicated with the identical taphonomic or systemic variables and

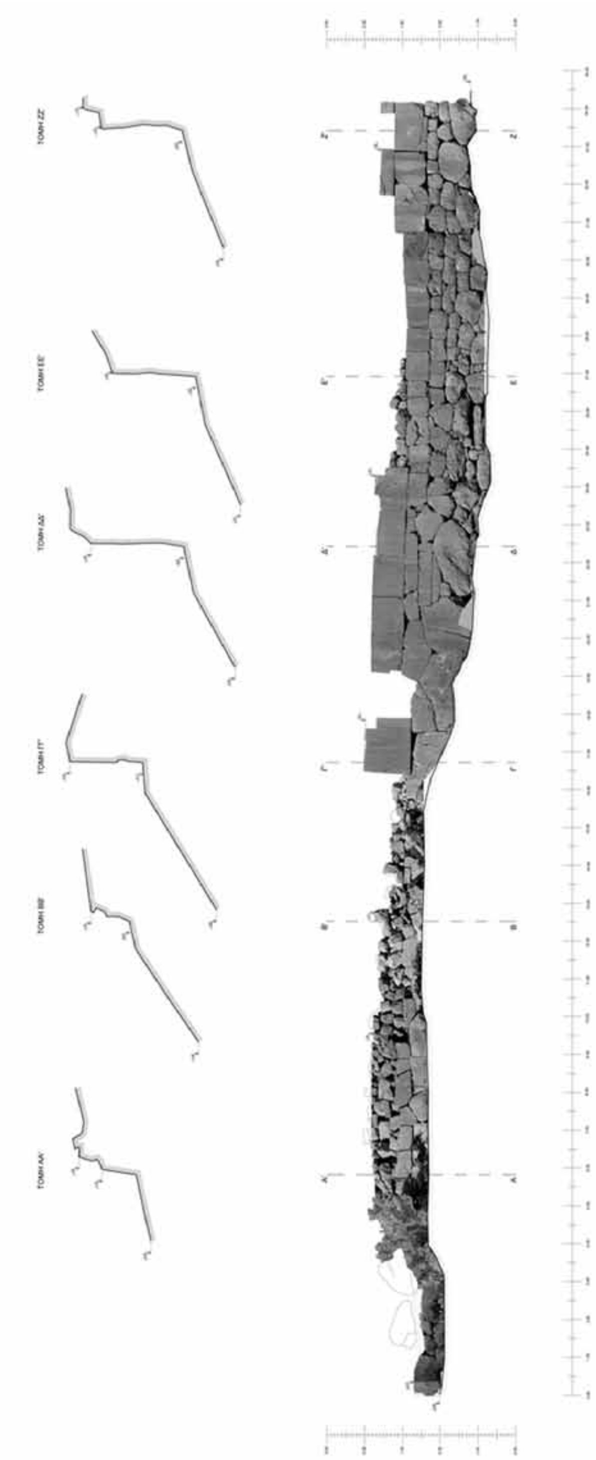

Figure 10.30: Orthophoto of the west defensive wall of acropolis (photo KARP-NTUA).

Figure 10.31: A stable grid on the inclining ground of the Kymissala Hill (photo KARP).

parameters (Nami 2010). Moreover, it is difficult for archaeologists to detect temporal phenomena without integrating patterns—relationships between multiple variables and scales of context—ultimately derived from well-dated groups of finds. Consequently archaeological analysis depends entirely on accurate dating and recording. The construction of an application capable of recording precisely the multiplicity of variables of the excavation process, and its products is essential.

Technical Issues

All ancient features, installations, and sites in the region of Kymissala have been mapped as a result of the formal collaboration between the Department of Mediterranean Study and the School of Surveying Engineering and the National Technical University of Athens. The project involved the generation of topographical and digital maps with photographic backgrounds (**fig. 29**); a orthophotomap of the wider region, at a scale of 1:5.000 (**fig. 37**); and photogrammetric documentation of monumental graves (**fig. 38a–b**) from the central necropolis and the western defensive wall of the citadel of Hagios Fokas (**fig. 30**). We have also made progress on a plan of the urban structure of the settlement of Vassilika (see appendix 2).

Figure 10.32a: Vertical photography with the use of the large tripod in Sector I (photo KARP).

Vertical photographic recording, in the excavation context, has led to the construction of stable grids interrelated to the topographical map. Inspired by underwater archaeology where visibility problems make stable grids necessary (Catsambis, Ford and Hamilton, eds. 2011, 128), these armatures are constructed with four by four meter metal tubes—aluminum or plastic tubes are suitable if the prerequisite stability is ensured—supported by vertical axes, so that relative precision (Banning 2002, 11) on the horizontal gradient is ensured. The whole construction facilitates vertical measurements on steep and variable terrain (**fig. 31**)—the excavation in the central necropolis of Kymissala is conducted on steep inclines, exceeding forty-degree slopes.

Inspired by Poulter and Kerslake (1997), vertical photography became a technical issue of some importance in the KARP, conducted either with stable-trench armatures or large tripods. Vertical photographic recording ensures speed in recording and accurate scaling through computer applications (such as AutoCAD). During the

Figure 10.32b: Vertical photography with the use of the large tripod in Sector I (photo KARP).

excavation of a specific trench, every stratum is recorded with vertical photographs. A number of control points are used—normally painted red or yellow—and photographs are digitally manipulated in order to remove any distortion. The process of rectification results in a corrected plan construed through software following standards of good practice.

Dealing with tombs and burial chambers with irregular shapes and topography is a time-consuming process, and part of this work is carried out using photogrammetric procedures (see below, appendix 2 and **fig. 38a–b**). A major advantage of using photogrammetry to record sites is the time saved in the field (Fussell 1982), while digital photography surveys form a database that can be used for measurement at a later date. Large tripods have been used in cases of large-scale monuments. Photographs are rectified and scaled with the same process as mentioned above, and as each successive photo is placed on the mosaic a map of the monument emerges; the method

Figure 10.33: Students of the University of the Aegean during excavation (photo KARP).

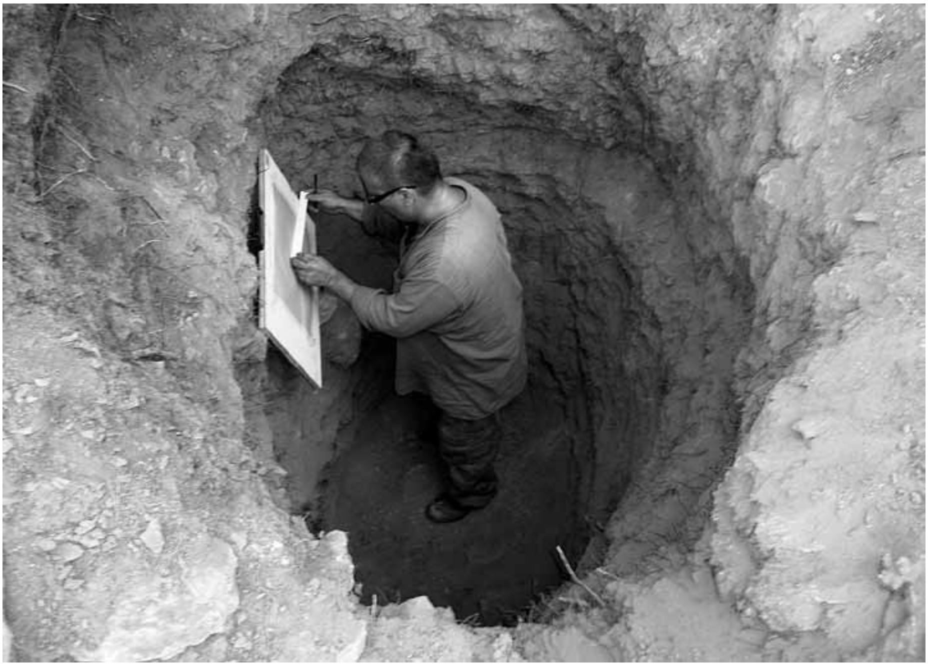

Figure 10.34: Students of the University of the Aegean during trench drawing (photo KARP).

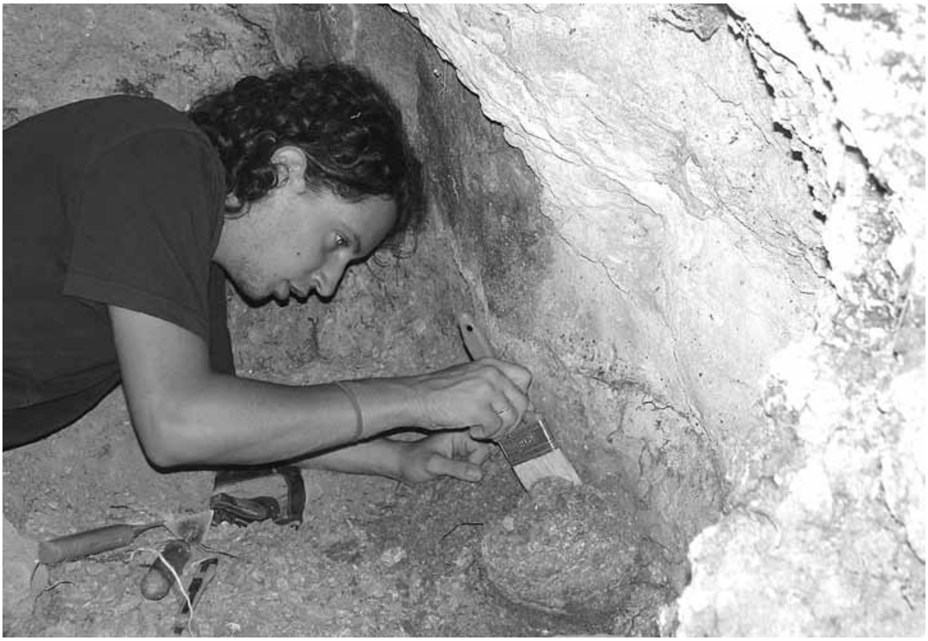

Figure 10.35: Students of the University of the Aegean cleaning skeletal remains (photo KARP).

Figure 10.36: Skeletal remains in grave 11/2009 (photo KARP).

Figure 10.37: The orthophotomosaic of the Kymissala area (photo KARP-NTUA).

was successfully applied on the series of the five contiguous grave monuments in the eastern part of the necropolis (**fig. 32a–b**).

Educational Issues

Education is an on-going issue that has been explored theoretically and practically through the seven consecutive years of excavation. The project trains undergraduate and graduate students in archaeology from Greek and Polish Universities, as well as students of topography from the National Technical University of Athens, under the guidance of faculty and members of the local Greek Archaeological Service. The integration of educational programs in archaeological field research is of course a complicated matter—the formation of long-term and sustainable programs is dependent on the intellectual direction of the field project, as well as the vagaries of practical, legal, and financial limitations of fieldwork. Other questions we have considered include how and when students should participate in the processes of interpretation, decision making, publication and synthesis. In KARP, students undertake the role of

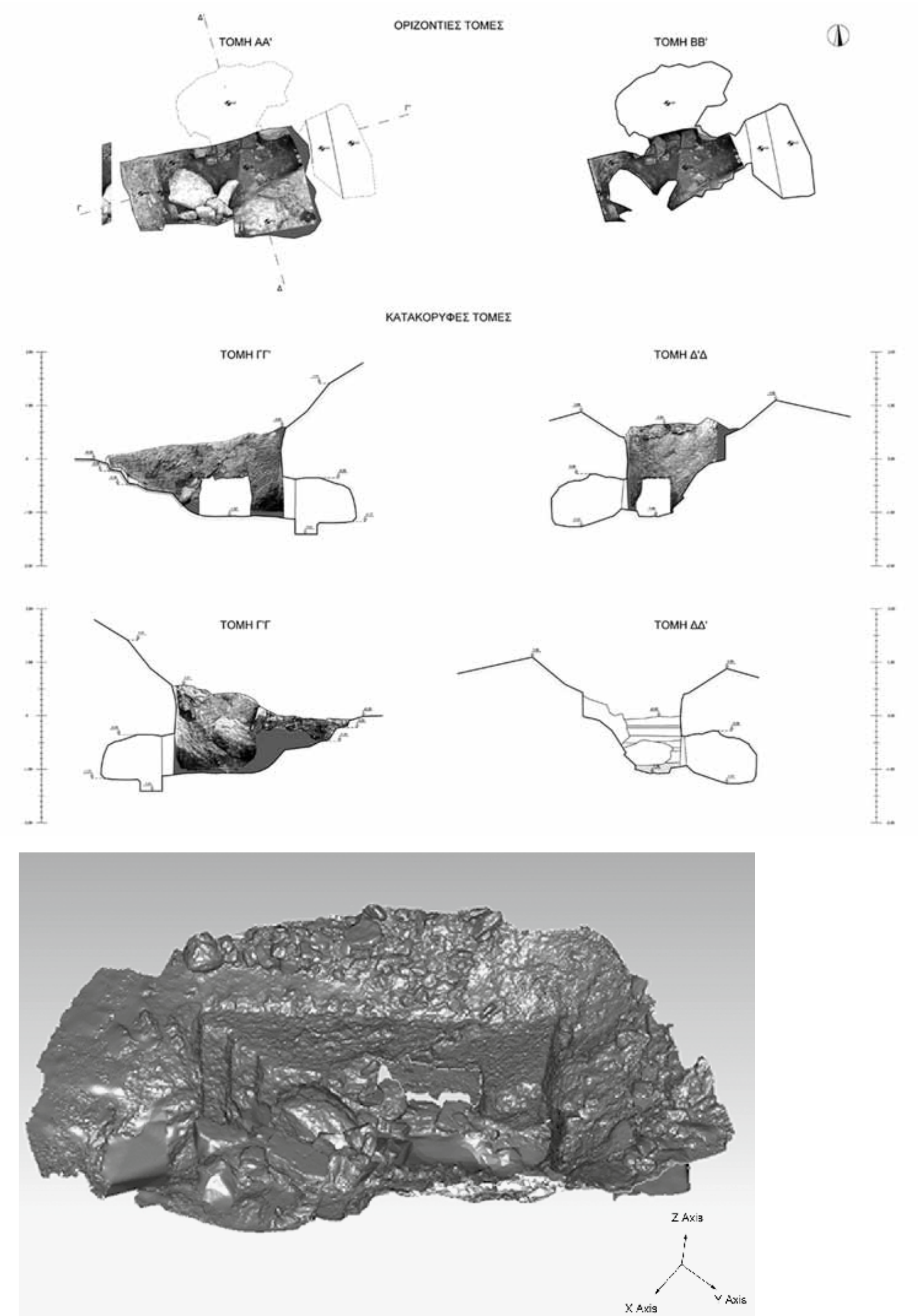

Figure 10.38a–b: The geometric documentation of grave 2/2006 on the Eastern Necropolis of Kymissala-Orthophotos (a) and 3D model (b) (KARP-NTUA).

archaeologists, always with guidance, in order that they acquire a range of experiences that might allow them to engage and understand the diverse range of procedures, methods, applications, and interpretive strategies involved in primary fieldwork. The purpose is that they learn field methods, but also visualize the importance and the formal process of an excavation at all stages.

Students gain practical experience defining trenches, recognizing stratigraphy, recovering artifacts and human remains (**figs. 33, 35**), drawing excavation plans (**fig. 34**), keeping excavation notebooks; they also conduct all routine photography of trenches and artefacts; conservation of pottery; classification of finds; and the primary recording and the digitalization of data. More advanced students are given the opportunity to write reports on the work completed and take on more specialized tasks, such as the conservation of human remains. Finally, manual labor is of course an essential part of the educational process, because one should become sensitive to the physical qualities of all components of archaeological context, including matrices, formation processes, and taphonomic processes, which can only be understood by hands-on participation, which on classical sites in Greece, is experience normally afforded to workmen.

The KARP excavation is directly connected with to "Undergraduate Student Practice" project of the Greek Ministry of Culture and Sports (organized by the University of the Aegean), thus providing an officially certified field practicum. The project is also linked to the European Union Erasmus Program ("Erasmus on Student Mobility for Placements"), enabling Polish graduate students of the Institute of Archaeology, Nicolaus Koperinicus University at Toruń, to conduct periodic internships in Kymissala.

On the graduate level, there are two Ph.D. dissertations, currently in progress in the University of the Aegean, related to KARP. One concerns the development and facilitation of finds classification, and the analysis of the material using digital applications; and the other deals with the constitution and the management of archaeological parks in Greece, with Kymissala being a test-case study. Also relevant are three MA theses focusing on the wider region of Kymissala as a context for analyzing sustainable growth, and cultural and environmental education, and public engagement and programming.

Further Comments

The methodology of KARP depends heavily on a series of interrelated variables, immediately relevant to the development of field practices, scientific applications and theoretical trends other sciences. It is clear that formal archaeological theory, whether articulated or not, shapes the foundation of recovery strategies in any aspect of the excavation process. In our own work, we have become conscious that theoretical trends often exist within a vacuum, depending on finite or uncritically self-defined datasets, with little engagement with innovations in methods, practice, and applications especially of the last decade. At the most fundamental level, it should be said that many of the core questions that guide archaeological research in Greece have changed little since the establishment of the discipline of archaeology, while innovations in theory remain problematic for practitioners, and slow to evolve in application and revision of dominant narratives in archaeology (Trigger 1989, 4–7).

Manolis I. Stefanakis and Konstantinos Kalogeropoulos

Appendix 1: The Analysis of the Human Skeletal Remains from Kymissala

The study of human skeletal remains from Kymissala provides insights into the life ways, demography, paleopathology, and diet of the population groups (Larsen, 1997; Buikstra and Beck, eds. 2006). Bones and teeth serve as the primary source of evidence for anthropological and paleopathological analysis, thus their careful excavation and post-excavation treatment secures the optimal recovery and further examination at the laboratory.

The Excavation of the Burials and Curation of Skeletal Material

The existence of burials and the potential presence of human remains was known in advance of excavation, so a bioarchaeologist was involved in KARP from the outset. One of the primary aims was to apply a standard protocol for the excavation and optimal recovery of the human remains. The majority of the students participating in the fieldwork have attended the relevant courses on funerary archaeology and bioarchaeology offered by the author within the Department of Mediterranean Studies (University of the Aegean). In these courses the students became familiar with human osteology (White and Folkens 2005) and were trained in the excavation and post-excavation treatment of inhumed and cremated human remains (McKinley and Roberts 1993; Brickley and McKinley 2004; Roberts, 2009).

Bones are fragile and may fragment easily, and they can be found in unexpected positions depending on the way in which the body was buried, and if any later disturbance has occurred. During excavation care was taken to disturb bones as little as possible, using specific tools, such as dental probes, forged spatulas, precision tweezers, and brushes (**fig. 35**). Special attention was given to the recovery of those bones important for aging and sexing (the pelvis and the skull). Soil samples were also kept from the area around the skull and the abdomen, for sieving in the laboratory in order to retrieve fragile and tiny cranial bones, such as the ear bones, or to check for calcified gall and kidney stones. No bones were lifted until fully exposed (**figs. 23, 36**), all contextual information was recorded, and detailed plans and photographs were taken. Detailed photographs were also taken when bones or features appeared anatomically abnormal. In addition, excavators used a "burial record sheet," specifically designed for documenting the recovery of skeletal material. The idea was to construct a clear and concise medium of primary documentation, which could be easily completed in the field, and then referenced later by archaeologists or bone specialists. These record sheets included data on the burial (type; offerings; measurements) and the associated skeletal remains (preservation; orientation; position).

Post-excavation procedures included the careful packing, labeling and transportation of the material to the facilities of the project, where it was subsequently cleaned and stored. Depending on bone fragility and soil or matrix type, dry brushing was conducted; otherwise, the bones were washed with water, with a soft brush and ideally under a small two-millimeter mesh. Whether dry brushed or washed, special attention was given to fragile bones (such as the facial bones), or to teeth with calculus deposits (tartar), as intensive cleaning would have damaged the samples. After being thoroughly dried, bones were packed in plastic bags; sealable bags were preferred for small bones or dental remains. Fragile and pathologic bones were protected by being wrapped in acid-free tissue paper. Large cartons, clearly labeled, were usually used for storing remains of more than one individual, because most of the excavated material so far is poorly preserved.

Aims of Bioarchaeological Analysis

The study of the human remains focuses on detailed anthropological (determination of sex, estimation of age and height), as well as paleopathological analyses (diagnosis and interpretation of the observed pathological conditions). The methodology of aging and sexing follows the criteria described by Buikstra and Ubelaker (eds., 1994), while the diagnosis of pathological conditions is based on established morphologies (e.g., Aufderheide and Rodríguez-Martín 1998; Ortner 2003). Macroscopic (visual) observation and radiological analysis are the primary applied methods. The application of an integrated bioarchaeological approach (integration of all available archaeological, cultural and biological data), is considered the best practice for understanding aspects of daily life in the past, and will encompass a diachronic study from the Archaic to the Hellenistic periods, comparing mortality patterns, as well as the development and prevalence of specific pathological conditions. As it is essential to provide raw data for any future comparative analyses—and estimation of disease prevalence—a detailed inventory of bones and teeth is included in the study. These data are tabulated, presenting the number of individuals affected by a pathological condition (crude prevalence rates) and the number of skeletal elements affected (true prevalence rate). The next step includes the application of techniques, such as stable isotope analysis, in order to begin reconstructing dietary and weaning patterns across the samples.

Limitations of Bioarchaeological Analyses

Although the excavation of complete skeletons—the recovery and identification of individuals in the sample population—is a desirable goal, the specific conditions of sites and graves may preclude this ideal. One of the problems encountered at Kymissala, and not uncommon when dealing with multi-period sites, was that some of the graves had been looted in ancient or recent times, resulting in a severe disturbance of the burial context and the skeletal remains. Furthermore, the burial environment played a significant role in determining the overall condition and preservation of skeletal material, affecting the completeness of the skeleton, or resulting in alterations of the shape and surface of the preserved bones (such as erosion, discoloration, plant root and rodent activity) (Henderson 1987; Buikstra and Ubelaker, eds., 1994). These pitfalls increased the difficulty of aging and sexing, taking measurements, or attempting the diagnosis of certain pathological conditions; for example, the severe surface erosion of the bones precluded any attempt to observe possible cases of non-specific infections, such as periostitis; similarly, the poor preservation of articular surfaces limited the examination for degenerative joint diseases. Although it is widely accepted that from soil conditions to recovery methods, human remains are subjected to a number of intrinsic and exogenous factors that potentially complicate any attempt to reconstruct past life ways, an effort is taken to record and study every bone fragment.

Preliminary Results

The human skeletal material under current study has been retrieved from the Archaic burials of the site (sixth century). The material was very poorly preserved. All bones exhibit extreme surface erosion and rodent activity, while discoloration is also recorded. A total of ten individuals have been analyzed. In most cases, the necessary skeletal elements for sex determination and age estimation are missing or severe post-mortem damage is noted. Only four individuals are sexed: two males, one possible female and a female. All are adult individuals, but a more precise estimation of age is possible. Few pathological conditions are observed, including dental diseases, hematopoietic disorders (*cribra orbitalia*), traumatic incidents (fractures) and a benign neoplasm (*button osteoma*).

Future Work

Although the study of the human remains at Kymissala has just begun, it is hoped that it will provide greater insight into the reconstruction of living conditions during the periods in question. Diachronic studies are rarely applied to the skeletal material from Greece, and it will be of great importance to study the development of the observed pathological conditions or process of possible dietary changes under specific cultural and environmental conditions from the same site. The study of the human skeletal collection from the central necropolis of Kymissala is expected to add significantly to the scarce body of evidence from the chronological phases in question and to form a solid background for similar analyses in the future.

Chryssi Bourbou

Appendix 2: Theoretical Issues of Topographic Applications

Over recent decades, international organizations have passed resolutions concerning the obligation for protection, conservation and restoration of monuments. The Athens Convention (1931), the Hague Agreement (1954), the Chart of Venice (1964) and the Granada Agreement (1985) are but a few of these resolutions, in which the need for accurate spatial, or geometric, documentation of monuments and sites is stressed as a fundamental prerequisite of their protection, study and conservation.

The geometric documentation of a monument, as a necessary primary stage of study and preservation, may be defined as follows (U.N.E.S.C.O. 1972): the action of acquiring, processing, recording and presenting the necessary data to determine the precise location, and the position, form, shape and size of a monument in three dimensional space at a particular moment in time; and as it has been shaped through time. Geometric documentation is considered an integral part of the general documentation of cultural heritage, comprising, among other things, historical, architectural, archaeological, and bibliographical documentation.

Geometric documentation consists of a series of necessary and accurate measurements, from which visual products such as vector drawings, raster images and 3D visualizations may be produced. These products usually have metric properties, especially those being suitable for orthographic projections. Hence one could expect from the geometric documentation a series of drawings, which present the orthoprojections of the monument on suitably selected horizontal or vertical planes. The most important properties of these products are their scale and accuracy, which should be defined at the outset of any fieldwork affecting the existing condition of the monument. While geometric documentation has traditionally been the purview of archaeological and architectural research projects, in recent years, other specialists have become involved, such as surveyors and photogrammetrists, as technological advances have enabled them to produce interesting alternatives to normal documentation, affecting accuracy and global precision.

For geometric recording several surveying methods may be applied, ranging from the conventional simple topometric methods for partially controlled or totally uncontrolled surveys, to elaborate contemporary surveying and photogrammetric applications, for completely controlled surveys. The simple topometric methods are used only when the spatial unit is small or localized, or a targeted monument is simple in its dimensions and form. Surveying and photogrammetric methods are based on direct measurements of lengths and angles, either on the monument or on images thereof. They determine three-dimensional point coordinates in a common reference system and ensure uniform and specified accuracy. Moreover they provide adaptability, flexibility, security and efficiency. All in all they present undisputable financial merits, in the sense that they are the only methods, which may surely meet any requirements with the lowest possible total cost.

Description of Methods and Applications Available

Traditional topographical survey has been greatly affected by technological advances. Telemetry, using electromagnetic radiation of many forms, and digital imaging, have completely revolutionized fieldwork and the variety of results, which are affected as well by the evolution of digital processing. At the same time terrestrial laser scanning has been developed as another important tool to enhance the quality and the variety of the end products. Contemporary surveying and photogrammetric methods for the geometric documentation of a monument are always applied in combination (Ogleby and Rivett 1985; Carbonnell 1989; Georgopoulos and Ioannidis 2006). The emphasis of each depends on the accuracy specifications and on the level of detail required. These two main methods contribute to the final product. Survey measurements provide an accurate determination of specific points, which form a rigid framework within which details from the photogrammetric survey are placed—a basis for photogrammetric and other procedures.

Nowadays it is possible to produce highly accurate measurements of single points, and to collect point clouds to determine the form, size and position of any surface at any detail, however complicated, from conventional or digital photographic images. The results are two-dimensional or three-dimensional vector or raster drawings that can be produced in printed or digital form. The photogrammetric methodology is capable of providing adequate overall accuracy common for all points measured and details surveyed. The photogrammetric methods may be categorized as single image or monoscopic, and as multi image or stereoscopic.

Photogrammetry in principle uses photographic images of the objects of interest as raw data. Complicated techniques have been developed over the years in order to produce specialized visualizations— mostly orthogonal projections, vector or raster. Lately sophisticated digital techniques have been developed in order to produce three-dimensional views of these objects on computer screens, thus allowing the human observer to grasp the environment in three dimensions. Laser scanner technology has also been employed to this very end for the benefit of geometric recording of monuments with impressive results. In this way a process, which started at the real object with the direct measurements, returns to it via a series of digital image transformations and representations (Georgopoulos et al. 2003).

The three-dimensional modeling and visualization of monuments constitutes a very sophisticated and integrated method of geometric recording, affecting the documentation and preservation of cultural heritage. It is particularly effective when applied to the documentation of significantly large and complicated monuments, not easily grasped in their entirety by the human eye. When the three-dimensional modeling is composed by accurately detailed data, it is in fact the final product of a long series of extensive processes with a number of intermediate products, such as the two-dimensional and three-dimensional vector and raster plans. Supported by laser scanning instrumentation and related software, these three-dimensional renderings, together with traditional techniques, play an important role, as they are able to exploit the detailed work carried out by traditional surveying and photogrammetric techniques. Therefore for certain applications of three-dimensional visualization , traditional techniques are and should still be used.

Photogrammetric Representation at Kymissala

Photogrammetric methodology has been applied extensively during the past five years at the Kymissala archaeological site. In the following several examples are selected in order to demonstrate the main possibilities. The archaeological research zone of Kymissala is extensive, a wide mountainous and mostly wooded region interspersed with cultivated fields, mostly vineyards. One can only grasp the extent of the area and the interrelationships of the various specific sites when looking from above. For this reason color aerial photography was used to produce an orthophotograph of the whole region. Two strips of four images each were available at a scale of 1:10,000 covering the area. Several control points were determined using accurate GPS measurements in order to orient the images and produce a dense Digital Terrain Model (DTM) from which the final orthophotos were produced. These in turn were combined to form the final orthophotomosaic map (**fig. 37**), which was an indispensable tool for the management and planning of sampling and detailed study as it has all metrical advantages of a conventional map, but also carries photographic qualitative information.

Similar work has been done in two of the many monumental graves in the central necropolis, but at a much larger scale. Both graves were documented using a full combination of the available methods—that is, topographic measurements, digital imaging and terrestrial laser scanning. These data acquisition methods resulted in an extensive geometric documentation of the graves both in two and three dimensions (**fig. 38a–b**).

Another example of such work is in the area of the Vassilika settlement, where we conducted an extensive documentation of the road network at a large scale (1:50), requiring vertical photography that used a specially developed mega-tripod—a height of seven and a half meters—and a normal DSLR digital camera. Accurate point measurements were also taken in order to support the necessary processing. This project is ongoing and the results so far are presented in **fig. 39**.

Topographical science and technology is now in a position to support the work of archaeologists in many ways. Fieldwork derived from programmatic plans of regional fieldwork lead ultimately to protection, preservation and management of archaeological landscapes, sites, assemblages and artifacts comprising the research universe. The culmination of archaeological fieldwork normally involves conservation and, of course, publication of the results. It is apparent that all stages of conventional archaeological practice may be positively affected by the introduction and exploitation of digital topographic technologies. Remote sensing assists the non-intrusive and rapid detection of loci of interest. Instruments as such as spectroradiometers or ground penetrating radar—or even the simple processing of multispectral satellite images—may easily lead to the efficient location of subsurface finds, while contemporary survey technologies, such as photogrammetry, terrestrial laser scanning

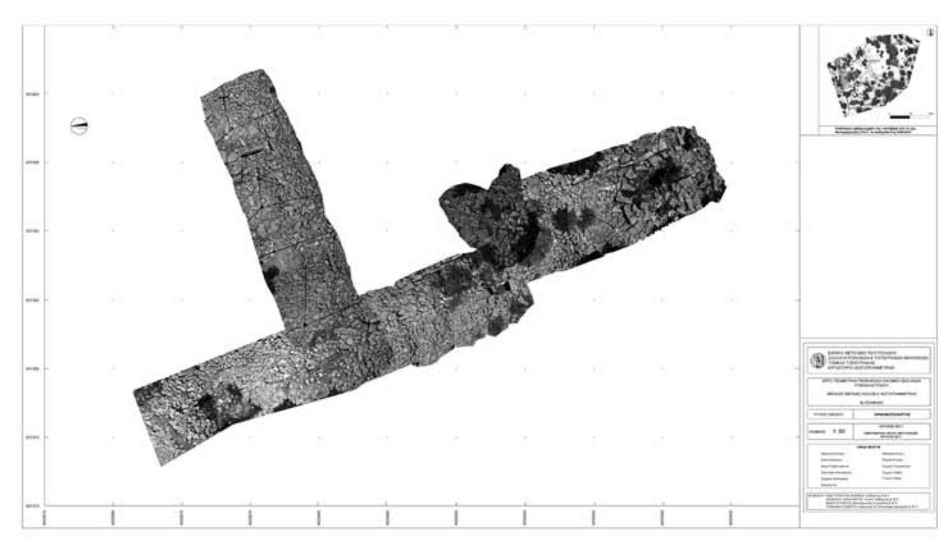

Figure 10.39: The orthophotomosaic of the road network in the Vassilika settlement (photo KARP-NTUA).

and digital imaging, may be used to produce accurate base maps for further study, or three-dimensional virtual renderings and visualizations, as already mentioned. The collected data may be stored in interactive databases, georeferenced, and managed according to the needs of the experts.

Andreas Georgopoulos

Appendix 3: Interrelational Database

"Digit" is a software application used for collecting and integrating data into a comprehensive database. It works either as local (intranet) or web (internet) implementation, on IIS server (Microsoft) or Apache server (open-source) independently of operating platform. It is fully functional either on a university server, accessible to multiple excavations, or in the computer of a single researcher. Digit is written in PHP language and the software uses as a backend a relational MYSQL database, which can be used for simultaneous servicing multiple processes.

Digit was tested as a web application during the 2003–2006 excavations at Phalassarna, under the supervision of Manolis Stefanakis and Elpida Chatzidaki. The acquired experience and the relevant developments of the software were initially presented in the 10th International Cretological Congress (Kalogeropoulos 2006). Since 2006, "Digit" has become the main database software at Kymissala. The present phase of development is stable version "Digit V 2.0," supporting as a CMS, *Eulimene,* a refereed academic periodical which publishes articles in classical archaeology, epigraphy, numismatics and papyrology (http://www.eulimene.eu).

Accelerating in the past two decades, the experimental practice of integrating archaeological data management with digital storage capabilities is perhaps, in a way, the invasion of the technology of computer systems into various cultural areas—a form of cultural technology. A significant problem from the beginning of this new practice has been the definition of the quality of digital information, the ease of access and the ability to cross reference diverse data streams. The problem was to preserve information, and then to be able to manipulate it and see it in very different ways (Martinez 2001, 9–16). That is to say, the use of computers in archaeological field projects offers clear advantages, but the "successful implementation requires a great deal of planning" (Dibble and McPherron, 1988, 431–440). The framework for the implementation of a database at Kymissala encompassed the essential interrelationships between activities, concepts, and results of fieldwork and research, with emphasis on reusing and analyzing any observations produced for every find or group of finds. Obviously fieldwork and analysis are bound together, but the first usually attracts greater attention than the second. The practice of digitization of an archaeological file, considering that issues of good practice and classification are taken into consideration, to a large extent restores the observed imbalance and also contributes to an integrated presentation of the archaeological project.

The Relational Database

Relational databases provide faster access to data through queries, and have built-in mechanisms in order to handle concurrent access. Digit is a specialized Content Management System (CMS) written in PHP. MySQL has a good interface with PHP as a database management system; it is open source, low cost, high performance, and portable, as it is supported from both UNIX and MS Windows systems (Converse, Park and Morgan, 2004, 6). Using the term *content management system*, we mean custom applications that rely on schemas for storing content within relational or object databases (Shklar 2003, 219). The relational database of "Digit" CMS consists of basic tables describing entities on a given hierarchy and auxiliary tables describing attributes of these entities in one excavated unit (context). All of these tables store indexed data, which makes them searchable.

The table below (table 1), derived from the Phpmyadmin 3.4.1.10 database management system (see www.phpmyadmin.net/), presents a specific data taxonomy for entities, such as phases, geographical locations, sites, contexts, finds and independent but related entities, strata, dating, and users. Each phase is a discernible period of time during which a geographical site is explored, and a site belonging to this geographical site is excavated. Excavation is a process that takes place in context units in order to expose an archaeological record, part of which is made up of context finds. In fact there is a "one to many" relation in this kind of taxonomy, which allows any operator to import and export data using proper SQL queries.

Table 10.1: Data taxonomy (derived from Phpmyadmin 3.4.1.10 database management system) (www.phpmyadmin.net/).

Table	Records	Type	Size	Comments
authors	2	InnoDB	16.0 KB	Authors of preliminary reports
cont	11	InnoDB	32.0 KB	Contexts (*entities*)
contcategories	5	InnoDB	16.0 KB	Categories of contexts (context attribute)
contcolours	13	InnoDB	16.0 KB	The Munsell soil color system (Actually any color system fits, according to specific research interests) for a given context in a specific stratum (context attribute)
contconsists	7	InnoDB	16.0 KB	Sand, stones, conglomerates, roots, etc. (context attribute)
contcorces	8	InnoDB	16.0 KB	Humus, depositions, shell stratum, tsunami stratum, artificial deposition, floor (context attribute)

Table	Records	Type	Size	Comments
contedgedefs	4	InnoDB	16.0 KB	Edge definition as vertical, scalar, inclining (context attribute)
contfindcategories	4	InnoDB	16.0 KB	Artifacts, ecofacts buildings, constructions (context finds attribute)
contfindgrouping	2	InnoDB	16.0 KB	Collective numbering of finds (context finds attribute)
contfindimages	6	InnoDB	16.0 KB	Context finds images (context finds attribute)
contfinds	6	InnoDB	16.0 KB	Context finds (*entities*)
contfindtypes	15	InnoDB	16.0 KB	Finds types: sherds, vessels, coins, bones, glass, etc. (context finds attribute)
contgrades	4	InnoDB	16.0 KB	Post-holes (context attribute)
contgrids	2	InnoDB	16.0 KB	Unified, different grids (context attribute)
contlogs	1	InnoDB	16.0 KB	Logs for a specific context (context attribute)
contmethods	2	InnoDB	16.0 KB	Excavation method (context attribute)
contplans	3	InnoDB	16.0 KB	Plans of contexts (context attribute)
contprofiles	19	InnoDB	16.0 KB	Horizontal, sloping etc. (context attribute)
conttextures	6	InnoDB	16.0 KB	Context texture: solid, dense, thin etc. (context attribute)
conttypes	3	InnoDB	16.0 KB	Context type: deposit, surface etc. (context attribute)
countries	4	InnoDB	16.0 KB	Automated geolocation
datingmethods	4	InnoDB	16.0 KB	Dating methods (dating attributes)
datings	5	InnoDB	16.0 KB	Dating (*entities*)
datingtypes	3	InnoDB	16.0 KB	Dating types: absolute, relative etc. (dating attributes)
districts	3	InnoDB	16.0 KB	Automated geolocation
findimages	3	InnoDB	16.0 KB	Images of finds
gallery_category	7	InnoDB	32.0 KB	Galleries' categories
gallery_photos	7	InnoDB	32.0 KB	Photos presented in every gallery
geositeimg	0	InnoDB	16.0 KB	Geographical site images (geosites attributes)
geositemap	1	InnoDB	16.0 KB	Geographical site maps (geosites attributes)

Table	Records	Type	Size	Comments
geosites	2	InnoDB	16.0 KB	Geographical sites (*entities*)
imgtypes	8	InnoDB	16.0 KB	East, West, North, South, South–East etc.
messages	1	InnoDB	16.0 KB	Work flow for successive users
phaselogs	6	InnoDB	16.0 KB	General logs for every period of excavation written by excavation supervisor
phases	4	InnoDB	16.0 KB	Excavating periods (*entities*)
provences	3	InnoDB	16.0 KB	Automated geolocation
publications	2	InnoDB	32.0 KB	Publications for specific researches on CMS
relations	10	InnoDB	16.0 KB	Stratigraphic relations
siteenvs	5	InnoDB	16.0 KB	Site environment (site attributes)
siteexctechs	7	InnoDB	16.0 KB	Site excavations techniques (site attributes)
siteexctypes	3	InnoDB	16.0 KB	Site excavation types: vertical, horizontal expansion, mixed (site attributes)
siteforms	9	InnoDB	16.0 KB	Site forms: cave, harbor, fortress etc. (site attributes)
siteimg	0	InnoDB	16.0 KB	Site images (site attributes)
siteinvmethods	3	InnoDB	16.0 KB	Investigation methods: aerial, via satellite, etc. (site attributes)
sitemap	0	InnoDB	16.0 KB	Site mapping (site attributes)
sitephotos	0	InnoDB	16.0 KB	Photos intended for promotion purposes (site attributes)
sites	2	InnoDB	64.0 KB	Sites (*entities*)
stratig	2	InnoDB	32.0 KB	Stratigraphy
stratum	6	InnoDB	16.0 KB	Strata (entities)
substratum	4	InnoDB	16.0 KB	Substrata
texts	4	InnoDB	64.0 KB	General information texts on specific areas of research, actually a library
tutorials	2	InnoDB	32.0 KB	Tutorials on setting up and using Digit
_columnschema	281	InnoDB	96.0 KB	*For administrative purposes*
_fkschema	0	InnoDB	16.0 KB	*For administrative purposes*
_languages	2	InnoDB	16.0 KB	*For administrative purposes*
_prefs	9	InnoDB	16.0 KB	*For administrative purposes*

Table	Records	Type	Size	Comments
_rendertypes	12	InnoDB	16.0 KB	*For administrative purposes*
_tableschema	44	InnoDB	32.0 KB	*For administrative purposes*
_userlevels	4	InnoDB	16.0 KB	user levels: personnel, students and supervisors (*attributes*)
_users	6	InnoDB	16.0 KB	Users are *entities*
60 tables	601	–	1.2 MB	

Management and productive use of the archaeological record is a complex and laborious task, which requires careful planning and organizational expertise. Until recently, archaeological recording used analog means of documentation such as notebooks, catalogs of finds, two-dimensional analog plans and photographs. These instruments, however, despite their contribution to the recording process, make it difficult to access and crosscheck data records, thus limiting the interpretative capabilities of researchers. Digital databases, however, are able to present cross-references and any kind of audiovisual material that has been imported into them by operators. Undoubtedly documentation of an excavation is a special area of digital technology because of the theoretical, methodological and practical particularities of each excavation. That said, increasing technological developments and the continuing accumulation of experience in the development of digital information systems for archaeological use opens new perspectives for the most effective and innovative adoption of digital technology in the research.

Hierarchical Data Model and Table Relationships

A one-to-many relationship actually allows records of one table to be connected to many records of another table without the limitations imposed by resorting to redundant or limited numbers of fields in a single table (**fig. 40**). This reduces the size of the database and increases the flexibility and performance of queries operating on that data (Erickson 2009, 208). Thus, according to the requirements of the excavation conducted at ancient Kymissala, a particular period of time—a phase—encompasses spatial entities such as the geographical archaeological area (geosite), which includes a series of archaeological sites. It is a defined geographical area with definable topographical features. This demarcated area has been both a well-defined ecological and cultural territory; a specific site or sites; and of course a context unit within specific sites. This time-space connection in one excavation event permits dissociation of discernible but parallel excavations.

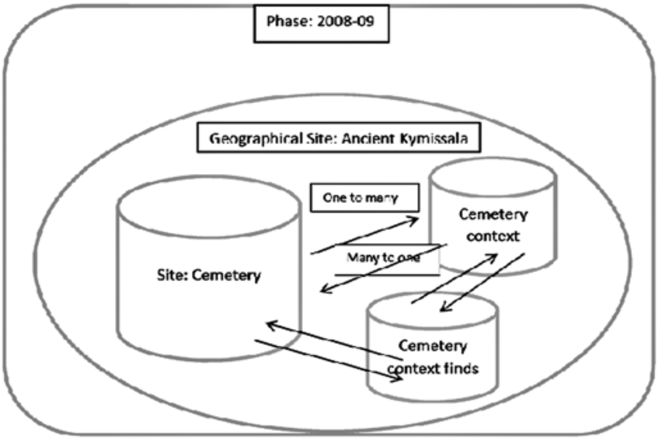

Figure 10.40: Digit: hierarchical data model and table relations (drawing K. Kalogeropoulos).

Modular Design and Expansibility

CMS "Digit" is able to store, retrieve, edit, update and control content stored in a database with standard editorial tools—Graphical User Interface (GUI). It allows content creators to submit content though forms without any technical knowledge of HTML or the need to upload files to the server. "Digit" also has a modular design that permits the development of multiple queries and responses since it is a server-side application. In practice, that means that it can be expanded according to the specific needs of an excavation through new modules, without changing the rest or the core of the software application. It is also capable of providing the proper environment for publishing content. Content creation functionality includes separation of presentation and content, utilization of illustrations in different contexts and metadata support. Other features include template availability through style sheets, and allow for the integration of multiple formats on rendering text.

Keeping in mind that a content management system, even one created for specific reasons, is a concept rather than a product, and embraces a set of processes (Browing and Lowndes 2001), "Digit" handles all necessary processes for documenting the archaeological record, from daily logs to find classification and illustration. Moreover it can render information, general or specific, in different formats, from simple text to PDF documents. In any case, both the developers of such specific CMS and archaeologists should keep in mind that data are not actual objects—they are only measurements and observations we make about these objects, and more or less, constructions or impressions of the way we see things (Sullivan 1978, 189).

Konstantinos Kalogeropoulos

References

Andronikos, M. 1963. “Ελληνικά επιτάφια μνημεία,” *ArchDelt* 17 (1961–62), A’ Meletai, pp. 152–210.
–. 1968. *Totenkult* (*Archaeologia Homerica III, W*), Gottingen.
Aufderheide, A., and C. Rodríguez-Martín. 1998. *The Cambridge Encyclopedia of Human Paleopathology*. Cambridge.
Banning, E.B. 2002. *Archaeological Laboratory*, New York.
Berg, A. 1862. *Die Insel Rhodos*, Braunschweig.
Biliotti, E., and l’abbé Cottret. 1881. *L’île de Rhodes* (vol. 2), Rhodes.
Boudon, R. 1991. “Review: What Middle-Range Theories Are,” *Contemporary Sociology* 20, pp. 519–522.
Boxill, I., C. Chambers, and E. Wint. 1997. *Introduction to Social Research with Applications to the Caribbean*, Kingston.
Brickley, M., and J.I. McKinley. 2004. *Guidelines to the Standards for Recording Human Remains* (*Institute of Field Archaeologists, Paper 7*), Reading.
Buikstra, J.E., and D.H. Ubelaker, eds. 1994. *Standards for Data Collection from Human Skeletal Remains*, Faytteville.
Buikstra, J.E., and L.A. Beck, eds. 2006. *Bioarchaeology: The Contextual Analysis of Human Remains,* Amsterdam.
Calciati, R. 1986. *Corpus Nummorum Siculorum: The Bronze Coinage. Vol. II (Area IV) Syracuse*, Milan.
Carbonnell, M. 1989. *Photogrammetry Applied to Surveys of Monuments and Historic Centres*, ICCROM, Rome.
Catsambis, A., B. Ford and D. Hamilton, eds. 2011. *The Oxford Handbook of Maritime Archaeology*, Oxford.
Challis, D. 2008. *From the Harpy Tomb to the Wonders of Ephesus: British Archaeologist in the Ottoman Empire 1840–1880*, London.
Cohen, L., and A. Maldonado. 2007. “Research Methods in Education,” *British Journal of Educational Studies* 55, p. 9.
Converse, T., J. Park, and C. Morgan. 2004. *PHP5 and MySQL Bible*, Indiana.
Coombs, C.H. 1964. *A Theory of Data*, New York.
Daston, L., and E. Lunbeck, eds. 2011. *Histories of Scientific Observation*, Chicago.
Dibble, H.L., and S.P. McPherron. 1988. “On the Computerization of Archaeological Projects,” *JFA* 15, pp. 431–440.
Embree, L. 1990. *Critical Traditions in Contemporary Archaeology*, Cambridge.
Erickson, J., ed. 2009. *Database Technologies: Concepts, Methodologies, Tools and Applications*, New York.
Furtwängler, A. 1886. “Erwerbungen de Königliche Museen zu Berlin 1885,” *JdI* 1, pp. 133–160.
Fussell, A. 1982. “Terrestrial Photogrammetry in Archaeology,” *WorldArch*, 14.2, pp. 157–172.
Gardin, J.C. 1980. *Archaeological Constructs: An Aspect of Theoretical Archaeology*, Cambridge.
Gartell, D., and J. Gartell. 1996. “Positivism in Sociological Practice: 1967–1990,” *Canadian Review of Sociology* 33, pp. 143–158.
Georgopoulos, A., and Ch. Ioannidis. 2006. “3D Visualization by Integration of Multisource Data for Monument Geometric Recording,” in *Recording, Modeling and Visualization of Cultural Heritage*, E. Baltsavias, A. Gruen, L. Van Gool, and M. Pateraki, eds., Leiden.
Georgopoulos, A., A. Daskalopoulos, G.N. Makris, and Ch. Ioannidis. 2003. “A Trip from Object to Image and Back,” in *The International Archives of Photogrammetry, Remote Sensing and Spatial Information Sciences: Proceedings of the Workshop “Vision Techniques for Digital Architectural and Archaeological Archives,” Ancona 2003* (*vol. 34, p. 5/W12, Comm. V*), pp. 141–144.

Henderson, J. 1987. “Factors Determining the State of Preservation of Human Remains in Death, Decay and Reconstruction,” in *Approaches to Archaeology and Forensic Science*, A. Boddington, A.N. Garland, and R.C. Janaway, eds., Manchester.
Hope Simpson, R., and J.F. Lazenby. 1973. “Notes from the Dodecanese III,” *BSA* 68, pp. 146–147.
Hunter, L., and E. Leahey. 2008. “Collaborative Research in Sociology: Trends and Contributing Factors,” *American Sociologist* 39, pp. 290–306.
Inglieri, R.U. 1936. *Carta Archeologica dell’Isola di Rodi*, Firenze.
Kalogeropoulos, K. 2006. “Digit: Questions on Digitalisation of Excavations’ Data,” unpublished paper, *10th International Cretological Congress, October 1–8 2006*, Chania.
Konstantinopoulos, Gr. 1969. “Ύπαιθρος Ρόδου, Κυμισάλα,” *ArchDelt* 24 (B’, Chronika), pp. 480–482.
Larsen, C.S. 1997. *Bioarchaeology: Interpreting Behavior from the Human Skeleton*, Cambridge.
Lock, G., and B. Leigh Molynaux, eds. 2006. *Confronting Scales in Archaeology*, New York.
Maillis, A.S., K.E. Skandalidis, and K.F. Tsalachouris. 2002. *Η Ρόδος τον 19ο Αιώνα*. Athens.
Maiuri, A. 1916. “Ricerche archeologiche nell᾽isola di Rodi,” *ASAtene* 2, pp. 285–298.
–. 1928. “Scavi ed esplorazioni nell’isola di Rodi. Esplorazione della regione dell’Acramiti,” *ClRh* 1, pp. 83–84.
Martinez, P. 2001. “Digital Realities and Archaeology: A Difficult Relationship or a Fruitful Marriage?,” in *VAST ‘01: Proceedings of the 2001 Conference on Virtual Reality, Archeology and Cultural Heritage*, New York, pp. 9–16.
McKinley, J.I., and C.A. Roberts. 1993. *Excavation and Post–Excavation Treatment of Cremated and Inhumed Remains* (*Technical Paper* no. 13), Birmingham.
Mpakalakis, G. 1974. “Δεύτερες φροντίδες,” *Επιστημονική Επετηρίς Φιλοσοφικής Σχολής Πανεπιστημίου Θεσσαλονίκης* 13, pp. 245–259.
Nami, H.G. 2010. “Theoretical Reflections on Experimental Archaeology and Lithic Technology,” in *Experiments and Interpretation of Traditional Technologies: Essays in Honor of Errett Callahan*, H.G. Nami, ed., Buenos Aires, pp. 91–170.
Newton, C.T. 1865. *Travels and Discoveries in the Levant*, London.
Ogleby, C., and L. Rivett. 1985. *Handbook of Heritage Photogrammetry* (*Australian Heritage Commission Special Australian Heritage Publication* no. 4), Canberra.
Orlandos, A.K. 1994. *Τα Υλικά Δομής των Αρχαίων Ελλήνων και οι Τρόποι Εφαρμογής αυτών κατά τους Συγγραφείς, τας Επιγραφάς και τα Μνημεία* (Βιβλιοθήκη της εν Αθήναις Αρχαιολογικής Εταιρείας 37), Athens.
Ortner, D.J. 2003. *Identification of Palaeopathological Conditions in Human Skeletal Remains*, San Diego.
Papachristodoulou, Ch.I. 1989. *Οι Αρχαίοι Ροδιακοί Δήμοι. Ιστορική Ανασκόπηση. Η Ιαλυσία*. Athens.
–. 1994. *Ιστορία της Ρόδου*, Athens.
–. 1996. “Κεντρική και περιφερειακή οργάνωση της Ροδιακής Πολιτείας –Δήμοι,” in *Πρακτικά του Διεθνούς Επιστημονικού Συμποσίου “Ρόδος: 24 Αιώνες,” Ρόδος 1–5 Οκτωβρίου 1992*, Athens, pp. 47–60.
–. 2009. “Νέα στοιχεία ως συμβολή στην τοπογραφία της αρχαίας Καμιρίδος. Το χωριό Φάνες της Ρόδου,” in *Φάνες Επιγραφές και Αρχαιολογικά Ευρήματα*, I.Ch. Papachristodoulou, P. Zervaki, and P. Triantaphyllides, eds., Weilheim, pp. 41–87.
Papaioannou, M.D. 1991. *Ρόδος και Νεώτερα Κείμενα 3*. Athens.
Patsiada, V., and Philimonos, M. 1987a, “Σιάννα, θέση Πουγκάς,” *ArchDelt* 42 (B’, Chronika), pp. 618–619.
–. 1987b, “Γλυφάδα,” *ArchDelt* 42 (B’, Chronika), p. 619.
Pernier, L. 1914. “Ricognizioni archeologiche nelle Sporadi,” *BdA* 8, pp. 236–242.

Poulter, G.A., and I. Kerslake. 1997. “Vertical Photographic Site Recording: The ‘Holmes Boom’,” *JFA* 24, pp. 221–232.

Roberts, C.A. 2009. *Human Remains in Archaeology: A Handbook*, York.

Salmon, M. 1982. *Philosophy and Archaeology*, New York.

Shklar, L. 2003. *Web Application Architecture: Principles, Protocols and Practices*, New Jersey.

Smith, C. 1883. “Inscriptions from Rhodes,” *JHS* 4, pp. 136–141.

–. 1885. “Vases from Rhodes with Incised Inscriptions,” *JHS* 6, pp. 371–377.

SNG Copenhagen: *Sylloge Nummorum Graecorum, The Danish National Museum, Copenhagen* Vol. 1: Italy – Sicily, Copenhagen 1981.

Sørensen, L.W., and P. Pentz. 1992. *Excavations and Surveys in Southern Rhodes: The Post-Mycenaean Period until Roman Times and the Medieval Period: Lindos IV, 2, Results of the Carlsberg Foundation Excavations in Rhodes 1902–1914*, Copenhagen.

Sourvinou-Inwood, C. 1996. *Reading Greek Death to the End of the Classical Period*, Oxford.

Stefanakis, M., and V. Patsiada. 2009–2011. “Η αρχαιολογική έρευνα στον Αρχαίο Δήμο των Κυμισαλέων (Ρόδος) κατά τα έτη 2006–2010: μια πρώτη παρουσίαση,” *Ευλιμένη* 10–12, pp. 63–134.

Stefanakis, M.I. 2009. “Ο Αρχαίος Δήμος των Κυμισαλέων: πέντε χρόνια έρευνας του Πανεπιστημίου Αιγαίου και της ΚΒ΄ ΕΠΚΑ,” *Δωδεκάνησος* 2, pp. 93–116.

–. 2010a, “Η αρχαία Κυμισάλα στο Δήμο Αταβύρου: Παρελθόν, παρόν και μέλλον,” in *Πρακτικά 1ου Πανελληνίου Συνεδρίου, Τοπικές Κοινωνίες και Τριτοβάθμια Εκπαιδευτικά Ιδρύματα: Συνύπαρξη για Αειφορική Ανάπτυξη*, Δήμος Ροδίων, Πανεπιστήμιο Αιγαίου, Διεθνές Κέντρων Συγγραφέων και Μεταφραστών Ρόδου, Rhodes, http://www.eulimene.eu/read/Ancient-Kymissala.pdf.

–. 2010b. “Πρόταση ίδρυσης αρχαιολογικού–οικολογικού πάρκου στη Ρόδο (αρχαία Κυμισάλα): Μια πρόκληση για την τοπική ανάπτυξη,” in *Χωροταξία–Πολεοδομία–Περιβάλλον στον 21ο Αιώνα: Ελλάδα – Μεσόγειος*, H. Beriatos and M. Papagoergiou, eds., Volos, pp. 685–702.

Stefanidou, A.S. 2001a. “Βίγλες της Ρόδου,” *Ενετοί και Ιωαννίτες Ιππότες. Δίκτυα Οχυρωματικής Αρχιτεκτονικής*, Πειραματική Ενέργεια Archi–Med., Athens, p. 215.

–. 2001b. “Κάστρο Μονολίθου,” *Ενετοί και Ιωαννίτες Ιππότες. Δίκτυα Οχυρωματικής Αρχιτεκτονικής*, Πειραματική Ενέργεια Archi–Med., Athens, p. 205.

–. 2001c. “Κάστρο Σιαννών,” *Ενετοί και Ιωαννίτες Ιππότες. Δίκτυα Οχυρωματικής Αρχιτεκτονικής*, Πειραματική Ενέργεια Archi–Med., Athens, p. 204.

–. 2004. *Η Μεσαιωνική Ρόδος. Με Βάση το Χειρόγραφο και την Εικονογράφηση του Johannes Hedenborg (1854)*, Thessaloniki.

Sullivan, A.P. 1978. “Inference and Evidence in Archaeology,” *Advances in Archaeological Method and Theory* 1, pp. 183–222.

Tod, M.N. 1921. “The Progress of Greek Epigraphy, 1919–1920,” *JHS* 41, pp. 50–69.

Trigger, B.G. 1989. *A History of Archaeological Thought*, Cambridge.

U.N.E.S.C.O. 1972. *Photogrammetry Applied to the Survey of Historic Monuments, of Sites and to Archaeology*, UNESCO editions.

von Gaertringen, H.F. 1917. “Die Demen der rhodischen Städte,” *AM* 42, pp. 171–184.

Wacquant, L. 1992. “Positivism” in *The Blackwell Dictionary of Twentieth-Century Social Thought*, T. Bottomore and W. Outhwaite, eds., Oxford, pp. 495–498.

White, T.D., and P.A. Folkens. 2005. *The Human Bone Manual*, Amsterdam.

Zervoudaki, I. 1970. “Γλυφάδα,” *ArchDelt* 25 (Β’, Chronika), pp. 517–518, pl. 439δ-ε.