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The Mysteries of Lake Copais and the Island Fortress of Gla

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Abstract

The Bronze Age drainage of Lake Copais, Boeotia, is unique within Europe as the largest and most complex work of engineering of the period. Comprising large dams, polder dykes, canals, massive levees, cuttings and tunnels, it made at least 95km² of drained lake bed available for agricultural production. The first polders were established in the Middle Helladic period with great extensions in the Late Helladic. During the latter period the largest of all the Mycenaean citadels was constructed at Gla which had been a rocky island in the lake prior to the drainage. But exactly what type of settlement it was still remains something of a mystery. This paper draws together the history of research on the citadel of Gla.

Keywords: Gla, Ancient Boeotia, Mycenaean palaces, Mycenaean fortifications.

1. Introduction

In 1886 a site forgotten to the history of Greece resurfaced almost miraculously from the water after being drowned for at least thirty-one centuries: the plain of Lake Copais in Boeotia, which lies some 100 km north-west of Athens (Fig.1). On the ground of the drained marsh, still crowded with a thick vegetation of reeds, enigmatic remains of dykes and canals appeared. This amazing discovery led archaeologists to search the fortified island of Gla, an ancient settlement of people who had domesticated the waters of the lake, until disaster caused the final flooding of much of their territory and ruined their cities. Since the 19th century archaeological survey has revealed a great number of sites around and within the Plain (Fig. 2).

Located at the foot of high mountains, covered by snow in winter, the marshes of Lake Copais are indeed fed by many rivers, in order of decreasing importance: the Kephissos[1], the

1 We can claim no consistency in the transliteration of Greek names. We have used the "old English version" where the names are generally known but a closer transliteration from Greek where the names are less well-known.

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Melas, the Herkyne, the Phalaros and the Lophis[2]. In summer, the waters of the marshes were partly reduced by evaporation, but throughout the year, their overflow drained to the east of the lake into twenty-three sinkholes (*"katavothres"*), natural cracks in the karstic limestone. Becoming underground waters, they joined the sea in the Gulf of Euboea, some 3km distant.

- Since 1850 researchers have revealed a unique Mycenaean citadel at Gla, Boeotia.
- Gla is by far the largest Myceanean, Cyclopean-walled fortress.
- The "palace" and other buildings are quite unlike other Mycenaean palatial structures.
- Other building complexes resemble barracks, work-shops and/or storage facilities.

A first attempt at drainage was carried out by a French company at the end of the 19th century. After its partial failure, a British company undertook more significant works which made possible the final, complete drainage in the 1930s (Dean, 1937; Idol, 2018).

Boeotia and Attica form a long peninsula, therefore bathed by the sea on three sides; but Boeotia is so isolated from marine influence by the mountain ranges which surround it that winters are harsh and summers are scorching. As the highest mountains are to the north, west and south, the plain is especially exposed to the winds from the east. Following Theophrastus (V, 12, 3) we can also assume that before the intensive drainage the constant moisture maintained in the plain by the evaporation of the marsh was more important and mitigated the rigors of the climate.

2. 19th century observations of the Copais basin

In 1850, before its drainage, Emile Burnouf, a member of the French School of Archaeology of Athens, published a report on Lake Copais, as it appeared at that time, with reference to ancient authors. The low waters of the lake covered 150 km² and the high waters 230 km². The flood-depth was 6 m at its deepest near the city of Copae (modern Kastro) in January and February. In the north-east, the lake was separated from the Euboean Gulf by a pass at Kephalari, 35 m higher than the lake level and thus it could never have joined the sea. Such land-locked basins are quite common in the Balkan peninsular and may be found at considerable heights above sea-level as "mountain-plains" such as Lassithi in Crete or as lower endorheic basins or "polje". Burnouf realized that the Lake had changed greatly through time and quoted Strabo (IX, 2, 4) who reported a popular tradition that in ancient times the ground of Copais had been dry and well cultivated and that the Orchomenians had been rich.

The swamp was drained at the end of the 19th century by the British Lake Copais Company. Immediately the dried lake bed revealed traces of very old works, namely dykes and canals. These observations were carefully recorded in 1892 by Michalis A. Kambanis, a Greek archaeologist who was very familiar with the region and published his observations in 1892 and 1893. He noted the huge ancient tunnel only partially completed under the pass of Kephalari to the north-east of the lake.

Secondly, at the south-east end of the lake, he found the remains of a huge trench, which had reached more than 30m depth through the limestone rock, to cut through the Karditza pass which separates Lake Copais from Lake Hylike. "The traces of work started on the passes of Moriki and Anthedon to connect Lake Hylike with Lake Paralimni and this latter to the sea,

[2] The modern annual flows of these rivers are estimated as: Kephissos 179hm³, Melas 130hm³, and the Herkyna, Pontzas and Lofis together 44hm³ (Mamassis et al. 2015).

remained as a draft of the present drainage works,"[3] Kambanis noticed. He also noted the presence of three massive canals with high dams and cut channels embracing the flow from all the rivers entering the lake and flowing to the sinkhole area at the north-east end of the lake. He also realized that the masonry of the dams and dikes was similar in style to that at the fortress of Gla and at Tiryns in the Argolid. "These are," he concluded, "the best evidence to show us, at least with some approximation, that this work relates to an era that corresponds to the floruit of the Minyans, the subjects of Minyas, King of Orchomenos."

The ruins of the city of Orchomenos, in the west of the plain, have since been extensively studied. This city was founded at the beginning of the Middle Bronze Age and the upper layers were dated to the Mycenaean period (LHII-LHIIIC). Schliemann discovered in the city a beautiful tholos tomb which had been described by Pausanias (IX, 36.3) as the "Treasury of Minyas" and he commented "distinguished historians have explained the pyramids of Egypt in the greatest detail, and not made the slightest mention of the 'Treasury of Minyas' or the walls of Tiryns, which are by no means less marvelous". The remarkable similarity of this tholos tomb to the "Treasury of Atreus" at Mycenae was commented on by Schliemann and his assistant Dörpfeld even suggested that the two tombs may have been planned by the same architect (Wood, 1990).

Later work (Knauss et al.1984; Knauss,1986) has shown that the first attempts at drainage by the use of dikes to create polders began in the Middle Helladic period and the creation of large canals, dams and dikes allowed the near-complete drainage of the whole plain during the Late Helladic period when the citadel of Gla and other cities around and within the Copais basin flourished (Fig. 2). More recent research (Lane et al., 2020; Kountouri et al., 2013) has added considerable detail to our knowledge of the Bronze Age drainage and the subsequent land use in the plain.

3. The fortress of Gla

3.1 *19th century research*

Interesting ruins are located at the east end of the plain, facing the high cliff overlooking the north of the ancient city of Copae (modern Kastro). There, about 1km from the former eastern shore of the lake, a rocky outcrop in the form of a triangular plateau called Gla with an area of 23.5ha rises up to 30m above the plain. When the plain was flooded, this rocky eminence obviously became an island, but we can imagine that when the plain was dry it became accessible, so its inhabitants built the wall which can still be seen atop the island's steep flanks. Inside this massive Cyclopean defensive wall were found the foundations of buildings which were first excavated by the Belgian archaeologist A. de Ridder in 1894. The area enclosed by the great wall is much larger than that of other Mycenaean defenses (Fig. 3), measuring some 23.5ha compared with Mycenae at 3.1ha within the walls. De Ridder commented: "The entire circumference of the island (3km) is crowned by a wall of consistent thickness. The fortress[4], which dates from the same time, was placed at the highest point of the island, at right angles it formed a barrier against attackers from the east. Its construction is similar to that of the defenses of Mycenae and Tiryns, but the architect was more successful at Tiryns in making it difficult to enter some rooms" (Figs. 4 & 5). It is a single-entry enclosure, with main rooms preceded by a vestibule or access room, and communicating with each other only by narrow corridors". According to de Ridder: "A fire ruined the palace. In the center of the island are the ruins of a large entrenched camp, bounded on two

[3] It is a strange omission that no modern researchers seem to refer to these massive channels which may have been an element of the uncompleted Hellenistic drainage system.

[4] The building usually referred to as the "palace" or "melathron".

sides by long parallel walls. On the island, there is no trace of springs, but in the limestone ground, they could disappear."

The origin and meaning of the modern toponym Gla are uncertain: perhaps a deformation of the Albanian term "goulas" meaning fortress, because many immigrants of Albanian origin have lived in the region since the 16th century at least.[5] In 1894, the German archaeologist F. Noack identified Gla with Homeric Arne, relying on the arguments of Thucydides (I, 12, 3)[6] saying that Thessalian Arne was the main center of the Boeotians, and in 1962 Threpsiadis agreed but in reality there is no firm identification of Gla with any of Homer's cities.

3.2 *The so-called "agora" and "palace".*

In 1954 J. Threpsiadis (Daux, 1961 & 1962) took over the excavations at Gla. Six years later, he reached the main gates of the massive Cyclopean walls of the island, which were flanked by square towers. He also explored the western part of the buildings located within the central enclosure that de Ridder called "the entrenched camp". There he discovered a series of "workshop-rooms" whose function could not be clearly defined (Fig. 5). Threpsiadis called this area the "agora", because he thought it was at the center of an ancient city. Later, Richard Hope Simpson (1981) suggested that the long buildings looked like military barracks with stables at both ends. A lane was cleared which led from the South Gate of the so-called "agora" to the great South Gate of the encircling walls of the island. At the North Gate they found traces of two roads, one leading to the town of Copae, the other leading west, onto the old marsh. This "agora" was, in fact, the southern half of a large central rectangular enclosure of 31,000m^2, built on the highest part of the island. A wall separated the southern part ("agora") from the northern part (the "palace" or "*melathron*"), which marked a second protected area within the acropolis. Inside this area, a third enclosure seemed reserved for the occupants of the east wing of the building (Fig. 5).

A remarkable system of wastewater disposal was discovered inside the "palace". The floors of rooms and of the two "megara"[7] could still be distinguished, as well as the successive layers of plaster, three thick layers, bore witness to a long occupation of the building. The thick walls and the waste water system indicate that the palace was of two storeys, the upper parts being of mudbrick. One half of "horns of consecration" of Poros marble, similar to those found in Cretan palaces was found. The roughly cut horn (80 x 18cm) was a work similar to that of the Poros steles of Mycenae and of the Poros cube with engraved depiction of ships found in the Boeotian village of Paralia, Avlis (possibly the ancient Hyria)[8]. Also, there was a multitude of fresco fragments, the most remarkable showing diving dolphins and parts of other maritime scenes, including large-scale argonauts from the east wing of the south enclosure as reconstructed by Christos Boulotis (2015).

Recently, analysis of the rare blue color used in these frescoes has shown the use of rare, imported lapis lazuli as a pigment, mixed with hematite and an organic color possibly from murex (Brysbaert 2006), an example of extraordinary conspicuous consumption. Further, the remains of roof-tiles showed that the roofs were ridged and tiled unlike other Mycenaean palaces.

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[5] Alternative etymologies have been proposed but a derivation from Arvanitika, a form of Albanian, "goulas" / "gulas" meaning "fort" seems most certain (John Bintliffe, pers.comm.)

[6] Thucydides (I,12,3) states: "Thus in the sixtieth year after the fall of Troy, the Boeotian people, having been expelled from Arne by the Thessalians, settled in the country formerly called Cadmeis, but now Boeotia: a portion of the tribe already dwelt there, and some of these had joined in the Trojan expedition."

[7] Though often described as such the rooms at the southern and western ends of the "palace" structure show very little similarity to the "megara" of other Mycenaean palaces. It is surely a misnomer.

[8] This unusual engraving is now in the Schimatari Archaeological Museum near ancient Tanagra.

Guy Rachet (1969) commented on the palace of Gla: "By its structure, it differs from other palaces with a megaron, as this name was wrongly given to the rooms located at each end of the buildings. The western 'megaron', with its pillars, rather recalls the Cretan megara."

The excavations at Gla were renewed in 1979 by S. Iakovidis. In his reports (1983 & 2001), he noted that the so-called "megara" located at the west and south ends of the L-shaped "palace" building had, in fact, neither throne emplacements nor central hearths which radically distinguishes them from other known Mycenaean palaces. He also found that the main gates of the fortress were accessible by metaled roads coming up out of the plain by ramps and inclined sections. The west and south gates had ramps leading onto the rampart. Carts could have been used on these paved roads. Also, Iakovidis said the walls of Gla were not as thick as those of Mycenae and Tiryns and the stones used were smaller, but its plan was more elaborate.

Iakovidis also published (1978) a study on five bronze door hinges that were found in the palace, four by de Ridder and one by Threpsiadis. Iakovidis claimed that they appeared less sophisticated than those found at Mycenae and Tiryns, and therefore they were certainly older. They differed also from the types of hinges of the same period found in Crete, Egypt and the Middle East. Finally, he concluded from the finds on Gla that it can be asserted that the fortress was built and used when the citadels of the Argolid were still in the early stages of construction and, he claimed, that it was burned and abandoned before their second and last stages of extension and before the palace of Pylos was destroyed. That is to say that the Gla structures would belong to the first half of the 15th century B.C. and would thus precede the other Mycenaean sites by more than a century. However, later work has revised this assessment.

3.3 *The defensive walls and lower town*

Though not particularly well-preserved today, the Cyclopean walls were once truly massive. Their total length is 2.8km and the width consistently between 5.4m and 5.8m with offsets every 6m to 12m with four major gates and two "sally-ports". This Cyclopean wall enclosed a huge area of 23.5ha, compared to only 1.7ha at Tiryns and 3.1ha at Mycenae. Having searched the buildings of the eastern part of the "agora", Iakovidis (1983) identified them as warehouses. But Hope Simpson (1981), suggested that this "agora" plan resembles military barracks and the rectangular divisions of the long buildings at the south and east of the enclosure strongly suggested stables because a culvert along the north wall was probably intended for the removal of animal urine. The ceramics gave a date in LHIIIA (c. 1400-1320 BC) for the construction of these buildings. However, as the current ruins sit directly on the bedrock, it is not possible to know if other constructions already existed in previous eras. While the first vestiges of Orchomenos date back to the Neolithic period (Dakouri-Hild, 2010), the first main period of prosperity of the region could be placed between 1750 and 1400 B.C. Furthermore, it has been found that the fortress of Gla was linked to several other strongholds built in the Late Bronze age on the hills east of the basin (Fig. 7), probably to protect the zone of sink holes (*katavothres*) against attack (Fossey, 1980). According to Pausanias (IX, 38, 5), Heracles himself as leader of the Thebans during a war against Orchomenos, blocked the main sinkholes in one day and thus flooded the plain where the Minyan cavalry had gathered[9].

Another element which should be noted is references by ancient authors, repeated by modern writers, to foreign influences or immigration into the area. In 1848, L. Ross, Professor at the University of Halle, who saw Gla as a refuge for the inhabitants of the nearby towns in case of

[9] This is a common interpretation. However, Pausanias says: "The Thebans say that Herakles turned the River Kephissos into the Orchomenian Plain; it once ran below the mountain into the sea until Herakles broke open the chasm in the mountains." This may suggest the destruction of the diversionary dam or the canal linking the River Kephissos to the Melas rather than the blocking of the sinkholes.

enemy attack, recognized these people as having a Phoenician origin with a close relationship with the Egyptians, because of the names of surrounding places, such as Mount Ptoon (Ptoion), which he claimed could be found in the two languages. In 1972 and 1973 T. G. Spyropoulos, based partly on his discoveries of the "tomb of Amphion and Zethos" in Thebes, developed the hypothesis of an Egyptian occupation of Copais in EH II (c. 2650-2200 BC). However, he adduced no evidence for this claim and his claims for the tombs in Thebes have been substantially revised (Ministry of Culture and Sport, 2012).

During his extensive work on the evolution of the whole basin, J. Knauss (1986) revealed that Gla had an extensive "Lower Town" (Fig. 8), a large area of settlement on the drained plain to the immediate west of the citadel and protected from flooding by the long approximately north-south polder dyke. This area is so large that it almost links Gla to the ancient city of Copae on its hill to the north-west.

More recently, there has been an intensive program of research on the citadel of Gla and in the surrounding area, led by Elena Kountouri and Michael Lane (Kountouri et al., 2013; Kountouri & Lane, 2018; Lane et al., 2020) which has revealed many new discoveries. First, in the area, Mycenaean walls have been revealed and dated at both Ayia Marina Pyrgos and Ayios Ioannis (Fig. 7) In the plain itself a system of rectilinear land or field boundaries have been revealed by geophysical techniques, indicating how the 'new' agricultural land was sub-divided. At the same time the application of several geophysical techniques and excavation within the citadel of Gla has revealed many previously unknown buildings and building complexes which substantially fill the large 'empty' areas on the plans of earlier researchers (Fig. 9). Of particular note is the enormous circular geophysical "anomaly P" with a diameter of some 40m the significance of which is, as yet, unknown (Koutouri et al., 2013).

Other building complexes are unusual, notably the "Eastern Complex", a group of six nearly identical structures laid out in a neat symmetry of two rows of three, most unlike typical building complexes elsewhere and somewhat reminiscent of a modern 'industrial estate". All the excavated groups have been dated to the LHIIIA/B period (c. 1400-1200 BC). Despite these remarkable discoveries the exact nature of the so-called "palace" or "*melathron"* and the citadel as a whole remains debatable.

4. The site of Copae

Formerly the hill of Copae, in the north-east of the lake, was isolated from the northern bank by the Great Canal and separated from the rest of the plain to the south by the course of the earlier outlet of the lake, and then by the last section of the channel which went along the east bank towards the north, following the earthen bank which protected the lower city and the polder of Gla. But the foot of the hill of Copae was surrounded by a broad marshy zone which was itself drained at some time by ditches. Unfortunately, it is difficult now to carry out excavations on the hill of Copae as it is entirely covered by the modern village of Kastro. However, certain vestiges of ancient constructions were still visible in the 19th century according to H. N. Ulrichs (1840) a German traveler: "On a small flattened hill, surrounded by marshes crossed by a narrow roadway reinforced by polygonal walls, there was a fortress with polygonal walls of rough stones laid out horizontally, with many doors. And, inside the enclosure, stood the bases of great constructions that Pausanias identified as sanctuaries to Demeter, Dionysus and Serapis". A Demeter "Tauropoulos"[10] was mentioned on the coins of the city where a bull appeared. In fact, according to the shards of pottery found on the surface, the hill of Copae was occupied without a break from

[10] This would be an unusual epithet for Demeter. It is far more commonly associated with Artemis, after the place-name Tauris.

the Neolithic era to the Roman period. In 1980 J. M. Fossey said: "Immediately north of the chapel of Ayia Paraskevi, until the 1960's and the beginning of the 1970's, a piece of wall in broad rough blocks remained, whose construction and size invite comparison with the enclosure of Gla. This wall was completely covered over during the last three or four years. Some other rare vestiges of the enclosure wall, a little to the west of the same chapel, are on the contrary, built in traditional masonry." Little remained to guide the research. But perhaps it would be easier now to excavate the site of the ancient surrounding marsh, which has almost completely dried but remains an accessible zone. And we should not forget that the lower city of Gla was in close relationship with Copae. Both the fortress and the Lower Town of Gla fall within the "30-minute walking zone" (Farinetti, 2011) of Copae which would suggest that in the Late Helladic III period they effectively formed a single settlement.

5. The end of settlement at Gla

The massive drainage works of the Copais basin seem to have failed at the end of the Late Helladic IIIB period and the basin reverted catastrophically to a lake. This had the effect of submerging Gla's Lower Town and turning the fortress back into an island. At the same time many of the sites around the reformed lake, including Gla, show signs of widespread burning. Some settlements such as Orchomenos were re-occupied in the Late Helladic IIIC but most were not. In and around the basin we know of at least 18 sites occupied in the LHIIIB period but only 5 in LHIIIC. It may seem obvious that the population would have declined after the loss of the huge area of prime agricultural land to the newly risen lake but the phenomenon of decreased settlement density in LHIIIC affects the whole of Boeotia as Fossey (1988) demonstrated conclusively.

The ancient sources put the destruction of major sites such as Gla and the whole of the hydraulic works down to conflict, particularly between Thebes and Orchomenos with Herakles as a major protagonist. In 2020, Laetitia Phialon published an important review of the possible archaeological evidence for such inter-palace rivalry in Boeotia, but the events behind the collapse of both settlement and drainage works remain obscure. All we can say without hesitation is that this collapse and the desertion of the citadel of Gla is part of the general collapse of the Mycenaean, palace centered civilization.

6. Conclusion

In the last 130 years, archaeological survey and excavation have revealed an amazing story of hydraulic engineering draining the great Lake of Copais, works which are unique in scale in Europe in the Bronze Age. At the same time the huge citadel of Gla has come under investigation. The work through the 20th century revealed the unique "palace" and the rows of possible "barracks" or workshops in the so-called "agora". The buildings were so unlike other Mycenaean palatial buildings that their real nature remained obscure. Modern, multi-disciplinary studies have added greatly to our knowledge of the settlement, revealing numbers of previously unrecognized building complexes and remarkable signs of conspicuous consumption within the citadel. However, many questions remain unanswered and we can only hope that continuing research will produce further material to help define the true nature of the site; its relationship to nearby sites such as Copae and the date and nature of the catastrophe that destroyed the wealth of the area by returning the Copais basin to a marshy lake which lead to the desertion of the great Mycenaean fortress of Gla.

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Figure 1. Location of Lake Copais, Boeotia

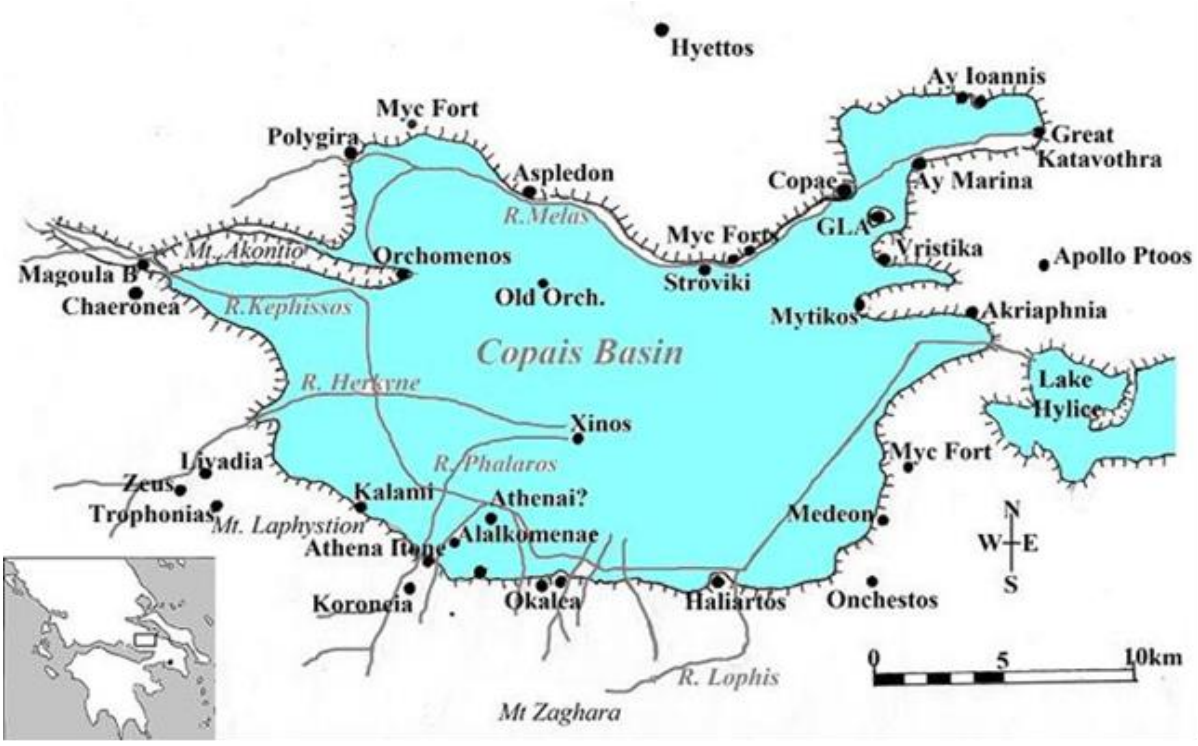


Figure 2. Archaeological sites in and around the Copais basin

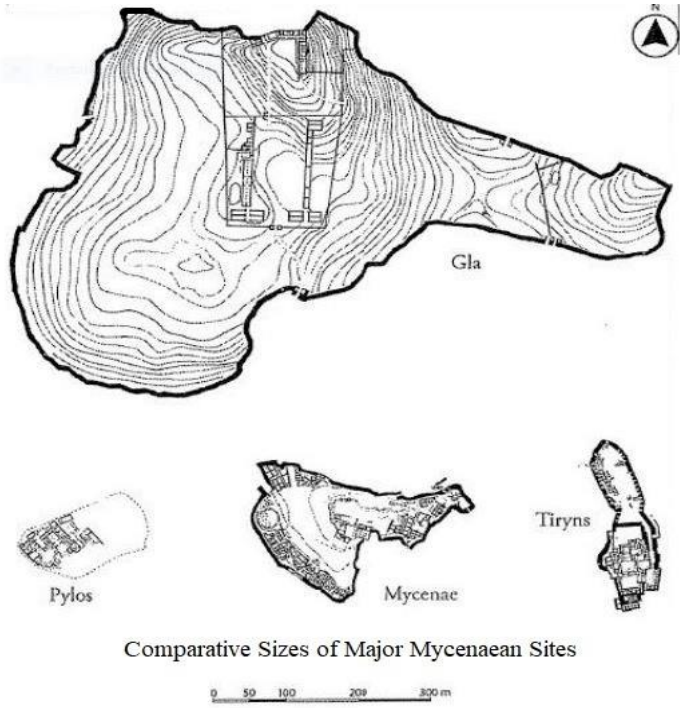


Figure 3. The comparative sizes of four major Mycenaean sites

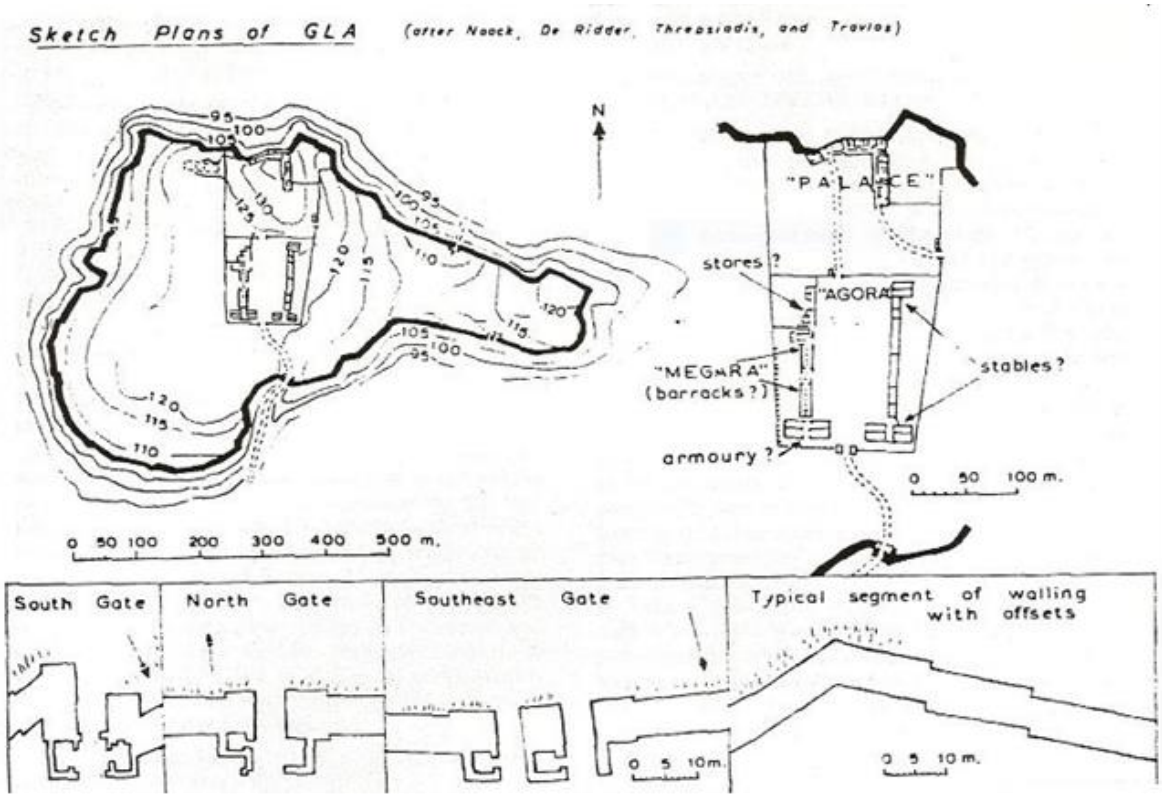


Figure 4. Sketch plan of Gla drawn by Hope Simpson
(after Noack, De Ridder, Thresiadis and Travlos)

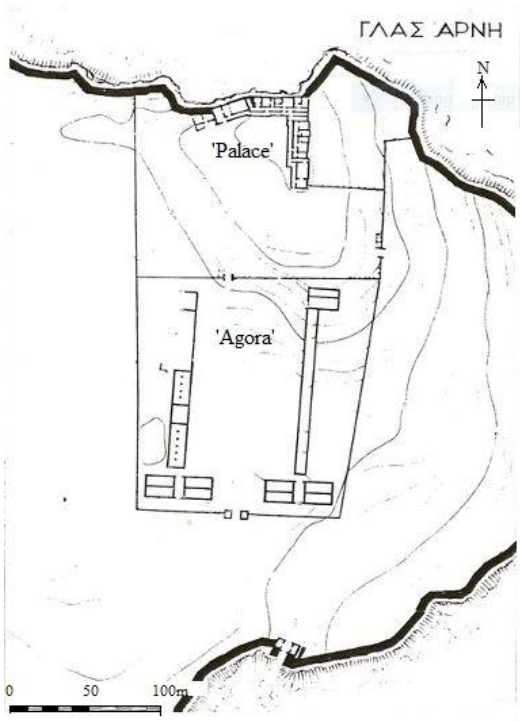


Figure 5. Plan showing the Main Enclosures with the "Palace" and "Agora", by J. Threpsiadis, 1960.

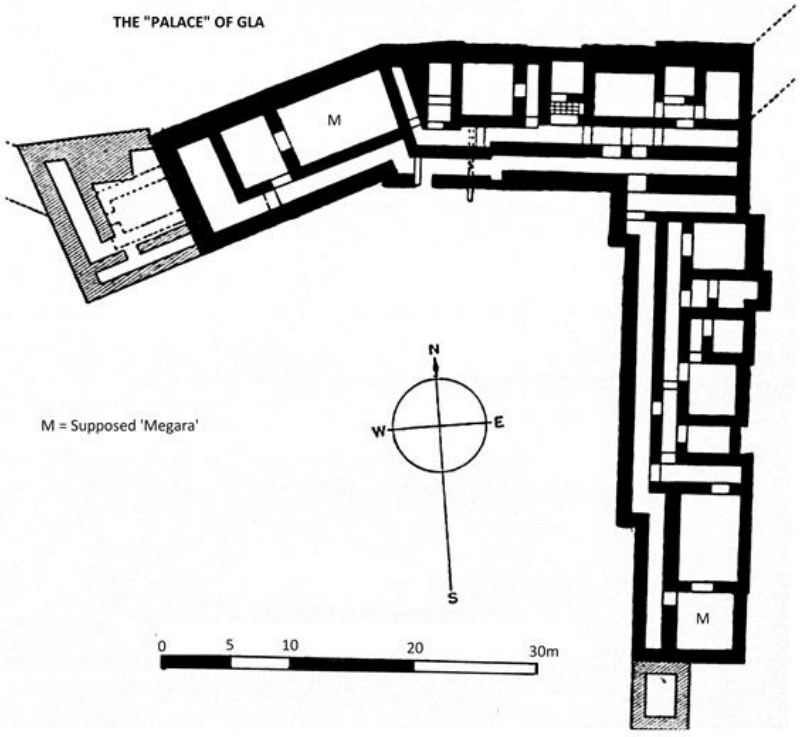
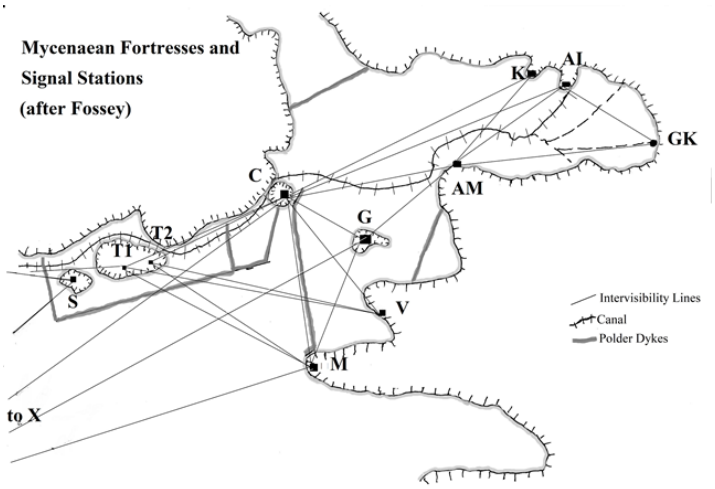


Figure 6. Plan of the "Palace/Melathron" of Gla. (after De Ritter, 1894 and Threpsiadis, 1954)



X- Xinos S- Stroviki T1- Tourloyianni 1 T2- Tourloyianni 2C- Copae G- Gla AM- Ayia Marina-Pyrgos K- Kontza GK- Great Katavothra V- Vristika M- Mytikas

Figure 7. North-east area of the Copais showing the Intervisibility Network (after Fossey, 1980)

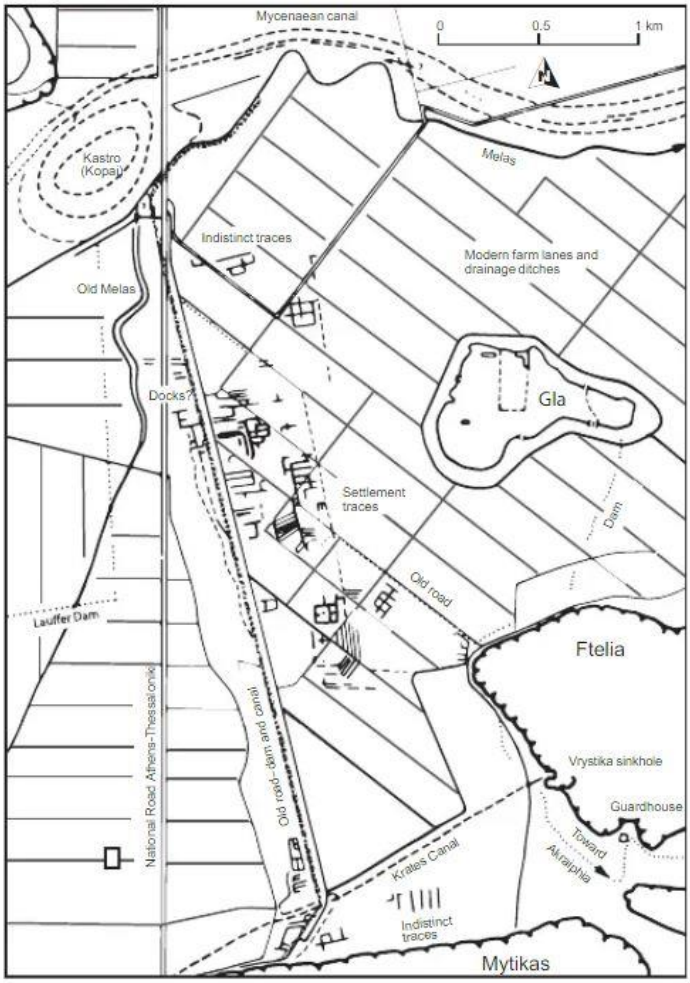


Figure 8. The "Lower Town" settlement area of Gla (after Lane, 2020 from Knauss, 1986)

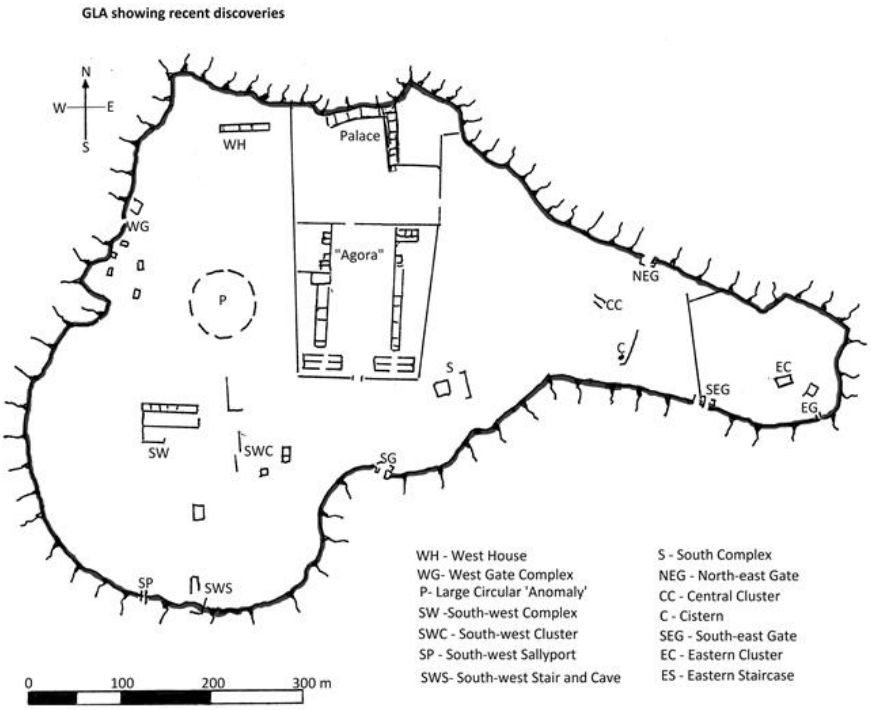


Figure 9. Recent discoveries within the Citadel of Gla (after Kountouri et al., 2012)