Hoarding bronze in the Mycenaean world and its periphery

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Abstract

The phenomenon of hoarding is a special aspect of economic, social or political life throughout the European continent, generally divided into utilitarian assemblages and votive deposits. To a lesser extent, it is located at the Helladic area in the third phase of the Late Bronze Age, almost parallel to the establishment of the Mycenaean palatial civilization. To date, only twenty-three hoards of metal objects have been identified from the core or the periphery of the Mycenaean world. Although in most cases there is a lack of data from the context or the conditions of unearthing Helladic hoards, few deposits are recognized as possible collective offerings to the aquatic or supernatural element. Mainly though, they are located in a domestic or public space, which is usually controlled by the administrating bodies of the Mycenaean authority. The brief examination of the Helladic hoards leads to few interesting conclusions, regarding their contents and their possible character or their chronological order, before and after the gradual decline of the Mycenaean civilization in 1200 BC.

Keywords

Mycenaean culture, copper/bronze, metalworking, utilitarian hoards, votive deposits

Riassunto

Il fenomeno della deposizione dei ripostigli fa luce su aspetti particolari della vita economica, sociale o politica nella preistoria dell'Europa continentale ed è rappresentato da contesti generalmente distinti in complessi utilitari e depositi votivi. In misura minore il fenomeno riguarda l'area elladica nella terza fase della tarda età del Bronzo, all'incirca corrispondente allo sviluppo della civiltà palaziale micenea. Allo stato attuale soltanto ventitré ripostigli di bronzi sono stati identificati nelle regioni di cultura micenea, tanto centrali quanto periferiche. Benché nella maggior parte dei casi manchino dati sui contesti e sulle circostanze di rinvenimento, alcuni depositi sono riconosciuti come possibili offerte comunitarie a enti soprannaturali. Tuttavia i depositi provengono principalmente da spazi domestici o pubblici, controllati di norma dalle istituzioni amministrative micenee. Un breve esame dei ripostigli elladici conduce ad alcune interessanti conclusioni concernenti i loro contenuti, la loro natura e la loro collocazione cronologica nelle fasi precedenti o successive al declino della civiltà micenea nel 1200 a.C. ca.

Parole chiave

Cultura micenea; rame/bronzo; industria metallurgica; ripostigli utilitari; depositi votivi

The phenomenon of hoarding[1] is characteristic across almost the entire European continent, where it has been quite thoroughly studied at least in certain areas. In terms of chronology, it matches the systematic use of metals in the course of the Final Neolithic or Chalcolithic period or at least from the fourth millennium BC onwards, when it gradually expanded throughout Europe. Metal objects were exceptionally valuable to the prehistoric user and were deposited or concealed, because they represented the end products of composite and collective processes, over which as a rule the owner had no control. Location and exploitation of ore deposits, technology for the extraction of pure metal from the ore (smelting), commercial circulation and distribution of raw materials, continuous experimentation for the creation of durable alloys, casting as well as final processing of the objects (hammering, sharpening, grinding), but also the knowledge of the degree to which all these aspects were desirable for the subsequent determination of their value, imply the involvement of unknown to each other people and groups from different regions, along with the occurrence of organized networks for the circulation of raw materials and artefacts or objects, all along the long way from production to consumption (*chaîne opératoire*).[2]

Hoarding continues to be practised mainly through the Early and less so in the Middle Bronze Age, to reach its peak in the Late Bronze Age and even more towards its end. It evolves into a composite economic and social-political phenomenon, which diachronically characterises the diverse human activity, but often also extends into the broader ideological or religious sphere. European hoards are mainly distinguished in utilitarian assemblages and votive deposits with a corresponding intention of later recovery or not.[3] Of course, each hoard must be examined separately as to the conditions and setting of its unearthing, its content and probable character, if we are after all aiming at an as much as possible objective interpretation, when this is tangible. They occur more frequently in the transitional period of crisis from the Late Bronze Age to the Early Iron Age. The long-standing question, why such large quantities of bronze are taken out of circulation, when metal becomes hard to find, due to the collapse of the composite social-political and economic structures in the Aegean and Europe, remains in fact unanswered to this date.

On the Greek mainland things are quite different. The composite phenomenon of hoarding metal or bronze objects appears in the third millennium BC or Early Bronze Age in mainland Greece (new hoard from Komotini, Petralona, Rodotopi, Thebes, Eutresis), but also in the islands of the Aegean (Aegina, Keros, Syros, Naxos, Lemnos-two).[4] The occurrence of just about eleven examples simply indicates the limited extent of the phenomenon. A greater surge is observed in the Late Minoan I period or the mid-second millennium BC on the island of Crete (*e.g.* LM IB Mochlos and recently Chrysi).[5] In all probability, this was also the period, in which the copper ores of Cyprus at the foothills of the Troodos mountain range were exploited on an industrial scale. Standardized raw material is now transported by merchant ships and distributed to ports of the east Mediterranean (early shipwrecks of Kyme and Kumluca, late shipwrecks of Uluburun and Gelidonya) for the gradual manufacture of alloys and objects.

The phenomenon attains its greatest extent in the third phase of the Late Bronze Age and especially in the transitional period between the Late Helladic IIIB and IIIC phase, when the Mycenaean civilization reaches its culmination and eventually its gradual fall. About twenty-three hoards with

[1] I extend my warmest thanks to Elisabetta Borgna for the chance to participate in the webinar of May 22nd 2021 on the Late Bronze Age hoards, *Nature and Function of Bronze Deposition between Europe and the Mediterranean: Hoards of the Late Bronze Age,* Scuola Interateneo di Specializzazione in Beni Archeologici (Università di Trieste – Udine – Venezia).

[2] Georgakopoulou, Bassiakos 2010, pp. 419-442 (especially: p. 421, fig. 1).

[3] Bradley 1990: he identifies many parameters for their classification.

[4] Branigan 1969, pp. 1-11. The Early Bronze Age hoards were presented by the author in a web lecture (19-10-2021), which was given at the University of Heidelberg, Institute of Prehistory, Protohistory and Near-Eastern Archaeology, titled *Aegean Early Bronze Age Deposition and Corresponding Metalwork: Towards a Native Autonomy?*.

[5] Mochlos: Soles 2008, pp. 143-156. Chrysi is a new excavation on Crete.

Figure 1
Map showing the seventeen sites of the twenty-three Late Helladic III hoards (by the author).

bronze objects are known from seventeen sites (fig. 1) in the Helladic territory: Mycenae-five and Tiryns in the Argolid, Ayios Vasileios in Laconia, Mygdalia in Achaea, the Acropolis of Athens, Oros on Aegina and Kanakia on Salamis, Thebes-two, Orchomenos and Anthedon in Boeotia, Kierion of Karditsa, Kalydon in Aetolia and Polis Cave on Ithaka, Stephani of Preveza and Katamachi of Ioannina, Chania and Karphi-two on Crete. The first fifteen hoards from ten sites were unearthed in the core region of the Mycenaean world, of which eleven come from six palatial sites and another four from similarly important Mycenaean sites. The last eight were found at seven sites in the so-called periphery of the Mycenaean world (with the exception of Chania).

The Mycenaean hoards present several problems as to their archaeological context or excavation setting, since most of them are older occurrences or accidental and handed-in findings (nineteen), while only four represent new excavation finds (Ayios Vasileios, Mygdalia, Kanakia, Chania). Related studies are confined to just one published doctoral thesis, a few scientific articles and simpler references.[6] We realise right away that this particular

[6] Spyropoulos 1972; Knapp, Muhly, Muhly 1988, pp. 233-262; Blackwell 2018, pp. 509-539.

phenomenon has not been researched in detail in mainland Greece. The subsequent research scarcity ended in a traditional or simplified distinction of the Mycenaean hoards into utilitarian assemblages of bronze traders or/and founders, essentially avoiding the theoretical discussion on the evolution of the phenomenon on European level and recognition of votive deposits.[7]

The oldest, in terms of chronology, treasure of the Late Helladic period comes from the Acropolis of Mycenae.[8] It was found south of Grave Circle A in a small space between a pipeline and a wall together with a handful of animal bones. It includes a small number of valuable objects. More precisely, it contained four gold two-handled kylikes (with dog's heads attached to the handles), a gold hemispherical one-handled cup, part of a gold vase handle with a lion in the round, nine gold wires of square and four of circular section (spiral coiling), five gold and one silver ring (probably hair rings), two gold signet rings and fourteen or seventeen gold necklace beads with granulation. This is a rather homogeneous assemblage (gold drinking vessels and jewels) of valuable objects, which most probably come from the looting of a grave of the Late Helladic II period. It has been interpreted as an act of hoarding or concealing, which took place at a later stage (Late Helladic III period). The lack of precise stratigraphic evidence leaves room for a more unconventional interpretation. The raw material (gold) and integrity of the objects, the co-occurrence of elegant drinking or feasting vessels, jewels and signet rings with ceremonial iconography, the presence of animal bones and the proximity to Grave Circle A, in combination with the chronological sequence of the treasure's objects, indicate an offering or sacrificial deposit. The character of offering could have been that of thanksgiving or expiatory, addressed to the gods or the ancestors. In this case, there certainly was no intention of recovery (apotropaic character), as supernatural wrath would have brought negative effects upon the living.

A similar interpretation also applies to the outstanding case of the Tiryns treasure.[9] It was found inside a bronze cauldron within a house to the southeast of the acropolis, with which though it is not clear whether it was functionally related. Karo divides it into two groups, one of gold objects and stone or glass jewels, which were located inside a bronze one-handled cup with a bird in the round on the rim, and another of bronze objects. Among the bronze finds of the treasure there are included an elaborate Cypriot tripod, three legs from two tripods, three cauldrons, a tripod basin, two one-handled and three handle-less cups, two spits, two Naue II swords, a bronze and an iron sickle-shaped knife, a copper bun ingot and some ivory fragments of irregular shape. The collection of functionally and chronologically heterogeneous objects suggests a similar provenance for the finds from grave looting or else they constitute an offering. More precisely, it could be the offering of the ruling family in Tiryns or more generally a community deposit. The contents of the treasure are dated around the 15th-12th century BC or even later, providing a relevant *terminus ad quem* for the period of this unique stratified and structured deposition.

There follow another four hoards from Mycenae, which are generally dated towards the end of the Late Helladic period.[10] In fact, the 'Tsountas' hoard from Mycenae encompasses the contents of two smaller hoards, which were found among stones of walls in the ruins of Mycenaean houses northeast of the Lions' Gate.[11] The two hoards combined include about one hundred and two intact or fragmentary bronze objects and a gold hair ring. More precisely,

[7] Hansen 1994. Hänsel 1997, pp. 11-22; Hansen 2020, pp. 165-185.

[8] Schliemann 1878, pp. 398-411; Thomas 1938-1939, pp. 65-87, pls. 26-28. The hoard was found in 1877. According to Schliemann, Tsountas and Wace, it corresponds to remains of a looted or destroyed shaft grave by the construction of the Late Helladic pipeline while, according to Schuchhardt, Stais and Karo, it belongs to a hoard.

[9] Philadelfeus 1916, pp. 13-21; Karo 1930, pp. 119-140, pls. 2-4; Spyropoulos 1972, pp. 177-193, pls. 25-32; Maran 2006, pp. 128-142. The hoard was uncovered in 1915 and is discussed by J. Maran in this volume.

[10] Borgna 1995, pp. 7-55; Aulsebrook 2020, pp. 237-264. For a practical and theoretical approach, respectively.

[11] Tsountas 1891, pp. 25-26; Spyropoulos 1972, pp. 8-45, 79-82, 194-197, pls. 1-15. The two hoards were uncovered in 1890 in Tsountas' excavations, but their contents were unified and is hardly possible to sort them out. As co-findings are reported two heads of bovine figurines, two violin-shaped fibulae, a vase fragment of pictorial style, while in the same area were also unearthed six children's cist graves.

nine double-edged axes, fourteen flat chisels and six smaller ones, nine awls of rectangular section, nineteen single-edged knives with curved and nine with straight back, a razor, two horned swords, a sword of Naue II type, part of a sword, three daggers with T-shaped pommel, a single-edged knife with similar pommel, a dagger casting, a leaf-shaped spearhead, a mirror disc, two roundels decorated with rosette in relief, five pairs of tweezers, fifteen band-shaped sheets, a horse bridle, part of an ingot and a gold hair ring. Just minor or a few wear traces are reported in relation to twelve objects, a small degree of wear appears on thirty-seven and more extensive on thirty-three objects. This therefore is a hoard of mixed character, since it mainly contains tools, weapons, objects of personal use and toilet, raw material. Of mixed purpose also is the act of hoarding, given that it comprises groups of intact and functional objects ready for distribution, worn objects for repair and scrap metal for remelting. All of them possibly belong to the stock reserve of a palatial workshop of Mycenae with objects, which were hidden away in the Late Helladic IIIC period, thus reflecting the apex but also the decline of the Mycenaean bronze industry.[12] We entertain some doubts about the purpose of concealment as such, considering that the conditions, in which the objects were found among stones of Mycenaean ruins, do not exclude their initial storage on shelves and their accidental fall after some natural disaster (*e.g.* earthquake). In both cases (concealment or storage), the intention of recovery must be regarded as certain, especially when taking into account their diverse state of preservation inside the houses of Mycenae.

The hoard of the 'Poros Wall' of Mycenae was unearthed northeast of the similarly called wall.[13] It contains the following bronze objects: double-edged axe, hammer, chisel or adze and four chisels, six single-edged knives with curved back and one with straight back, five parts of other knives, cleaver, dagger with T-shaped pommel, part of a sword or dagger, pair of tweezers, two vase handles, sixteen ingot fragments, forty sheets. Therefore, the assemblage consists of twenty-five bronze objects, parts of ingots and bronze sheets. The hoard is of mixed character, as it mainly includes tools and raw material, fewer parts of weapons and vases. Only six objects display small and repairable worn areas, while the remainder are preserved in a more fragmentary state and worn to such an extent that they must have been meant for remelting. This hoard too seems to represent the raw material stock reserve of a palatial workshop of Mycenae. In all probability, the concealment of the above objects took place at the end of the Late Helladic IIIB phase, on the basis of its ceramic context and the collapse of the 'Poros Wall'. In fact, it is the sole mainland hoard, which is directly related to primary copper production.[14] It is a hoard of scrap metal, which was concealed or stored away with a clear intention of recovery. The wide range of metal object recycling may equally indicate lack of raw material or on the contrary increase of production towards the end of the Late Bronze Age.

The 'Mylonas' hoard was found on the north slope of the acropolis at the base of a monumental staircase, in a crypt or mortar joint between two stone blocks of a retaining wall, which probably supported a road.[15] It includes twenty-one bronze objects, more analytically: four double-edged axes, a flat chisel and a second smaller one, two awls, three knives with curved back and two with straight back, three daggers with T-shaped pommel, a leaf-shaped spearhead, three band sheets from metal vases, part of an ingot. The mixed character of the hoard is justified by the presence of tools, weapons, a few parts

[12] The term was coined by S. Iakovidis; see relatedly, Iakovidis 1982, pp. 213-231.

[13] Wace 1953, pp. 6-7, pl. 2; Stubbings 1954, pp. 292-296; Spyropoulos 1972, pp. 46-51, 82-87, 197-199, pl. 16. The hoard was found in 1952 in the excavations of the British School at Athens. It was thought that it had been hidden away in a sack placed on the floor or in a wall. In the same area was located a large quantity of pottery and clay figurines, dated mainly to the Late Helladic IIIB period.

[14] Knapp, Muhly J., Muhly P. 1988, p. 256. J. Muhly saw the hoard in 1976 in the National Archaeological Museum, Athens. He mentions sixteen fragments of copper oxhide ingots and an intact bun ingot. Moreover, he identified some remains of primary copper smelting (matte) and other fragments from the lining of a metallurgical furnace, all these findings were mentioned then for the first time.

[15] Mylonas 1959, p. 145, pl. 124b; Mylonas 1962, pp. 406-408, pl. 121 ; Spyropoulos 1972, pp. 51-57, 87-90, 199. It was found in Mylonas' excavations (1959). Mylonas mentions fragment of gold wire, not referred to by Spyropoulos.

of vases and raw material, which are preserved in good condition with the aim to undergo repair or remelting. These objects can be dated to the Late Helladic III and their concealment to the end of the Late Helladic IIIB period. The concealment of the above assemblage in an accessible place inside a wall demonstrates clear intention of recovery and therefore its potentially utilitarian character in the hands of a merchant or a founder.[16] Evident also are typological similarities to the previous Mycenaean hoards ('Poros Wall' and 'Tsountas').

A distinct case is that of a recent find from Ayios Vasileios in Laconia.[17] On the floor of a room within a dense stratum of burnt materials, there was a hoard of sixteen early type A bronze swords and one of type B. They were neatly arranged next to each other in successive rows, having probably been placed in a wooden chest. Their stone and ivory pommels were lying on the grips and on the blade tips at the edges of the chest. Along with them there were a bronze dagger and a knife, bronze and stone arrowheads, a bronze helmet and remains of a boar's tusk helmet. This interesting assemblage is assigned to the Late Helladic IIIA2 phase. Furthermore, in conjunction with other ritual objects and remains of feasting, it may substantiate the hypothesis that events in honour of the ancestors were taking place. Known from the same site also are Linear B tablets, one of which (AV Rb1) refers to at least six hundred short swords or daggers (*e-pi-zo-ta* = *επίζωστα*), documenting the fact that only a small portion of the initially manufactured or used artefacts has subsequently entered the archaeological record.

Yet another new find comes from the settlement of Mygdalia in Achaea.[18] In a destruction layer, scattered across a surface of three sqm in a room of the so-called 'House of Bronzes', were found more than fifteen bronze knives of various types, five bronze pairs of tweezers, a bronze ring or earring, five needles, a bronze leaf-shaped arrowhead and a second four-sided one. Moreover, two rings of sea-shells, beads of stone, faience or sea-shell and stone buttons or spindle whorls occurred in the same room too. Some other stone tools for grinding or sharpening (two grinders and two whetstones), obsidian and flint flakes as well as quartz fragments, are interpreted as the toolkit and waste from a workshop for the manufacture of small objects. A group of clay spindle whorls, a loom weight and part of a spinning vase with a handle on the inside are regarded as articles of weaving equipment. All objects were most probably kept in a wooden chest on the upper floor and, when the latter collapsed, they were scattered in the room of the ground floor. The entire assemblage is dated to the end of Late Helladic IIIA1 period or early IIIA2, in line with the destruction of the building, in the interior of which Mycenaean pottery suitable for feasting was also located.

The hoard from the Acropolis of Athens was found incorporated in a wall's foundation of a Mycenaean building, in the gap between it and an adjacent edifice inside the Cyclopean wall.[19] It includes about thirty-seven bronze objects, more precisely: nine double-edged axes and four parts of similar objects, seven flat chisels and a smaller one, a bigger and smaller hammer, an anvil, a rasp, a knife with straight back and a sickle-shaped knife, a dagger blade and a dagger casting with T-shaped pommel, a leaf-shaped spearhead, two shovels, three mirror discs, a spatula and a bowl. The hoard contains mainly tools but also a few weapons, objects which bear from slight to extensive wear marks and could have been available for trade, repair or remelting. From the same find spot, there are also reported two pottery fragments of the Late Helladic IIIC period, although the relation between their context and that of the hoard is not known. The hoard's chronology ranges between the *termini* fixed by the construction of the Mycenaean wall and the destruction of the Mycenaean acropolis (Late Helladic IIIB2-C). The find spot, the nature and preservation of objects point to a utilitarian

[16] For a different explanation of the hoards from the Mycenaean citadels as mainly not retrievable deposits see however Borgna 1995.

[17] Vasilogamvrou 2010, p. 76, pl. 50a; Vasilogamvrou 2012, p. 546. The probable bronze helmet is briefly described as conical object of unknown use, while this unique assemblage awaits proper publication.

[18] Papazoglou-Manioudaki, Paschalidis 2021a, pp. 479-480; Papazoglou-Manioudaki, Paschalidis 2021b, pp. 392-397. It is dated to the period of the beginning of the Mycenaean palatial civilization in mainland Greece.

[19] Montelius 1924, pp. 152-156 ; Spyropoulos 1972, pp. 63-78, 92-97, 202-203, pls. 18-24. It was found in 1888.

hoard, which was hidden away with clear intention of recovery.[20] The hoard comprises an interesting collection of metallurgical tools, which most probably denotes the owner's occupation as a bronzesmith, since these objects were rarely deposited in hoards of the Helladic mainland, as opposed to those coming from Cyprus (*e.g.* Enkomi and others).

Another hoard, containing sixteen bronze objects, was found long ago at the site of Oros on Aegina.[21] It includes five sickles or knives, four razors, three small chisels and two awls, part of a dagger with T-shaped pommel, an oval bronze sheet, which probably belonged to a mirror disc. Most of the objects are intact, but the dagger and the razors are fragmentary. There is only one old photograph depicting the find, which is approximately dated to the Late Helladic IIIC period. Fragments of Mycenaean figurines are also known from the same site, which imply the occurrence of cult in the place, as well as a fragment of a stone mould for casting metal double-edged axes.

The small hoard of Kanakia on Salamis was located under the floor of an elongated space in a building at the eastern complex of the Mycenaean acropolis.[22] It includes a sickle-shaped knife, a flat chisel and a second smaller one, a broad folded sheet. The latter contained a bronze scale from a well-known eastern corselet type with the cartouche of the Egyptian Pharaoh Ramesses II (13th century BC). The objects-tools of the hoard are preserved in a fairly good state. Their concealment is assigned to the Late Helladic IIIC Early phase, coinciding with the final abandonment of the area. They were apparently kept as the raw material stock by one of the last inhabitants of Mycenaean Salamis.

Turning now to Boeotia and the palatial centre of Thebes, we come across two hoards.[23] The former comes from Pavlogiannopoulos' plot and includes six bronze leaf-shaped spearheads and two bronze arrowheads, a bronze horse bridle and parts of other bronze objects and sheets. It is assigned to the Late Helladic IIIB phase. The latter hoard from the 'Arsenal' of Thebes is in fact unpublished and contains thirty-two bronze objects, more precisely: three double-edged axes, two flat chisels and a smaller one, two sickle-shaped knives and three with straight back, an anvil, an unidentifiable object, a melted amalgam of fragmentary objects and eighteen broken pieces. Both hoards are utilitarian assemblages with clear intention of recovery, judging from the fact that they were located on the interior of buildings in the Mycenaean settlement of Thebes, sections of which were excavated during the last decades in the context of rescue excavations at plots of the modern city.

The hoard of Orchomenos is not associated with precise information on its archaeological context, other than it was found inside a well of the settlement.[24] It includes one hundred and two bronze objects and fragments, such as: a double-edged axe and six fragments of similar axes, a drill, a flat chisel and a second smaller one, seven chisel fragments, thirty blade fragments of single-edged knives with straight back and sickle-shaped knives with curved back, eight fragments of sword blades, dagger hilt plating and nine fragments of dagger blades, part of a spearhead, twelve vase fragments, five fragments of tripod legs and part of a cauldron body with a leg, three pairs of tweezers, a fibula, an earring, a spit, a hook, nine fragments of unknown objects. Six objects are preserved intact and functional or with small repairable wear marks, while the remaining ones are fragmentary. The hoard is of mixed character, as it contains mainly tools, weapons and vases, a few objects of personal use or toilet and fragments of other ones. This is a hoard of scrap metal,

[20] For a different opinion see Borgna 1995.

[21] Gauss 2007, pp. 130-133, 141. Judging from the setting, the hoard might have been a votive deposit.

[22] Lolos 2003, pp. 78, 92-93; Marabea 2010, pp. 70, 235-236, figs. 25-26. The hoard was uncovered in 2002 in the systematic excavation of the University of Ioannina. There is no direct evidence up to now on the existence of local metallurgical tradition and production on the island. At floor level of room 23 (hoard), LH IIIB-C pottery was found together with a stone slab, probably serving as work surface.

[23] Lazaridis 1965, p. 233, pl. 278b; Spyropoulos 1972, pl. 33; Blackwell 2018 (*Appendix*).

[24] Spyropoulos 1970, pp. 263-267; Spyropoulos 1972, p. 221, pls. 34-37. The hoard in its entirety is currently on display in the Archaeological Museum of Chaeronea, where one hundred objects and fragments have been recorded.

which probably formed the raw material stock of a Mycenaean workshop in the important centre of Boeotian Orchomenos. The objects and their concealment can be dated to the Late Helladic IIIB-C phase. This utilitarian hoard was hidden or stored away with the intention of recovery, which was never fulfilled. Given that it is one of the largest hoards in mainland Greece in terms of quantity of finds, remarkable is the withdrawal from circulation, as well as accumulation and layoff of broken bronze objects (scrap metal kept as raw material) and above all, its find spot inside the well.

The hoard of Anthedon was found on the ground with fragments of storage vases, no other information being available.[25] It includes more than thirty-seven bronze objects, more precisely: two double-edged axes and other two parts of similar axes, a trunnion axe, a drill, an awl, a shovel and the blade of a second one, a sickle-shaped knife, thirteen single-edged knives with straight or curved back, a razor, part of a spearhead, four vase fragments, fragments of a large vessel-cauldron, two parts of a flat rod (possibly a tripod's leg), a band decorated with galloping deer, a bronze fragment with relief decoration, fragments from a bundle of rods, a hollow horn-like object and a ring. Furthermore, it contained a quantity of bronze sheets, large masses of slag (probably parts of ingots or remains of smelting) and a number of other small objects, which are not specified. The assemblage consists of tools and vase parts, bronze sheets and copper slags. Some objects (about ten) are preserved intact and functional, while quite a few bear unrepairable wear marks to the extent that they could be useful only as raw material. The concealment is dated to the Late Helladic IIIC phase. The hoard might have been the freight of an itinerant merchant or craftsman, since there are no reported finds from this particular region on the foothills of the Euboean gulf.

Let us now examine the last and less known hoards on the periphery of the Mycenaean world. The hoard of Psorolithi near Calydon of Aetoloacarnania was located on the right bank of the Evinos river.[26] It encloses fourteen bronze objects, more specifically: a double-edged axe and the half of a second bigger one, two flat chisels broadened in the middle, seven blades of single-edged knives with curved back (sickle-shaped) and a rivet hole, a dagger blade with four rivet holes, a triangular barbed arrowhead and a tripod leg. The tools and weapons of the hoard are preserved in good state with small repairable wear marks, while only three are so damaged, as to be suitable for remelting. The chronology of the objects, which were deposited out of any inhabited area, is set in the Late Helladic IIIB-C phase.

The Polis hoard on Ithaca comes from a region which lies in a leeward bay on the northwest coast of the island near the similarly called cave.[27] According to the excavator of the cave, S. Benton, the find was not unearthed in the 1930-1932 excavation campaign and she does not recognize it as hoard. The opposite is suggested by Catling, while Benton's assessment is adopted by Desborough and Spyropoulos.[28] It includes twenty-five fragments, which belong to fifteen bronze objects. More precisely: two blade fragments of a Naue II sword, nine fragments of spearheads (among them one leaf-shaped and one lanceolate), a small leaf-shaped spearhead and a lanceolate spearhead, a Mycenaean single-edged knife with straight back and a second one with curved back, a broken chisel with perforation or else a flat axe or an adze. Among the above objects there also was an elaborate bronze vase handle, which more probably was an intrusive element in the otherwise homogeneous assemblage. All the objects of the assemblage are fragmentary, apart from the small leaf-shaped spearhead. It is obvious that this is a small hoard of scrap metal, which was meant for the manufacture of new items. The Polis hoard is of mixed character, as it contains both

[25] Rolfe 1890, pp. 99-100, 104-107, pl. 15; Spyropoulos 1972, pp. 57-62, 90-92, 200-202, pl. 17. It was found in 1889 in the excavations of the American School at Athens and is now considered lost.

[26] Mastrokostas 1965, pp. 343-344, pl. 410. The hoard is on display at the Archaeological Museum of .Mesolongi.

[27] Benton 1934-1935, pp. 71-73: «Group of bronze objects not found in the excavation, but said to come from Polis».

[28] Catling 1964, p. 297; he states: «It was clearly a hoard»; also, Knapp, Muhly, Muhly 1988, pp. 247-248; Spyropoulos 1972, p. 4; he interprets the assemblage as dedications in the cave. Now the hoard is lost.

weapons and tools. Its fragmentary state of preservation weakens the case of its function as votive deposit in the cult cave of Polis from the Geometric period. Moreover, it is rather difficult to pinpoint with precision the chronology of the objects in the hoard with the exception of the Naue II sword. This specific type of weapon appears in Greece after 1250 BC and becomes popular in the Late Helladic IIIC, while later on it survives in iron variants.

The hoard of Kierion in Karditsa, in the Thessalian hinterland,[29] includes five intact and functional bronze objects with a small degree of wear, along with two bronze fibulae. More precisely: two double-edged axes of the 'Hermones-Kierion' type, a flat chisel broadened in the middle, a leaf-shaped spearhead, a four-sided arrowhead with cylindrical shaft and parts of two fibulae. The first fibula is violin-shaped and the second has a leaf-shaped bow. The Kierion hoard is also of mixed character both in terms of preservation and typology. It includes three intact and functional tools (two axes and a chisel), two intact and functional offensive weapons (a spearhead and an arrowhead), two objects of personal ornament (fibulae) in fragmentary state. The seven artefacts of the hoard and the concealment can be assigned to the Late Helladic IIIB-C period. The village of Pyrgos, where the hoard comes from, has been identified with ancient Kierion (*Arne* for Homer, *Il*. II 507; VII 9): To the west of the village, on the Oglas hill there is an acropolis of historical times, the Late Helladic pottery on it indicating the existence of a Mycenaean fortress. The Mycenaean settlement is situated at the southwest foot of the hill as well as within the village. The ancient city was situated in the centre of the west part of Thessaly and had control over the passages in the plain.

The hoard of Stephani at Preveza was located in a fissure of limestone rocks in the inner part of the Ambracian gulf and in a region, which in the Late Bronze Age was a steep and rocky section of the coast.[30] It contains five bronze double-edged axes of the Helladic type and another five of the northern 'Hermones-Kierion' type, three bronze leaf-shaped spearheads, two bronze unidentifiable rods, looking like parts of large pins, and two whetstones. The hoard of Katamachi at Ioannina was found on a steep slope at a high elevation (figs. 2-3) on mount Alyssos in the hinterland of Epirus.[31] It includes five bronze double-edged axes of the Helladic type, a bronze pyramidal anvil and a bronze conical chisel with hollow socket of a further northern Balkan or European type. The objects of the hoard are intact and functional, as opposed to those of the Stephani hoard, although breakage in the latter seems to be intentional. The two hoards from Epirus were located at the two ends of an important natural passage, which joins the coast with the inland region. Their find spot lies next to small streams and in landscapes that are difficult to access, something that justifies their probable character as votive deposits without any clear intention of recovery, dated to the Late Helladic IIIB-C period. They are indirectly linked to the rest of the Mycenaean hoards, since they contain double-edged axes of Creto-Mycenaean type, possibly this being their most characteristic trait, although the type is particularly popular in Epirus as well as in neighbouring south Albania.[32]

In the Late Helladic hoards bronze objects make up the greater percentage, while gold items occur only in the deposits identifiable as treasures (Acropolis of Mycenae and Tiryns). Represented by just a few occurrences are objects of glass, iron, silver, ivory and various stones. Almost three hundred bronze tools are reported, among which prevail single-edged knives with straight or curved back, double-edged axes, flat chisels and smaller ones, awls. In fact, all these were tools used for domestic tasks (*e.g.* cutting and chopping), as well as for logging or carpentry works (*i.e.* for raw material and wood fuel). Bronze weapons come next with almost one hundred specimens, among which swords and daggers along with leaf-shaped or lanceolate spearheads and arrowheads are more popular, providing the principal military or/and hunting equipment in Late Helladic period. A smaller occurrence rate is repre-

[29] Kilian 1975, pp. 13, 18, pl. 95B; Buchholz 1983, p. 89. He notices discrepancies in the correspondence between the actual size and the scale of the objects' drawings. The hoard is currently at the Archaeological Museum of Volos.

[30] Kleitsas, Mehofer, Jung 2018, pp. 73-107. The hoard was accidentally found and handed over in 1985.

[31] Vokotopoulou 1972, pp. 112-119. The hoard was accidentally found and handed over in 1970.

[32] Kleitsas 2018, pp. 57-65. Two stone moulds were found at the lake settlements of Maliq and Sovjan, SE Albania.

Figure 2
The find spot of the Katamachi hoard on mount Alyssos in the Epirus hinterland (photo by the author).

Figure. 3
The hoard of Katamachi near Ioannina, including seven cast bronze intact artefacts (photo by the author).

sented by some bronze and a few gold vases, gold jewels and a handful of bronze ones. Finally, two copper bun ingots and several fragments of ox-hide ingots from the Mycenae and Tiryns hoards, bronze sheets and ivory fragments, were meant for raw material.

Most of the twenty-three Late Helladic hoards were located in settlements of the Mycenaean world and its periphery. To be more precise, eleven come from six palatial centres (Mycenae, Tiryns, Ayios Vasileios, Acropolis of Athens, Thebes, Orchomenos), another four were found at important Mycenaean sites (Mygdalia, Kanakia, Oros on Aegina, Anthedon), while the remaining ones occur at sites of the Mycenaean periphery. Although the conditions, under which they were found, are not described in detail or are not at all reported, it seems that most of them were related to assemblages, which were hidden or stored away in a domestic or settlement space with the intention of recovery, something that in the end never happened and as a result these utilitarian hoards entered the archaeological record. The final aim at the time of hoarding was availability for circulation, repair or remelting of the hoarded objects (intact, with repairable damages or broken-scrap metal), while corresponding must have also been the occupations of their owners (merchants, craftsmen or founders with permanent base or itinerant). Different appears to be the case of the Acropolis of Mycenae treasure as a probable votive deposit, as well as that of the unique Tiryns treasure, which was possibly put together by collective activity as a family or communal deposit. Furthermore, some other hoards (Anthedon, Polis Cave, Psorolithi, Stephani and Katamachi) have been located away from any known settlement as concealments, the last three of which next to a river or stream and the larger hoard of Orchomenos within a well. These last hoards can be interpreted as votive deposits to the aquatic element without any intention of recovery, a common practice across the larger part of the European continent.

The bulk of the contents is assigned to local Aegean types. In terms of typology, some objects are closer to Balkan forms, as for example the bronze double-edged axes of 'Hermones-Kierion' type in the Stephani and Kierion hoards, the bronze chisel with hollow socket in the Katamachi hoard, the European Naue II swords (considerably spread also in Albania and mainland Greece, especially in Achaea), the gold-wire wheels, the spokes of which are set with amber cylinders from the Tiryns treasure. On the other hand, characteristic objects of eastern provenance are the early hematite cylinder seal, the elaborate bronze tripod and the iron knife in the treasure of Tiryns, the bronze armour scale with the cartouche of Ramesses II in the hoard of Kanakia. The exchange of gifts or Minoan and Mycenaean products for eastern ones, which was practised already in the Middle Bronze Age, at the time of the Minoan thalassocracy, is archaeologically documented in an undisputable manner by the cargo of the shipwreck at Uluburun, which is paralleled with a merchant's hoard, and at Gelidonya, which is paralleled with a founder's hoard.[33]

Conversely, Aegean objects are encountered in remote hoards. A recent remarkable example is that of the Kozman Dere hoard at the sea of Marmara in Turkey.[34] There are depicted seventy-seven bronze objects, but reference is made to a double number of occurrences. More precisely, it contains a horned sword, a dagger with T-shaped pommel, a third sword, three fragmentary leaf-shaped spearheads, three double-edged axes, two trunnion axes, a socketed celt, forty-five sickles of the same type, four armbands, eleven hemispherical bowls or lids, a bowl with relief decoration and a saucer, two vase handles, as well as part of a copper ox-hide ingot. The typology of the contents is fully compatible with the find spot of the hoard at the crossroads of the Aegean and the Black Sea, Anatolia and the Balkans. More frequent are the Balkan (socketed celt, small sickles, armbands), the Aegean (two swords, spearheads, double-edged axes and a copper ingot) and less so the eastern products (a sword, trunnion axes, bowls). Most of the hoard's objects are in a good state of preservation or with slight wear traces, while a few are turned to scrap metal (three spearheads, five sickles, five bowls). They are dated from the 14th to the 11th century BC, when their probable collection and concealment took place for unknown reasons.

The most numerous group of twenty Late Helladic hoards is dated to a short period of a few decades, which is associated with the collapse of the pa-

[33] Uluburun: Yalçin, Pulak, Slotta (eds.) 2005; Gelidonya: Bass 1967.

[34] Harmankaya 1995, pp. 217-254. The hoard was uncovered accidentally by a peasant in 1984.

latial economy and moreover with an overall uncertainty that preceded it, but also followed after it. The phenomenon is particularly characteristic of the Late Helladic IIIB2 and IIIC Early periods. Nevertheless, there is a small group of three hoards (Ayios Vasileios, Mydgalia, Chania), which is dated within the limits of the Late Helladic IIIA2 period. It marks the end of the early Mycenaean period, as well as the beginning of the Mycenaean palatial civilization in the Helladic mainland, which most probably was accompanied by social upheavals. On the whole, remarkable is the withdrawal from circulation of so many bronze objects, the number of which though would have been relatively small, when compared to the total of the Mycenaean industrial production. After all, the 14th and 13th century BC coincide, in terms of quality and quantity, with the apex of Mycenaean metallurgy, the wide use of its products, the influence of palatial production over the periphery and the far-reaching trade, elements that compose the interesting phenomenon of the Mycenaean *koinè*, along with the rest of the material and ideological trends of the Mycenaean civilization. Towards the end of the 13th century BC, anthropogenic and natural factors caused a gradual collapse of the palatial structures and subsequent disruption in the organized distribution and procurement of raw materials.[35] There was a drastic reduction in the deposition of metal objects as funerary goods in tombs, but also in the rate of their abandonment or loss on the margins of houses and settlements.

The dwindling of raw material procurement is also perceptible in the accounting records, which were registered in about thirty Linear B tablets from the Pylos archive (Jn series).[36] There, about four hundred metalsmiths (2/3 of them employed in the palace) share by state provision approximately a thousand kilos of raw material, stated principally in copper ingots, without though excluding the presence of recyclable objects among them. Allotted to each active metalsmith were about four kilos of bronze, which were probably sufficient to balance out just the quantity that was used for repairs. The seriousness of raw material shortage, but also the obligatory use of recyclable objects, is reflected in a state tablet (Jn 829), which refers to the recycling of 'temple' bronze for the production of spearheads and arrowheads.[37] Finally, characteristic for Pylos remains still the absence of hoarded assemblages, due probably to the organized abandonment that has been suggested for the region.

In the wider geographical framework, collection and recycling of scrap metal continued for much longer periods than the hoards themselves, which are supposed to supply the principal indications for these processes that have been characterized as fundamental or as driving forces of the Bronze Age society.[38] It is a fact that during the transition from the Late Bronze Age to the Early Iron Age vast quantities of bronze and objects were deposited throughout Europe, but never recovered. Quite attractive seems to be the interpretation about intentional withdrawal from circulation of bronze, so as to provoke shortage and subsequent increase of its exchange value in the face of the introduction of iron. All this of course presupposes extensive and adequate coordination among the European prehistoric societies, something that would not have been feasible not even for the ranked Mycenaean state entity. The introduction of iron was not the outcome of advancements in technology, but mainly of the collapse of a social-economic system, which held together various communities in different regions of Europe. The change of technology resulted rather from a more general lack of metals and raw materials than from the improved properties of the new material, which was meant to give its name to a new long historic period, the Iron Age.

[35] Iakovidis 1982, p. 227; he notes: «Nothing comes to an abrupt or cataclysmic end. No class of artifacts cease being produced, no technical skills vanish or deteriorate. But there is a manifest dwindling of resources, a perceptible lowering of living standards and a disruption and erosion of economic and political power, leading at the beginning of the 11th century BC to an era of withdrawal, depression and mere survival in a reduced and impoverished world».

[36] Smith 1992-1993, pp. 167-259. It includes the most detailed publication of the interesting Pylos Jn series. It is thought that in this period craftsmen were mainly occupied with the repair of objects and that the greater quantity of metal came from recycling: Blackwell 2018, pp. 514-517, 526-533 (*ta-ra-si-ja*); Aulsebrook 2020, pp. 244-247.

[37] Chadwick 1976, pp. 140-142; he characteristically mentions: «Thus the shrines may be presumed to have quantities of bronze objects, often worn and useless; in an emergency the authorities might well demand that these, despite their dedication, be turned in for scrap». This specific case has many interesting ethnographic parallels.

[38] Huth 2000, pp. 176-193; Sherratt 2000, pp. 82-98.

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