Der Anschnitt, Beih. 50, pp.187–204, 2023, https://doi.org/10.46586/DBM.264.401

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Last use and abandonment of the Cistern No. 1 *ergasterion* at Thorikos: Finds from the lowest levels of the cistern's fill

To the memory of Francine Blondé (1948–2019)

ABSTRACT: *This contribution focusses on the finds related to the last use and abandonment of Cistern No. 1 and found in its lowest layers during the excavation campaigns of 2011 and mainly 2012. The cistern, partially hewn in the bedrock and partially constructed with massive ashlars, belonged to a silver-working ergasterion that included the newly discovered ore washery W13 and that drew its ores from Mine No. 2. With a calculated capacity of 209.6 m^3, it forms the largest cistern in Thorikos. The ergasterion, which on the basis of finds in the foundation layers of the south wall of the cistern probably came into existence in the late 5th century BC, remained in operation (perhaps with a hiatus after the Peloponnesian War) until it was abandoned in the Early Hellenistic period, ca. 325-275 BC. After having fallen in disuse as a metallurgical cistern and after a process of filling in with mudbrick debris, disintegrated cistern lining and erosion material from around the cistern, the remaining part of the cistern was still able to contain some water. At some point in the Late Hellenistic period (2nd/1st century BC) a limited activity is to be seen around the cistern: a visitor or inhabitant of Thorikos dropped a water jar in the cistern and a fragment of a brown-glazed lagynos (?) dated to the first quarter of the 2nd century BC found its way into the fill. This process of micro-events can be traced in the archaeological record of successive filling layers. The upper layers of this fill were mixed with Late Antique/Early Byzantine pottery and mill stone fragments suggesting some new activities around the cistern and Mine No. 2.*

KEYWORDS: LATE CLASSICAL, HELLENISTIC, LATE ANTIQUITY, EARLY BYZANTINE, WORKSHOP, SILVER, METALLURGY, CERAMICS, HOUSEHOLD POTTERY, STONE TOOLS, ROOF TILES, WATER MANAGEMENT

Introduction

Between 2010 and 2012, a rectangular cistern and its workshop (*ergasterion*), situated within Macrosquare A'51 just above the Industrial Quarter of Thorikos, have been the object of archaeological investigations (Figs. 1–3).[1] The excavations were conducted within the framework of the Thorikos Archaeological Research Project (TARP) of the Belgian School at Athens and Ghent University in collaboration with Utrecht University and under the aegis of the then Ephorate of Eastern Attika (ΕΦΑΑΝΑΤ).

Primarily during the Late Classical (400–323 BC) and part of the Early Hellenistic period (323–290 BC), the Laurion witnessed a true mining boom, with ore processing *ergasteria* being set up all over the area (Conophagos 1980; Jones 1985; Photos-Jones and Jones 1994; Kakavoyannis 2001; 2005). These generally consisted of an ore washery, workspaces, a cistern and living quarters, and were located at a short distance to the mine entrances. As the ores came from the mine, they were purified in the washeries, which were especially designed to recycle water. According to one view (Conophagos 1980, pp.213–273; Rehren, et al., 2002; see Mussche 2006, Nomicos 2020, Morin-Hamon, this vol., for a discussion of other theories), the beneficiation or concentration process in these washeries started from water being fed from the main reservoir, through a fixed number of nozzles connected to wooden sluices. This process is based on the gravity of the ore particles: the heavier metal particles more readily sink, while the lighter impurities are swept away by the water flow. Afterwards, the water flowed into a series of channels and settling tanks, where the remaining ore particles could settle, and was recuperated at the end of the circuit. Therefore, an extensive and reliable water stock throughout the year was indispensable, particularly in an area as the Laurion with few permanent rivulets or springs. This was overcome by harvesting rainwater in large cisterns, which are, because of their size and massive walls, often the only evidence of the scale of the industrial activities and the significance

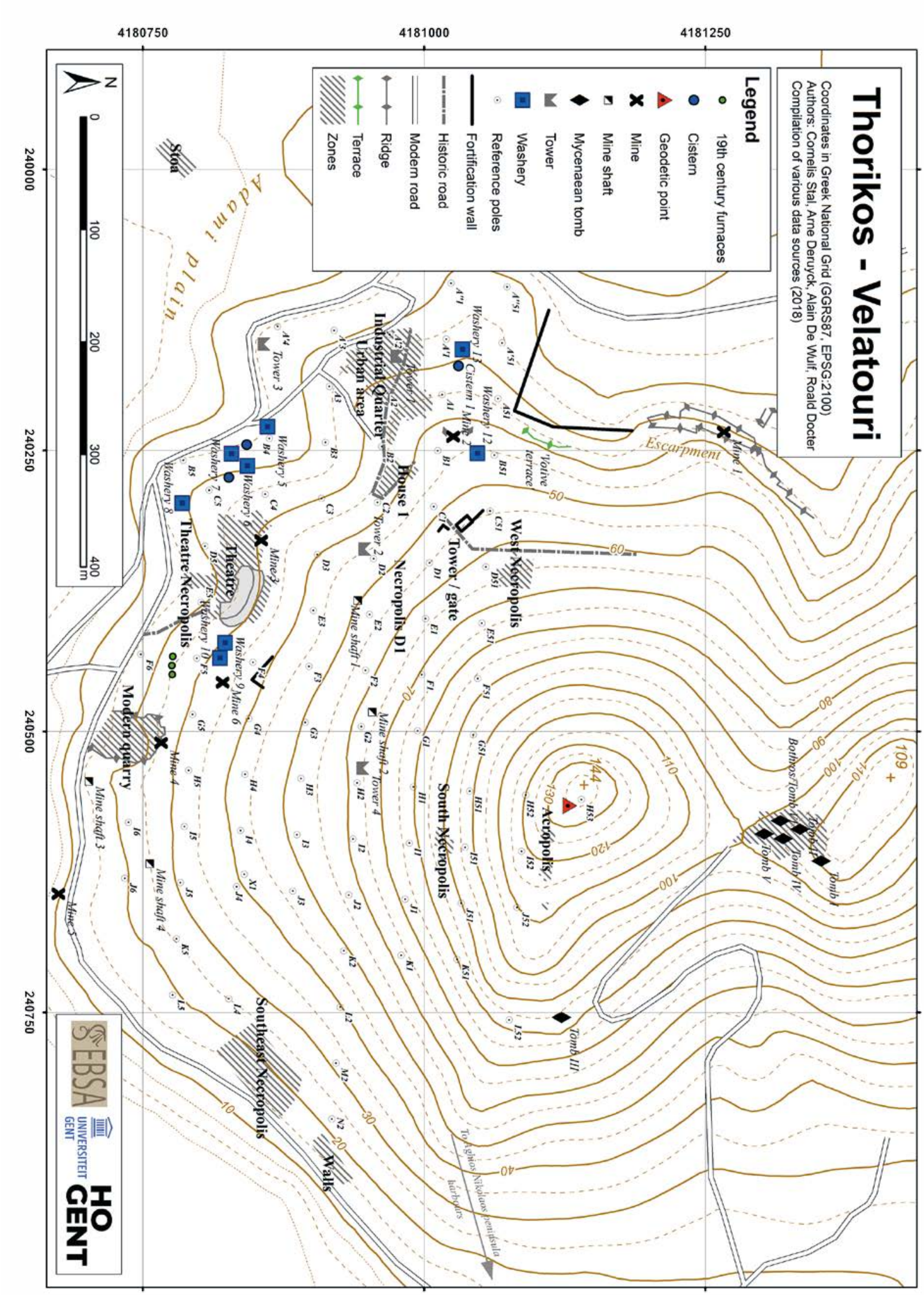

Fig. 1: Map of the Velatouri Hill at Thorikos with indication of the Cistern No. 1 ergasterion (C. Stal – TARP).

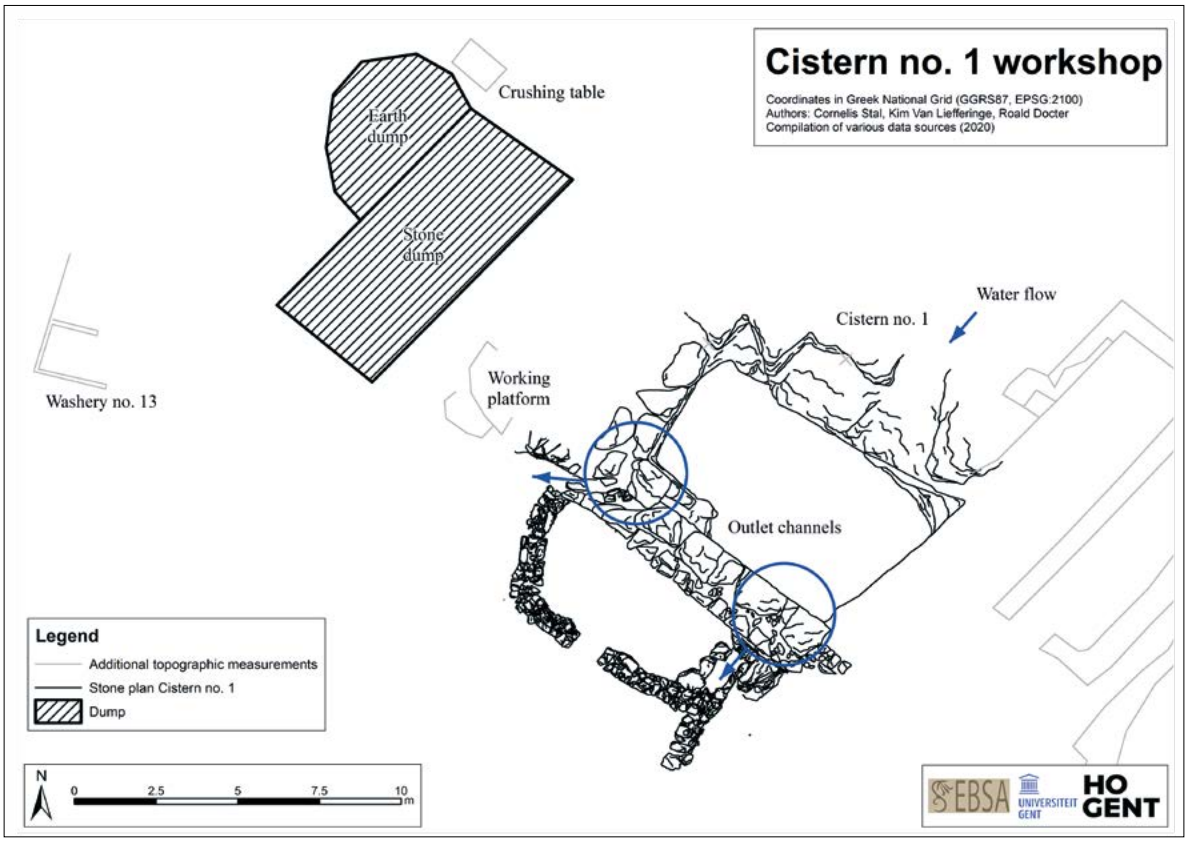

Fig. 2: Plan of Cistern No. 1 and constructions of the ergasterion (K. Van Liefferinge – TARP).

Fig. 3: Cistern No. 1 viewed towards the east with mining waste dump of Mine No. 2 in the background, 2011 (photo: K. Van Liefferinge, TARP).

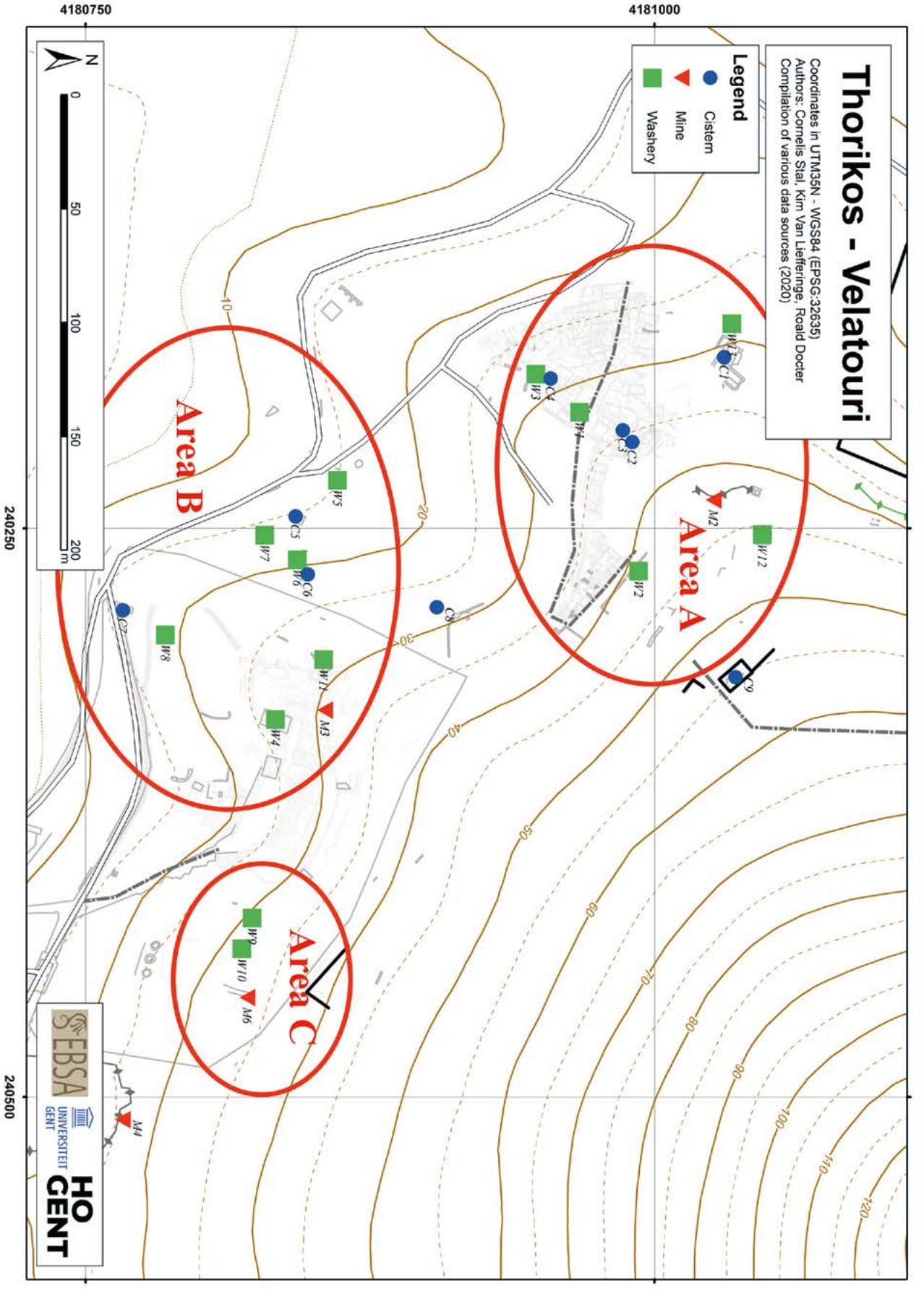

Fig. 4: The three metallurgical complexes (A-B-C) in Thorikos with indication of cisterns, washeries and Mine entrances (map: updated version of Van Liefferinge, et al., 2014, p.277 fig.6: K. Van Liefferinge, C. Stal and R. F. Docter).

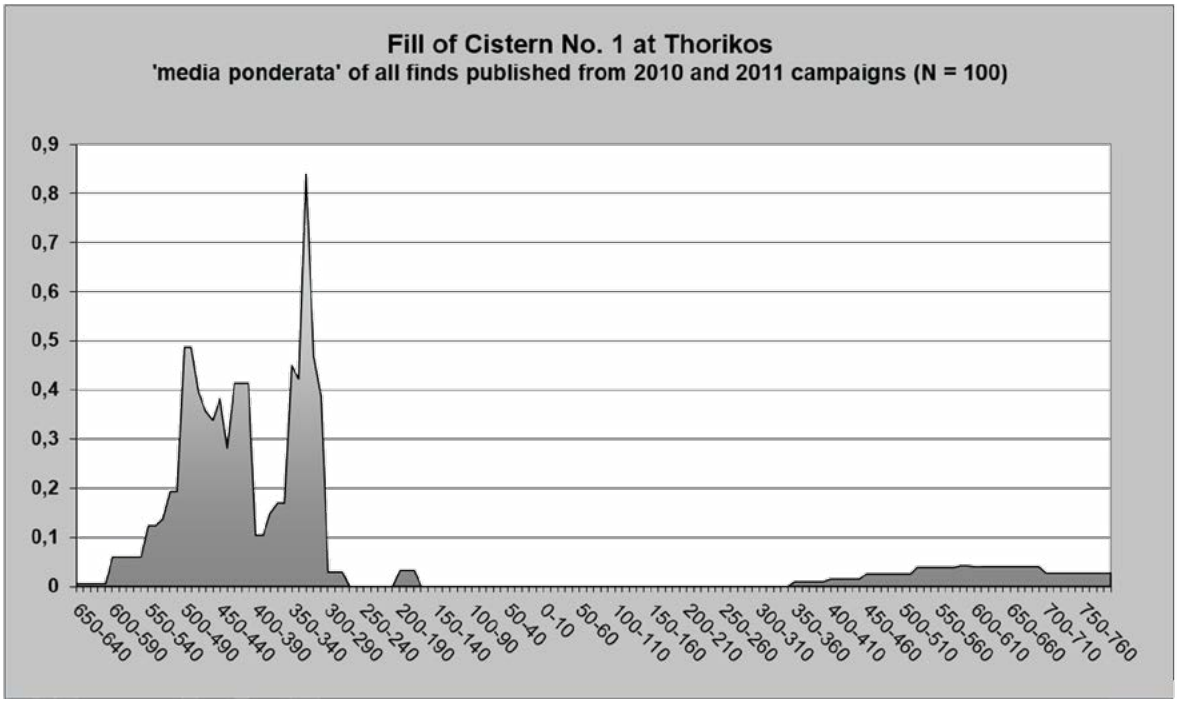

Fig. 5: Thorikos, Cistern No. 1. 'Media ponderata' of fill based upon the published finds from 2010 and 2011 campaigns (Docter, Monsieur and van de Put, 2011, p.119 fig.42).

of careful water management for silver production (Van Liefferinge, et al., 2014).

The cistern, which we discuss here, was first mentioned by H. F. Mussche in his seminal work *Thorikos. A Mining Town in Ancient Attica* of 1998, where it is labelled as Cistern No. 1, but has otherwise escaped scholarly attention (Mussche 1998, 56). It was hewn out of the bedrock – in its northern part from ground level – and constructed with massive ashlars of an average of 1.6 m thickness in its western and southern parts and partially its eastern part (Fig. 3). While Mussche underestimated its capacity at 80 m³, Cistern No. 1 was (and remains) the largest reservoire discovered on the Velatouri hill. The chronology and layout of the *ergasterion* to which the cistern belonged, remained uncertain, however. The surrounding area showed various courses of rubble walls and a marble crushing table was visible to the west (Van Liefferinge, et al., 2011, p.73 fig.17). But the washery, otherwise a conspicuous element in the industrial landscape of Thorikos and the Laurion, remained (yet) invisible. The *ergasterion* clearly depended upon the yield from nearby Mine No. 2, as did four other workshops around it (Fig. 4; Van Liefferinge 2014, p.142 fig.58; Van Liefferinge, et al., 2014, pp.277–278, fig.6). Mussche already knew four cisterns in the Industrial Quarter (Area A), of which two are domestic ones (C2 and 3), as well as four washeries (Mussche 1998, p.56). In 2011, the investigation of the area of Cistern No. 1 brought a fifth washery to light (W13; Figs. 2, 4), to the west of the cistern. It clearly belonged to this *ergasterion*. Recently, a new cistern was discovered in Area A, situated in Macrosquare C51 farther to the north-east, which had been constructed in a rectangular structure, interpreted as a gate building, separating the West Necropolis from the Industrial Quarter (Fig. 4, C9; van den Eijnde, et al., 2018a, pp.40–41, with fig.). It may have served either Washery W2 or W12, or both. It may equally have served the public water provision, situated at the highest point of entry to the Industrial Quarter and at the lower end of the south-western Velatouri slope, so theoretically with a huge water capturing potential (Van Liefferinge, et al., 2011, pp.60–62; 2014, pp.275, 279, figs.3, 8). Another cistern was discovered during the intensive survey on the Velatouri in Area B and may have belonged to Washery W11 (Fig. 4, C8; van den Eijnde, et al., 2018b).

The choice for Cistern No. 1

The investigation of Cistern No. 1 had been high on the list of research priorities in the domain of Thorikos ever since the restart of TARP in 2005. When one of the present authors started a PhD project, funded by the Special Research Fund of Ghent University, on "Technological change in the Laurion silver mining area during the fifth and fourth centuries BC. An archaeological contribution to the study of the Athenian economy" (Van Liefferinge, 2014), we seized the opportunity to use the well-preserved Cistern No. 1 and its *ergasterion* as one of the case studies. Thereby we were guided by three aims: establishing the capacity of the cistern and, hence, its operational potential,

establishing the closing date of the cistern and establishing its construction date. Contrary to most of the cisterns in the Laurion, it seemed to have been spared from the fate of partial destruction and industrial emptying in search of re-usable ancient metal waste by the 19th and 20th century Compagnie Française des Mines du Laurion (CFML).

A heavy layer of rubble and large boulders from the superstructure covered the interior of the cistern, thereby allowing us to investigate an untouched fill with the potential of providing a closing date for the use of the cistern and, hence, the *ergasterion*. To the best of our knowledge, no fill of a cistern in the Laurion has ever been carefully excavated or at least been published. Moreover, the fact that it had been partially constructed instead of fully hewn out of the bedrock offered the possibility to investigate the exterior, where we hoped to find untouched foundation layers that would contain datable material. This is clearly linked to the still unsolved question of the beginning of silver mining and metallurgical exploitation in Thorikos within the Classical period: 5th or 4th century BC (Mussche, 1998, pp.13–14, 62–63). During the 5th century BC Thorikos witnessed a great expansion, especially from ca. 460 BC onwards. There is, however, no reason to believe that Thorikos fulfilled a major role in the actual silver production and exploitation; it may rather have been an important economic, cultural and administrative centre in the Laurion (one is reminded of the impressive theatre), benefitting from good harbour facilities. What is now conventionally called 'Industrial Quarter' may not yet have been a metallurgical hotspot during most of the 5th century BC.

Important changes took place only near the end of the 5th century BC, when an ore-washery was installed in Insula 1 (Mussche, 1998, pp.50–51, 62–63), suggesting an increase or concentration of production in Thorikos itself. It is not unlikely that this was a direct consequence of the Peloponnesian War which started in 431 BC. Athens would have taken measures to secure its finances to cover the expenses of war. Both Thucydides and Xenophon suggest in this connection that the Laurion was of vital importance to the city-state's economy. Thucydides wrote that the Spartans invaded Attica in 430 BC "where the silver mines are" (2.55 and 57) and that Alcibiades later recommended the tactical siege of Dekeleia in 413 BC, causing a major disruption of the silver exploitation as slaves began to desert. Even though ancient sources may have exaggerated the number of deserted slaves, archaeological research presents irrefutable evidence that it was in fact a critical period. Activity in the Laurion came almost to a complete standstill as a result of the Peloponnesian War (Photos-Jones and Jones, 1994, p.309; Mussche 1998, pp.62–63). In comparison to the chronology of other *ergasteria* in Thorikos and the Laurion, we therefore cautiously hypothesized that the Cistern No. 1 *ergasterion* had been constructed somewhere during the last quarter or final years of the 5th or the 4th century BC (Docter and Van Liefferinge, 2010, pp.56–57; Duchène, et al., 2018).

The excavation of Cistern No. 1

After cleaning and removal of the heavy overgrowth, the focus of the campaigns of 2010 and 2011 was on the interior of the cistern. Notwithstanding the fact that more than 15 m^3 of stones were removed – manually – and piled up to the west of the cistern, we were unable to reach the bottom during these campaigns. Two preliminary reports were drafted and published in that very same year (Van Liefferinge, et al., 2011; Docter, Monsieur and van de Put, 2011). The main structure of the cistern proved to have been relatively well-preserved, being partly cut into the bedrock and partly built up with ashlar masonry consisting of large, mostly rectangular blocks of (local) stone, averaging in length from 1 to 2 m. In all probability, the irregular shape of the cistern (with sides measuring 9 m, 4.5 m, 7.5 m, and 5.5 m) can be related to the local, pre-existing topographical conditions. Two drainage channels were observed. The first channel, located in the south(-east) corner, was intentionally closed at some unknown moment, the second was probably operational until the cistern's abandonment and had likely been built at the same time the cistern was created.

Of particular interest was the composition of the ceramic and worked stone assemblage in the cistern's fill, at least in the upper part reached during these excavations (Figs. 6–7, layers 1–4; Van Liefferinge, et al., 2011, pp.66–67, figs.11–12). Based upon a selection of 100 finds we were able to establish a date range for this upper fill of the cistern (Fig. 5; Docter, Monsieur and van de Put, 2011; Mortier, 2011). Two large chronological horizons could be distinguished: the majority of the finds (87%) originated in activities that took place around the cistern, and most likely higher up the Velatouri during the Late Archaic and Classical to Early Hellenistic period. Only 13% of the finds could be attributed to a Late Antique phase, when the cistern was ultimately filled in. Sherd size and the measure to which joins are encountered within the finds played an important role in assigning material to one of the two major chronological horizons, especially in the case of chronologically less distinctive plain, cooking and coarse wares. The Late Archaic to Late Classical/Early Hellenistic material in the fill proved to be generally much more fragmented, smaller and worn, at least in these upper layers. The Late Antique pottery fragments, which have been studied by A. Konstantinidou, generally seem to be of larger sizes and so to have been subjected less to erosion and redeposition processes. Fragments of a rotary hand mill from these upper layers might even be attributed to the Early Byzantine period (TP11.149 and TP11.545; see Duchène, this vol.). Several contexts with large numbers of animal bones (of relatively large sizes), which have been studied by E. Yanoulli, are thought to belong exactly to this chronological horizon.

Within the Late Archaic to Early Hellenistic finds two marked peaks could be discerned: one comprising the 5th century and one the second half of the 4th century BC, with

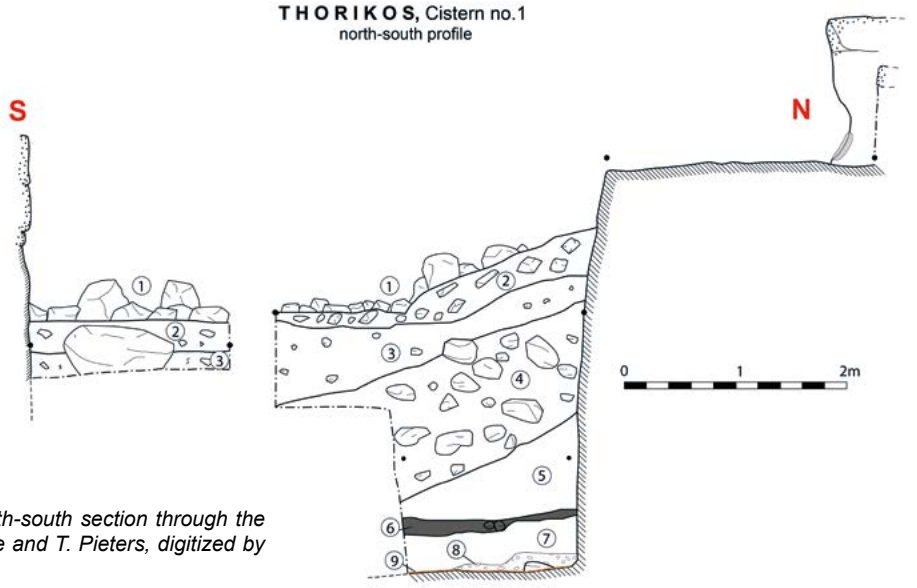

Fig. 6: Thorikos, Cistern No. 1. North-south section through the cistern and its fill (K. Van Liefferinge and T. Pieters, digitized by J. Angenon – TARP).

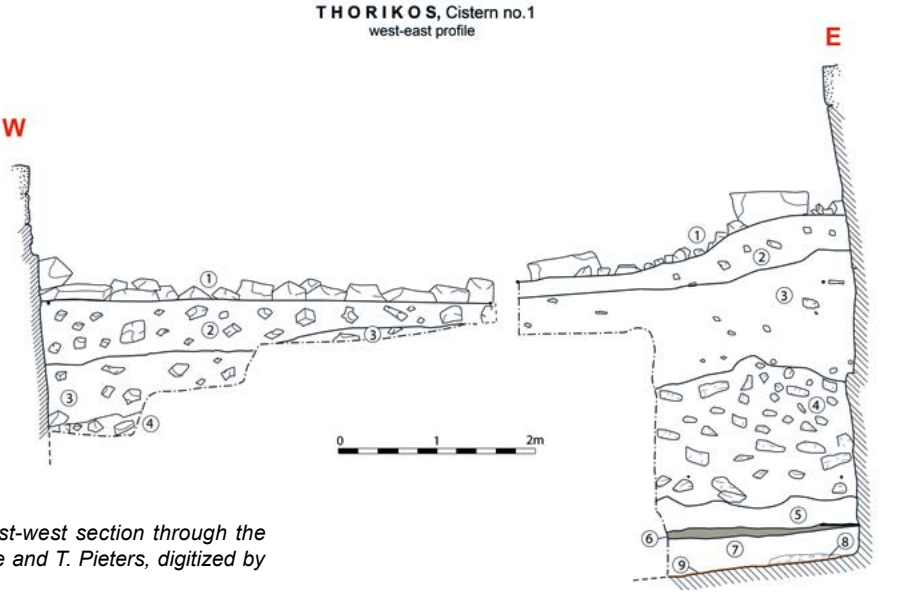

Fig. 7: Thorikos, Cistern No. 1. East-west section through the cistern and its fill (K. Van Liefferinge and T. Pieters, digitized by J. Angenon – TARP).

a significant peak in the period 330 – 320 BC (Fig. 5). The latest part of the pottery in the fill dated coherently to the 6th and 7th centuries CE (viz. between 520 and 700 CE). They even lead us into the Early Byzantine period, with clear indications of finds dating to within the 8th century CE, offering a completely new perspective upon the latest phase of Thorikos' occupation and metallurgical activities in the area of Mine No. 2 (cf. Docter, Monsieur and van de Put, 2011; Konstantinidou, et al., 2018).

Two priorities were set for the concluding excavation campaign of 2012. On the one hand, we focused on the south-western and north-eastern sectors within the cistern (Sector C and A, respectively), where we intended to reach the bottom of the cistern and at least be able to draw up two crossing sections of the fill (Figs. 6 – 7). This would at the same time leave two large sectors untouched for future investigations (Van Liefferinge, et al., 2011, pp.64 – 65, fig.10). On the other hand, we directed our attention to the sector immediately to the south of the cistern with the aim of obtaining dating material from foundation levels against the constructed south wall (Sector G). Moreover, it was hoped to find chronological evidence for the closure of the drainage channel in the south(-east) corner of the cistern that was blocked off at a certain moment of its existence (Sector F; Van Liefferinge, et al., 2011, p.63 – 64, figs.7 – 8). The excavations uncovered a room built against the south wall of the cistern with a stratigraphy that may be suggestive of a late 5th century BC chronology for the cistern's construction (Fig. 9). In the frame of a discussion on the set of geomatical tools

Fig. 8: Thorikos, Cistern No. 1. 3D model of the cistern at the end of the campaign 2012 (C. Stal – TARP).

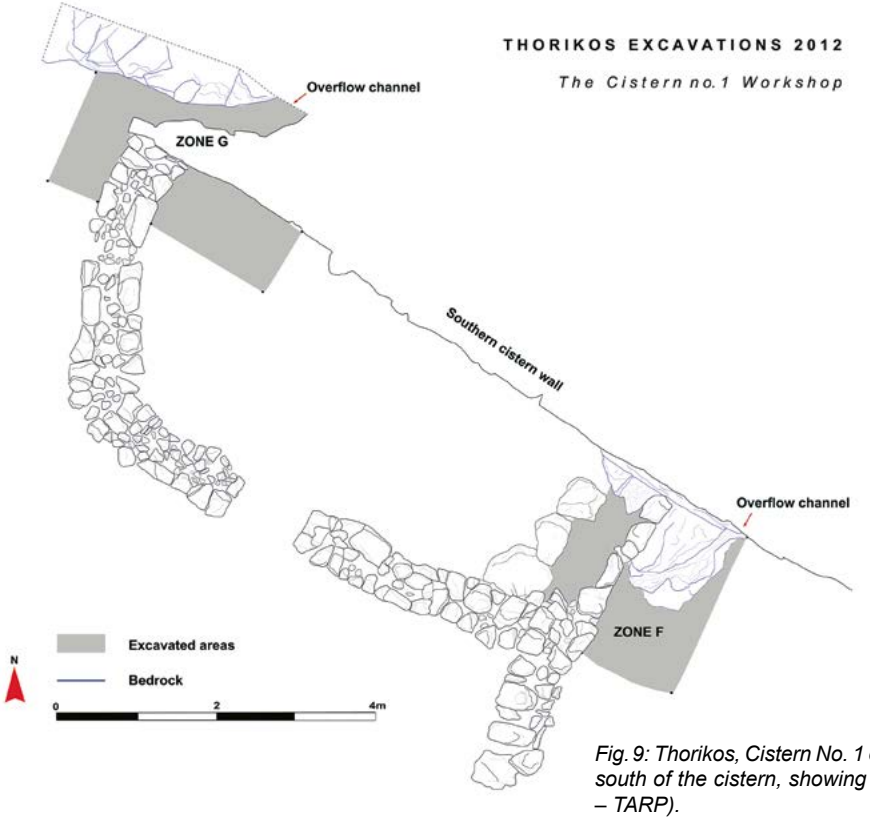

Fig. 9: Thorikos, Cistern No. 1 ergasterion. Ground plan of the area south of the cistern, showing Zones G and F (K. Van Liefferinge – TARP).

that we employed in the 2012 campaign, we already published a preliminary presentation of the architecture and stratigraphy in this part of the site (Stal, et al. 2014). The full discussion of finds, chronology, architecture and stratigraphy, however, is foreseen for the comprehensive publication of the 2010 – 2012 excavations in the Cistern No. 1 ergasterion.

The present contribution focuses on the results of our first 2012 priority, the interior of the cistern. Only in the north-east sector A were we able to reach the bottom (Fig. 8) with a clear stratigraphy that did not yield many finds, but belonged to a sequence of last use and abandonment layers (Figs. 6 – 7). The basin of the cistern turned out to be much deeper than expected and could be accurately calculated to have a capacity of maximum 209.6 m³ (Stal, et al., 2014, pp. 119 – 122). Starting from layer 5, of which the upper part had already been documented in 2011 (here, Cat. 1 – 4; Van Liefferinge, et al., 2011, p.67 fig.12), five layers were excavated (layers 5 – 9; Figs. 6 – 7) of which we present the finds below.[2] It will be followed by a discussion of the chronological and functional implications of the cistern's abandonment.

Fig. 10: Thorikos, Cistern No. 1, layer 5: fragment of large oval basin Cat. 5 with some fragments of the same vessel from higher levels in the fill (drawings: R.F. Docter digitized by F. Gignac and Q. Drillat; Photo's TARP). – a. Cat. 5; – b. TC10.52 (context T10-5-2); – c. TC12.122 (context T12-32-2).

Layer 5

Layer 5 can be characterized as a blackish, extremely fine, silty sand layer (T12 – 4-1/2 and T12 – 5-1/2), with few small stones, mixed with fragmented mortar/cistern lining. A limited amount of pottery was found in 2011 and 2012, amongst which are several larger and joining fragments (Cat. 1+5, 2, 11-12; Figs. 10 – 12). A fragmented large water jug or amphora was found lying on top of the layer against the east wall of the cistern (Cat. 6, Fig. 11a).

Context T11-16-1 was found on the very last day of the 2011 campaign and has only been inventoried but, unfortunately, not yet drawn and photographed. It is, hence, not impossible that some of the fragments may join or belong to fragments found in 2012.

T11-16-1

- **Cat. 1**: TC11.500 (context T11-16-1), base fragment of large oval coarse ware basin. Same vessel as Cat. 5 (see below).
  Chronology: Classical?
- **Cat. 2**: TC11.501 (context T11-16-1), ring base fragment of mortar in plain ware.
  Chronology: Classical?
- **Cat. 3**: TC11.502 (context T11-16-1), flat base fragment of jug, red washed on outside.
  Chronology: Classical?
- **Cat. 4**: TC11.503 (context T11-16-1), edge fragment of cover tile in red glazed ware.
  Chronology: Classical?

T12-4-1

- **Cat. 5**: TC12.50 (context T12-4-1), base fragment of large oval basin in Coarse Ware (Fig. 10a).
  PH 15.0, diam base not to be estimated; thickness of wall varies.
  Clay: reddish yellow 5YR6/6 to red 2.5YR5/8. Surface reddish grey 5YR5/2 to reddish brown 5YR5/3. Very coarse fabric with some angular and subangular quartz (0.2 – 1.0 mm), some white particles (0.4 – 0.6 mm), few white lime (?) particles (1.0). Lower interior covered with silver-like white residue (calcium?; litharge?).
  Chronology: Late Classical/Early Hellenistic?
  Layer 5 contained two fragments of this industrial basin, executed in a very distinctive coarse fabric (Cat. 1 and 5, the latter found at the same level as Cat. 6). Apart from that, the higher layers of the cistern fill contained several large fragments of the same fabric that in all probability belong to the same vessel: TC10.52 (Fig. 10b), TC10.207 (context T10-7-4), TC11.156 (context T11-14-1), TC12.48 (context T12.3.1), TC12.122 (Fig. 10c; context T12-32-2), TC12.1559 (context T12-2-3) and TC12.1579 (context T12-2-4). The base fragment TC10.52 (Fig. 10b) had already been published in the preliminary report of 2011, although as a drain or terracotta water channel (Docter, Monsieur and van de Put, 2011, 98 – 99, fig. 24). The alternative interpretation, as a basin, also

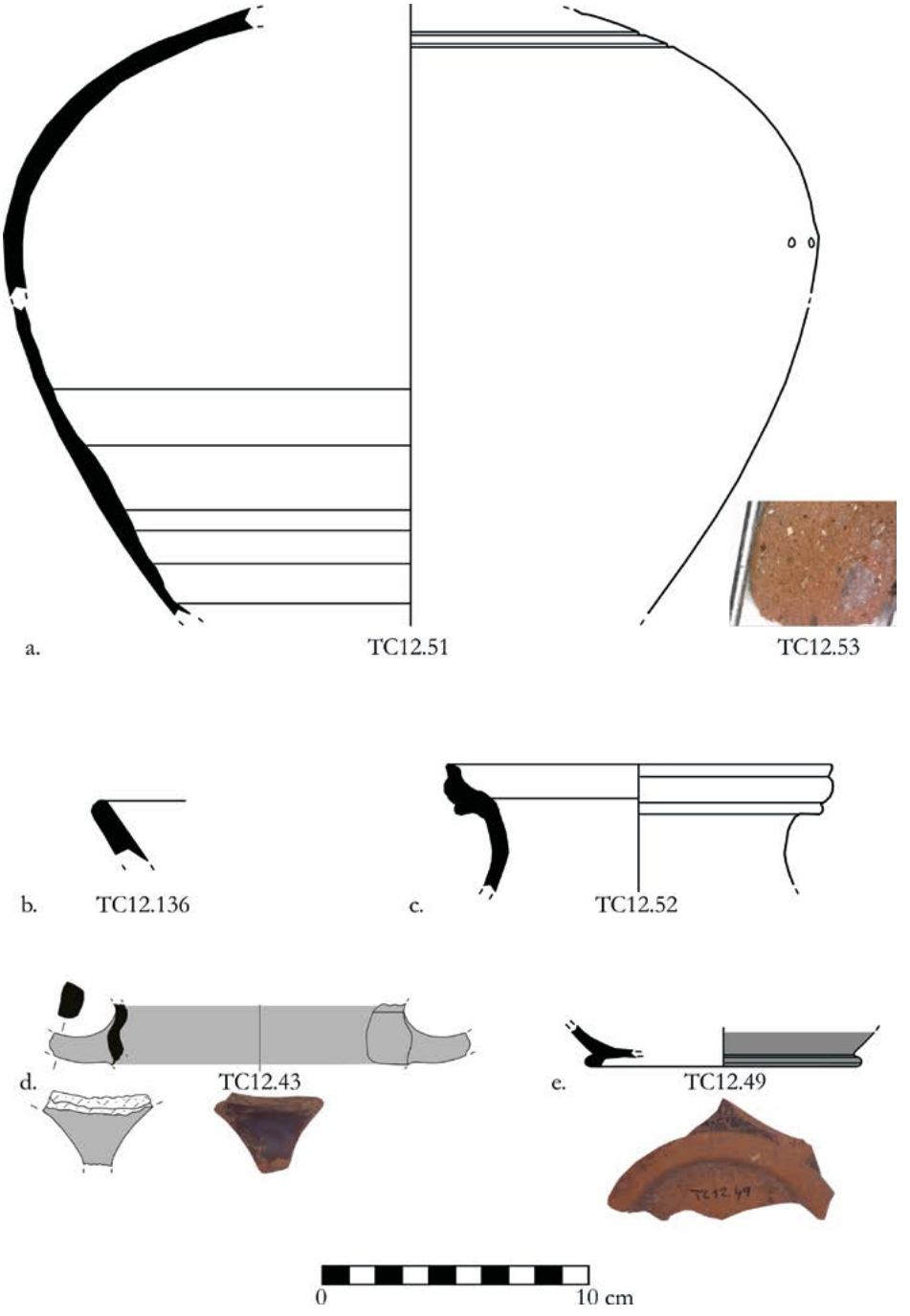

Fig. 11: Thorikos, Cistern No. 1, layer 5: pottery Cat. 6, 8–9 and 13–14 (drawings: R.F. Docter digitized by Q. Drillat; Macro-photo Cat. 6: S. Claeys, not to scale; Photo's TARP). – a. Cat. 6; – b. Cat. 8; – c. – Cat. 9; – d. Cat. 13; – e. Cat. 14.

given in this publication, was based upon the terracotta sarcophagus of a child burial in the West Necropolis of Thorikos (Tomb 70; Bingen 1967, p.55 fig.67), which may well have been a re-used industrial basin rather than a custom-made larnax. The excavator associated the tomb which lacked any grave gifts with the last burials in the necropolis, dating to the years before 300 BC. In 2011, the interpretation as a drain or water channel was still favoured over the alternative of a basin, but now that the other fragments can be taken into account, some of which are clearly curved, one may abandon this hypothesis. All fragments need to be re-studied, if possible re-fitted, and would also deserve to be sampled and analysed in order to corroborate the suggestion that the silver-like white residue on the interior (Fig. 10a) is indeed litharge rather than calcium.

- **Cat. 6:** TC12.51 (context T12-4-1) + TC12.53 (context T12-4-2), 17 fragments of body profile of large

Fig. 12: Thorikos, Cistern No. 1, layer 5: tiles Cat. 7 and 11–12 (Drawings: R.F. Docter digitized by Q. Drillat; Photo's TARP). – a. – Cat. 7; b. – Cat. 11; c. – Cat. 12.

Fig. 13: Thorikos, Cistern No. 1, layer 5: small handstone Cat. 10 (Photo's: S. Duchène – TARP).

water jug or amphora of which 1 × 4, 1 × 2 and 1 × 3 joining (Fig. 11a).
PH ca. 30.0, diam at carination 30.0.
Clay: reddish brown 5YR6/6. Surface light reddish brown 5YR6/4. Imported fabric with some rounded quartz (0.2 mm), some white lime particles (0.1–0.3 mm), and few pink particles (0.5–1.0 mm).
Carinated at shoulder, grooves around the neck.
Chronology: Early Hellenistic.

At first sight, the shape of the body reminds of that of transport amphoras, which would not be impossible in view of the remarkable fabric that is otherwise not attested in Thorikos and would be suggestive of an import (Fig. 11a). On the other hand, it reminds of S. Rotroff's description of the Pink Temper Fabric (*Agora* XXXIII, 23–28), so one is tempted to look for comparisons in the Hellenistic repertoire of household pottery. Indeed, amongst the typical Hellenistic water jugs that

started to be produced as from 325 and continued into at least the 1st century BC, one finds several potential comparisons (*Agora* XXXIII, 73–77). Especially in the jug forms 1 and 2 parallels that would match the large size, can be found. The bulging shape of the body finds a perfect parallel in the Agora, contextually dated to ca. 325–290 BC, although of smaller dimensions (*Agora* XXXIII, p.249 fig.7, pl. 7, cat. 39). As S. Rotroff kindly indicated (by e-mail of 2.8.2020), the large size would fit more jug form 2 and the fabric does look quite a lot like the Pink Temper Fabric she distinguished in the Agora material (*Agora* XXXIII, pp.23–28, figs.6–7, tab.7). In Athens, "almost all instances of Pink Temper that I have seen at the Agora date in the 2nd or 1st century – there are only a couple that might date before 200, and none in early Hellenistic deposits."

- **Cat. 7**: TC12.135 (context T12-4-1), edge fragment of cover tile in Plain Ware (Fig. 12a).
  PH 4.2.
  Clay: yellowish red 5YR5/6. Surface reddish yellow 7.5YR6/6, partly covered with calcareous concretions. Fabric with many quartz (0.1–0.2 mm) and few white particles (0.2 mm).
  Chronology: Archaic/Classical?
  The Plain Ware cover tile belongs to a Laconian roof system of which several other ones (in different shapes) have been encountered in the upper fill of the cistern (Docter, Monsieur and van de Put, 2011, pp.114–116, fig.39, cat.96–101, esp. cat. 98).
- **Cat. 8**: TC12.136 (context T12-4-1), rim fragment of mortar in cooking ware (Fig. 11b).
  PH 2.5, diam rim ?
  Clay: red 10R4/6, gray towards both sides. Surface reddish brown 2.5YR4/4, burnished on both sides. Imported fabric with many angular and subangular quartz and stone particles (0.2-0.4 mm).
  Chronology: Archaic-Classical.
  Precise comparisons for the rim fragment could not be found. An Archaic rimless version of a conical flat-based mortarium from the Athenian Agora (P8860) is closest (Villing and Pemberton, 2010, pp.567–568, fig.5). Other parallels in cooking ware show a more rounded rim: one from Thorikos, dated to the second half of the 5th century BC (Vanhove 2014, pp.91, 114, cat./fig.101), and two from Athens, dated to ca. 520–480 and ca. 425–400 BC respectively (*Agora* XII, p.369 fig.16, pl.90, nos.1891, 1893).

T12-4-2

- **Cat. 9**: TC12.52 (context T12-4-2), rim-neck fragment of hydria or table amphora in Cooking Ware (Fig. 11c).
  PH 4.7, diam rim 14.0.
  Clay: reddish yellow 7.5YR6/6 with wide dark grey core. Surface brown 7.5YR5/3. Imported fabric with some dark gey and few shining particles (mica?) (0.1–0.2 mm) and few lime particles (0.5–1.0 mm).
  Chronology: Classical/Early Hellenistic.
  The fragment may have belonged to a hydria or table amphora, even though an exact parallel for the particular rim shape could not be found. Comparable rims of Cooking Ware hydriai have been published from Athens (*Agora* XII, 348, fig. 17, pl. 71, no. 1596; Rotroff and Oakley 1992, 121, fig. 26, pl. 58, cat. 328), dating to the last quarter of the 5th century BC. Also, Late Classical table amphorae of Form 3 from the Athenian Agora, dated to the period 375–300/275 BC, are more or less comparable (*Agora* XXXIII, pp.87, 257 fig.20, pl.18, cat.123). The Vari House yielded a similar rim of a neck amphora, dated by its general context to the period 350–275 BC (Jones, et al., 1973, pp.381–382, pl.74 fig. 8, cat.49). Farther away, a 4th century BC (ca. 375–330) context at Thasos has yielded similar rims belonging to amphoras and large jugs (*cruches*) executed in the local Thasian Cooking Ware (Blondé, 1989, pp.531–532, fig.21, cat.230–231).

T12-5-1

- **Cat. 10**: TP12.39 (context T12-5-1), small handstone (Fig. 13)[3].
  H 6.5, max. preserved length 5.9, max preserved width 4.5.
  Surface dark grey 10YR4/1.
  TP12.39 is a half cobble of fine-grained, greenish grey rock (possibly sandstone) used as a handstone for crushing and perhaps also grinding. The relief of the flatter surface seems to be altered by the use. The edges of the surface are softened. The rounded side features at least three flattened or slightly incurved zones. One of these shows possible impact traces and seems to be covered by a dark polish. Unknown white deposit sticks to the rounded side. The actual and precise function of TP12.39 could only be revealed by a use-wear analysis and by a study of hypothetical residues that might still be trapped in the relief of the stone. This type of tool is not specific to any period and is not incompatible with a Classical or Hellenistic context, as shown by small handstones found in Halieis (Kardulias and Runnels, 1995, p.121, figs104–105).
  Rock: fine-grained, greenish grey rock, possibly sandstone. Unknown provenance.
  Chronology: Classical/Hellenistic?
- **Cat. 11**: TC12.40 (context T12-5-1), 3 joining edge fragments of pan tile in Red Glazed Ware (Fig. 12b).
  PH 10.0.
  Clay: reddish brown 10YR5/4. Surface interior upper side reddish brown 5YR4/3 glaze, partly worn off; roughened on outer, lower side. Fabric with many white foraminiferi (0.1–0.2 mm) and some quartz and dark particles (0.3–0.4 mm).
  Chronology: Archaic/Classical?
  The Red Glazed Ware pan tile belongs to a Laconian roof system of which several other ones (in different shapes) have been encountered in the upper fill of the cistern (Docter, Monsieur and van de Put, 2011,

p.114). The fact that three large fragments (with ancient breaks) join suggests that they ended up as one tile or as a very large fragment in layer 5 of the fill.

- **Cat. 12**: TC12.41 (context T12-5-1), 2 joining edge fragments of cover tile in Black Glaze Ware, recently broken (Fig. 12c).
  H 8.3.
  Clay: red 10YR5/6. Surface red 10YR5/6 on roughened lower side and traces of good black glaze on top, covered with greyish white film. Fabric with much fine mica, some quartz and stone particles (0.5–1.0 mm), and isolated reddish particle (2.5 mm).
  Chronology: Archaic/Classical?
  The Black Glaze Ware cover tile belongs to a Laconian roof system of which several other ones (in different shapes) have been encountered in the upper fill of the cistern (Docter, Monsieur and van de Put, 2011, pp.114–116, fig.39, cat.94–95). The particular edge finishing is more or less comparable with the Plain Ware cover tile Cat. 7 (Fig. 12a).
- **Cat. 13**: TC12.43 (context T12-5-1), wall fragment with lower handle root of kantharos (Fig. 11d).
  PH 2.2, diam wall 11.0, handle section 0.8 × 1.2.
  Clay: pinkish grey 7.5YR6/2. Surface good dark reddish brown 2.5YR3/3 glaze. Fabric with no visible inclusions.
  Chronology: *ca.* 375–275 BC.
  The fragment may have belonged to a kantharos with either plain or moulded rim that have been dated from the second quarter of the 4th to the middle of the 3rd century BC, becoming already rare in the third quarter of the 3rd century BC (*Agora* XXIX, pp.83–85, figs.4–6, pls.1–5). Thorikos has yielded quite a few published examples of these kantharoi that may be considered as 'guide fossils' tracing occupation in Late Classical and Early Hellenistic Thorikos. Their presence in the Industrial Quarter of Thorikos is well attested with at least 23 published examples: House no. 1 (Mussche, 1998, pp.70, 160 figs.141–142, cat.28); House no. 4 (Mussche, 1990, pp.50–51, fig.45, cat.100–101); Insula 1 (Vanhove, 2006, pp.10, 159 figs.30–31, cat.15); Insula 3, Tower Compound (Spitaels, 1978, pp.92, 94–95, 98–99, figs.52, 56, cat.98, 114–116; cat.98 = Mussche, 1967, p.64 fig.79; Vanhove, 2006, pp.53, 191 figs.203–204, cat.98); South of Insula 3 (Vanhove 2006, pp.53, 191 figs.201–202, cat.97); Insula 10, Sanctuary (Mussche, 1971, pp.126–128, 130–131, figs.82, 84); upper layers of Cistern No. 1 (Docter, Monsieur and van de Put, 2011, pp.79–80, fig.5; Mortier, 2011, pp.133–134, fig.2). The Theatre area and the West Necropolis each yielded one published kantharos of this type (Bingen, 1978, p.181 fig.109 = Vanhove, 2006, pp.102, 226 figs.358–359, cat. 167 and Vanhove, 2006, pp.92, 218–219, figs.322–323, respectively).

T12-5-2

- **Cat. 14**: TC12.49 (context T12-5-2), base fragment of closed vessel (Fig. 11e).

Fig. 14: Thorikos, Cistern No. 1, layer 9: pottery Cat. 15–16 (photo: TARP); – a. Cat. 15; – b. Cat. 16.

PH 2.3, diam base 10.
Clay: yellowish red 5YR5/6. Surface reddish brown 5YR5/4 at base, good black glaze on outside. Fabric with few shining particles (<0.1 mm).
Chronology: Classical/Early Hellenistic.
The ring foot is probably to be attributed to an oinochoe or lekythos for which several parallels can be found in the Athenian Agora: Rotroff and Oakley, 1992, 116, fig. 19, pl. 54, no. 285, dated to the period 475–425 BC, and *Agora* XII, 313, fig. 19, pl. 38, no. 1108 = *Agora* XXIX, 349, fig. 69, pl. 81, no. 1110, dated to the period 325–275 BC.

Layer 6

Below Layer 5, a thin layer of ca. 10 cm thickness was encountered containing a large amount of mortar (T12-6-1/2). Consequently, it was much lighter in colour, with an ashy texture. Apart from one very small pottery fragment, no other finds were recorded.

T12-6-1

This context only contained mortar of which one sample was kept.

T12-6-2

This context, dug on the next day, also contained mainly mortar and one tiny fragment in the sieving sample.

Layer 7

Layer 7 (T12-7-1), below layer 6, had the exact same characteristics as layer 5, but contained only one pottery fragment. In the north and west corner, a collection of small rocks and large chunks of plaster were recorded,

No.	Shape + feature	Ware	Remarks	Chronology	Cat./Fig.	Context
1. Transport and Storage						
1	Amphora wall fragments	Plain, White-washed	Import	Classical?		T11-16-1
17	Large jug or amphora profile fragments	Plain	Import	Classical/Hellenistic	Cat. 6; Fig. 11a	T12-4-1
3	Amphora wall fragments	Plain	Lesbian grey, not joining	Archaic/Classical		T12-4-1
2	Amphora wall fragments	Plain	Import, different fabrics	Classical?		T12-4-1
1	Amphora wall fragment	Plain	Import; small fragment	Classical?		T12-5-1
1	Amphora neck fragment	Plain	Imported	Classical?		T12-5-2
1	Closed vessel wall fragment	Black Glaze	Local; thick-walled	Classical		T12-5-2
2. Food preparation (before cooking)						
1	Mortar base fragment	Plain	Local	Classical?	Cat. 2	T11-16-1
1	Mortar rim fragment	Cooking	Import	Classical	Cat. 8; Fig. 11b	T12-4-1
1	Mortar wall fragment	Plain	Import	Classical?		T12-4-2
3. Cooking						
2	Cooking pot wall fragments	Cooking	Local?	Classical?		T11-16-1
2	Cooking pot wall fragments	Cooking	Import	Classical?		T12-4-2
1	Cooking pot wall fragment	Cooking	Import	Classical?		T12-5-1
4. Serving and consumption						
4A. Food serving and consumption						
-	-	-	-	-	-	-
4B. Drinking (serving and consumption)						
1	Jug base fragment	Red Washed	Local	Classical?	Cat. 3	T11-16-1
1	Hydria or table amphora rim fragment	Cooking	Import	Classical/Hellenistic	Cat. 9; Fig. 11c	T12-4-2
1	Kantharos handle fragment	Black Glaze	Local	375-275 BC	Cat. 13; Fig. 11d	T12-5-1
4C. Undistinguishable (eating/drinking)						
2	Undetermined wall fragments	Plain	Small fragments; local	Classical?		T11-16-1
2	Closed vessel wall fragments	Plain	Local	Classical?		T11-16-1
2	Closed vessel wall fragments	Cooking	Import	Classical		T12-4-1
1	Closed vessel wall fragment	Plain	Import	Classical?		T12-4-1
1	Closed vessel wall fragment	Plain	Local	Classical?		T12-4-1
1	Closed vessel wall fragment	Plain	Local; small fragment	Classical?		T12-4-2
1	Open vessel wall fragment	Black Glaze	Small fragment; local	Classical		T12-5-1
1	Oinochoe or lekythos base fragment	Black Glaze	Local	Classical/ Early Hellenistic	Cat. 14; Fig. 11e	T12-5-2
1	Closed vessel wall fragment	Black Glaze	Local; thin-walled	Classical		T12-5-2
5. Lighting						
-	-	-	-	-	-	-
6. Industrial and domestic artisanal activities						
2	Basin base fragments	Coarse	Local	Late Classical/Hellenistic?	Cat. 1+5; Fig. 10a	T11-16-1 T12-4-1
1	Small handstone	Sandstone?	Imported?	Classical?	Cat. 10; Fig. 13	T12-5-1
7. Architectural						
1	Cover tile edge fragment	Red Glaze	Local	Archaic/ Classical?	Cat. 4	T11-16-1
1	Cover tile wall fragment	Red Glaze	Local	Archaic/ Classical?		T11-16-1
1	Cover tile edge fragment	Plain	Local	Archaic/ Classical?	Cat. 7; Fig. 12a	T12-4-1
3	Pan tile edge fragment	Black Glaze	Local	Archaic/ Classical?	Cat. 11; Fig. 12b	T12-5-1
2	Cover tile edge fragment	Black Glaze	Local	Archaic/ Classical?	Cat. 12; Fig. 12c	T12-5-1
1	Cover tile edge fragment	Plain	Local; small fragment	Archaic/ Classical?		T12-5-1

Tab. 1: Functional distribution of the finds from Layer 5 (TARP).

No.	Shape + feature	Ware	Remarks	Chronology	Cat./Fig.	Context
4. Serving and consumption						
4C. Undistinguishable (eating/drinking)						
1	Closed vessel wall fragment	Plain	Local; tiny fragment from sieving sample	Classical?		T12-6-2

Tab. 2: Functional distribution of the finds from Layer 6 (TARP).

No.	Shape + feature	Ware	Remarks	Chronology	Cat./Fig.	Context
1. Transport and storage						
1	Amphora wall fragment	Plain	Imported; small fragment	Classical?		T12-7-1

Tab. 3: Functional distribution of the finds from Layer 7 (TARP).

No.	Shape + feature	Ware	Remarks	Chronology	Cat./Fig.	Context
3. Cooking						
1	Closed vessel wall fragment	Cooking	Imported	Classical	Cat. 16; Fig. 14b	T12-8-1
4. Serving and consumption						
4B. Drinking (serving and consumption)						
1	Cup handle fragment	Black Glaze	Local	Archaic/ Classical	Cat. 15; Fig. 14a	T12-8-1

Tab. 4: Functional distribution of the finds from Layer 9 (TARP).

as indicated on the section drawings (Figs. 7 – 8) as a separate layer 8.

T12-7-1

Layer 9

The last layer encountered in the basin was a very thin compacted stratum, brown reddish in colour with a silty sand texture (T12-8-1). It contained only two small sherds, one of which with heavy calcareous concretions. At a depth of 4.9m, measured from the highest point of the masonry wall, the bottom of the cistern was reached. This cistern floor, which appeared after the removal of layer 9, was meticulously coated with waterproof mortar of a very good quality. As other mortars in the Laurion, it consisted of two layers: a thick white-yellowish lime mortar, measuring approximately 10 cm in width, and a fine coating, black in colour and consolidating the whole (cf. Van Liefferinge, et al., 2011, pp.60, 62 fig. 6).

T12-8-1

- **Cat. 15:** TC12.2 (context T12-8-1), wall fragment with horizontal handle root of Black Glazed Ware cup, with heavy calcareous encrustations all over (Fig. 14a).
  Clay: Attic, good black glaze.
  Chronology: Archaic/Classical.
  The small fragment of a rather sturdy handle may have belonged to several types of Archaic or Classical cups or cup-skyphoi (Agora XII, pp.88 – 112, pls.18 – 27, figs.4 – 6).
- **Cat. 16:** TC12.3 (context T12-8-1), wall fragment of closed vessel in Cooking Ware (Fig. 14b).
  Clay: imported.
  Chronology: Classical.

Last use and abandonment

Cistern No. 1 had been constructed probably during the late 5th century BC and it remained in use (perhaps with a hiatus in the aftermath of the Peloponnesian War) till the end of the 4th or first quarter of the 3rd century BC. The two very small fragments in layer 9 on the bottom of the cistern (Cat. 15 – 16; Tab. 4; Fig. 14) may well belong to the last use phase of the installation, having washed into the basin or remained there after the last cleaning. The calcareous concretions on Cat. 15 (Fig. 14a) would plea in favour of such a reconstruction. Layer 8, consisting of large chunks of plaster and some small rocks, probably originated in a first collapse of the cistern lining higher up and, hence, belong to the phase of abandonment after

the cistern fell into disuse (Figs. 6 – 7). The very fine dark brown, perfectly horizontal layer 7 with only one small pottery fragment included (Tab. 3) may originate in the further but gradual deterioration of a mudbrick superstructure, the erosion material of which was able to settle gently in the basin. This layer was covered by the equally horizontal layer 6 consisting of mortar debris, probably resulting from the further collapse of the cistern lining, and only one tiny pottery fragment (Tab. 2). It is very likely that up to that moment the exterior walls of the cistern, at least the northern and eastern uphill ones, still stood to some height, protecting the cistern from filling rapidly with erosion material. It is not even impossible that part of the roof still existed at that time. Layer 5 was formed definitely at the moment, when the uphill walls had (partially) collapsed, allowing water and erosion material to enter the cistern and depositing a thick layer of dark silty sand sloping downwards from north-east to south-west, so coming from uphill (Figs. 6 – 7). As in the case of layer 7, this material is probably to be interpreted as disintegrated mudbrick stemming from these very walls. The chronology of the household pottery included in layer 5 (Tab. 1) that probably originated in the living quarters of the *ergasterion* suggests that this sequence of micro-events may have occurred within the timeframe 325 – 275 BC, exactly the moment when silver extraction also witnessed a sharp decline elsewhere in Thorikos and the Laurion (Docter and Van Liefferinge 2010, pp.57 – 58). The lack of lamps (Tab. 1), otherwise so ubiquitous in mining area deposits, may just be accidental; in the upper layers of the cistern they do occur (Docter, Monsieur and van de Put, 2011, p.81 fig.9, cat.17). The large and joining fragments of tiles (Fig. 12) may suggest that at this moment the remainder of the roof of the cistern or of a nearby construction had collapsed (or had been taken away for reuse elsewhere, leaving only the broken ones). The fragments of the large basin Cat. 1+5 (Fig. 10) may have belonged to the working apparatus of the *ergasterion*, perhaps having stood on the northern platform of the cistern in Sector E (Fig. 6). Once broken, its pieces ended up first in layer 5 and on top of it and – still later – in the upper layers 2 – 4 (Cat. 5; Figs. 6 – 7). Also, the small handstone Cat. 10 (Fig. *13*) in this layer may once have been part of the *ergasterion*'s apparatus. The large profile of a Hellenistic water jug or amphora Cat. 6 (Fig. 11a) that was found in large pieces on top of layer 5 concludes this phase. It may either date to the last phase of use and have fallen, washed or thrown in during this abandonment period, or it may be a testimony of some later Hellenistic visitor or inhabitant of Thorikos trying to scoop water from the abandoned and already partially filled cistern and dropping it in the process. This may well have been as late as the 2nd or 1st century BC, if the attribution of the fabric to the Pink Temper Fabric of Cat. 6 (Fig. 11a) proves to be correct. Such a late chronology for at least some activities around the cistern seems also suggested by the carination fragment of a brown glazed lagynos (?) found higher up in the stratigraphy and dated to ca. 200 – 175 BC (Mortier 2011, p.136, cat.6, fig.5). The upper layers 1 – 4 (Figs. 6 – 7), then, conclude the story of this cistern; they contain mainly rubble and ashlar wall collapse mixed with quite a number of mainly small and worn fragments of Late Archaic and Classical/Early Hellenistic household pottery that had eroded into the basin from higher up the Velatouri (Fig. 5). The fact that also larger fragments of Late Antique domestic pottery and of a rotary hand mill are mixed in these same layers suggests that some activity took place around Cistern No. 1 from the 6th to within the 8th century CE. It is likely that this cistern, even partially filled in, still functioned as a collection basin for water that attracted people to settle nearby, probably the very same people that frequented and exploited (?) the mining galleries of Thorikos in this period (Docter, Monsieur and van de Put, 2011, pp.118 – 120; Morin and Delpech 2018; Konstantinidou, et al., 2018). That the vicinity of the Mine No. 2 entrances, therefore, formed another attraction factor for these people is not unlikely, but remains to be investigated.

Acknowledgments

In the 2012 campaign, we acknowledge the participation of the following students and volunteers of Ghent and Utrecht Universities: Eline Amsing, Violet Annaert, Jasper Billemont, Amber Brüsewitz, Annelies Claus, Mahdokht Farjamirad, Pieter Houten, Mounir Lahcen, Els Meijer, Timothy Nuyts, Thomas Pieters, Margit Pothoven, Willem Van Aenrode, Bas Vandermeulen, Koen Van Gelder, Roy van Wijk, Sarah Van Wynsberghe, Tine Vekemans. The project's logistics were in the hands of Guy Dierkens, aided by Prof. Gunnar De Boel. On behalf of the Ephorate, Maria Skalia supervised the works as epoptria. We thank the staff of the Ephorate of Antiquities of East Attica and especially Dr. Eleni Andrikou, Eleni Assimakou, Dimitra Kai, Prof. Andreas Kapetanios, Maria Mexi and Dr. Katerina Petrou. We acknowledge the help of the staff of the Archaeological Museum at Lavrio, in particular Mrs. Despoina Moschopoulou, Mrs. Photini Spanou, Mr. Prokopis Makris, Mrs. Polly Dara and Mr. Manolis Athinaios. Our thanks also go to Prof. Panagiotis Iossif and Prof. Jan Driessen of the Belgian School at Athens. During our fieldwork and study campaigns we were kindly hosted in the Technological Park of Lavrio, for which we thank the Mayor, Mr. Dimitris Loukas, and the staff of the Park. Funding for the campaigns was provided by Ghent University, Utrecht University, the Belgian School at Athens, and private donors; we extend our warmest thanks to all of them. In writing up the text of this contribution, we acknowledge the expertise of Prof. Susan I. Rotroff (Washington University in Saint Louis) who kindly shared her expertise on fabric and typology of Cat. 6 (Fig. 11) on the basis of photographs and section drawing. During the academic year 2019/2020, Roald F. Docter benefitted from a sabbatical leave funded by the

Special Research Fund of Ghent University to prepare the comprehensive publication of the cistern excavations. Unfortunately, the Covid-19 outbreak prevented a scheduled control campaign in the storerooms of the Lavrio Museum (e.g., of Cat. 1–5). The Proceedings of the International Conference »Ari and the Laurion from Prehistoric to Modern Times« in October/November 2019 offered the logical venue to present at least part of the results. We thank the organizers, Prof. Hans Lohmann, Dr. Frank Hulek and Dr. Sophia Nomicos, for their warm hospitality at Bochum and their patience in preparing the proceedings and, last but not least, we thank the participants for their comments and stimulating discussions during the conference.

Notes

1 The results presented here mainly stem from the 2012 fieldwork campaign directed by R.F. Docter and F. van den Eijnde. K. Van Liefferinge co-directed the cistern excavations with C. Stal being in charge of the geomatical part. R.F. Docter, W. van de Put and S. Mortier were responsible for the pre-registration of the contexts upon which the conclusions in this article are based. Fabric descriptions and drawings have been made by R.F. Docter. S. Duchène added the comments on the stone tools.

2 Colour descriptions follow *Munsell Color,* 1990. Measurements are in cm unless otherwise stated. All clay descriptions are based upon a macroscopic analysis unless otherwise stated.

3 Although TP12.39 has not been fully studied yet, this description could be given based on the pictures and the preliminary observations made during the pre-registration of the finds. A more comprehensive study of the crushing and grinding stone tools of Thorikos is prepared by S. Duchène, *Crushing and grinding in Thorikos* within the framework of a PhD study funded by the Special Research Fund Ghent University (2017-2021).

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