



EXPLORING THORIKOS

Edited by
Roald F. DOCTER and Maud WEBSTER

Ghent University
Department of Archaeology
Ghent - 2018





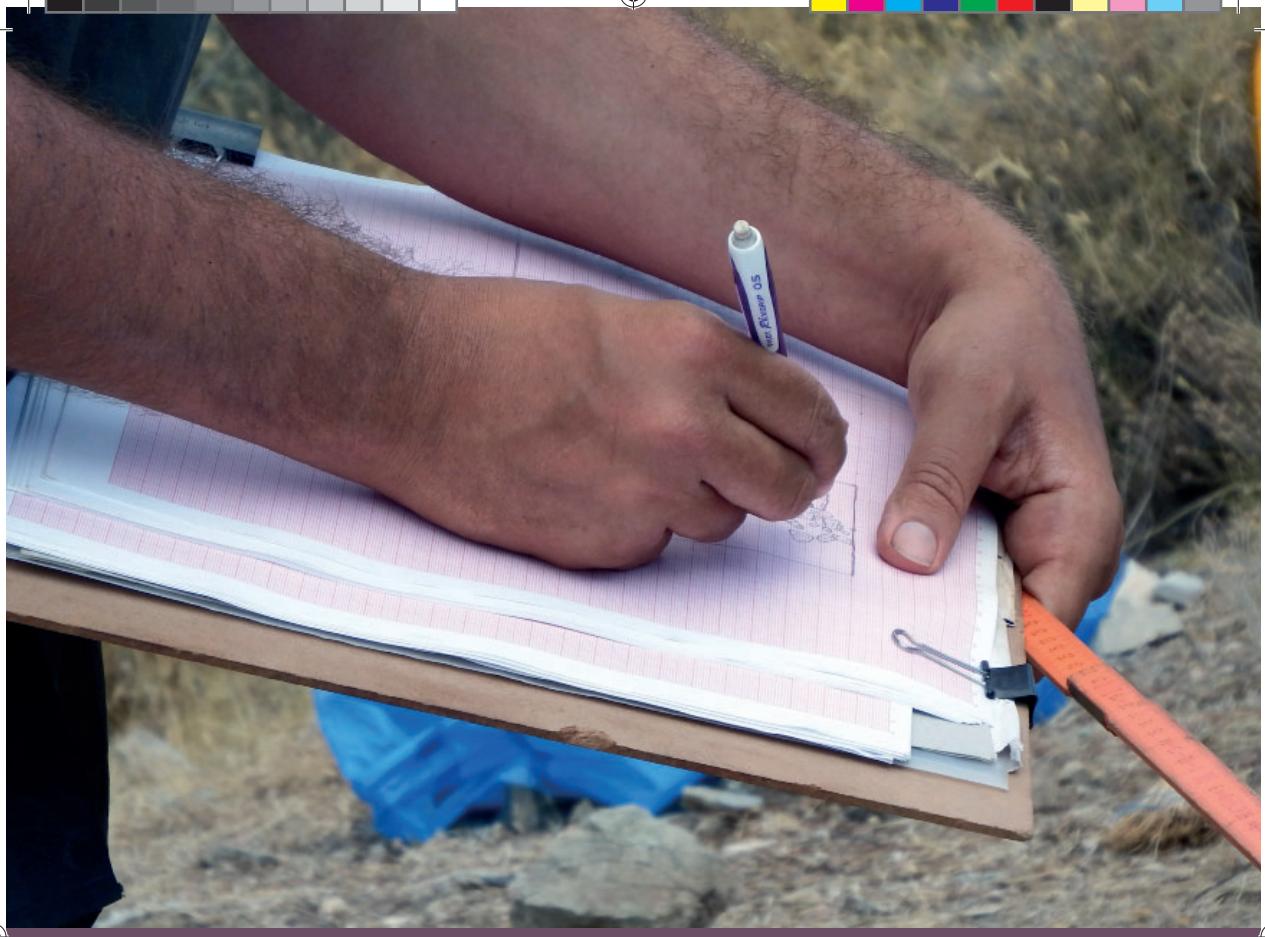
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Thorikos occupies the coastal northeast of the Lavrion area of Attica, Greece. The ancient town comprised the double-peaked Velatouri hill, which has seen human activity since the Final Neolithic period and been the focus of archaeological research for more than 50 years. This timely publication serves as a guide to ancient Thorikos, a presentation of ongoing work and a preview of new undertakings. Growing out of a Belgian initiative in the 1960s, the Thorikos Project is today an international program with a wide range of contexts and assemblages under study. Here, members of the international team present themes of current interest and aspects of recent work in a multi-authored collection of texts intended for the general public as well as for specialists.



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Cover illustrations: (front): The double-peaked Velatouri hill seen from the west; the island of Makronisos in the background, 1974 (photo: Thorikos archive). (back): Drawing architecture in the field, West Necropolis 2014 (photo: T. Pieters). The site map, prepared by C. Stal, A. Deruyck, A. De Wulf and R.F. Docter, is to be found on pages 6-7.

Illustration on pages 5, 12, 16, 18, 20, 34, 52, 57, 69, 71 and 72: Ceramic pomegranate, 735-720 BC (TC65.598, Thorikos archive/KVG).

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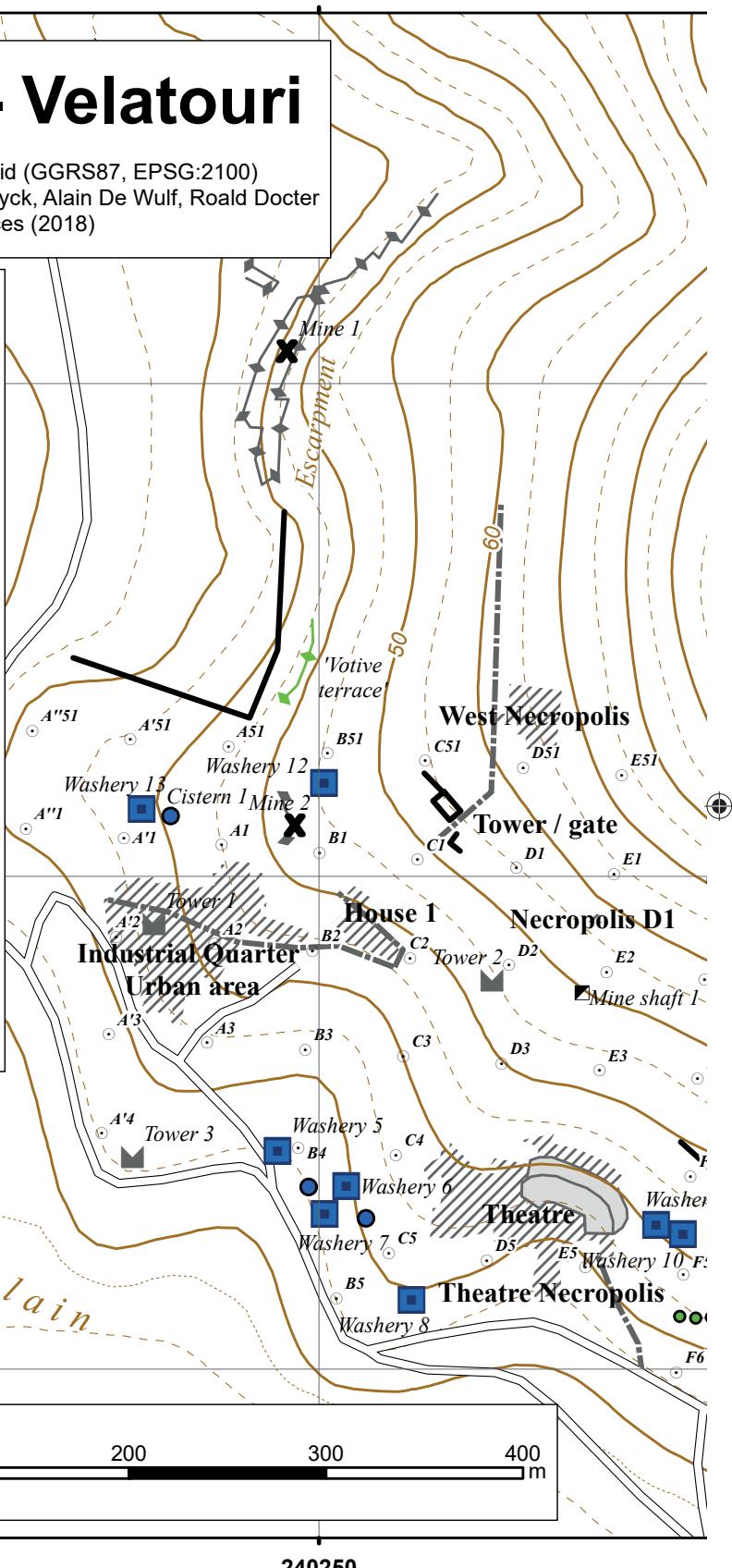


Thorikos - Velatouri

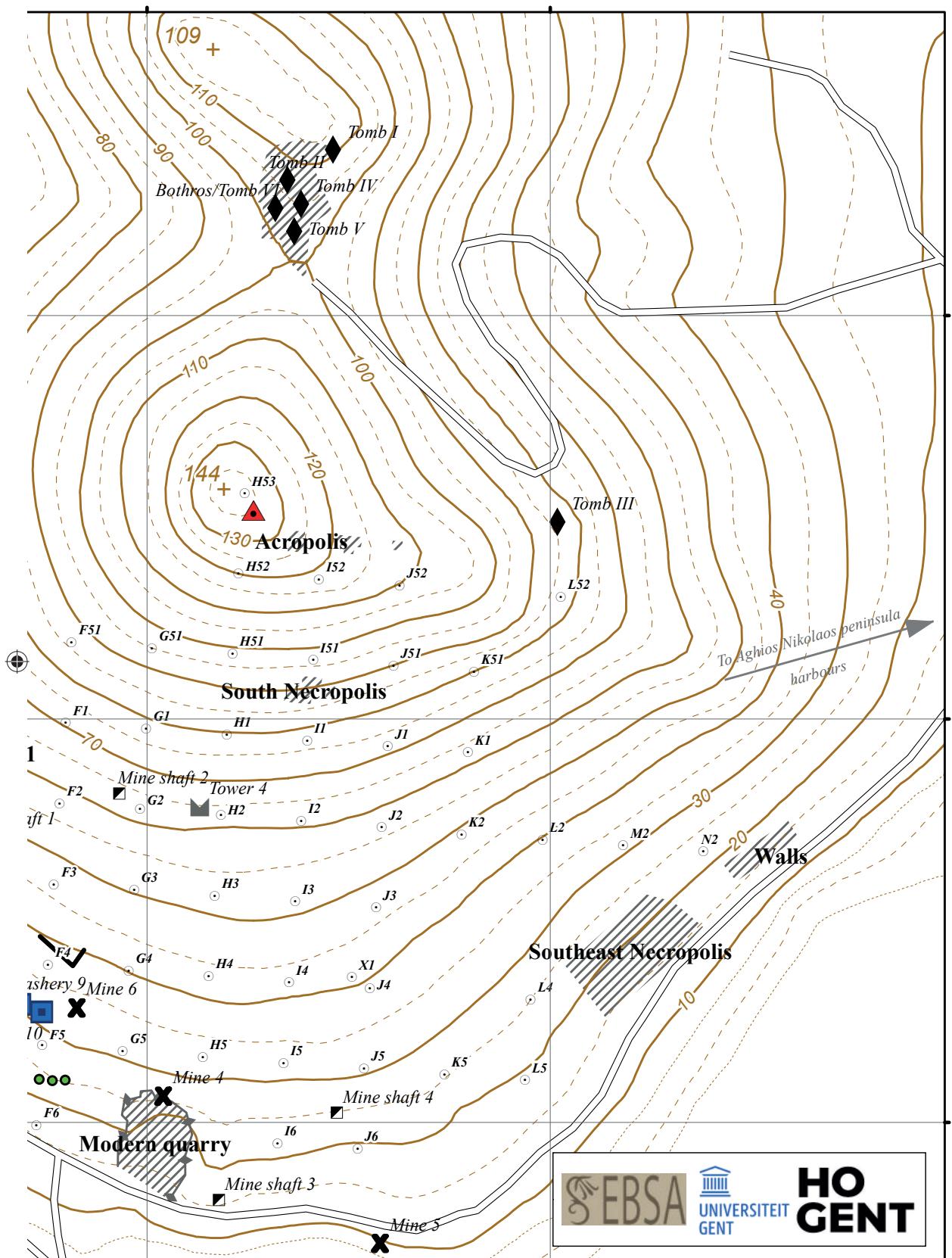
Coordinates in Greek National Grid (GGRS87, EPSG:2100)
Authors: Cornelis Stal, Arne Deruyck, Alain De Wulf, Roald Docter
Compilation of various data sources (2018)

Legend

- 19th century furnaces
- Cistern
- ▲ Geodetic point
- ✖ Mine
- Mine shaft
- ◆ Mycenaean tomb
- Tower
- Washery
- Reference poles
- Fortification wall
- Historic road
- Modern road
- ↔ Ridge
- ↔ Terrace
- ▨ Zones



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Foreword

This publication has been conceived as a comprehensive guide to the archaeology and excavation history of the site of Thorikos, and at the same time a presentation of ongoing work and a preview of new undertakings – a mission statement of sorts for the five-year fieldwork project currently under way (2018–2022). Growing out of a strictly Belgian initiative led by the universities of Ghent and Liège, the Thorikos Project has become a truly international research program, involving more than 40 scholars affiliated to 12 universities and other institutions, as well as countless students and volunteers. Rather than having one or two authors covering the many aspects of this complex site and its exploration, we are therefore happy to have the specialists themselves present their work in a multi-authored collection of texts, highlighting both the coherence of the project and the collaborative spirit that underlies it. The resulting book is intended for the general, interested public as well as for specialists.

The monograph written by the project's previous director Herman Mussche in 1998 remains indispensable for a more in-depth account of the archaeology of Thorikos before c. 1990, but previous general guides to the site date to the -70s and -80s of the last century and are both out of print and outdated at this point (Mussche 1974; 1978; 1986). In the years since, the site has been briefly treated in a guide to the Lavreotiki and the Lavrion Museum published by the Hellenic Ministry of Culture (Salliora-Oikonomakou 2007) and in a book accompanying an exhibition held at the Numismatic Museum of Athens (Iossif, ed. 2010). A local publication has also been dedicated to the ancient theatre at Thorikos and its partial restoration (Dermatis and Manthos 2010). For other relevant and scholarly literature, the academic readership will find an extensive reference section at the end of this book.

We are sincerely grateful to the contributing authors for agreeing to participate in this venture so swiftly, and to Victor Martínez Hahnmüller for taking on the layout in the same enthusiastic manner. Many preliminary and comprehensive publications on both old and recent fieldwork are currently in advanced stages of preparation, and it is hoped that the spirit of rapid publication informing the present book will have a favourable influence on the scholarly venues as well.

Roald F. Docter and Maud Webster, 30 November 2018





the 4th and 6th centuries AD, using fire-setting technology. Underground, the stifling atmosphere and temperatures up to +21°C raise the crucial question of ventilation: the mining works evinced here suggest that the physical capabilities and skills of the ancient miners was quite considerable, as they were able to exploit such complex silver ore deposits and assure ore dressing in this taxing environment. In all, the evidence testifies to a deliberate strategy and a highly developed technological and spatial control over the process.

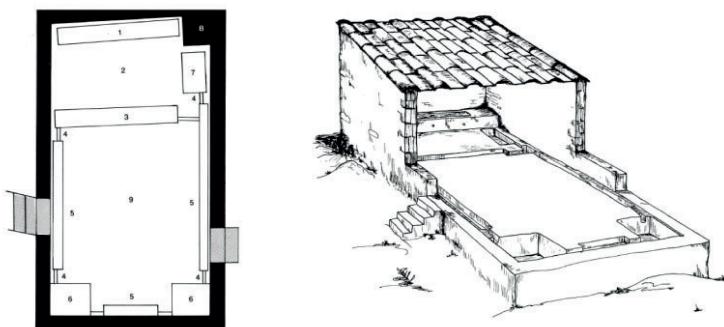
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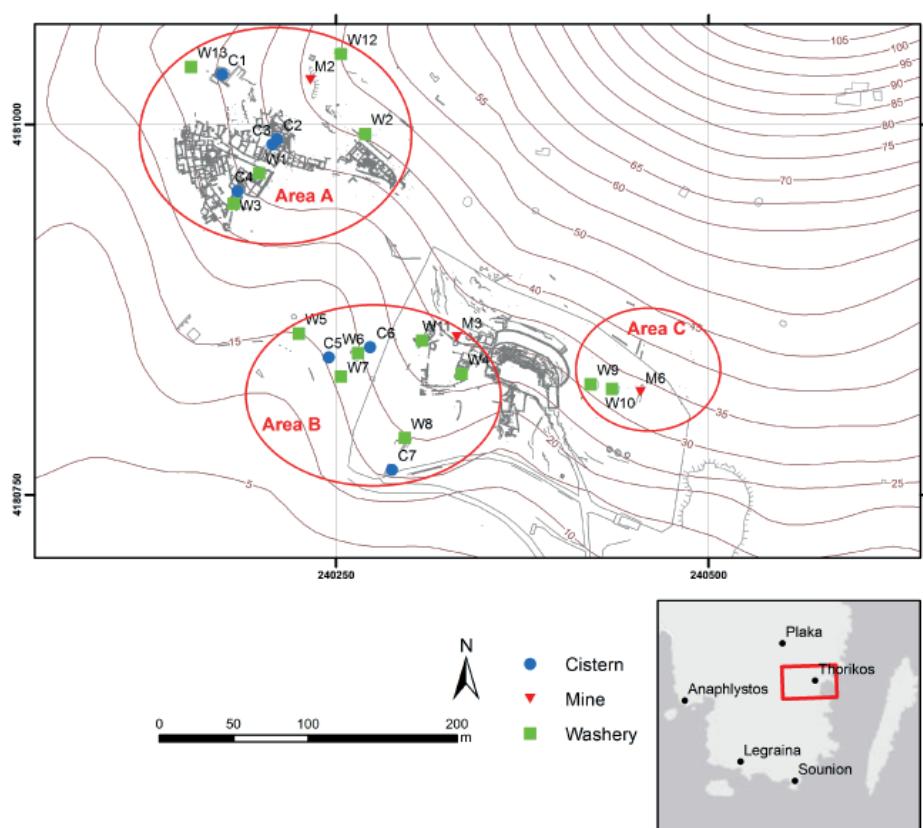
References: Morin (ed.), forthcoming; Morin, forthcoming; Nazou, forthcoming 1 and 2; Konstantinidou, forthcoming; Morin and Photiades 2012; Mountjoy 1995; Spitaels 1984; Waelkens 1990; Blondé 1983.

19. The Ore-Processing Workshops

Ore-processing workshops at Thorikos and in the Lavrion area played an important part in the production of silver during the 4th century BC. Silver was present as inclusions in local minerals such as galena and cerrusite. To liberate the silver particles, workers processed the ores in especially designed workshops where they were crushed, ground, washed and concentrated before being sent to the furnaces. This process was crucial because it significantly reduced the smelting

*A washery and its components. 1) water-tank; 2) washing-floor; 3) and 5) water-channels; 4) overflows; 6) sedimentation basins; 7) tank for recycled water; 8) draining board
(after Mussche 1998, 102, fig. 20; cf. Jones 1984, 69-73).*

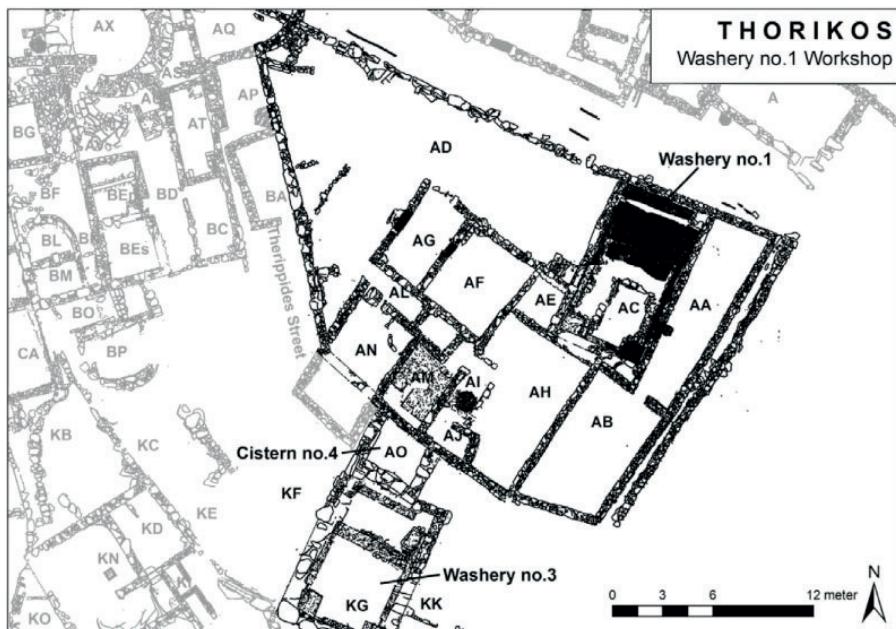




*Distribution map of the identified workshops and metallurgical complexes at Thorikos
(Van Liefferinge 2014, 142, fig. 58).*

costs. The main feature of the workshops was the washery, where the ground ore was washed to separate the rock matrix or gangue from the denser lead ore. This characteristically rectangular structure consists of a water tank, washing floor and drying table, surrounded by a series of water channels and sedimentation basins to recycle the water. In addition, the workshops generally include a cistern to secure the water supply, as well as grinding stations, storage rooms and living quarters for workers and workshops owners. In total, 13 washeries have been identified at Thorikos, spread over three metallurgical complexes.

Complex A comprises five washeries organized around Mine no. 2. The fully excavated workshop of Washery no. 1, built over the remains of a 5th-century BC house, probably was in use between 430 and 400 BC and again in the 4th century BC. It consists of a washery, workspaces and living quarters forming a walled compound. The workshop's cistern is located immediately to the south, and seems to have provided both Washery no. 1 and Washery no. 3 with water. The latter was installed in the 4th century BC. Two other workshops have been partly excavated. Washery no. 2 was inserted into an earlier building north



Workshop of Washery no. 1 in the Industrial Quarter, southeast of Tower Compound 1 (after Van Liefferinge et al. 2014, 278, fig. 7).

of House 1 in the 4th century BC. Washery no. 13 is part of a workshop that stands out because of its large cistern (no. 1). With its 209 m³, this is by far the biggest cistern at Thorikos, and would have had a prominent place in the mining landscape.

Complex B includes Mine no. 3 and six washeries, two of which have been excavated: Washery no. 11, which was rather carelessly installed in an earlier building, and Washery no. 4, located next to the theatre. Both date to the 4th century BC. Less is known of Complex C, situated to the east of the theatre, because this area has been disrupted by modern mining activities. One mine entrance (no. 6) and two washeries have been identified (nos. 9 and 10).

Many questions about the washeries at Thorikos still need to be answered. Their dating is problematic, and the integration of most washeries in the urban and mining landscapes is not fully understood. As archaeological research is ongoing, it is hoped that future discoveries will shed more light on this innovative feature of ancient silver production.

SoD, KVL, MK

References: Conophagos 1980, 214; Rihll 2001, 118-26; Jones 1984, 69-72; Mussche 1998, 39-56; Van Liefferinge 2014, 141-43; Van Liefferinge et al. 2011; Nazou et al. 2018; Van Liefferinge, forthcoming.



REFERENCES

Abbreviations

IGCH: Inventory of Greek Coin Hoards, M. Thompson, O. Mörkholm and C. Kraay (eds.), American Numismatic Society/International Numismatic Commission 1973.

SEG: Supplementum Epigraphicum Graecum, A. Chaniotis, T. Corsten, N. Papazarkadas and R.A. Tybout (current eds.), Leiden (<https://referenceworks.brillonline.com/browse/supplementum-epigraphicum-graecum>).

The *Thorikos* publication series

Thorikos I, 1963 (1968): Mussche, H.F., J. Bingen, J. Servais, R. Paepe and T. Hackens, *Thorikos 1963. Rapport préliminaire sur la premiere campagne de fouilles. Voorlopig verslag over de eerste opgravingscampagne*, Brussels.

Thorikos II, 1964 (1967): Mussche, H.F., J. Bingen, J. De Geyter, G. Donnay and T. Hackens, *Thorikos 1964. Rapport préliminaire sur la deuxième campagne de fouilles. Voorlopig verslag over de tweede opgravingscampagne*, Brussels.

Thorikos III, 1965 (1967): Mussche, H.F., J. Bingen, J. Servais, J. De Geyter, T. Hackens, P. Spitaels and A. Gautier, *Thorikos 1965. Rapport préliminaire sur la troisième campagne de fouilles. Voorlopig verslag over de derde opgravingscampagne*, Brussels.

Thorikos IV, 1966/1967 (1969): Mussche, H.F., J. Bingen, J. Servais, R. Paepe and G. Donnay, *Thorikos 1966/1967. Rapport préliminaire sur la quatrième campagne de fouilles. Voorlopig verslag over de vierde opgravingscampagne*, Brussels.

Thorikos V, 1968 (1971): Mussche, H.F., J. Bingen, J. Servais, R. Paepe, H. Bussers and H. Gasche, *Thorikos 1968. Rapport préliminaire sur la cinquième campagne de fouilles. Voorlopig verslag over de vijfde opgravingscampagne*, Brussels.

Thorikos VI, 1969 (1973): Mussche, H.F., J. Bingen, C. Conophagos, J. De Geyter, R. Paepe, G. Vandeven and D. Deraymaeker, *Thorikos 1969. Rapport préliminaire sur la sixième campagne de fouilles. Voorlopig verslag over de zesde opgravingscampagne*, Brussels.





Thorikos VII, 1970/1971 (1978): Spitaels, P., J. Bingen, A. Uyttendaele, F. Blondé, K. Van Gelder, A. Cheliotis and A. Helsen, *Thorikos 1970/1971. Rapport préliminaire sur les septième et huitième campagnes de fouilles. Voorlopig verslag over de zevende en achtste opgravingscampagnes*, Ghent.

Thorikos VIII, 1972/1976 (1984): Mussche, H.F., J. Bingen, J. Servais and P. Spitaels, *Thorikos 1972/1976. Rapport préliminaire sur les 9e, 10e, 11e et 12e campagnes de fouilles. Voorlopig verslag over de 9e, 10e, 11e en 12e opgravingscampagnes*, Ghent.

Thorikos IX, 1977/1982 (1990): Mussche, H.F., J. Bingen, J.E. Jones and M. Waelkens, *Thorikos 1977/1982. Rapport préliminaire sur les 13e, 14e, 15e et 16e campagnes de fouilles. Voorlopig verslag over de 13e, 14e, 15e en 16e opgravingscampagnes*, Ghent.

Thorikos 10 (2011): Docter, R.F. (ed.), *Thorikos 10. Reports & Studies*, Ghent.

Thorikos XI, 1983/1990 (2014): Mussche, H.F., D. Vanhove and V. Varoufakis, *Thorikos 1983/1990. Rapport préliminaire sur les 17e, 18e, 19e, 20e et 21e campagnes de fouilles. Voorlopig verslag over de 17e, 18e, 19e, 20e en 21e opgravingscampagnes*, Paris.

Thorikos 12 (forthcoming): Docter, R.F. (ed.), *Thorikos 12. Reports & Studies*, Leuven/Paris/Bristol, CT.

Fouilles de Thorikos - Opgravingen van Thorikos

Labarbe, J. 1977, *Thorikos. Les testimonia (Fouilles de Thorikos-Opgravingen van Thorikos I)*, Ghent.

Mussche, H. 1998, *Thorikos. A mining town in ancient Attika (Fouilles de Thorikos-Opgravingen van Thorikos II)*, Ghent.

Vanhove, D. 2006, *Thorikos. Graffiti, Dipinti, Stamps (Fouilles de Thorikos-Opgravingen van Thorikos III)*, Leuven.

Nazou, M. forthcoming 2, *Thorikos Mine 3: The Neolithic and the Early Bronze Age Pottery (Fouilles de Thorikos-Opgravingen van Thorikos IV)*, Leuven/Paris/Bristol, CT.

Morin, D. (ed.), forthcoming, *Ore Resources, Mining and Territory in the Aegean: The Ancient Mining Complex of Thorikos (Fouilles de Thorikos-Opgravingen van Thorikos V)*, Leuven/Paris/Bristol, CT.



Bibliography

- Alexandridou, A. 2017, "Sacred or Profane? Interpreting Late Geometric edifices in proximity to burials in Attica", in A. Tsingarida and I. Lemos (eds.), *Constructing Social Identities in Early Iron Age and Archaic Greece* (*Études d'Archéologie* 12), Brussels, 43-72.
- Andrikou, E. forthcoming, 'Thorikos in Context: The Prehistory', in *Thorikos 1963-2013: 50 Years of Belgian Excavations. Evaluation and Perspectives (BABESCH Annual Papers on Mediterranean Archaeology, Supplements)*, Leuven/Paris/Bristol, CT.
- Apostolopoulos, G.A., A.A. Kallioras, K. Pavlopoulos, K.A. Stathopoulou and A.A. Vlassopoulou 2014, 'Reconnaissance Geophysical Survey for the Detection of Salinization and Stratigraphy in Thorikos Valley, Attica, Greece', in *Near Surface Geoscience: 20th European Meeting of Environmental and Engineering Geophysics, Athens, Greece, 14-18 September 2014* (doi: 10.3997/2214-4609.20142087).
- Apostolou, E. and P.P. Iossif 2010, 'A small lot of repatriated coins: "... the Belgian contribution"', in P.P. Iossif (ed.), *All that Glitters... The Belgian Contribution to Greek Numismatics*, Athens, 95-97.
- Bingen, J. 1967a, 'L'établissement du IX^e siècle et les nécropoles du secteur ouest 4', in *Thorikos* II, 25-46.
- Bingen, J. 1967b, 'L'établissement géométrique et la nécropole ouest', in *Thorikos* III, 31-56.
- Bingen, J. 1968, 'La Necropole Ouest 4', in *Thorikos* I, 59-86.
- Bingen, J. 1969, 'Les établissements géométriques et la nécropole ouest', in *Thorikos* IV, 71-120.
- Bingen, J. 1973, 'Le trésor monétaire de Thorikos', in *Thorikos* VI, 7-59.
- Bingen, J. 1984, 'La nécropole géométrique ouest 4 (1971 et 1975)', in *Thorikos* VIII, 72-150.
- Bingen, J. 1990a, 'La nécropole géométrique D1', in *Thorikos* IX, 73-106.
- Bingen, J. 1990b, 'Deux tombes tardives de la "Nécropole du Théâtre"', in *Thorikos* IX, 107-13.



- Bingen, J. 2010, ‘The monetary hoard “Thorikos 1969” (*IGCH* 134)’, in P.P. Iossif (ed.), *All that Glitters... The Belgian Contribution to Greek Numismatics*, Athens, 62-67.
- Bingen, M. and J. Bingen 1982, ‘Le cratère «géométrique récent» de Thorikos’, in L. Hadermann-Misguich and G. Raepsaet with G. Cambier (eds.), *Rayonnement Grec. Hommages à Charles Delvoye (Université Libre de Bruxelles 83)*, Brussels, 77-90.
- Blondé, F. 1983, *Greek Lamps from Thorikos (Miscellanea Graeca 6)*, Ghent.
- Butcher, S.A. 1982, ‘Late Roman Lamps from a Mine Gallery at Thorikos (with a note on chronology by Dr. Judith Binder)’, in P. Spitaels (ed.), *Studies in South Attica I (Miscellanea Graeca 5)*, Ghent, 137-48.
- Conophagos, C.E. 1980, *Le Laurium antique et la technique grecque de la production de l'argent*, Athens.
- Cremasco, V. and R. Laffineur, ‘The Engineering of Mycenaean Tholoi. The Circular Tomb at Thorikos Revisited’, in P. Betancourt, V. Karageorghis, R. Laffineur and W.D. Niemeier (eds.), *Meletemata. Studies in Aegean Archaeology presented to Malcolm H. Wiener as he enters his 65th Year (Aegaeum 20)*, Liège, 139-48.
- Cullen, T. and D.E. Keller 1989, ‘The Greek Pithos through Time: Multiple Functions and Diverse Imagery’, in W.D. Kingery (ed.), *Ceramics and Civilization V: The Changing Roles and Functions of Ceramics in Society from ca. 26,000 B.P. to the Present*, Westerville, Ohio, 183-210.
- Curtius, E. and J. Kaupert 1887/1895-1903, ‘XVI: Laurion’, in *Karten von Attika*, Berlin.
- Cushing, W.L. 1895-96, ‘The theatre of Thoricus. Supplementary report’, *Papers of the American School of Classical Studies at Athens* IV, 23-24.
- Dermatis, G.N. and K.G. Manthos 2010, Θορικός: To ἀρχαίο Θέατρο – *Thorikos: The ancient theatre*, Lavrion.
- De Smet, S. forthcoming, ‘Hera Teleia at Thorikos. A new reading on the evidence of the so-called Sanctuary of Hygieia at Thorikos’, in *Thorikos* 12.
- Devillers, M. 1988, *An Archaic and Classical Votive Deposit from a Mycenaean Tomb at Thorikos (Miscellanea Graeca 8)*, Ghent.



De Wulf, A., T. Van Herck, M. De Dapper and B.M. De Vliegher 2000, 'Analysis of the efficiency in archaeology of GPS satellite surveying versus classical surveying using total stations: Applications in the Thorikos region and on the Pyrgari (Greece)', in F. Vermeulen and M. De Dapper (eds.), *Geoarchaeology of the Landscapes of Classical Antiquity. Géoarchéologie des paysages de l'Antiquité Classique. International Colloquium Ghent, 23-24 October 1998. Colloque International Gand, 23-24 octobre 1998 (BABESCH Annual Papers on Mediterranean Archaeology, Supplement 5)*, Leuven, 197-207.

Docter, R.F., P. Monsieur, M. Nazou, W. van de Put and K. Van Gelder 2010, 'Thorikos: A Picture in Pottery', in P.P. Iossif (ed.), *All that Glitters... The Belgian Contribution to Greek Numismatics*, Athens, 44-51.

Docter, R., P. Monsieur and W. van de Put 2011, 'Late Archaic to Late Antique finds from Cistern no. 1 at Thorikos (2010 Campaign)', in *Thorikos* 10, 75-127.

Dodwell, E. 1819, *A classical and topographical tour through Greece during the years 1801, 1805 and 1806* Vol. I, London.

Ekroth, G. 2002, *The sacrificial rituals of Greek hero-cults in the Archaic to the early Hellenistic periods* (*Kernos*, Supplement 12), Liège.

Gautier, A. 1967, 'Analyse des restes osseux de l'insula 3', in *Thorikos* III, 72-73.

Hackens, T. 1963, 'Le théâtre', in *Thorikos* I, 105-18.

Hackens, T. 1965, 'Le théâtre', in *Thorikos* III, 75-96.

Iossif, P.P. (ed.) 2010, *All that Glitters... The Belgian Contribution to Greek Numismatics*, Athens.

Jones, J.E. 1984, 'Ancient Athenian Silver Mines, Dressing Floors and Smelting Sites', *Journal of Historical Metallurgy* 18, 65-81.

Jöhrens, G. 1999, *Amphorenstempel im Nationalmuseum von Athen. Zu den von H. G. Lolling aufgenommenen 'unedierten Henkelinschriften'* (Deutsches Archäologisches Institut, Abteilung Athen), Mainz.

Kakavoyiannis, E. 2005, Μέταλλα εργάσιμα και συγκεχωρημένα. Η οργάνωση της εκμετάλλευσης του ορυκτού πλούτου της Λαυρεωτικής από την Αθηναϊκή Δημοκρατία, Athens.

Kapetanios, A. forthcoming, 'Thorikos' Theatre: Retaining Walls – Retaining Chronologies?', in *Thorikos 1963-2013. 50 Years of Belgian Excavations. Evaluation and*



perspectives (BABESCH Annual Papers on Mediterranean Archaeology, Supplements), Leuven/Paris/Bristol, CT.

Karivieri, A. 1996, *The Athenian Lamp Industry in Late Antiquity (Papers and Monographs of the Finnish Institute at Athens V)*, Helsinki.

Kilian-Dirlmeier, I. 1997, *Das mittelbronzezeitliche Schachtgrab von Ägina (Alt-Ägina IV, 3)*, Mainz.

Konstantinidou, A. forthcoming, 'Lighting while Mining. The Late Roman Lamps from Mine 6', in D. Morin (ed.), *Ore Resources, Mining and Territory in the Aegean: The Ancient Mining Complex of Thorikos (Fouilles de Thorikos-Opgravingen van Thorikos V)*, Leuven/Paris/Bristol, CT.

Labarbe, J. 1977, *Thorikos. Les testimonia (Fouilles de Thorikos-Opgravingen van Thorikos I)*, Ghent.

Laffineur, R. 2010a, 'Πολυάργυρος Θορικός. Thorikos rich in silver: the prehistoric periods', in P.P. Iossif (ed.), *All that Glitters... The Belgian Contribution to Greek Numismatics*, Athens, 26-40.

Laffineur, R. 2010b, 'Thorikos', in E.H. Cline (ed.), *The Oxford Handbook of the Bronze Age Aegean (ca. 3000-1000 BC)*, Oxford, 712-21.

Laffineur, R. forthcoming, 'Tomb V at Thorikos Revisited', in N. Papadimitriou, J.C. Wright, N. Sgouritsa, S. Fachard and E. Andrikou (eds.), *Athens and Attica in Prehistory. Proceedings of the International Conference held at Athens, 27-31 May 2015*, Athens.

Le Roy, J.D. 1758, *Les ruines des plus beaux monuments de la Grèce*, Paris.

Lupu, E. 2005, *Greek sacred law. A collection of new documents (NGSL)*, (*Religions in the Graeco-Roman World* 152), Boston and Leiden.

Lüdorf, G. 2000, *Die Lekane. Typologie und Chronologie einer Leitform der attischen Gebrauchskeramik des 6.–1. Jahrhunderts v.Chr.* (*Internationale Archäologie* 61), Rahden.

Mazarakis Ainian, A. 1997, *From rulers' dwellings to temples: architecture, religion and society in Early Iron Age Greece (c. 1100-700 B.C.)*, (*Studies in Mediterranean Archaeology* CXXI), Jonsered.

McCredie, J.R. 1966, *Fortified Military Camps in Attica (Hesperia, Supplement XI)*, Princeton.



- McDonald, W.A. 1961, 'A Geometric Grave Group from Thorikos in Attica', *Hesperia* 30, 299-304.
- Miles, M. 2015, 'The vanishing double stoa at Thorikos and its afterlives', in M. Miles (ed.), *Autopsy in Athens. Recent archaeological research on Athens and Attika*, Oxford, 163-80.
- Miller, W. 1885-86, 'The theatre of Thoricus. Preliminary report', *Papers of the American School of Classical Studies at Athens* IV, 1-21.
- Monsieur, P. 1990, 'Une amphore de Chios au Musée de Tournai', *L'Antiquité Classique* 59, 237-45.
- Monsieur, P. 2008, 'Thorikos (South Attica, Greece): Lamps and Amphorae as Evidence for Mining Activity in Late Antiquity (4th-6th centuries)', poster delivered at the 3rd International Conference on Late Roman Coarse Wares, Cooking Wares and Amphorae in the Mediterranean: Archaeology and Archaeometry, Comparison between Western and Eastern Mediterranean (LRCW 3), 26-30 March 2008, Parma/Pisa.
- Morin, D. forthcoming, 'Early silver mining technologies below the Velatouri. Hand picking and firesetting technologies. A comprehensive approach between traces and technogenesis', in *Thorikos 1963-2013. 50 Years of Belgian Excavations. Evaluation and perspectives (BABESCH Annual Papers on Mediterranean Archaeology, Supplements)*, Leuven/Paris/Bristol, CT.
- Morin, D. (ed.), forthcoming, *Ore Resources, Mining and Territory in the Aegean: The Ancient Mining Complex of Thorikos (Fouilles de Thorikos-Opgravingen van Thorikos V)*, Leuven/Paris/Bristol, CT.
- Morin, D. and A. Photiades 2012, 'L'exploitation des gisements métallifères profonds dans l'Antiquité. Les mines du Laurion (Grèce)', in E. Olshausen and V. Sauer (eds.), *Die Schätze der Erde - Natürliche Ressourcen in der antiken Welt (Stuttgarter Kolloquium zur Historischen Geographie des Altertums* 10, 2008), Stuttgart, 280-335.
- Morris, S.P. and J.K. Papadopoulos 2005, 'Greek Towers and Slaves: An Archaeology of Exploitation', *American Journal of Archaeology* 109/2, 155-225.
- Mountjoy, P.A. 1995, 'Thorikos Mine no. 3: the Mycenaean Pottery', *Annual of the British School at Athens* 90, 195-227.
- Mussche, H.F. 1961, 'La forteresse maritime de Thorikos', *Bulletin de Correspondance Hellenique* 85, 176-205.





- Mussche H.F. 1967, 'Le quartier industriel', in *Thorikos* III, 57-71.
- Mussche, H.F. 1974, *Thorikos. A Guide to the Excavations*, Brussels.
- Mussche, H.F. 1978, *Thorikos. Eine Führung durch die Ausgrabungen*, Ghent/Nuremberg.
- Mussche, H.F. 1986, *Thorikos. Het leven in een oudgriekse mijnstad*, Brussels.
- Mussche, H. 1998, *Thorikos. A mining town in ancient Attika (Fouilles de Thorikos-Opgravingen van Thorikos II)*, Ghent.
- Nazou, M. 2014, *Defining the Regional Characteristics of Final Neolithic and Early Bronze Age Pottery in Attica*, University College London (doctoral thesis).
- Nazou, M. forthcoming 1, 'The Neolithic and the Early Bronze Age pottery from Mine 3 at Thorikos', in *Thorikos 1963-2013: 50 Years of Belgian Excavations. Evaluation and Perspectives (BABESCH Annual Papers on Mediterranean Archaeology, Supplements)*, Leuven/Paris/Bristol, CT.
- Nazou, M. forthcoming 2, *Thorikos Mine 3: The Neolithic and the Early Bronze Age Pottery (Fouilles de Thorikos-Opgravingen van Thorikos IV)*, Leuven/Paris/Bristol, CT.
- Nazou, M., R. Docter, F. van den Eijnde, D. Morin, K. van Liefferinge, W. van de Put, A. Brüsewitz, A. Perugini, S. Mortier, E. Yannouli, L. Karali, L. Verdonck, C. Stal, A. De Wulf, G. Dierkens, T. Pieters, K. Van Gelder, A. Konstantinidou, A. Alexandridou, M. Praet, S. De Smet, S. Claeys and P.P. Iossif 2018, 'Οι αρχαιολογικές έρευνες της Βελγικής Σχολής στο Θορικό (2010-2015)', στο EMENA (επ.) Πρακτικά ΙΣΤ' Επιστημονικής Συνάντησης ΝΑ. Αττικής, 18-22 Νοεμβρίου 2015, Λαύριο. Καλύβια Θορικού, Εταιρεία Μελετών Νοτιοανατολικής Αττικής, 133-40.
- Paepe, R. 1971, 'Geo-electrical prospection of the Temple site area in the Adami Plain', in *Thorikos* V, 9-16.
- Palyvou, C. 2001, 'Notes on the geometry of the ancient theatre of Thorikos', *Archäologischer Anzeiger* 2001/1, 45-58.
- Papadimitriou, N. 2001, *Built Chamber Tombs of Middle and Late Bronze Age Date in Mainland Greece and the Islands (British Archaeological Reports, International Series 925)*, Oxford.
- Papadimitriou, N. forthcoming, 'Ceramic material from Valerios Staïs' excavations at the prehistoric settlement of Thorikos', in *Thorikos 1963-2013: 50 Years of Belgian*



Excavations. Evaluation and Perspectives (BABESCH Annual Papers on Mediterranean Archaeology, Supplements), Leuven/Paris/Bristol, CT.

Pelon, O. 1976, *Tholoi, tumuli et cercles funéraires. Recherches sur les monuments funéraires de plan circulaire dans l'Égée de l'âge du Bronze (III^e et II^e millénaires av. J.-C.)*, (Bibliothèques de l'École française d'Athènes et de Rome, Series Athènes 229), Athens.

Perlzweig, J. 1961, *Lamps of the Roman Period. First to Seventh Century after Christ (The Athenian Agora. Results of excavations conducted by the American School of Classical Studies at Athens VII)*, Princeton.

Petrakos, V. 1995, ‘Θορικός’, *To Ἔργον ἐν Ἀθήναις Ἀρχαιολογικὴς Έταιρείας*, 22-27.

Petrakos, V. 1996, ‘Θορικός’, *To Ἔργον ἐν Ἀθήναις Ἀρχαιολογικὴς Έταιρείας*, 20-23.

Petrakos, V. 1997, ‘Θορικός’, *To Ἔργον ἐν Ἀθήναις Ἀρχαιολογικὴς Έταιρείας*, 19-23.

Petrakos, V. 1998, ‘Θορικός’, *To Ἔργον ἐν Ἀθήναις Ἀρχαιολογικὴς Έταιρείας*, 23-24.

Pieri, D. 2005, *Le commerce du vin oriental à l'époque byzantine (Ve -VIIe siècles). Le témoignage des amphores en Gaule* (Bibliothèque Archéologique et Historique 174), Beirut.

Phialon, L. 2011, *L'émergence de la civilisation mycénienne en Grèce centrale (Aegaeum 32)*, Liège.

Posselt & Zickgraf Prospektionen 2010, *Archaeological-geophysical survey at Thorikos (Lavrion, East-Attica, Greece)*, unpublished report.

Privitera, S. 2013, *Principi, pelasgi e pescatori. L'Attica nella Tarda Età del Bronzo (Studi di Archeologia e Topografia di Atene e dell'Attica 7)*, Athens and Paestum.

Reese, D.S. and C. Sease 1993, ‘Some previously unpublished engraved Tridacna shells’, *Journal of Near Eastern Studies* 52/2, 109-28.

Rihll, T.E. 2001, ‘Making Money in Classical Athens’, in D. Mattingly and J. Salmon (eds.), *Economies beyond agriculture in the Classical world*, London and New York, 115-42.

Robinson, H.S. 1959, *Pottery of the Roman period: Chronology (The Athenian Agora*.



Results of excavations conducted by the American School of Classical Studies at Athens V), Princeton.

Salliora-Oikonomakou, M. 2007, *Lavreotiki: The Lavrion Museum*, Athens.

Sarris, A. (ed), 2015, *Best Practices of GeoInformatic Technologies for the Mapping of Archaeolandscapes*, Oxford.

Sarris, A. 2017, ‘Geophysics’, in A.S. Gilbert (ed.), *Encyclopedia of Geoarchaeology (Encyclopedia of Earth Sciences Series)*, Dordrecht, 323-26.

Scheffer, Ch., A. Tarantola, O. Vanderhaeghe, P. Voudouris, T. Rigaudier, A. Photiades, D. Morin and A. Alloucherie 2017, ‘The Lavrion Pb-Zn-Fe-Cu-Ag detachment-related district (Attica, Greece): Structural control on hydrothermal flow and element transfer-deposition’, *Tectonophysics* 717, 607-27.

Scheffer, Ch., O. Vanderhaeghe, P. Lanari, A. Tarantola, L. Ponthus, A. Photiades and L. France 2016, ‘Syn- to post-orogenic exhumation of metamorphic nappes: structure and thermobarometry of the western Attic-Cycladic metamorphic complex (Lavrion, Greece)’, *Journal of Geodynamics* 96, 174-93.

Servais, J. 1967, ‘Les fouilles sur le haut du Vélatouri’, in *Thorikos* III, 9-30.

Servais, J. 1968a, ‘Le secteur mycénien sur le haut du Vélatouri’, in *Thorikos* I, 27-46.

Servais, J. 1968b, ‘La “Nécropole Sud” sur le Vélatouri’, in *Thorikos* I, 47-58.

Servais, J. and H. Gasche 1971, ‘Les fouilles sur le haut du Vélatouri’, in *Thorikos* V, 17-102.

Servais, J. and B. Servais-Soyez 1984, ‘La tholos ‘oblongue’ (Tombe IV) et le tumulus (Tombe V) sur le Vélatouri’, in *Thorikos* VIII, 15-71.

Spitaels, P. 1978, ‘Insula 3. Tower Compound 1’, in *Thorikos* VII, 39-110.

Spitaels, P. 1982, ‘An Unstratified Late Mycenaean Deposit from Thorikos (Mine Gallery no. 3), Attica’, in P. Spitaels (ed.), *Studies in South Attica I (Miscellanea Graeca 5)*, Ghent, 83-96.

Spitaels P. 1984, ‘The Early Helladic Period in Mine no. 3 (Theatre Sector)’, in *Thorikos* VIII, 151-74.

Staïs, V. 1893, ‘Ἀνασκαφαὶ ἐν Θορικῷ’, *Πρακτικά της ἐν Αθήναις Ἀρχαιολογικῆς Εταιρείας*, 12-17.

Staïs, V. 1895, ‘Προϊστορικοὶ συνοικισμοὶ ἐν Ἀττικῇ καὶ Αἰγίνῃ’, *Ἀρχαιολογικὴ Εφημερίς*, 221-34.



Stal, C. and A. De Wulf forthcoming, '50 Years of Topographical Surveying in Thorikos', in *Thorikos 1963-2013: 50 Years of Belgian Excavations. Evaluation and Perspectives (BABESCH Annual Papers on Mediterranean Archaeology, Supplements)*, Leuven/Paris/Bristol, CT.

Stal, C., K. Van Liefferinge, J. De Reu, R. Docter, G. Dierkens, P. De Maeyer, S. Mortier, T. Nuttens, T. Pieters, F. van den Eijnde, W. van de Put and A. De Wulf 2014, 'Integrating geomatics in archaeological research at the site of Thorikos (Greece)', *Journal of Archaeological Science* 45, 112-25.

The Society of Dilettanti 1817/1833, 'Portico at Thoricus', in *The unedited antiquities of Attica: comprising the architectural remains of Eleusis, Rhamnus, Sunion and Thoricus*, London, 57-60.

Thielemans, S. 1994, 'The Reconstructed Height of a Number of Attic Towers: Some Critical Remarks', in H. Mussche (ed.), *Studies in South Attica II (Miscellanea Graeca 9)*, Ghent, 127-47.

Travlos, J. 1988, *Bildlexikon zur Topographie des antiken Attika*, Tübingen.

van den Eijnde, F. 2010, *Cult and society in early Athens, 1000-600 BCE: Archaeological and anthropological approaches to state formation in Attica*, Utrecht University (doctoral thesis).

van den Eijnde, F., R. Docter, A. Brüsewitz, W. van de Put, S. Mortier, M. Nazou, A. Perugini, A. De Wulf, C. Stal, T. Pieters and L. Verdonck, 'The Ghent-Utrecht Survey Project at Thorikos: Methodology and Preliminary Results of the 2012 and 2013 Campaigns', in *Thorikos 1963-2013: 50 Years of Belgian Excavations. Evaluation and Perspectives (BABESCH Annual Papers on Mediterranean Archaeology, Supplements)*, Leuven/Paris/Bristol, CT.

van de Put, W. forthcoming, 'Houses, Pots and People in Ancient Thorikos', in *Thorikos 1963-2013: 50 Years of Belgian Excavations. Evaluation and Perspectives (BABESCH Annual Papers on Mediterranean Archaeology, Supplements)*, Leuven/Paris/Bristol, CT.

Van Gelder, K. 2011, 'Old excavations near the top of the Velatouri at Thorikos: A revision', in *Thorikos* 10, 15-49.

Van Gelder, K. forthcoming, 'Geometric and Early Archaic Thorikos', in *Thorikos 1963-2013: 50 Years of Belgian Excavations. Evaluation and Perspectives (BABESCH Annual Papers on Mediterranean Archaeology, Supplements)*, Leuven/Paris/Bristol, CT.





Vanhove, D. 2006, *Thorikos. Graffiti, Dipinti, Stamps (Fouilles de Thorikos-Opgravingen van Thorikos III)*, Leuven.

Van Liefferinge, K. 2014, *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*, Ghent University (doctoral thesis).

Van Liefferinge, K. forthcoming, 'Water and the development of silver production at Thorikos and the Laurion', in *Thorikos 1963-2013: 50 Years of Belgian Excavations. Evaluation and Perspectives (BABESCH Annual Papers on Mediterranean Archaeology, Supplements)*, Leuven/Paris/Bristol, CT.

Van Liefferinge K., R. Docter, T. Pieters and F. van den Eijnde 2011, 'The excavation of Cistern no. 1 at Thorikos', in *Thorikos* 10, 57-74.

Van Liefferinge, K., C. Stal and A. De Wulf 2011, 'The Thorikos excavations 1963-2010 in maps', in *Thorikos* 10, 15-50.

Van Liefferinge, K., M. van den Berg, C. Stal, R. Docter, A. De Wulf and N.E.C. Verhoest 2014, 'Reconsidering the role of Thorikos within the Laurion silver mining area (Attica, Greece) through hydrological analyses', *Journal of Archaeological Science* 41, 272-84.

Voudouris, P., V. Melfos, P.G. Spry, T.A. Bonsall, M. Tarkian and C. Solomos 2008, 'Carbonate replacement Pb-Zn-Ag ± Au mineralization in the Kamariza area, Lavrion, Greece: mineralogy and thermochemical conditions of formation', *Mineralogy and petrology* 94, 85-106.

Waelkens, M. 1990, 'Tool Marks and Mining Techniques in Mine No. 3', in *Thorikos* IX, 114-43.





Authors

- AA: Alexandra Alexandridou, Dept. of History and Archaeology, University of Ioannina
- AB: Amber Brüsewitz, Dept. of History, Ghent University
- ADW: Alain De Wulf, Dept. of Geography, Ghent University
- AK: Alexandra Konstantinidou, Independent
- AnK: Andreas Kapetanios, Dept. of History, Ionian University, Corfu
- AnP: Andrea Perugini, Dept. of Archaeology, Ghent University
- AP: Adonis Photiades, Inst. of Geology and Mineral Exploration (I.G.M.E.), Acharnae
- AS: Apostolos Sarris, FORTH Hellas, Laboratory of Geophysical-Satellite Remote Sensing and Archaeoenvironment, Rethymno
- AT: Alexandre Tarantola, GeoRessources Laboratory, University of Lorraine
- CH: Carina Hasenzagl, Dept. of Archaeology, Ghent University
- ChS: Christophe Scheffer, Dept. of Geology, Laval University, Québec/GeoRessources Laboratory, University of Lorraine
- CS: Cornelis Stal, Dept. of Real Estate and Applied Geomatics, Ghent University College/ Dept. of Geography, Ghent University
- DM: Denis Morin, Dept. of Archaeology, University of Lorraine
- EM: Evi Margaritis, STARC Research Center, The Cyprus Institute, Cyprus
- ERA: Emilio Rodríguez-Álvarez, School of Anthropology, University of Arizona
- EY: Eftychia Yannouli, Independent
- FJ: Francis Janot, HISCANT-MA Laboratory, University of Lorraine
- FvdE: Floris van den Eijnde, Dept. of History and Art History, Utrecht University
- GD: Guy Dierkens, Dept. of Archaeology, Ghent University
- JB: Johannes Bergemann, Inst. of Archaeology, University of Göttingen
- KVG: Koen Van Gelder, Dept. of Archaeology, Ghent University
- KVL: Kim Van Liefferinge, Independent





LK: Lilian Karali-Giannakopoulou (em.), Dept. of Archaeology and History of Art, National and Kapodistrian University of Athens

LV: Lieven Verdonck, Dept. of Archaeology, Ghent University

MK: Maria Kayafa, Center of Environmental Education, Lavrion

MN: Margarita Nazou, AEGIS Research Group, Catholic University of Louvain-la-Neuve/ Dept. of Archaeology, Ghent University

MP: Maarten Praet, Dept. of Archaeology, Ghent University

MW: Maud Webster, Independent

NP: Nikolas Papadimitriou, Inst. of Classical Archaeology, Heidelberg University

OV: Olivier Vanderhaeghe, GeoRessources Laboratory, University of Lorraine/GET, University of Toulouse

PM: Patrick Monsieur, Ghent University Museum, Archaeological Collections

PPI: Panagiotis P. Iossif, The Belgian School at Athens/Inst. of Historical, Literary and Cultural Studies, Radboud University, Nijmegen

PV: Panagiotis Voudouris, Dept. of Mineralogy and Petrology, National and Kapodistrian University of Athens

RFD: Roald F. Docter, Dept. of Archaeology, Ghent University

RK: Rebecca Klug, Inst. of Archaeology, University of Göttingen

RL: Robert Laffineur (em.), Dept. of Historical Sciences, University of Liège

SD: Serge Delpech, Ermina National Society

SDS: Silke De Smet, Dept. of Archaeology, Ghent University

SM: Sophie Mortier, Dept. of Archaeology, Ghent University

SoD: Sophie Duchène, Dept. of Archaeology, Ghent University

SyD: Sylviane Déderix, Inst. of Classical Archaeology, Heidelberg University

WvdP: Winfred van de Put, The Netherlands Institute at Athens





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