



## ABSTRACT

### Gold Embroidery

#### *A Sophisticated Technique for Early Mycenaean Swords and Daggers*

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One of the advanced decorative techniques of the Late Bronze Age Aegean is so-called gold embroidery, restricted only to luxurious weapons of the Early Mycenaean period. The technique consists in the dense placement of minute twisted gold bars (or ›threads‹) next to each other in order to give the impression of a mosaic. In the final stage, the craftsman decorated the whole with engraved designs, usually spirals. The present paper presents a detailed discussion on the history of research, the context, chronology and typology of the known examples, and a technical analysis based on archaeometric and experimental data. It is suggested that the use of the technique, which extends across the LH I–IIIA1 period, was reserved for burials of the highest status and was associated with other exclusive metal-working techniques, like inlaid decoration. The technique is unknown in Minoan Crete and the Eastern Mediterranean and, so far, the only possible parallels are to be found in the Wessex and Armorican cultures.

## KEYWORDS

gold embroidery, Early Mycenaean period, Mycenaean weapons, metal-working techniques



# Gold Embroidery

## A Sophisticated Technique for Early Mycenaean Swords and Daggers

<sup>1</sup> For the students of Mycenaean archaeology, it is common grounds that the elite graves of the Shaft Grave period were furnished with masterpieces of advanced aesthetics and technical knowledge: repoussé, filigree, cloisonné and granulation applied on jewellery, weapons and utensils, indicate the high skills of the artisans who made them to honour the distinguished members of their community.

<sup>2</sup> Among these techniques, there is one which is exceptionally delicate and demanding, yet little known so far: gold embroidery. The technique was used for the decoration of luxurious weapons and consisted in the application of minute (< 1 cm) L-shaped gold bars on the organic (ivory or wooden) hilt-plates and pommels of bronze daggers and swords.

<sup>3</sup> Examples of the technique are known from a handful of sites in the Peloponnese (Table 1)<sup>1</sup>. It is possible, however, that more examples lay unnoticed in museum storerooms: the gold particles of this technique are extremely small and not easily discernible without the use of a microscope. Moreover, sometimes they are covered by layers of copper corrosion.

<sup>4</sup> The present paper is meant to provide a detailed archaeological and technological account of 'gold embroidery' and to offer a guide for the safe identification of the technique in future. It has five sections (history of research, contexts, technical analysis, discussion, catalogue) and an appendix on the conservation of gold embroidery. The greatest part of our work was conducted at the National Archaeological Museum of Athens, where the majority of finds are kept. We have also visited the Archaeological Museum of Nauplion to study the fragment DEND 2b, the National Museum of Denmark at Copenhagen to study the sword DEND 2a, and the Archaeological Museum of Chora

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<sup>1</sup> All tables are presented at the end of the paper, pp. 71–74. For the sake of convenience, throughout the paper the examined objects are referred to by their catalogue numbers, as listed in Table 1. Abbreviations: For the provenance of objects: DEND = Dendra; KAK = Kakovatos; MYC = Mycenae; PRO = Prosymna; PYL = Pylos; VAPH = Vaphio; UNP = unprovenanced. – For museums: AMN = Archaeological Museum of Nauplion, Ephorate of Antiquities of the Argolid; AMP = Archaeological Museum of Chora at Pylos, Ephorate of Antiquities of Messenia; NAM = National Archaeological Museum, Athens; NMD = National Museum of Denmark, Copenhagen. Illustration credits are to be found at the end of the paper. In the viewer format of the article, credits are given following each caption.

at Pylos to search for remains of ›gold embroidery‹ in weapons from Early Mycenaean tombs at Pylos, Peristeria and Routsis<sup>2</sup>.

## History of Research

<sup>5</sup> The technique of gold embroidery was first noticed in 1897 by Christos Tsountas on the hilts of weapons from Mycenae and Vaphio<sup>3</sup>. Tsountas identified two versions of the technique: in the first version, minute L-shaped gold bars were used to create motifs on the surface of the hilt; in the second, the gold bars were placed densely next to each other, until they covered the entire surface of the hilt or pommel, and then were decorated by engraving. Tsountas suggested technical solutions for the manufacture of the gold bars and for their fitting on the surface of the hilt<sup>4</sup>. Since there were no known parallels from Crete or Egypt, he proposed that the technique was a Mycenaean invention.

<sup>6</sup> Following Tsountas, other scholars published weapons with gold embroidery and discussed briefly the technique: in 1909, Kurt Müller from Kakovatos tholos tomb B (KAK 1)<sup>5</sup>; in the 1930s, Georg Karo from Mycenae Shaft Graves IV and V (MYC 1–10), and Axel Persson from Dendra tholos tomb (DEND 1)<sup>6</sup>. Both Karo and Persson agreed with Tsountas that the technique was Mycenaean in origin<sup>7</sup>. Persson further noted that it produced the same artistic effect as gold-sheathing but was much more demanding and time-consuming; for him, the technique expressed the mentality that »expenditure in labour increases the value of the product«<sup>8</sup>.

<sup>7</sup> In 1960, Paul Åström and Nikolaos Verdelis, while excavating chamber tomb 12 at Dendra (the ›Cuirass tomb‹), discovered part of a pommel decorated with gold embroidery (DEND 2b)<sup>9</sup>. Åström suggested that the fragment belonged to a type C sword decorated with gold embroidery, which was later acquired by the National Muse-

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<sup>2</sup> We are grateful to the following institutions and colleagues for granting us permission to study material from their collections: the National Archaeological Museum of Athens and especially its Director, Dr Anna-Vassiliki Karapanagiotou, its former Director, Dr Maria Lagogianni-Georgakarakou, the Head of the Department of Prehistoric Antiquities, Dr Konstantinos Nikolentzos, and the Head of the Department of Conservation, Physical and Chemical Research & Archaeometry, Dr Georgianna Moraitou; the Ephorate of Antiquities of the Argolid and especially its Director, Dr Alkestis Papadimitriou; the Ephorate of Antiquities of Messenia and especially its Director, Dr Evaggelia Militsi-Kehagia; the National Museum of Denmark at Copenhagen, and especially its Director, Dr Rane Willersev, the Head of Research in the Department of Ancient Cultures of Denmark and the Mediterranean, Dr Lasse Sorensen, and the Curator of the same department, Dr Stine Schierup. We are also grateful to Dr Sharon Stocker and Prof Jack Davies for sharing with us information about weapons with gold embroidery decoration from the ›Griffin Warrior‹ tomb at Pylos and for giving us the opportunity to have a closer look at the sword. We would also like to thank Dr Liana Philipaki, Laboratory of Palaeoenvironment and Ancient Metals Studies, Institute of Nanoscience and Nanotechnology National Center for Scientific Research »Demokritos«, for the XRF analysis of weapons with gold embroidery, Mr Giorgos Kouros, Chemist at the Department of Conservation of the National Archaeological Museum of Athens, for the radiographies of the specimens listed, Mrs Kalliopi Theodoropoulou for the marvelous drawings, Dr Elina Stamatatou for making the microscopic views of the Dendra sword DEND 2a in the National Museum of Denmark at Copenhagen, and Dr Colin Macdonald for his valuable advice on questions concerning the handles of swords.

<sup>3</sup> Tsountas 1897, 121–124 pl. 7, 3–6. For all the sites mentioned see <https://gazetteer.dainst.org/app/#!/home>.

<sup>4</sup> Tsountas 1897, 123. Tsountas' technical suggestions have been tested experimentally by the authors and the results are discussed in Papadimitriou et al. forthcoming.

<sup>5</sup> Müller 1909, 298 f. Xenaki-Sakellariou has proposed that some flat pieces of gold with bent ends from Tholos A may have also belonged to that technique, Xenaki-Sakellariou 1982–1984, 34.

<sup>6</sup> Karo 1930–1933, cat. nos. 394, 396, 397, 408, 464, 483, 485, 435, 779; Persson 1931, 35 f. 62 f.

<sup>7</sup> Karo 1930–1933, 314; Persson 1931, 62.

<sup>8</sup> Persson 1931, 62 f.

<sup>9</sup> Åström 1977, 18 cat. 28; Verdelis 1977, 55 cat. 12 b (erroneously identified as part of an ivory pyxis).

um of Copenhagen (DEND 2a); according to him, the sword had been removed from the tomb during a looting episode that took place shortly before the excavation<sup>10</sup>.

<sup>8</sup> Nancy Sandars, in her 1960s' analyses of Aegean swords, made passing references to the technique<sup>11</sup>. The first explicit study was made in the 1980s by Agnes Xenaki-Sakellariou<sup>12</sup>. She made a useful catalogue of Mainland examples and classified them to one of Tsountas' two technical styles, dating the first one to ca. 1500 B.C. and the second one to ca. 1400 B.C.<sup>13</sup>. She also discussed Arthur Evans' mention of pieces of »gold plate with minute gold nails« from the Corridor of the Sword Tablets in the Mycenaean palace of Knossos, which nevertheless remains unverified (see below)<sup>14</sup>. She concluded that gold embroidery was invented in the Argolid, most likely at Mycenae<sup>15</sup>.

<sup>9</sup> In 1993, Robert Laffineur mentioned the technique in his article on the art of the Shaft Grave period<sup>16</sup> and in 1998, Thanassis Papadopoulos discussed gold embroidery as part of his study on Early Mycenaean daggers<sup>17</sup>. Papadopoulos was the first Aegean scholar to discuss possible links with a similar technique attested in the Wessex culture of Southern England and the Armorican culture of NW France<sup>18</sup> – a topic which had been addressed by several specialists on the European Bronze Age<sup>19</sup>.

<sup>10</sup> The most recent discovery was made in 2015 by Jack Davis and Sharon Stocker at the »Griffin Warrior« tomb of Pylos. Among hundreds of finds, two objects were decorated with gold embroidery: a well-preserved type C sword and a dagger<sup>20</sup>. Finally, in 2020 Bernhard Steinmann associated a number of stray L-shaped gold bars from Prosymna chamber tomb 2 with other finds from the same tomb and attributed them to the hilt of a type C sword with gold embroidery<sup>21</sup>.

<sup>11</sup> The authors started working on this technique in 2014. So far, they have published two brief papers, where they discuss technical matters and possible relations with Wessex and Armorican examples<sup>22</sup>. A longer paper describes the experimental reconstructions of the technique made by Akis Goumas, based on microscopic observations and archaeometric analysis of objects decorated with gold embroidery<sup>23</sup>. Finally, they prepare a paper with archaeometric data deriving from XRF and SEM-EDX analyses of objects decorated with gold embroidery<sup>24</sup>.

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<sup>10</sup> Åström 1967, 65; Åström 1972, 47. 49 f.; Dietz et al. 2015, 21 (cat. 10) fig. 1. Another sword in the Copenhagen Museum seems to come from Dendra chamber tomb 12 as well, Dietz et al. 2015, 22 (cat. 11).

<sup>11</sup> Sandars 1961, 26; Sandars 1963, 120.

<sup>12</sup> Xenaki-Sakellariou 1982–1984; see also Xenaki-Sakellariou 1984, 135–137.

<sup>13</sup> Xenaki-Sakellariou 1982–1984, 31–34. The examples of the first version correspond to our MYC 1 and MYC 4. Six out of the seven examples of the second version correspond to our MYC 11, DEND 1, DEND 2, MYC 12, VAPH 1 or 2 (unclear) and KAK 1b (note that the KAK 1b gold bars come from Kakovatos tholos B, not tholos C as erroneously mentioned in Xenaki-Sakellariou 1982–1984, 34 cat. 6). The seventh example is a gold bar from Mycenae chamber tomb 93, which has been mentioned by Tsountas but never located since then. The »possible example« mentioned in Xenaki-Sakellariou 1982–1984, 34 cat. 1 corresponds to our MYC 3.

<sup>14</sup> Evans 1935, 854.

<sup>15</sup> Xenaki-Sakellariou 1982–1984, 36–38.

<sup>16</sup> Laffineur 1993, 273 n. 104.

<sup>17</sup> Papadopoulos 1998, 42 f.

<sup>18</sup> Papadopoulos 1998, 43. 49.

<sup>19</sup> E.g. Reinecke 1902, 110 f.; Piggott 1938, 95; Gerloff 1975, 88; Gerloff 2007, 137–139; Gerloff 2010, 629 f.; Gallay 1981, 118; Harding 1990, 148; for a recent summary, see Papadimitriou et al. 2021 ([https://www.academia.edu/45636149/A\\_demanding\\_gold\\_working\\_technique\\_attested\\_in\\_Armorican\\_Wessex\\_and\\_Early\\_Mycenaean\\_funerary\\_contexts\\_2021\\_](https://www.academia.edu/45636149/A_demanding_gold_working_technique_attested_in_Armorican_Wessex_and_Early_Mycenaean_funerary_contexts_2021_)).

<sup>20</sup> Davis – Stocker 2016, 635 for the sword; the discovery of a dagger with gold embroidery has not been officially reported yet but was kindly communicated to us by the excavators, to whom we are mostly grateful.

<sup>21</sup> Steinmann 2020, 388 f.; see also Steinmann 2012, 150; the gold bars had been first identified as belonging to gold embroidery decoration in Xenaki-Sakellariou 1984, 136 n. 47.

<sup>22</sup> Konstantinidi-Syvidi et al. 2014, 341–343 ([https://www.academia.edu/11889250/Goldworking\\_techniques\\_in\\_Mycenaean\\_Greece\\_17th\\_16th\\_12th\\_century\\_BC\\_some\\_new\\_observations](https://www.academia.edu/11889250/Goldworking_techniques_in_Mycenaean_Greece_17th_16th_12th_century_BC_some_new_observations)); Papadimitriou et al. 2021.

<sup>23</sup> Papadimitriou et al. forthcoming.

<sup>24</sup> Filippaki et al. forthcoming.

## Contexts

- 12 Gold embroidery has been identified on 6 sites and in 10 different contexts<sup>25</sup>:
- Mycenae: Shaft Graves IV (MYC 1–8) and V (MYC 9–10), chamber tombs 78 and 81 (MYC 11–12)
  - Dendra: tholos tomb (DEND 1) and chamber tomb 12 (DEND 2)
  - Prosymna: chamber tomb 2 (PRO 1)
  - Vapheio: tholos tomb (VAPH 1–2)
  - Kakovatos: tholos tomb B (KAK 1)
  - Pylos: ›Griffin Warrior‹ tomb (PYL 1–2).
- 13 In addition, at the National Archaeological Museum there are two groups of detached L-shaped gold bars and small fragments with gold embroidery, which have no recorded provenance (UNP 1–2).
- 14 There are also two unverified contexts: Mycenae, chamber tomb 93, and the Corridor of the Sword Tablets at the Palace of Knossos. They are discussed below but not included in the contextual analysis.

## Mycenae

### Grave Circle A, Shaft Grave IV

- 15 Shaft Grave IV was the largest and richest tomb of Grave Circle A<sup>26</sup>. It was built at a depth of ca. 8 m from the surface, with internal dimensions 6.55 m × 4.10 m and a height of ca. 2 m.<sup>27</sup> The tomb held the largest number of precious vessels, an abundance of swords, two inlaid daggers, gold jewellery and objects of faience and semi-precious stones, as well as three gold masks and a breastplate<sup>28</sup>.
- 16 The five burials of tomb IV, i.e. three male and – possibly – two female burials<sup>29</sup>, have been named by Stamatakis as Ε, Ο, ΙΙ, Ρ and Σ<sup>30</sup>. Two of the weapons decorated with gold embroidery, namely a long type B sword (MYC 1, Fig. 1) and the famous inlaid dagger with the hunting scene (MYC 3, Fig. 3), belonged to the most grandiose burial (Ο), the youngest male, less than 20 years old, to whom are attributed over 50 swords, other weapons and precious vessels like the famous Siege Rhyton and the silver ›Battle crater‹ found with 14 lavish vessels inside it<sup>31</sup>.
- 17 More objects decorated with gold embroidery have been found in tomb IV: two tangless daggers with spiraliform motifs (MYC 4–5, Fig. 4. 5), the handle of a type B sword (MYC 2, Fig. 2), several detached rivets from at least 3 weapons (MYC 6–7, Fig. 6. 7) and a sword's pommel preserving remains of the tang and hilt underneath (MYC 8, Fig. 8). Unfortunately, none of them was attributable to a specific burial.

25 The catalogue items have been inventoried by the first letters of the provenance site (MYC for Mycenae, KAK for Kakovatos, VAPH for Vaphrio, PYL for Pylos, PRO for Prosymna, DEND for Dendra) and UNP for unknown provenance.

26 For the dating of Grave Circle I, see among others Dickinson 1977, 46–51; Graziadio 1991, 430–437; Dietz 1991, 247–250.

27 Karo 1930–1933, 17 n. 2.

28 Demakopoulou 1990, 98.

29 Papazoglou-Manioudaki et al. 2010.

30 Panagiotis Stamatakis, supervisor of Schliemann's excavations at Mycenae, has left an invaluable manuscript which forms part of the NAM's archives, Konstantinidi-Syvridi – Paschalidis 2019.

31 Konstantinidi-Syvridi – Paschalidis 2019, 120 f.