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СТАРИНАР



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фото: Горан Стојић

Sur la couverture: La quenouille en ambre, Viminacium,
fin du II^{e} – commencement du III^{e} siècle
Photo: Goran Stojić



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THE MOULDS FROM VELEBIT AND EUROPEAN BRONZE AGE METAL ANVILS

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Abstract – During the first excavations of the cemetery dating from the Bronze Age and Early Antiquity in the village of Velebit near Kanjiža (Northern Serbia) one of the excavated artefacts was found to belong to a used and broken stone mould for casting anvils. However, without an expert archaeologist to supervise the recovery of this find, which remained unknown for decades after its discovery, as a starting point, the authors of this article present a synthesis that takes into account several aspects of this significant class of metalcraft object. This proceeds from the history of the excavation to the general role of European Bronze Age anvils in gold and bronze metalworking, and then further on to their typological, terminological, chronological and functional analysis and to their long-range distribution as a sign of an interregional network of craftsmen, including their social context and symbolism.

Key words – Bronze Age, Carpathian Basin, Tumulus Culture, anvils, moulds, jewellery, metallurgy

THE CONTEXT OF THE MOULDS FROM VELEBIT

During the Middle Bronze Age, according to N. Tasić,[1] or Br B-C according to R. Vasić,[2] or developed Bronze Age according to A. Bulatović, V. Filipović and R. Gligorić,[3] the first finds of the Tumulus culture (*Hügelgräberkultur*) appeared in the territory of Northern and North-Western Serbia. The process of the spread of these influences began from the Carpathian Basin and developed in two geographical areas (groups), the first being northern Bačka and Banat, whereas the second extended to the Danube Basin,[4] The Drina and the Western Morava river valleys (Map 1).[5] Cemeteries of the first group are characterised exclusively by flat graves without barrows, while in the territory of the second group barrows occur regularly. In relative terms, the necropolis at the modern village of Velebit, near (ca. 14 km NNW) the town of Kanjiža (Senta county, Vojvodina Province), represents the best investigated cemetery site of the Tumulus culture in the territory of Serbia, bordering the influence zone of the Belegiš culture and sharing certain traits and elements with better investigated cemeteries under the barrows, which are usually in The Drina and the Western Morava river valleys (Western Serbia).

* During the research and writing of this topic, Raško Ramadanski was working as an archaeologist in the Town Museum in Senta, and provided the archaeological material from the Velebit site, with the support of Rastko Vasić, to Albrecht Jockenhövel and Alexsandar Kapuran, after the finds had spent forty years in relative obscurity. Jockenhövel was then able to persuade Barbara Armbruster to collaborate on this study.

1 Tasić 2004: 31.

2 Vasić 2003: 3.

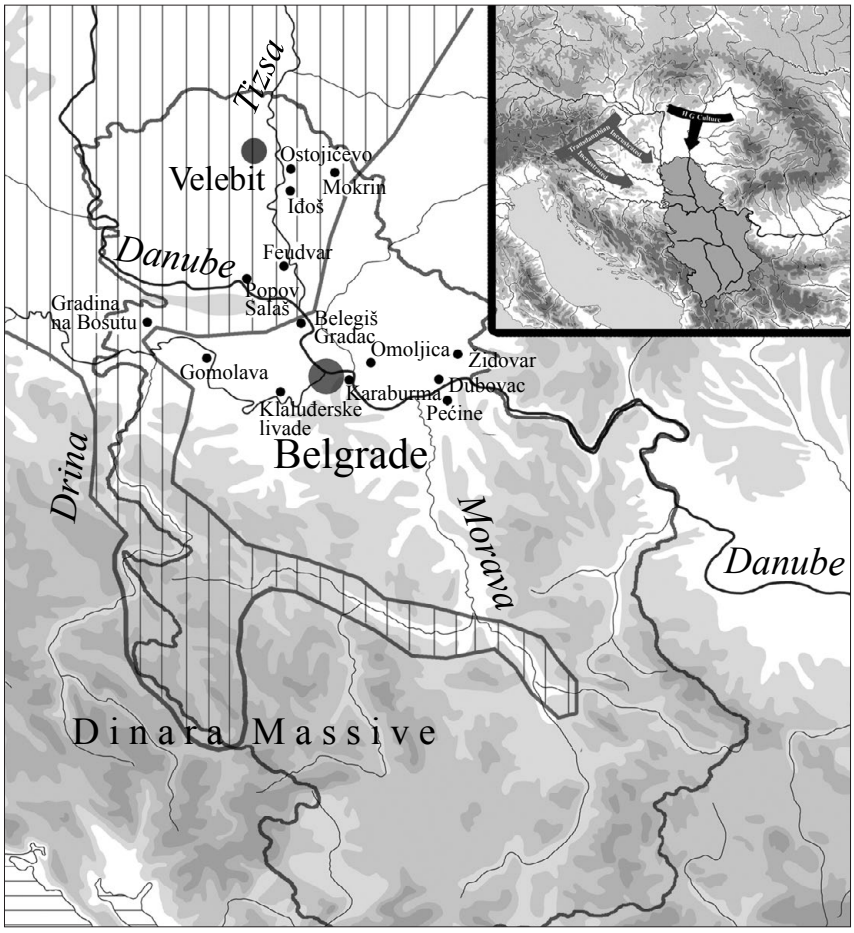
3 Булатовић, Филиповић, Глигорић 2017: 53.

4 Tasić 1974: 234

5 Tasić 1974: 234

The paper represents a result of the ОИ 177020 project *Arheologija Srbije: Kulturni identitet, integracioni faktori, tehnološki procesi i uloga centralnog Balkana u razvoju evropske praistorije* (*Archeology of Serbia: Cultural Identity, Integration Factors and the Role of the Mid-Balkans in the Development of European Prehistory*).

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Map 1. Tumulus culture (Hügelgräberkultur) penetration into the Central Balkans

Карта 1. Продор културе тробних хумки на простор централног Балкана

The site of the Velebit cemetery

During construction of a major road in the village of Velebit, small scale archaeological excavations were carried out in the mid-1950s that, despite their limited extent, provided significant finds. The further need for extending the road infrastructure in the village, as well as financial support from the Smithsonian Institute (Washington D. C, USA),[6] led to systematic archaeological excavations in 1970 when the site was investigated to the fullest possible extent. During the Bronze Age, a biritual burial rite (inhumation and cremation) was practiced at the Velebit cemetery[7] (Fig. 1; 2). During these excavations in 1970, a total of 108 graves were discovered, of which 77 are from the Bronze Age, including 43 cremation and 34 inhumation burials. The remaining 31 graves are from Late Antiquity and described as Sarmatian from the 4th century AD (Plan 1).[8]

The most representative of Bronze Age inhumation burials at the site is grave No 7 with rich bronze objects (Fig. 1) (Plate 1). Grave 7 is also interesting because of two large pottery vessels that typologically correspond to the Tumulus culture. Another representative example of a Bronze Age skeletal burial at the Velebit site is grave No. 80,[9] where a pair of *Regelsbrunn* type greaves (Plates 2/12.13), a typical Belegiš culture beaker, two lunular pendants (Plate 1/6), bronze sheet metal applications (Plate 1/10) and three spirally bent wires, most likely rings, were found (Plate 1/3).[10] Inhumation grave No. 94 contains two *Petschaftkopfnadeln* type pins (Plates 2/8.9) and a large belt made of thin hammered bronze sheet metal.[11]

A characteristic example of a cremation grave at the Velebit site is grave No 14 (Fig. 3) (Plate 1/12; 3/5.6), (Plate 1/12; 2/2). Cremation grave No 33 is also

[6] Tasić 1974: 235; Тасић 1983: 87; Sekereš 1971; Kapuran 2018.

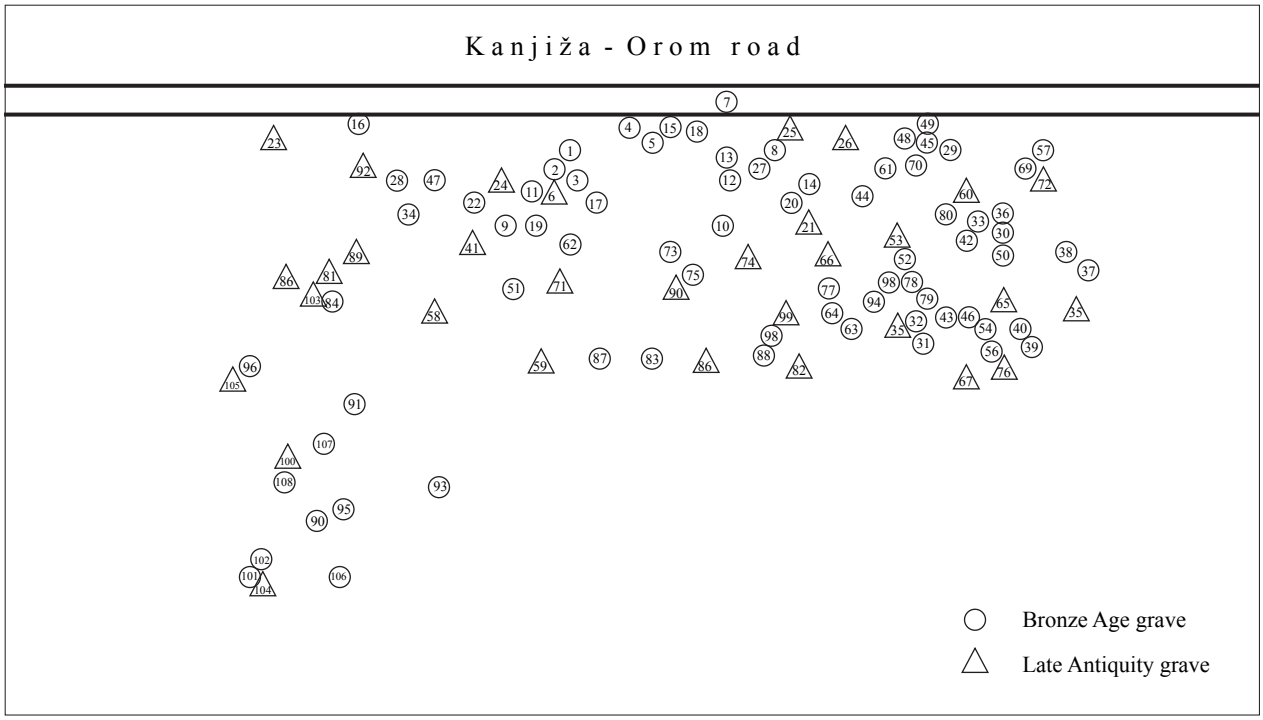
[7] Tasić 1974: 235.

[8] Sekereš 1971; Kapuran 2018.

[9] Kapuran 2018.

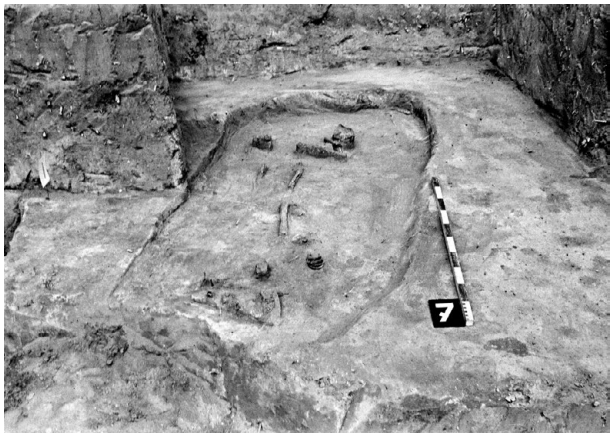
[10] Ibid.

[11] Ibid.



Plan 1. Velebit. Plan of the cemetery

План 1. Распоред гробова на некрополи Велебит



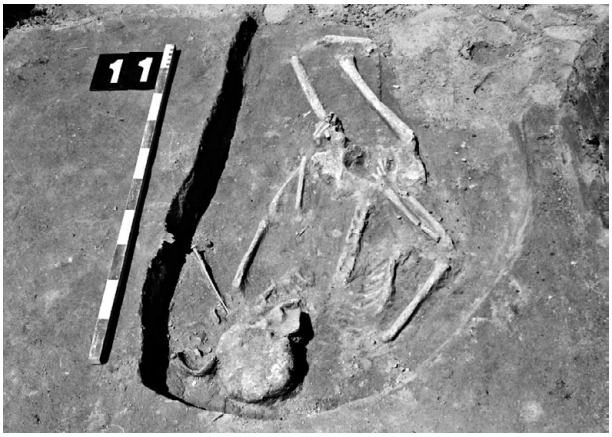


Fig. 1. Velebit. Inhumation grave No. 7. Extended body
Fig. 2. Velebit. Inhumation grave No. 11. Contracted body

Сл. 1. Велебит, гроб бр. 7:
скелетно сахрањен покојник у испруженом положају
Сл. 2. Велебит, гроб бр. 11:
скелетно сахрањен покојник у згрченом положају



Fig. 3. Velebit. Cremation grave No. 14

Сл. 3. Велебит, гроб бр. 14: гроб спаљеног покојника

interesting, mostly due to the fact that three typologically different beakers were discovered. While the first two are characteristic of the *Hügelgräber* culture (Plates 3/3.4), the third is a typical example of a so called „Pannonian" beaker and is part of the Belegiš culture (Plate 3/2). In contrast, the cremated remains were put in a rustic shaped urn of a relatively rough surface (Plate 3/7).

While the pottery production discovered at the Velebit necropolis manifests characteristics of the „Carpathian" variant of the Tumulus culture, which spread along the Tisza River towards the south of Pannonia, the assemblage of bronze products shows characteristics of the Kozsider bronze production from the Middle Bronze Age.[12] The same can be stated for the jewellery used to adorn the bodies at the Velebit cemetery, which differ only slightly from the usual assemblage of jewellery from the graves of similar Tumulus culture cemeteries in the Carpathian basin.

The moulds

Besides the attractive finds of jewellery and pottery discovered at the Velebit cemetery, one of the most significant finds are certainly a group of sandstone moulds (Plate 5), for which the context of finding still remains unclear, since they were discovered in the summer of 1954 when small scale excavations by the Senta Town Museum (Gradski muzej) were conducted, but without the supervision of an expert archaeologist. Consequently, it was never clear whether they represent grave goods, or belong to a hoard (perhaps to a so called „grave-hoard") or belong to an as yet undiscovered settlement in the vicinity of the site that existed at the time as the cemetery. All the moulds were made of sandstone, which is suitable for the engraving of negatives that were cast. Sandstone is a very common material for casting and easy accessible in various geological formations and locations, also in the Pannonian and Carpathian regions.[13] Some specimens have burnt edges around the negatives caused by high temperatures during the direct casting of molten bronze (Fig. 4/1–3). Most of the moulds of the Velebit complex are damaged and they could not be used for further castings.

Mould 1 a. b: a two part (bivalve) mould with negatives for the simultaneous casting of two lunular pendants (Fig. 4/2; 5/2–4; Fig. 4/1; 5/1. 2; Pl. 4/6a, 6b) that are typologically close but not the same as the pendants from grave No 80 (Plate 1/6). [14] The first part of this bivalve mould (Plate 4/6a) measuring 12 x 7 x 2 cm, was bifacial, or had a dual function, since its reverse side contained another, very damaged negative, for which we can only assume the shape of a socketed axe (Plate 4/1). Besides the pendant negatives, it contains two dowel-holes. The other part of the mould (Plate 4/6b) measuring 11.5 x 8.5 x 2 cm, also contained two dowel-holes. This stone mould, used to cast three lunular pendants that would have been typologically identical to pendants from Velebit grave 80, is almost identical to the double Mould 1 from the Velebit necropolis, and is kept today in the Museum of Subotica (Fig. 5/3).[15] From the territory of Eastern Serbia comes one more mould, discovered on the banks of The Danube in 1971, in the course of archaeological surveys at the Velesnica site (Fig. 5/1).[16] Lunular and heart-shaped pendants had an important role in the costume fashion of the Bronze Age, besides the large number of these pendant finds, they can also be indirectly observed on examples of the numerous anthropomorphic clay idols from that time.

Mould 2: The fragmented mould (Plate 4/5; Fig. 5/4) measuring 8.5 x 7 x 3 cm, seems to have served for the casting of bronze sickles. We assume this on the basis of the negative shape, which shows an elongated banded form of a handle of thin cross-section and a ribbed pattern. This assumption is strengthened by another fragmented mould (Plate 4/4) measuring 5.5 x 8 x 3 cm, in which the negative has an arched shape with a rib along the sharp edge. It also has the same thickness as the previously described mould, so we assume that they could together represent part of a larger mould for casting sickles, as indicated by one specimen discovered in Romania.[17]

Mould 3: An elongated mould measuring 7 x 3.5 x 3 cm, has a negative in the form of a pin with a seal shaped head or broadening (Fig. 4/3; Plate 4/1). The second oval broadening located below the first one may have been decorated with a sequence of parallel cannelures. Perhaps a mould like this could have served for the casting of a pin found in the Beltiug hoard in Romania. [18]

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[12] Kovács 1975: 43,44.

[13] See Soltvaldkert (Bács-Kiskun, Hungary) hoard: Gazdapusztai 1959.

[14] Bader 1978: pl. LXXXVI/5.

[15] Tasić 1974: 239/146.

[16] Васић, Ерцеговић-Павловић, Миниħ 1984: Сл. 110/4.

[17] Bader 1978: pl. LXIII/12.

[18] Bader 1978: 120, pl. LXXVII/15.



Fig. 4. Velebit. Sandstone moulds from an unknown area of the cemetery

Сл. 4. Велебиш, калуши од камена йешчара са некройоле

Mould 4: Mould 4 has an elongated form measuring 12.5 x 3 x 3 cm, for which we assume that it also served for casting some kind of pin shaped objects, containing three additional grooves that intersect the negatives at a 90° angle (Plate 4//5; Fig. 4/5). It is possible that this kind of mould was also used for the casting of the body of the *Blattbügel* type of fibulae dating in the Early Hallstatt (Ha A) period. [19] One mould from the Soltvaldkert (Bács–Kiskun, Hungary) hoard, has a negative that shows two pins connected with a channel at a 90° angle.[20]

Mould 5: This mould (Plate 4/3; Fig. 4/4) is small (measurement: 3.5 x 4 x 2.5 cm), and could have served for the casting of objects in the form of nails. It is possible that this mould was used as an auxiliary tool in a further metallurgic process, in the course of casting certain complex objects, or that it represented a small tool for decorating other bronze objects.

Mould 6: The last example from this group of moulds and the most interesting one measures 9 x 8 x 4 cm, and served for casting an anvil (Fig. 4/2; 5/4.5; 12/7). The negative shows that the anvil had a spike on one side probably not for fixing into a wooden support but for banding wire-shaped jewellery,[21] as seen on the specimen discovered in Fresné-la Mère (Fig. 13/10). The upper part of the Velebit anvil has a triangular shape. Moulds for casting anvils belong to rare finds of Bronze Age mould assemblages. Additionally, anvils are not easy to identify, especially when the moulds in which they were cast are fragmented. Anvils had a major role in various crafts and were necessary for plastic shaping techniques and the final treatment of objects after their casting. Without them, the processing of ingots into sheet metal shaped jewellery would hardly be possible, as a strong and flat support is necessary for forging. We assume that the belt from grave 94 could not have been properly made without such a small anvil, necessary for forging and decoration.

As stated earlier, during the Kozsider horizon in the Middle Bronze Age there was a significant expansion in jewellery and weapon production, especially those of

[19] Kytlicová 2007: 38, 256, pl. 178/B2.
[20] Gazdapusztai 1959: pl. IV/6–7.
[21] Tylecote 1987: 265, Fig. 7.19.

copper and tin alloys. Such a need for bronze products must have driven a certain social stratification based on metal smith crafts performed by Middle Bronze Age societies in Europe. Numerous sites have been found in the Alps, Carpathians, Eastern Serbia, and Western Bulgaria, at which traces of copper, and more rarely tin, were discovered. All tin ore deposits in Europe have been known to geologists for a long time, as well as in vicinities of the Cer and Bukulja mountains in Western Serbia.[22] It is assumed that the trade and exchange of tin and antimony led to the integration of the Tumulus culture during the Kozsider period.[23] Although animal husbandry and farming were still dominant in the economy, the rise of certain societies specialised in mining and metallurgy for the purpose of metal production is evident. Such societies are, among others, identified thanks to several decades of archaeological research conducted through the project „Research of



Fig. 5. Bronze Age stone moulds: 1) Velesnica; 2, 4, 5) Velebit; 3) Subotica

Сл. 5. Калуйи од камена: 1) Велесница; 2, 4, 5) Велебиш; 3) Суботица

ancient mining and metallurgy in the Timok eruptive basin" in the area of north-eastern Serbia, in the vicinity of Bor.[24]

In the territory of South-eastern Europe, moulds for bronze casting were found in the context of settlements, hoards, and rarely in burials.[25] Indirect evidence for the separation of metalworking as a specialised branch of the economy during the Middle and Late Bronze Age, beside burials with metalworking tools, is also provided by hoards containing moulds. B. Nessel assumed upon her analysis of burial assemblages tied to metallurgy in Central Europe, that there is no evidence that metalworkers enjoyed special social status in these communities, but rather they were fully integrated and respective members of the communities.[26] This was perhaps the case because of the fact that many members of these societies participated in the metalworking process, so it was not felt necessary to specially accentuate their role in funeral rites.[27]

The closest analogies to the mould hoard from the site of the Velebit necropolis is the site of Soltvaldkert (Bács–Kiskun) in Hungary, where 41 sandstone moulds for the casting of bronze objects were discovered in a pit, about 0.9 m deep.[28] Also, close to the Velebit necropolis, identical hoards of clay and stone moulds were discovered at the site of Şagu Site „A1–1" in Western Romania (Lower Mureş valley), although that context is chronologically somewhat younger, and corresponds to the Br D–Ha A1 period.[29] In the vicinity there is one more chronologically younger hoard of casting moulds from the Early Iron Age (8th–7th century BC) discovered at the site of St. Peter of Ludberg in Croatia.[30]

Relative and absolute chronology of the site

B. Hänsel and T. Kovács assume that finds of the Tumulus culture in the Carpathian Basin appear over a large time span from Br B1 to Br D (or during the phases MD II, MD III/SD I).[31] In the „Prehistory of Vojvodina", published nearly half a century ago, N. Tasić proposed that the sites of *Hügelgräberkulrur* in the surroundings of Subotica should be put a in chronological framework from the end of 14th to the beginning of the 13th century BC.[32] Vasić assumes that the same culture in Serbian territory can be determined in the Middle Bronze Age, or Br B and Br C,[33] which chronologically corresponds to the period between 1600/1500–1200 BC, and its second phase, as suggested by Tasić.[34] There are certain divisions of the Bronze Age according to which the Tumulus Hügelgräber culture in the Danube Basin is simultaneous to MD III, and does not start before the end of Br B1, or lasts between 1500–1300 BC,[35] with which F. Falkenstein also agrees.[36]

Turning to recent absolute dates obtained for sites in Serbia, we can say that previously stated relative chronologies did not diverge much from the results obtained by absolute dating. The first result is related to an AMS date from the central grave of mound XVIII at the site of Paulje, which shows the span of 1415–1278 cal BC with 95.4% confidence. [37] It means that the grave from Paulje certainly belongs to the mid-14th century BC.[38] Another absolute date is from the Velebit necropolis. An acquired date of 3061±25, with a modelled span of 1407–1236 cal BC, with 95.4% confidence[39] means that the incineration grave from grave 107 at the Velebit cemetery most certainly belongs to the 14th–13th century BC, similar to the grave from mound XVIII at Paulje. This tells us that the relative dates for *Hügelgräberkultur* in the north of Vojvodina, proposed by Tasić, were closest to the absolute dates obtained at the sites of Velebit and Paulje.

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[22] Powell at al. 2018; Durman 1997; Valera, Valera 2003.

[23] Sánta 2013: 82.

[24] Kapuran 2014: 64–66.

[25] Jockenhövel 2017: 53.

[26] Nessel 2013: 144,145; with differentiation Jockenhövel 2018: 276–277; 313.

[27] Nessel 2013: 144.

[28] Gazdapusztai 1959: Taf. IV/6–7; Hänsel 1968: 233; Mozsolics 1973: 80.

[29] Sava and Andreica 2013: 69.

[30] Šimek 2004: 92, 96.

[31] Hänsel and Kovács 1986: 69.

[32] Tasić 1974: 240.

[33] Vasić 2003: 3; Vasić 2010: 3.

[34] Tasić 2004: 31.

[35] Hänsel 1968: 143, 170.

[36] Falkenstein 1998: fig. 10.

[37] Gligorić, Filipović, Bulatović 2016: 105.

[38] Gligorić, Filipović, Bulatović 2016: 105.

[39] Kapuran 2018; The team engaged in the AMS dating procedure was comprised of: Molnár M, Riny L, Veres M, Seiler M, Synal H-A, Environ MICADAS: a mini 14C AMS with enhanced Gas Ion Source Interface in the Hertelendi Laboratory on Enviromental Studies (HEKAL) Hungary. Radiocarbon Vol 55, Nr 2–3 2013, p. 338–344. Molnar M, Janovic R, Major I, Orsovszki J, Gönczi R, Veres M, Leonard AG, Castle SM, Lange TE, Wacker L, Hajdas I, Jull AJT. Status report of the new AMS C14 sample preparation lab of the Hertelendi Laboratory of Enviromental studies (Debrecen, Hungary) Radiocarbon, Vol 55, Nr 2–3 2013, p. 665–676.

THE ANVIL MOULD FROM VELEBIT AND EUROPEAN BRONZE AGE METAL ANVILS

History of research

From the second half of the 19th century, Bronze Age metal anvils were discovered and published.[40] V. G. Childe published a short study on the anvil of Inshoch Wood (Scotland) (no. 121; Fig. 11/2) including metal analysis.[41] In 1975 J. Nicolardot and G. Gaucher provided a variant-rich typology based on French anvils, which was simplified by M. R. Ehrenberg (1981).[42] Namely, she listed a total of 36 Bronze Age anvils from Europe. On the basis of ca. 60 anvils, D. Jantzen (2008) classified them by physical and functional criteria.[43] Recently, regional studies on anvils have been published in Italy, including Sardinian anvils, as well as Moravia and Romania.[44]

Remarks on stone anvils

More than fifty years ago, J. J. Butler and J. D. van der Waals identified several small rectangular flat stones as metalworking tools, mostly dated as early as the Bell Beaker Culture and the Early Bronze Age of Central and Western Europe.[45] Such stone anvils gradually became significant elements in tool kits of gold, silver and coppersmiths. The anvils of the Amesbury Archer (or „King of Stonehenge") (Wessex, England) and of the „Chief of Leubingen" (Saxony-Anhalt, Germany) became well known a so called „cushion stones" (German: *Kissensteine*).[46] Several recent studies provided evidence for stone tools in the context of metalworking during the Bell Beaker period but also during the rest of the European Bronze Age when bronze tools were predominantly in use.[47] Some specimens of stone tools featuring flat or flat and curved sides and working faces or with prominent and slightly rounded edges and corners are supposed to have been anvils of the Middle and Late Bronze Age. A small stone anvil made of serpentine, embedded in a wooden stump, was found in the Late Bronze Age lake village of Mörigen (Switzerland), where bronze socketed hammerheads were also discovered.[48] Another combination of bronze and stone tools for metalworking appears in the Late Bronze Age hoard of fine metalworking tools from Génelard (Burgundy, France). It consists of several bronze socketed hammerheads and anvils (no. 28–31) and includes a hammer shaped like a stone axe head (Fig. 18).[49] Large and heavy stones were presumably also used as anvils.[50] In that regard, B. Armbruster observed West African blacksmiths of the Dogon community constructing their smithy around an *in-situ* rock which they used as an anvil.[51] A forging tool set consisting of a stone anvil and hammer, associated with moulds and scrap metal, is known from House 1 at the Early Bronze Age settlement of Çukuriçi Höyük (Western Anatolia).[52] It is possible that hardwood blocks were also used as anvils. It is additionally possible that such „archaic" installations were also common in Bronze Age Europe. However, by the Late Bronze Age, „cushion stones" disappeared from the inventory of metalworkers.

List of Bronze Age metal anvils

Abbreviations: E = Ehrenberg 1981; J = Jantzen 2008; N/G = Nicolardot/Gaucher 1975; G = grave; H = hoard; R = river find; S = settlement; W = wetland find

Austria (A)

1. Augsdorf (H), Carinthia (Müller-Karpe 1959: 278 [no. 21], pl. 129, 21) (Fig. 16/1)

2. Hallstatt (G; Grave 283) (G), Upper Austria (Kromer 1959: 82, Fig. 50, pl. 44, 8 [*iron*]) (Fig.7/8)

3. Sipbachzell (H), Upper Austria (Höglinger 1996: 111, pl. 1, 2 (Fig. 14/7)

Bosnia and Herzegovina (BiH)

4–6. Boljanić 1–3 (H), Doboj (König 2004: 191, no. 3 [39. 40. 41], pl. 17, 39–41) (Fig. 12/3; 15/6. 7)

Czechia (CZ)

Bohemia

7. Jarpice (H), okr. Kladno (Kytlicová 2007: 267 no. 66 [5], pl. 145, B 5) (Fig. 16/2)

8. Újezd (H), okr. Písek (Kytlicová 2007: 311 no. 345, pl. 1, B 12) (Fig. 7/1)

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[40] Chantre 1875; Evans 1881; Gross 1883; Hampel 1886; von Miske 1908; Coutil 1912; Müller 1920; Ohlhaver 1939.

[41] Childe 1945/46.

[42] Nicolardot/Gaucher 1975; Ehrenberg 1981.

[43] Jantzen 2008: 253–259. 326–333.

[44] Iaia 2014; Lo Schiavo 2018; Salaš 2014; Medeleț 1995; Gogâltan 2005.

[45] Butler/van der Waals 1966.

[46] Fitzpatrick 2011; Bertemes 2004.

[47] Bátora 2002; Armbruster 2006; idem 2010; idem 2012; Brandherm 2010.

[48] Gross 1883: 45, pl. 27, 17.

[49] Thevenot 1998; Armbruster 2008.

[50] A. Müller-Karpe 1994: 159.

[51] Armbruster 1995: 120, fig. 2; idem 2001, 13.

[52] Horejs/Mehofer/Pernicka 2010.

9. Velim (H), okr. Kolín (Kytlicová 2007: 312 no. 251, pl. 159, A 8) (Fig. 10/4)

Moravia

10. Blučina (H 4), okr. Brno-venkov (Salaš 2014: 65 no. 1, obr. 15, 1) (Fig. 15/4)

11. Brno-Rečkovice (H), okr. Brno-mešto (Salaš 2014: 65 no. 2, obr. 7, 10) (Fig. 6/5)

12. Jevičko (H), okr. Svítavy (Salaš 2014: 65 no. 3, obr. 15, 2) (Fig. 14/11)

13–15. Loučka 1–3 (H 2) (H), okr. Přerov (Salaš 2014: 65 no. 1. 5–7, obr. 15, 3. 4. 6) (Fig. 10/2. 3; 11/9)

16. Loučka 4 (SF), okr. Přerov (Salaš 2014: 65 no. 7, obr. 15, 5; 18) (Fig. 7/10)

Denmark (DK)

17. Damsholte (H), Frenderupgård, Vordingborg com., Møn (J 256 no. 370, pl. 68) (Fig. 16/7)

18. Sengeløse (H), Vasby, Københavns Amt (idem no. 35; J 256 no. 372, pl. 68) (Fig. 12/2)

19. Sulsted (H), Vestbjerg, Ålborg Amt (idem no. 36; J 256 no. 372, pl. 68) (Fig. 7/21)

France (F)

20. Alise-Sainte-Reine (R) (Canal de Bourgogne aux Laumes), Côte-d'Or (idem no. 21, fig. 2a; N/G 34 fig. 34; Thevenot 1998: 136, fig. 8,3 [see also Provenance unknown [no. 48]) (Fig.13/2)

21. „Angerville" (R), Essonne (Mohen 1977: 251 [no. 91–1]; N/G 32, fig. 2) (Fig. 11/3)

22. Bardouville, Seine River (R), Seine-Maritime (idem no. 16; N/G 30, fig. 2) (Fig. 13/7)

23. „Calvados" (?) (idem no. 15) (no illustration)

24. Coray (Keranfinit) (H), Finistère (Mohen 1990: 130, fig. 38, 70) (Fig. 13/9)

Corbeil see Seine between Corbeil/Villeneuve-Saint-George (fig. 11/7)

25. Cuiry-les-Chaudardes (S; mould), Aisne (Blanchet 1984: 186, fig. 99, 18) (Fig. 12/10)

26. Fort-Harrouard (S; mould), Eure-et-Loir (Mohen/Bailloud 1987: 127, fig. 69) (Fig. 12/8)

27. Fresné-la-Mère (H), Calvados (idem no. 14 fig. 2d; N/G 29, fig. 1) (Fig. 13/10. 10a))

28. Génelard 1 (H), Saône-et-Loire (Thevenot 1998: 130, fig. 4, 1) (Fig. 14/2)

29. Génelard 2 (H), Saône-et-Loire (Thevenot 1998: 127, fig. 3, 3) (Fig. 9/7)

30. Génelard 3 (H), Saône-et-Loire (Thevenot 1998: 127, fig. 3, 2) (Fig. 13/1)

31. Génelard 4 (H), Saône-et-Loire (Thevenot 1998: 127, fig. 3, 1 (Fig. 9/6)

32. Graville-Sainte-Honorine (H), Seine-Maritime (O'Connor 1980: 398 no. 174; Dubus 1912: 14–24, pl. 5, 47; Watté 2010: 39, fig. 2, 47) (Fig. 8/2)

Gray see Saône near Chalon-sur-Saône (no. 44) (fig. 13/4)

Keranfinit see Coray (no. 24) (fig. 13/9)

33. La Lède-du-Gurp (SF; mould), Gironde (idem no. 13; Moreau 1971) (fig. 12/9)

34. Larnaud (H), Jura (N/G 35, fig. 1) (Fig. 14/3)

35. La Tour de Langin (SF), Haute-Savoie (idem no. 26, pl. 1; fig. 4a; N/G 25, fig. 1) (Fig. 11/4)

Laumes see Alise-Sainte-Reine (no. 20) (fig. 13/2)

36. Mâcon (R), Saône-et-Loire (idem no. 24, fig. 2c; N/G 22, fig. 2) (Fig. 10/7)

37. Nantes, Prairie de Mauves (H), Loire-Atlantique (N/G 24, fig. 7) (Fig. 16/10)

38. Ouroux-sur-Saône (R), Saône-et-Loire (idem no. 32, fig. 3c; N/G 23, fig. 4) (Fig. 10/6)

39. Paris, La Villette/Pont du Flandre (R) (idem no. 18; Mohen 1977: 159 f. [246 no. 75–21] 178, fig. 649) (Fig. 10/5)

40. Plainseau (H), Amiens, Somme (idem no. 17; N/G 22, fig. 3) (Fig. 8/1)

41. Pontpoint (SF), Oise (N/G 24 fig. 6) (Fig. 16/1)

42. Porcieu-Amblagnieu (H), Isère (Mortillet 1906; Coutil 1912; idem no. 25) (Fig. 12/5)

43. Questembert (H), Morbihan (idem no. 12) (Fig. 14/10)

44. Saône bei Chalon-sur-Saône or Gray (R), Saône-et-Loire (idem no. 22, fig. 3b; N/G 33 fig. 1; Thevenot 1998, 136, fig. 8, 2]) (Fig. 13/4)

Seine, Paris (idem no. 20 = see „Angerville" [no. 21]) (fig. 11/3)

45. Seine between Corbeil/Villeneuve-St.-George (R) (idem no. 19; Mohen 1977: 159 f. [252 no. 91–12], 178 fig. 647) (Fig. 11/7)

46. St. Denis-de-Pile (H), Gironde (Coffyn 1969) (Fig. 7/2)

Tour de Langin see La Tour de Langin (no. 35) (fig. 11/4)

47. Trégorf-en-Surzur (H), Morbihan (Briard 1984: 163, fig. 13, 2; N/G 35, fig. 2) (Fig. 14/5)

48. „Provenance unknown" (Musée de la civilisation gallo-romaine Lyon) (Thevenot 1998: 136, fig. 8, 4) (modern copy of no. 20?) (Fig. 13/3)

Germany (D)

49. Altentreptow (SF?) Lkr. Mecklenburgische Seenplatte, Mecklenburg-Western Pomerania (Schoknecht 1974 [1975] : 166 [no illustr.; shape unknown])

50. Golchen, Lkr. Mecklenburgische Seenplatte, Mecklenburg-Western Pomerania (Schmidt 2014: 182, fig. 2, 5) (Fig. 9/5)

51. Lachen-Speyerdorf 1 (G), Stadt Neustadt an der Weinstraße, Rhineland-Palatine (Sperber 2000: fig. 2 (Fig. 14/1)

52. Lachen-Speyerdorf 2 (G), Stadt Neustadt an der Weinstraße, Rhineland-Palatine (Sperber 2000: fig. 10 (Fig. 16/7)

53. Maintal-Hochstadt (H), Main-Kinzig-Kreis, Hesse (Jockenhövel 1983: 587, fig. 1) (Fig. 16/4)

54. Murchin (H), Lkr. Vorpommern-Greifswald, Mecklenburg-Western Pomerania (Schoknecht 1974 [1975]: 163, fig. 10, 77; 359 no. E 314; 364 no. 363) (Fig. 11/8)

55. „Murnau" (H), Lkr. Rosenheim, Upper Bavaria (Nessel 2008: 58 no. 26, pl. 2, 26; 4, 26) (Fig. 13/5)

56. Oberwilflingen (H), Lkr. Ostalbkreis, Baden-Württemberg (Primas/Pernicka 1998) (Fig. 16/5. 5a)

57, 58. Ochtendung 1, 2 (H), Lkr. Mayen-Koblenz, Rhineland-Palatine (von Berg 2005) (Fig. 7/18; 12/1)

59. Plestlin (H), Gem. Bentzin, Lkr. Vorpommern-Greifswald, Mecklenburg-Western Pomerania (idem no. 34; Sprockhoff 1956: I 51; II 126, pl.11, 6; J 364 no. E 364) (Fig. 11/5)

60. Ruthen (H), Lkr. Ludwigslust-Parchim, Mecklenburg-Western Pomerania (J 364 no. E 362; Sprockhoff 1956: I 31; II pl. 73, 17 [Holzendorf]; Hundt 1997: 63 no. 129, pl. 36, 17) (Fig. 9/3)

61. Steinkirchen (G; Grave 10), Gem. Stephansposching, Lkr. Deggendorf, Lower Bavaria (Müller-Karpe 1969: 89, fig. 3) (Fig. 7/21)

Hungary (H)

62. Biharugra (H), Kom Békés (Gallus/Horváth 1938, 92, pl. 19, B 8 [Ugra]; Kemenczei 2005: 131 f. B 6 (no. 95), pl. 16, A 95 („hammer") (Fig. 9/8)

63. Esztergom (H), Kom. Komárom-Esztergom (Mozsolics 1985: 116 ff. 118 no. 91, pl. 138, 9) (Fig. 12/6)

64, 65. Lesenceistvánd 1, 2 (H), Kom. Veszprém (Mozsolics 1985: 144 no. 9, Pl. 270 A, 22. 24) (Fig. 7/16. 17)

66. Mátraszőlő-Kerekbükk, (H) Kom. Nógrád (Szabó 2011: 337, fig. 2, 3 [no illustration; „small anvil")

67–69. Nadap 1–3 (H), Kom. Fejér (Makkay 2006: pl. 19, 166. 167; 20, 184) (Fig. 7/5–7)

70, 71. Tállya-Várhegy 1, 2 (H), Kom. Borsod-Abaúj-Zemplén (Szabó 2013: 812 f., fig. 18) (Fig. 6/8. 9)

72, 73. Velem-Szentvid 1, 2 (S), Kom. Vas (von Miske 1908: pl. 29, 7. 8) (Fig. 14/8)

74. Velem-Szentvid 3 (S; mould), Kom. Vas (von Miske 1908: pl. 22, 3) (Fig. 14/9)

Ireland (IRL)

75. Bishopsland 1 (H), Co. Kildare (Eogan 1983: 36 f. no. 16; 226, fig. 10, 11; idem no. 9) (Fig. 13/6)

76. Cullen (H), Co. Tipperary (Eogan 1983: 155 ff. no. 135 [no illustration])

77. „Ireland" (idem no. 11; Coffey 1913: 27 f., fig. 22 [Bronze Age?]) (no illustration)

78. Lusmagh (H), Co. Offaly (idem no. 10, fig. 3a; Eogan 1983: 192–193 no. 22; 321, fig. 105, B 6) (Fig. 15/5)

79. „Near Sligo", Co. Sligo (Bronze Age?) (Milligan 1885-1886: 538, fig.; idem no. 8) (Fig. 6/1)

Omagh (123): see United Kingdom, Northern Ireland (fig. 11/1)

Italy (I)

80. Bologna-San Francesco 1 (H), Emilia-Romagna (idem no. 31; Iaia 2014: no. IB6; 103, fig. 9 [IB6]) (Fig. 9/2)

81. Bologna-San Franceso 2 (H), Emilia-Romagna (Iaia 2014: no. IB5; 103, fig. 9 [IB5]) (Fig. 16/11)

82. Bor di Pacengo (S), Verona (Iaia 2014: no. IB3; 103 fig. 9 [IB2]) (Fig. 15/8)

83. Contigliano (H), Rieti (Ponzi Bonomi 1970: 129, fig. 12, 4) (Fig. 9/2)

84, Falerii (G), Civita Castellana, Viterbo, Mazzano Romano (Montelius 1905/1910: pl. 329, 8 [*iron*]) (Fig. 7/19).

85. Frattesina (S), Rovigo (Iaia 2014: no. IB2; 103, fig. 9 [IB2]) (Fig. 11/13)

86. Gorzano (S), Modena (Iaia 2014: no IB1; 103, fig. 9 [IB1]) (Fig. 14/6)

87. Monte Cavanero (Chiusa di Pesio) (H), Cuneo (Iaia 2014: no. IB7; Venturino Gambari 2009: 63, fig. 45; 60, fig. 42, 4) (Fig.6/4)

88. Redù, Modena (Iaia 2014: no. IB4; 103, fig. 9 [IB4]) (Fig. 16/2)

Sardinia

89. Chiaramonti (S; Nuraghe Su Cobelciu) (Lo Schiavo 2018: 429 fig. 4. 5) (Fig. 15/1)

90, 91. Lei/Silanus-La Maddalena (H) (Lo Schiavo 2018: 429 fig. 4, 4. 9) (Fig.6/2. 7)

92. Lotzorai-Genna Tramonti (Lo Schiavo 2018: 430 fig. 4, 8) (Fig. 6/6)

93. Lula-Savadde (H) (Lo Schiavo 2018: 429 fig. 4, 3) (Fig. 7/4)

94. Nuragus-Forraxi Nioi (H) (Lo Schiavo 2018: 428 fig. 4, 1) (Fig. 11/10)

95. Ozieri-Chilivani (H) (Lo Schiavo 2018: 428m fig. 4, 7) (Fig. 15/3)

96. „Provenance unknown" (Sardinia?) (Lo Schiavo 2018: 428 fig. 4, 2) (Fig. 11/11)

97. „Provenance unknown" (Sardinia?) (Lo Schiavo 2018: fig. 4, 6) (Fig. 15/2)

98. „Provenance unknown" (Sardinia) (Lo Schiavo 2018: fig. 4, 10) (no illustration)

Poland (PL)

99. Przemyśl (H) (Gedl 2004: 72 no. 251, pl. 18, 251) (Fig. 7/14)

100. Świnoujście-Międzyzdroje (H), Woiw. Zachodniopomorskie (J 365 no. E 369; Blajer 1984: 54 no. 155, pl. 96, 30) (Fig. 9/4)

101. Witkowo (H), Woiw. Pomorskie (idem no. 32; J 365 no. E 370; Gedl 2004: 72 no. 252, pl. 18, 252) (Fig. 7/11)

Romania (RO)

102. Fratelia (H), Timişioara (Medeleţ 1995: fig. 3) (Fig. 7/3)

103. Gușteriţa (H), com. Sibiu (Gogâltan 2005: 31, pl. 12, 65b) (Fig. 16/3)

Serbia (SRB)

104. Velebit, Kanjiža, Severno-Banatski okrug (Fig. 4/3; 5/4. 5; 12/7)

Spain (E)

105. Valdevimbre (H), prov. Léon (Monteagudo 1977: 98 f. no. 607. 625, pl. 149, B 1) (Fig. 8/3)

Sweden (S)

106. Bromma, Ivetofta (W), Skåne (Oldeberg 1974: 17 no. 83; J 365 no. E 366) (Fig. 16/8)

107. Holmedal (SF), Varmland (Oldeberg 1974: 366 no. 2625; J 365no. E 367) (Fig. 16/9)

Switzerland (CH)

108. Auvernier 1 (S; mould), Kt. Neuchâtel (Gross 1883: pl. 29 12; Rychner 1979: pl. 134, 3) (Fig. 7/12)

109. Auvernier 2 (S), Kt. Neuchâtel 2 (idem no. 28; Rychner 1979: pl 125, 9) (Fig. 7/13)

110. Grandson-Corcelettes (S; mould), Kt. Vaud) (Musée cantonal vaudois 1896: pl. 30, 3; idem no. 27) (Fig. 14/3)

111. Riddes (SF), Kt. Valais (idem no. 26, fig. 2d; N/G 32, fig. 3; Wyss 1967: 10, pl. 3) (Fig. 12/4)

112, 113. Zürich-Wollishofen 1, 2 (S), Haumesser, Kt. Zürich (idem no. 29, fig. 4b; N/G 26, fig. 2; Wyss 1967: 10, pl. 2. 3) (Fig. 6/3; 11/6)

Ukraine (UA)

114. Nedilys'ka (H) [Неділиська, ehem. Niedzielska], Oblast Lwiw (Gedl 2001, 63: pl. 80, C 64 [*iron*]) (Fig. 7/9)

United Kingdom (GB)

England

115. Flax Bourton (H?), Somerset (idem no. 4; Pearce 1983: 514. no. 651a, pl. 74, 651a.) (Fig. 11/12)

116. Lakenheath, Suffolk (idem no. 2: „simple; gabled work-surface opposite spike") (no illustration)

117. Lichfield (H), Knowle Farm, Staffordshire (Meeks/Needham 1993) (Fig. 8/4)

118. Netherhampton (H [„Salisbury Hoard"]), Wiltshire (MacGregor 1987: 109 [no. 11.67]; Stead 1998: fig. 6) (Fig. 8/5).

119. St. Leonards, Marina (H), Sussex, England (idem no. 3; Rowlands 1976: pl. 3, 7) (Fig. 10/1)

120. West Row, Suffolk (idem no. 1: „simple; T-shape with flat work surface; no additional features") (no illustration)

Scotland

121. Inshoch Wood (H), Nairn (Childe 1945/46; idem no. 5, fig. 2b) (Fig. 11/2)

122. Kyle of Oykel („cairn"), Sutherland (Smith 1881; idem no. 6, fig. 1) (Fig. 13/8)

Northern Ireland

123. Omagh (H; mould), Co. Tyrone (Ó Faoláin 2004: 155 [no. 2], 208, fig. 12, 2) (Fig. 11/1)

Channel Islands, Jersey

124. Clos de La Blanche Pierre, St. Lawrence (Coombs 1988: 325, fig. 6, 69) (Fig. 7/15)

Socketed hammerheads used as anvils (?)
(selected examples: Fig. 17)

Deville-les-R ouen (H), Seine-Maritime, France (Verron 1971: 65 f., fig. 54) (no illustration)

Génelard 5 (H), Saône-et-Loire, France (Thevenot 1998: 125, fig. 1, 3) (Fig. 17/4)

Génelard 6 (H), Saône-et-Loire, France (Thevenot 1998: 126, fig. 2, 1) (Fig. 17/2)

Génelard 7 (H), Saône-et-Loire, France (Thevenot 1998: 126, fig. 2, 2) (Fig. 17/3)

Hallstatt (G; grave 469), Upper Austria (Kromer 1959: 110, fig. 91, pl. 82–84) (Fig. 17/10.

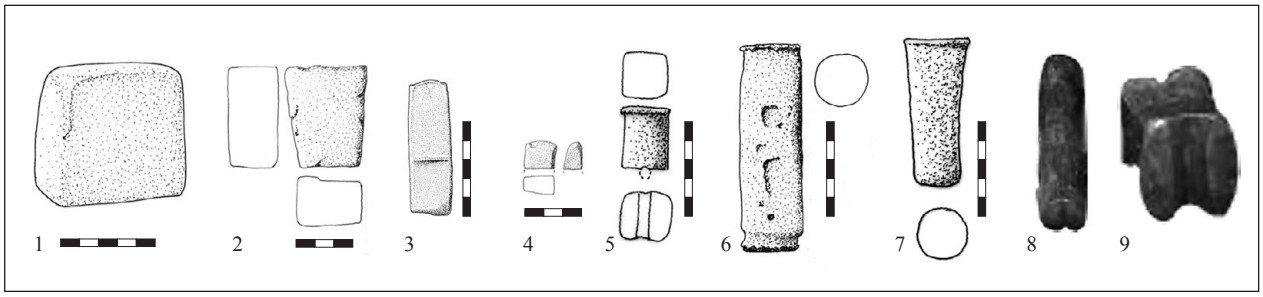


Fig. 6. Class 1, subclass 1a. Bench/block anvils: 1) "Near Sligo" (no. 71); 2, 7) Silanus (nos. 90, 91); 3) Zürich-Wollishofen (no. 113); 4) Monte Cavanero (Chiusa di Pesio) (no. 87); 5) Brno-Rečkovice (no. 11); 6) Lotzaroi-Genna Tramonti (no. 92); 8, 9) Tállya-Várhegy (nos. 70, 71). – Bronze. – M. 1:3 (8, 9 no scale)

Сл. 6. Класа 1, подкласа 1а: љоснато-равни наковњи, бронза, R 1 : 3

Rýdeč 1 (H), okr. Ústí nad Labem, Bohemia (Kytlicová 2007: 301 no. 207 [95: „fitting"], pl. 88, 95) (Fig. 17/5)

Rýdeč 2 (H), okr. Ústí nad Labem, Bohemia (Kytlicová 2007: 301 no. 207 [253], pl. 94, A 253) (Fig. 17/6)

Schiltern 1, 2 (H), Lower Austria (Girtler 1970; Hansen 1994: fig. 80, 1. 2) (Fig. 17/7. 8)

Tise (H), Hjørring amt, Denmark (Armbruster 2001: 11 fig. 2; J 242 no. 369, pl. 242) (Fig. 17/11)

Trenčianske Bohuslavice (H), okr. Nové Mesto nad Váhom, Slovakia (Novotná 1970: 99 no. 803, pl. 43, 803) (Fig. 17/1)

Zoggendorf (SF), com. Heiligenstadt, Lkr. Bamberg, Bavaria (Ausgrabungen und Funde in Oberfranken 11, 1997–1998: 20. 8, fig. 8, 5) (Fig. 17/9)

Terminology and classification

The English term *anvil* is currently used in archaeological literature mostly for pre-Iron Age tools. This refers to a blacksmith's tool, whilst today, the smaller tools used by fine metalworkers are called *stakes*. However, considering how embedded this technical term is, we are using the term *anvil* in this paper.

Bronze Age metal anvils reveal different features and each functional group corresponds to a specific technical definition. When addressing function, anvils can be described as an inactive percussion tool or support for receiving hammer strikes. All anvils in this regard can be considered as two-piece tools because they consist of a metal and a wooden part in order to operate. The most important characteristic is the shape anvils have. The shape of an anvil can be pyramidal, truncated pyramidal, cylindrical, hollow cylindrical, conical, truncated conical, spherical, hemispherical or barrel-shaped. Most anvils have a short or long spike (German: *Angel;* Serbian: *Трн*) for fitting to a wooden stump. Sometimes grooves and swages (German: *Sicken, Rillen, Kerben, Gesenk*; Serbian: *Шаре*) or hemispherical depressions are wrought into the working surface, which is called an anvil face (German: *Ambossbahn*; Serbian: *Лице наковња*). One or two lateral prolongations are named beaks but also spikes or tangs (German: *Horn/Stecken*; Serbian: *Рог, Pen*). Complex anvils can provide several working surfaces as well as beaks with round or rectangular cross sections. The central cavity in the anvil structure is called a punching hole (German *Nagelloch, Stanzloch;* Serbian: *Pyna*).[53]

Considering the spectrum of various forms and functions, we can distinguish five main classes (and subsequent subclasses) of Bronze Age metal anvils.[54] Apart from certain exceptions with well-defined characteristics, we will not refer to „types" of anvils, because when considering the broader traits, each anvil can have an individual character.

Class 1: Bench, block and pyramidal (frustrum) flat anvils

Subclass 1a: Flat anvils (German: Brettambosse)

The block shaped flat anvils consist of a simple block of a more or less rectangular shape. The Bronze Age (?) anvil from „Near Sligo" (no. 79) in fact appears

[53] Jantzen 2008, 253, Abb. 90; Nessel 2009, 49, Abb. 12.

[54] Coutil 1912; Ohlhaver 1939; Drescher 1973, 250 fig. 34; Nicolardot/Gaucher 1975; Ehrenberg 1981; Eluère/Mohen 1993; Armbruster 2001; Jantzen 2008, 253–259, 326–333.

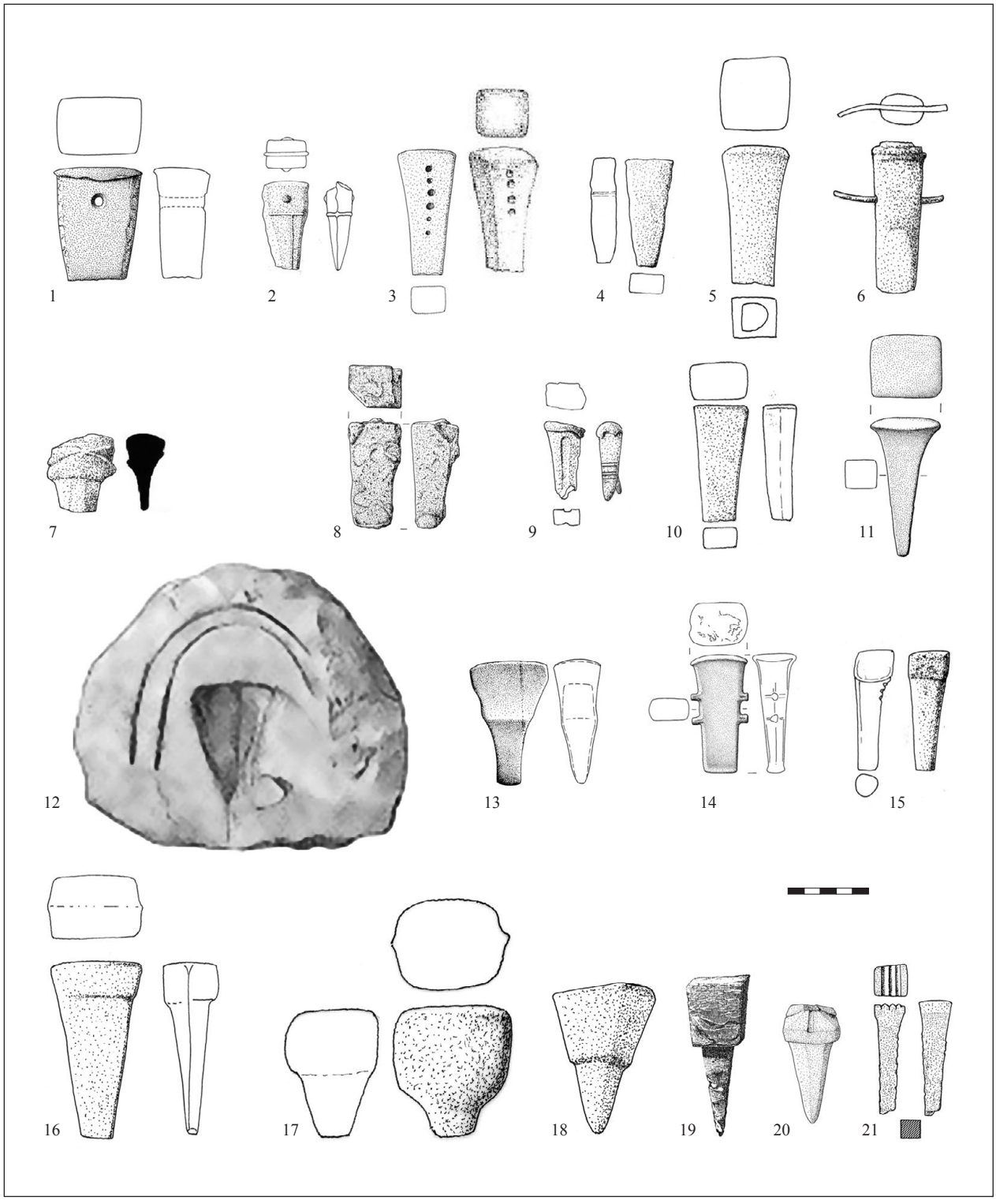


Fig. 7. Class 1, subclass 1b. Pyramidal (or frustrum) anvils: 1) Újezd (no. 8); 2) St. Denis-de-Pile (no. 46); 3) Fratelia (no. 102); 4) Lula-Savadde (no. 93); 5–7) Nadap (nos. 67–69); 8) Hallstatt (no. 2); 9) Nedilys'ka (no. 114); 10) Loučka (no. 16); 11) Witkovo (no. 101); 12, 13) Auvernier (nos. 108, 109); 14) Przemyśl (no. 99); 15) St. Lawrence, Jersey (no. 124); 16, 17) Lesenceistvand (nos. 64, 65); 18) Ochtendung (no. 57); 19) Falerii (no. 84); 20) Sulsted (no. 19); 21) Steinkirchen (no. 61). – Iron (8, 9, 19), all others Bronze. – M. 1:3

Сл. 7. Класа 1, йошткласа 1b: наковњи у облику пирамиде; 8, 9, 19) – гвожђе; остали – бронза, R 1 : 3

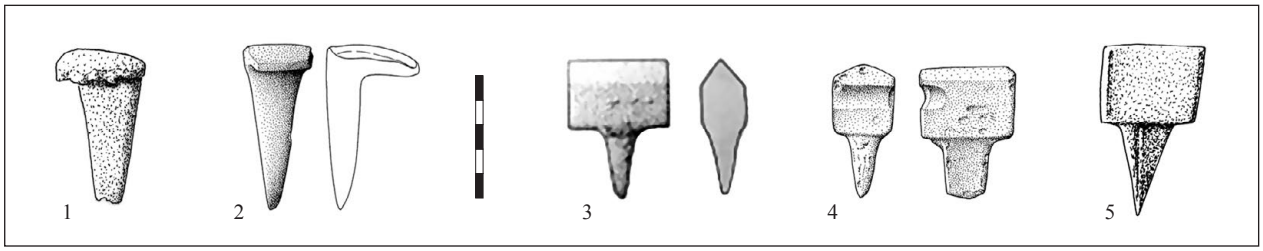


Fig. 8. Class 1, subclass 1c. Anvils with one lateral working surface: 1) Plainseau (Amiens) (no. 40); 2) Graville-Sainte-Honorine (no. 32). – Subclass 1d: Anvils with pentagonal body and a spike: 3) Valdevimbre (no. 105); 4) Lichfield (no. 117); 5) Netherhampton ("Salisbury Hoard") (no. 118). – Bronze. – M. 1:3

Сл. 8. Класа 1: 1–2) Потпкласа 1c: наковњи с једном радном површином; 3–5) Потпкласа 1d: наковњи петпаїоналної пресека са усадником, бронза, R 1 : 3

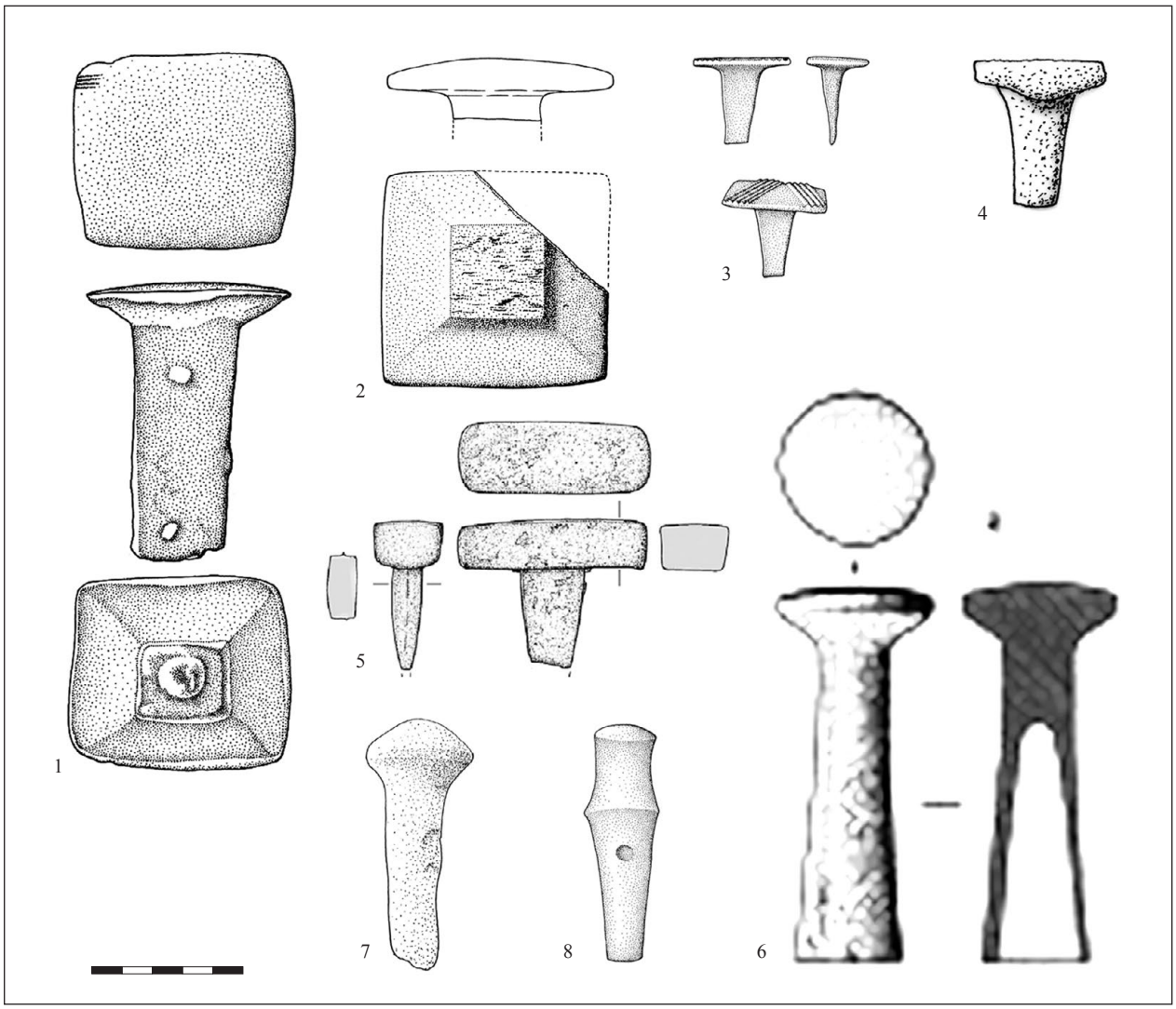


Fig. 9. Class 1, subclass 1e. Anvils with mushroom shaped working surface: 1) Contigliano (no. 83); 2) Bologna-San Francesco (no. 80); 3) Ruthen (no. 60); 4) Świnoujście-Międzyzdroje (no. 100); 5) Golchen (no. 50). – Subclass 1f. Anvils with plate shaped or hemispherical head: 6, 7) Génelard (nos. 31, 29); 8) Biharugra (no. 62). – Bronze. – M. 1:3

Сл. 9. Класа 1: 1–5) Потпкласа 1e: наковњи у облику печурке; 6–8) Потпкласа 1f: наковњи са равном или калоптастом главом, бронза, R 1 : 3

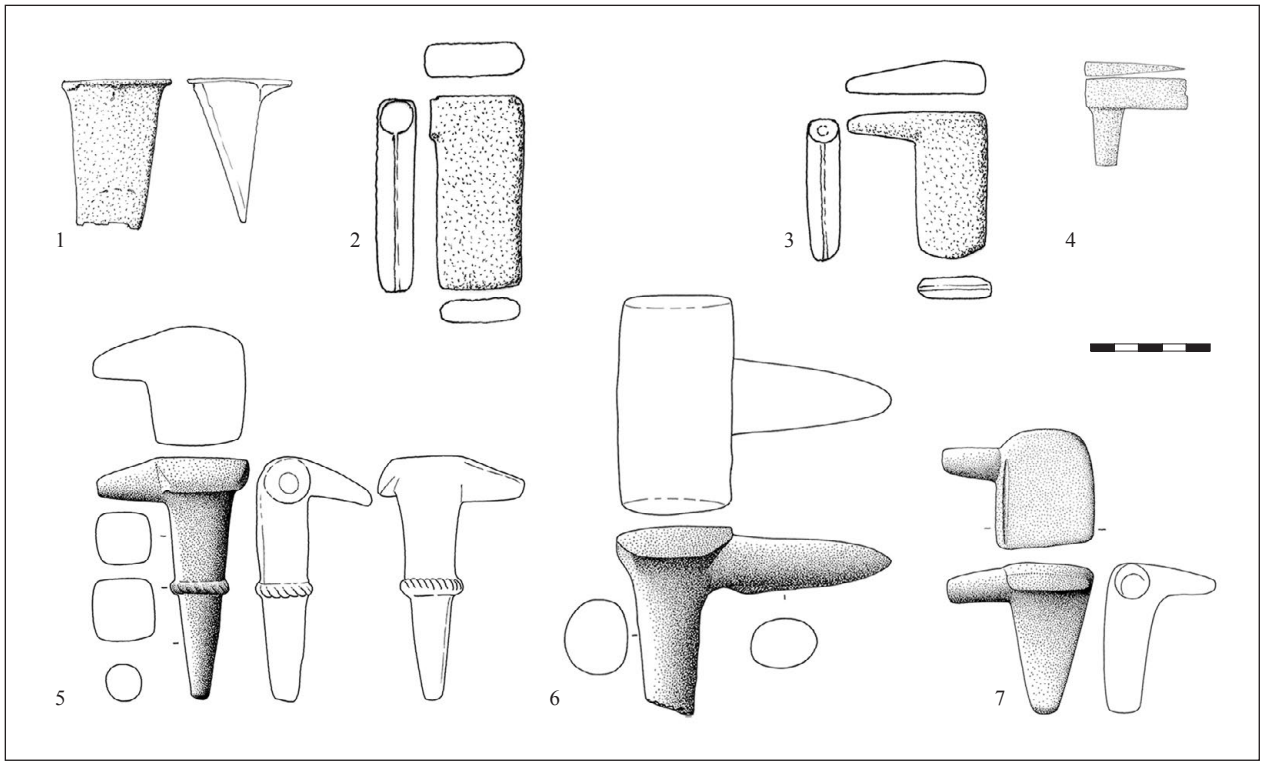


Fig. 10. Class 2, subclass 2a1: 1) St. Leonards, Marina (no. 119); 2, 3) Loučka (nos. 13, 15); 4) Velim (Bohemia) (no. 9); 5) Paris, La Villette/Pont du Flandre (no. 39); 6) Ouroux-sur-Saône (no. 38); 7) Mâcon (no. 36). – Bronze. – M. 1:3

Сл. 10. Класа 2, йошкласа 2a1: бронза, R 1 : 3

to be a „cushion stone" (Fig. 6/1). One block anvil has a gable shaped working surface (Fig. 6/4), and the flat anvil from Zürich-Wollishofen (no. 113) a horizontal feature for locking the anvil into a wooden surface (Fig. 6/3). Three other block anvils look like hammers. The anvil from Brno–Rečkovice (no. 11) has a rounded rectangular body with a punching hole (Fig. 6/5). Two Sardinian anvils (no. 92) have a cylindrical shape and two working surfaces (Lotzorai type according to Lo Schiavo) (Fig. 6/6). The two anvils (one with cylindrical, the other with a body like a hammer) with distinctive features from Tállya-Várhegy (no. 70–71) belong to this subclass (Fig. 6/8, 6/9).

Subclass 1b: Pyramidal (or frustum) anvils

Anvils of this kind have a truncated pyramid (frustrum) body with or without a shaft and mostly a square, flat or slightly convex working surface (one anvil with a gable-roofed working surface [Fig. 7/2]) (Fig. 7). The frustrum-anvil from Fratelia (no. 102) has a row of little bosses on two opposite faces of its body (Fig. 7/3). Two anvils have a punching hole in the body (Fig. 7/1. 6). In one anvil from Nadap (no. 68) a bronze wire is pulled through the punching-hole (Fig. 7/6). The Late Bronze Age anvil from Nedilys'ka (Niedszielska) (no. 114) was made from iron and is decorated with two lines (no swages) on one side (Fig. 7/9). The hornless anvil from the hoard of Pryzmyśl (no. 99) has half way up the body on two opposite faces two adjacent small projections, which could have served as a rest for a wooden stump or to carry the tool (Fig. 7/14).[55] The stone mould from Auvernier (no. 108) belongs to this class (Fig. 7/12). Some anvils have significant wear marks from extensive forging (Fig.7/1. 9. 14). The working surface of the small anvil from Steinkirchen (no. 61) is full of swages (Fig. 7/21). Three anvils (one in iron: from Falerii [no. 84]) are very similar to modern (German) *Steck-, Stock- or Stiftambosse* (Fig. 7/11. 18. 19).[56] The small (miniature?)

[55] Ohlhaver 1939: 23.

[56] Armbruster 2001: 17, fig. 12, 1.

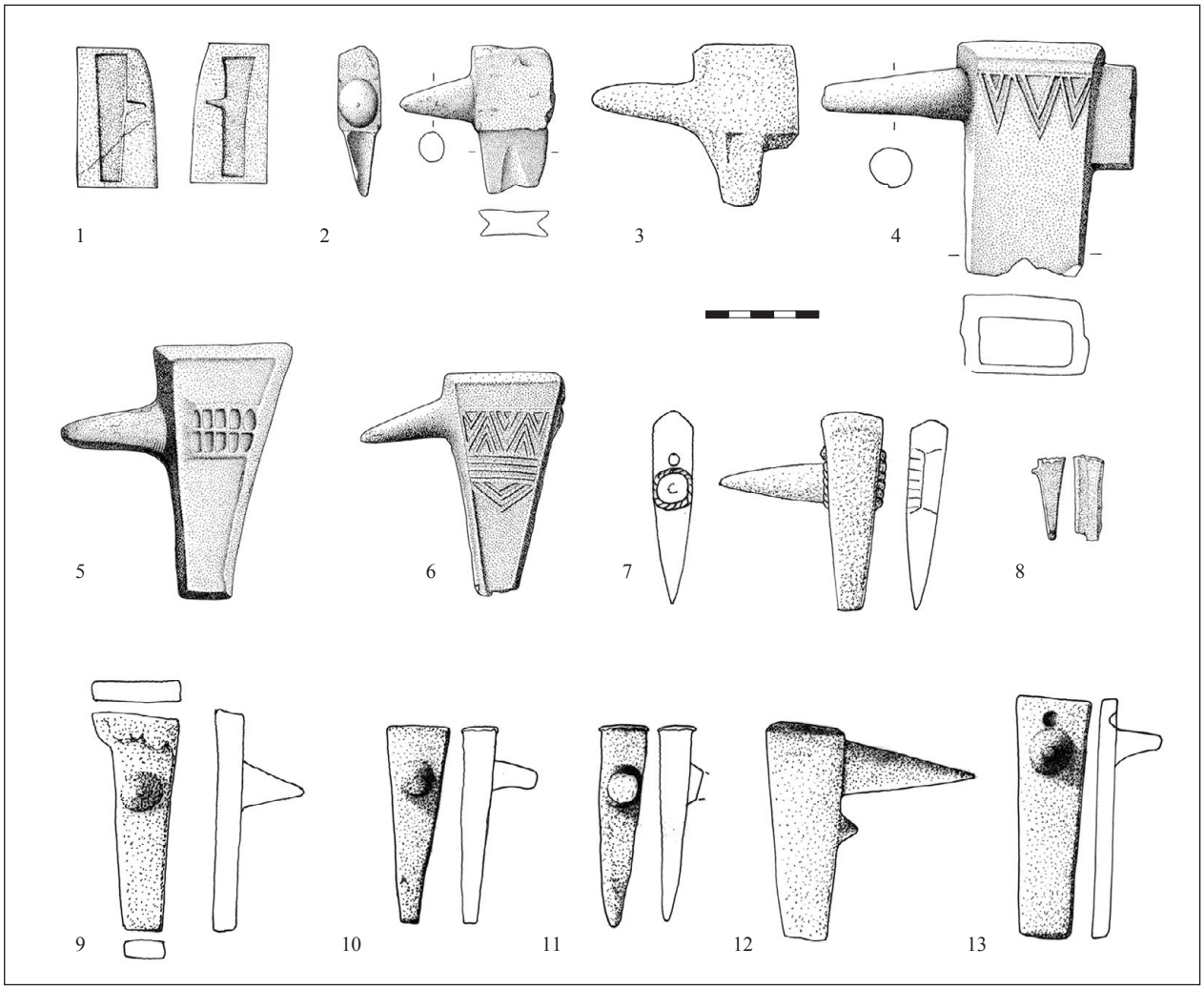


Fig 11. Class 2, subclass 2a2: 1) Omagh (no. 123); 2) Inshoch Wood (no. 121); 3) "Angerville" (no. 21); 4) La Tour de Langin (no. 35); 5) Plestlin (no. 59); 6) Zürich-Wollishofen (no. 114); 7) Seine between Corbeil/ Villeneuve-Saint-George (no. 45); 8) Murchin (no. 54); 9) Loučka (no. 14); 10) Nuragas-Forraxi Nioi (no. 96); 11) "Prov. unknown" (Sardinia?) (no. 96); 12) Flax Burton (no. 115); 13) Frattesina (no. 85). – Bronze. – M. 1:3

Сл. 11. Класа 2, йошкласа 2а2: бронза, R 1 : 3

anvil from Sulstedt (no. 19) has a pyramidal working surface with four crossing swages (Fig. 7/20).

Subclass 1c: Anvils with one lateral working surface

Two anvils of this subclass are characterised by one lateral working surface which is adjacent to the conical protrusion (Fig. 8/1. 2).

Subclass 1d: Block anvils with pentagonal body and a spike

Anvils without a beak have a spike for fitting and a pentagonal body with a gable-roofed working surface (Fig. 8/3–5).

Subclass 1e: Anvils with a mushroom-shaped working surface

These anvils have a flat rectangular body with a mushroom-shaped working surface[57] and a hollow-based and tapered shaft (Fig. 9/1–5). The anvil from Ruthen (no. 60) has two arrangements of grooves, shaped like chevrons, which are incorporated into the working surface of the anvil, probably for making plastic decorations on thin sheets (Fig. 9/3).

[57] Jantzen 2008, 330 (A 1): German: *pilzförmige Ambosse*.

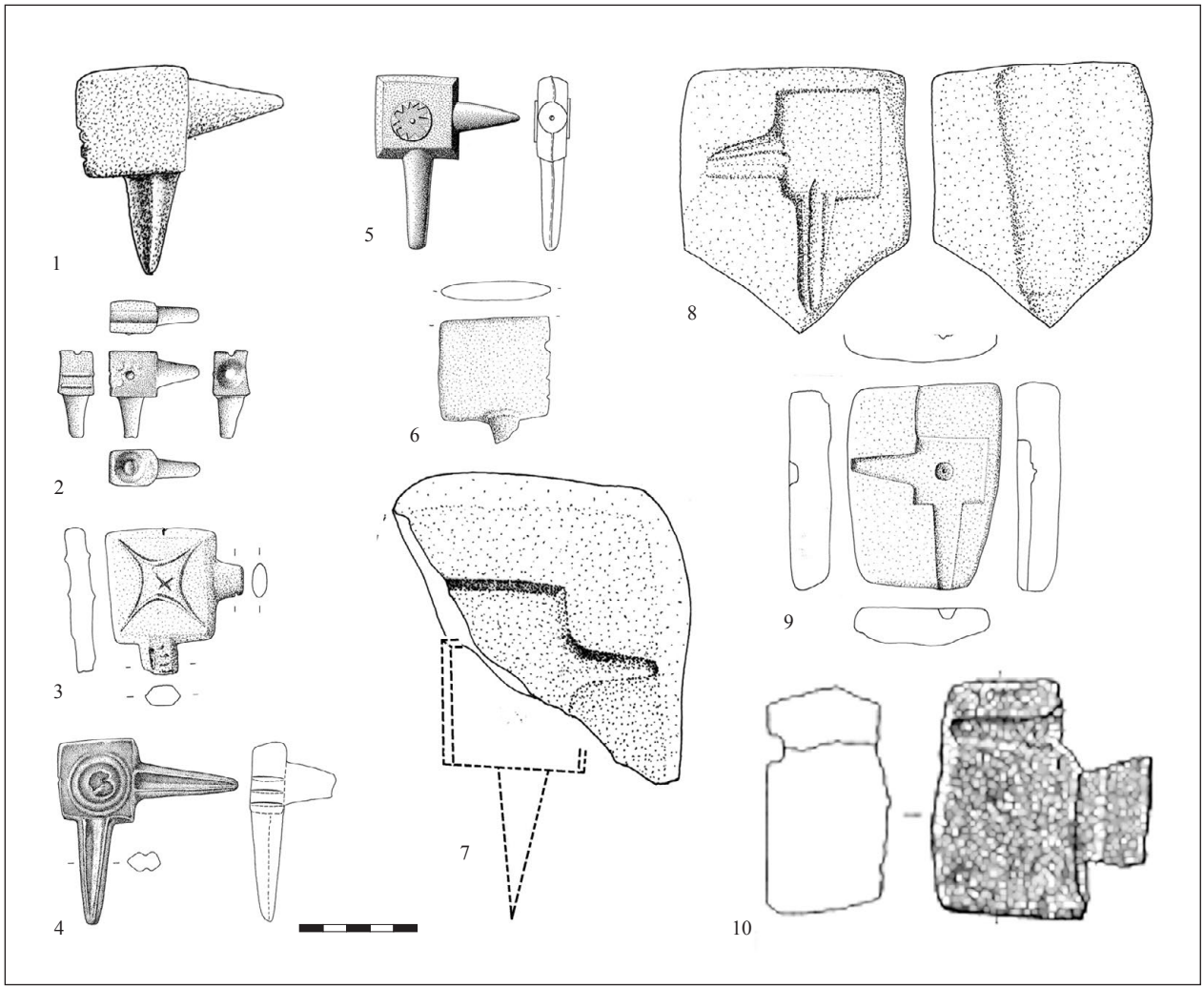


Fig. 12. Class 2, subclass 2b: 1) Ochtendung (no. 58); 2) Sengløse (no. 18); 3) Boljanić (no. 4); 4) Riddes (no. 111); 5) Porcieu-Amblagnieu (no. 42); 6) Esztergom (no. 63); 7) Velebit (reverse) (no. 104); 8) Fort-Harrouard (no. 26); 9) La Lède-du-Gurp (no. 33); 10) Cuiry-lès-Chaudardes (no. 25). – Bronze. – M. 1:3

Сл. 12. Класа 2, йошкласа 2b: бронза, R 1 : 3

Subclass 1f: Anvils with a plate-shaped or hemispherical working surface

Anvils of this kind are characterised by a plate-shaped or hemispherical working surface and a socketed shaft or hollow-based shaft with a round cross section (Fig. 9/6–8).

Class 2: Anvils with one or more beaks (German: *Hornambosse*)

Subclass 2a1: Anvils with one lateral beak fixed on the same level as the working surface

Anvils of this subclass have a beak which is fixed on the same level as the working surface either at one corner (Fig. 10/5–7) or in the middle of the working surface. The anvil of Paris-La Villette/Pont du Flandre (no. 39) has a plastic rib, with twisted decorations for better hafting, in the middle of the round conical shaft (Fig. 10/5). The dimensions of the working surface range from approximately 4 to 8 cm.

Subclass 2a2: Anvils with one lateral beak fixed a little below the working surface

Anvils such as these have a long and narrow, usually gable shaped working surface and one lateral beak, fixed below the working surface. On the body of the anvil from the Seine between Corbeil/Villeneuve-Saint

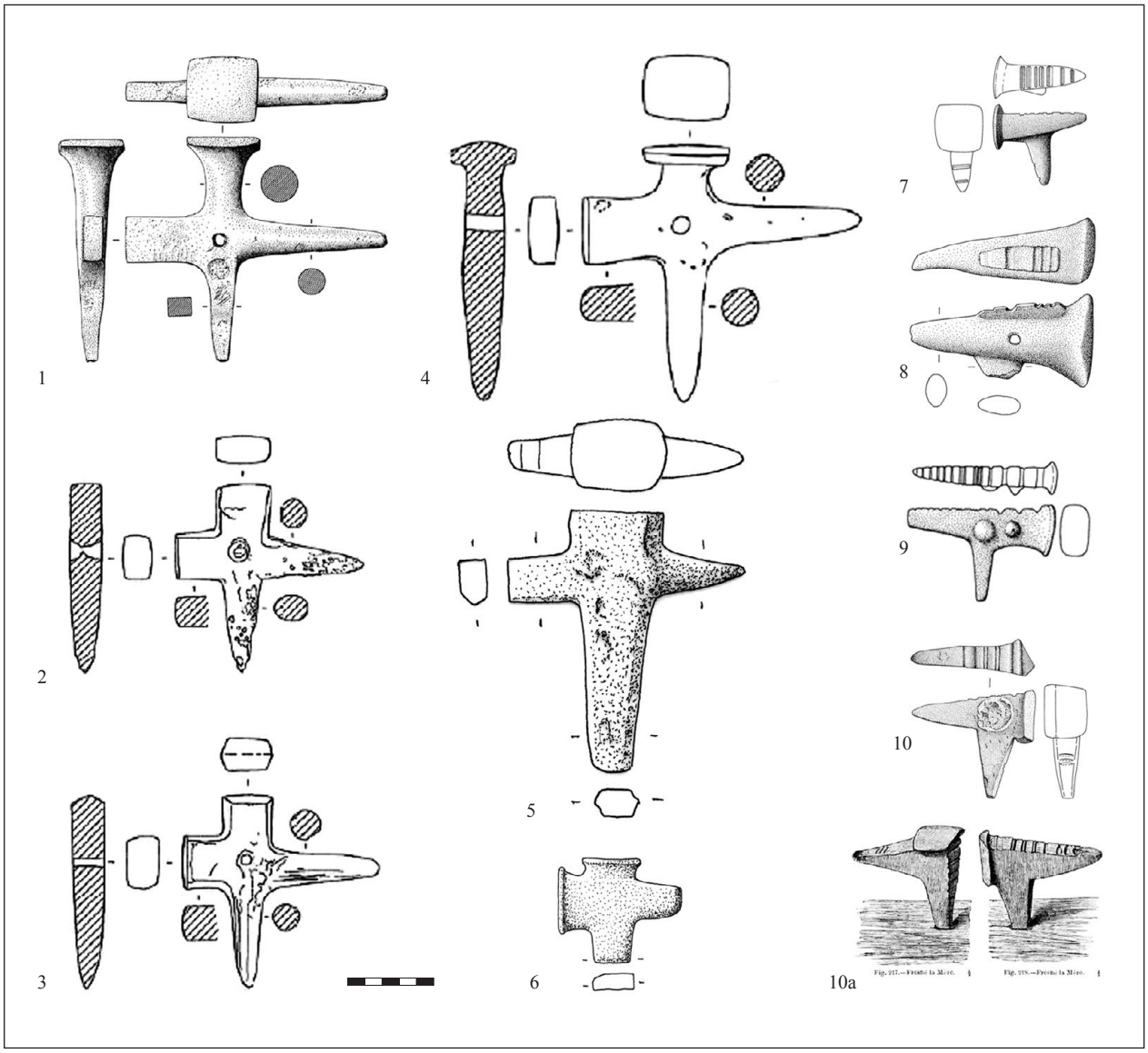


Fig. 13: Class 2, subclass 2c: 1) Génelard (no. 30); 2) Alise-Sainte-Reine/Laumes (no. 20); 3) Mus. Lyon (Prov unknown) (no. 48); 4) Saône near Chalon-sur-Saône/Gray (no. 44); 5) "Murnau" (no. 55); 6) Bishopsland (no. 75). – Subclass 2d: 7) Seine bei Bardouville (no. 22); 8) Kyle of Oykel (no. 122); 9) Coray (Keranfinit) (no. 24); 10) Fresné-la-Mère (no. 27) (10a hafting: Fresné [after Evans 1881, 182 fig. 217. 218]). – Bronze. – M. 1:3

Сл. 13. Класа 2: 1– 6) Поткласа 2c; 7–10) Поткласа 2d, бронза, R 1 : 3

George (no. 45) there is a ridge with swages (Fig. 11/7). The shaft is broad and has a rectangular cross-section. The anvil from La Tour de Langin (no. 35) has a socketed shaft instead of a solid shaft (Fig. 11/4). A remarkable feature is the plastic decoration some anvils have (Fig. 11/4–6). In that regard we can observe that both the hollow shaft and the plastic decoration are the result of casting using the lost wax technique.

Subclass 2b: Anvils with two lateral beaks fixed in the middle of the anvil block (Type Porcieu-Amblagnieu)

Anvils of this type (Type Porcieu-Amblagnieu) have an elongated, albeit relatively small, working surface (4 x 1.5–2.1 cm) and two conical beaks located in the middle of the rectangular or square block (Fig. 12). Some anvils are decorated with a cast plastic decoration

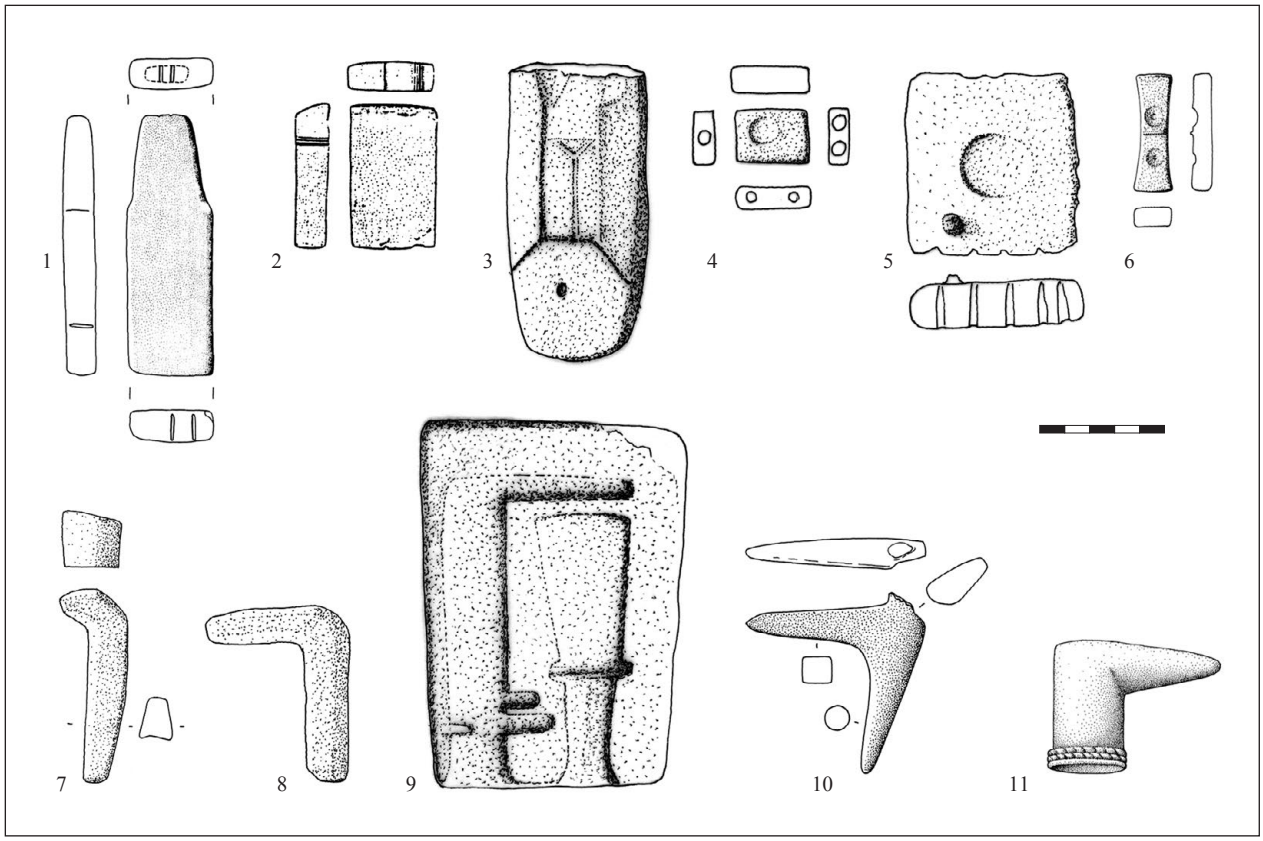


Fig. 14. Class 3. Bench anvils with swages and bosses: 1) Lachen-Speyerdorf (no. 51); 2) Génelard (no. 28); 3) Grandson-Corcelettes (no. 110); 4) Larnaud (no. 34); 5) Trégorf-sur-Surzur (no. 47); 6) Gorzano (no. 86). – Class 4. Bent anvils: 7) Sipbachzell (no. 3); 8, 9) Velem-Szentvid (nos. 72, 73); 10) Questembert (no. 43); 11) Jevičko (no. 12). – Bronze. – M. 1:3

Сл. 14. Класа 3: 1–6) Равни наковњи са удубљењима и исūуйчењима; 7–10) Савијени наковњи, бронза, R 1 : 3

on each lateral side of the body featuring knobs, concentric ribs, rosettes, or an X shape nestled in a pillow-shaped rib (Fig. 12/3–5). The four stone moulds from Velebit (no. 104), Cuiry-lès-Chaudardes (no. 25), Fort-Harrouard (no. 26) and La-Lède-du-Gurp (no. 33) all belong to this subclass.

Subclass 2c: Anvils with two working surfaces and two lateral beaks (T-shaped anvils / Type Chalon-sur-Saône/Gray)

Anvils of this subclass include three-armed anvils with a cruciform outline. They consist of a body with two working surfaces (1.5 to 4.5 cm) and two conical beaks. Swages are present only on the smaller working surface of the anvil from Murnau (no. 55) (Fig. 13/5). A common feature of four very similar anvils (Type Chalon-sur-Saône/Gray) is a punching hole in the middle of the anvil block (Fig. 13/1–4). It is plausible that the anvils from Alise-Sainte-Reine/Laumes (no. 20) and „Provenance unknown"/Mus. Lyon (no. 48) were cast in the same mould. This seems probable because of their identical features, dimensions and weights (Fig. 13/2.3) or another possibility is that the last one is a modern copy. We should also highlight that these multiple-armed anvils are multifunctional.

Subclass 2d: Anvils with one working surface, one beak as a shaft and one additional beak (Type Fresné-la-Mère)

The four very similar anvils of this subclass (Type Fresné-la-Mère) have one small rectangular working surface, a beak which can also be used as a shaft, as well as an additional beak (Fig. 13/7–10). It was possible to work on this anvil in two different positions (Fig. 13/10a). Several swages are on a ridge-shaped or comb-shaped elongation. One anvil has a punching hole (Fig. 13/8).

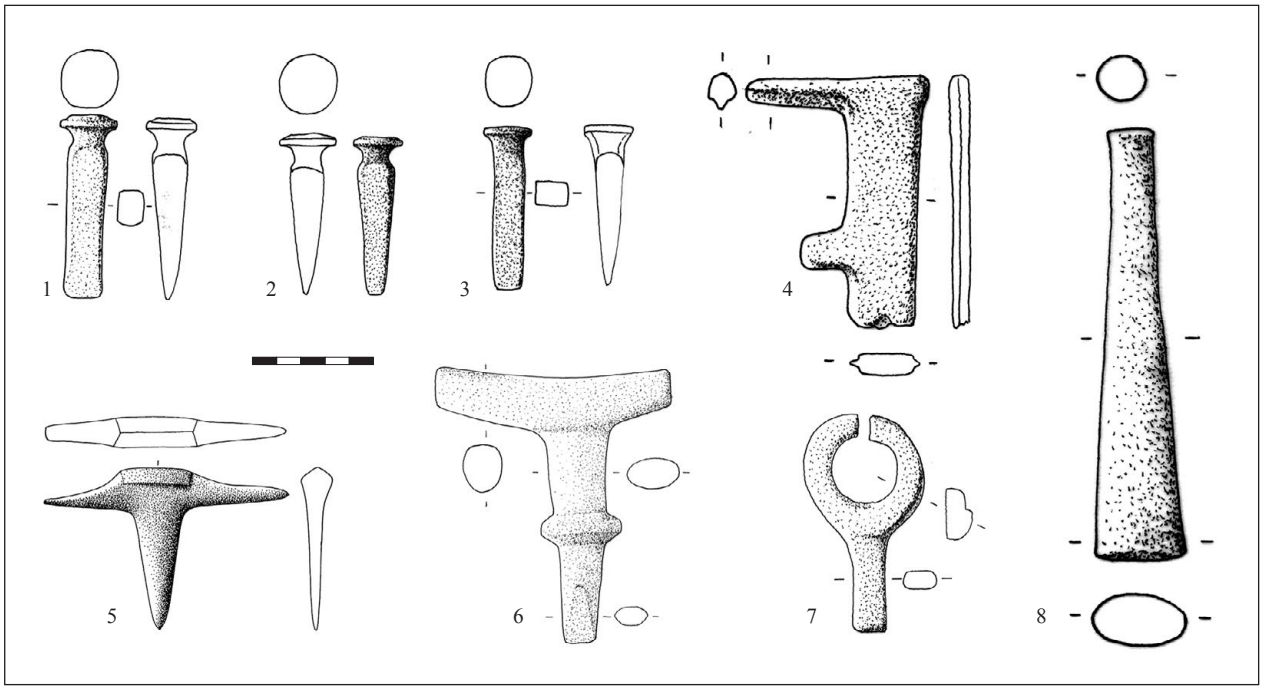


Fig. 15. Class 4. Beating fists: 1) Chiaramonti (no. 89); 2) "Prov. unknown" (Sardinia?) (no. 97); 3) Ozieri (no. 95). – Anvils with special features: 4) Blučina (no. 10); 5) Lusmagh (no. 78); 6, 7) Boljanić (nos. 5, 6); 8) Bor di Pacengo (no. 82). – Bronze. – M. 1:3

Сл. 15. Класа 4: 1–3) Наковњи за искуцавање; 4–8) Наковњи сйецифичних облика, бронза, R 1 : 3

Class 3: Bench anvils with swages and bosses

Some flat and rectangular bench anvils with an upper and lower working surface have one or more small sides with one or more swages (Fig. 14/1–6). These tools are named swage blocks (German: *Riefenanken*) (Fig. 14/1–3). The stone mould from Grandson-Corcelettes belongs to this group of anvils (Fig.14/3). The flat bench anvils could be mounted in different ways into depressions provided in a wooden stump. The flat anvil from Lachen-Speyerdorf has a broad shaft with two swages (Fig. 14/1). Another form, with massive flat plate-shaped bronze blocks with a rectangular or dovetail shape, is characterised by bosses and/or swages. These were used as swage blocks and doming blocks (German: *Kugelanken)* (Fig. 14/4–6).

Class 4: Bent anvils

Some anvils belong to the class of bent anvils (German: *Biegestöcke*) (Fig. 14/7–11). They are shaped as bent rods with a round, trapezoidal or D-shaped cross-section. Both parts of the bent rod could be used as a working surface. On the shorter part of the bent rod of the massive anvil from Sipbachzell (no. 3) there are two pronounced working surfaces (Fig. 14/7). From Velem-Szentvid (no. 73) a casting mould for a bent anvil is known. This mould has two casting negatives, one for an anvil and the second for a socketed hammerhead (Fig. 14/9). The bent anvil from Jevičko (no. 12) has a socketed shaft decorated with a cord-like twisted plastic decoration (Fig. 14/11).

Class 5: Beating fists (Fig. 15/1–3)

Three Late Bronze Age anvils from Sardinia are very similar to each other (nos. 89, 95 and 97) (Fig. 15/1–3). F. Lo Schiavo named them Type Chiaromonti.[58] The wedged-shape anvils have a conical form with a rectangular cross-section. The body changes its cross-section from the shoulder to a round neck. The working surface is disc-shaped. These anvils are quite long (ca. 17–20 cm) and the dimensions of the round-convex working surface ranges between ca. 5–7 cm. These tools look very much like modern beating fists (German: *Treibfäuste*).

[58] Lo Schiavo 2018.

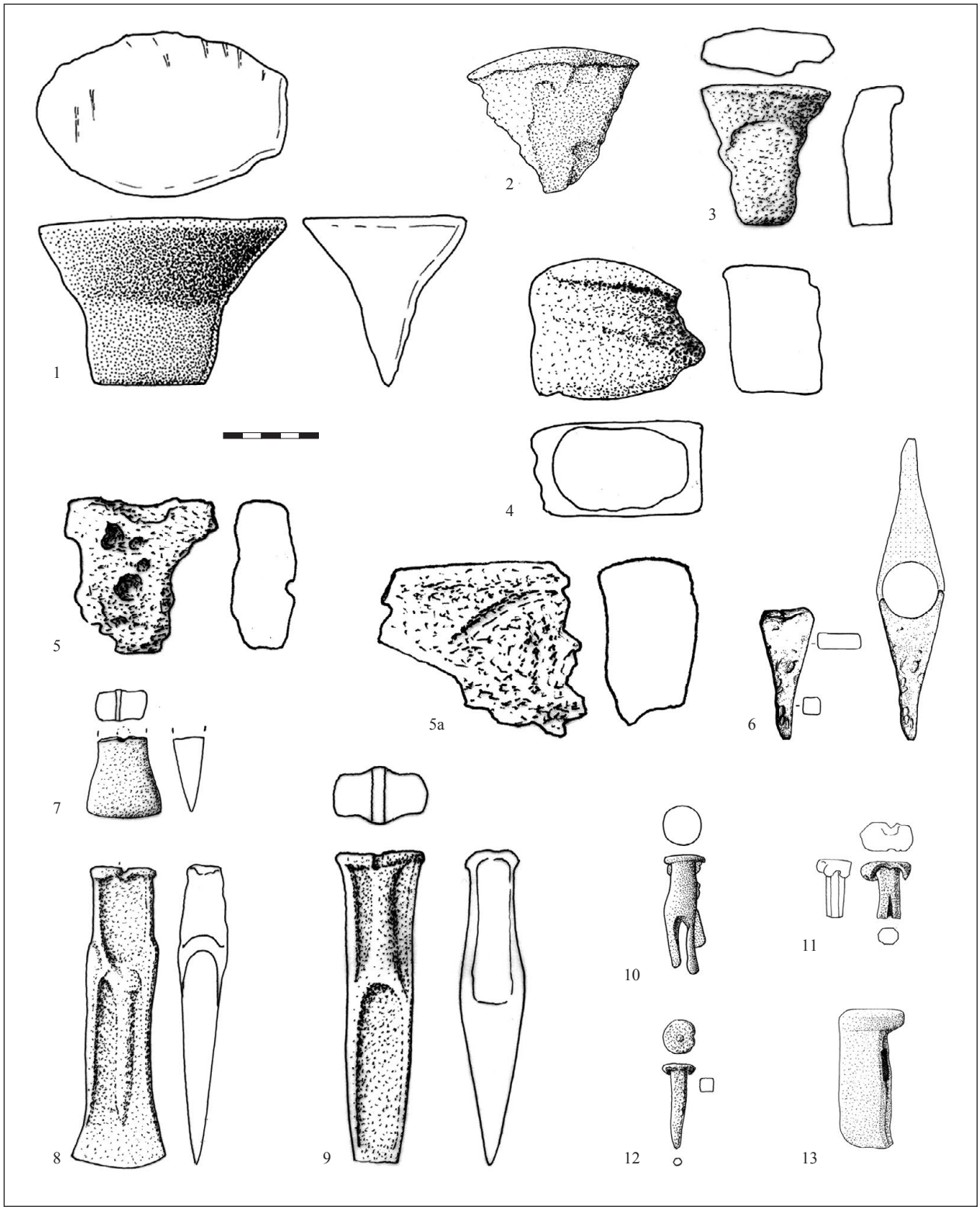


Fig. 16. Ad-hoc- *anvils: 1) Pontpoint (no. 41); 2) Jarpice (no. 7); 3) Guşteriţa (no. 103); 4) Maintal-Hochstadt (no. 53); 5, 5a) Oberwilflingen (no. 56); 6) Lachen-Speyerdorf (no. 52); 7) Damsholte (no. 17); 8) Bromma (no. 106); 9) Holmedal (no. 107); 10) Nantes-Prairie de Mauves (no. 37); 11) Bologna-San Franceso (no. 81); 12) Redù (no. 88); 13) Augsdorf (no. 1). – Bronze. – M. 1:3*

Сл. 16. Ad hoc *наковњи, бронза, R 1 : 3*

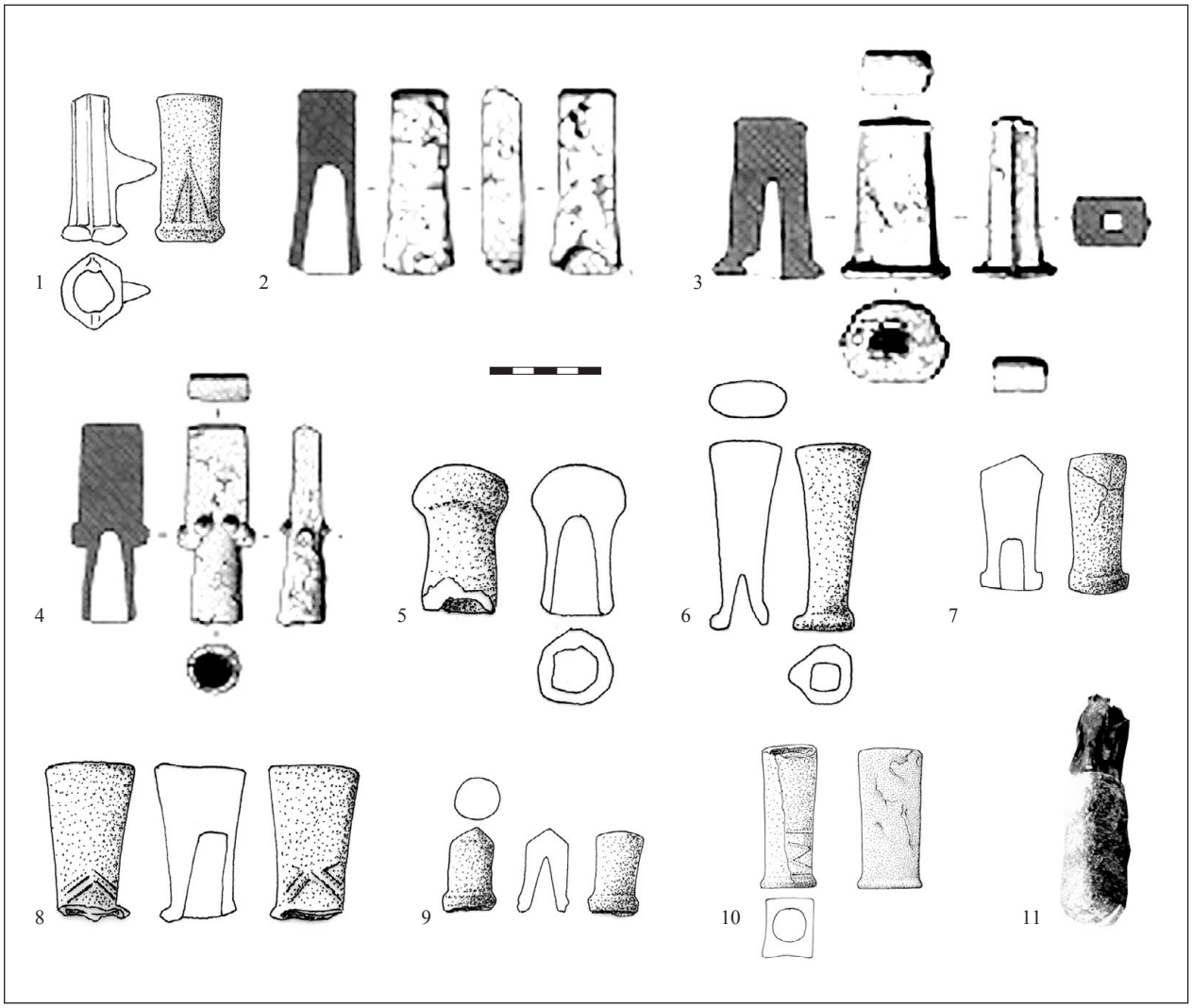


Fig. 17. Socketed hammerheads as anvils: 1) Trenčianske Bohuslavice; 2–4) Génelard; 5, 6) Rydeč; 7, 8) Schiltern; 9) Zoggendorf; 10) Hallstatt (Grave); 11) Tise. – Bronze. – M. 1:3

Сл. 17. Наковњи у облику чекића са усадником, бронза, R 1 : 3

Anvils with special features

Some anvils are characterised by special features Fig. 15/4–8). The anvil from Blučina (no. 10) with its long, small working surface and a lateral beak at the same level is similar to anvils of class 2a. In the middle of the rectangular shaft there is a short lateral beak, perhaps for better hafting (Fig. 15/4). The T-shaped goldsmith-anvil from Lusmagh (no. 78) of a narrow rectangular shape also has a long, small, gable-roofed working surface and two long beaks (one rectangular, the second one with a round cross-section) on the level of the working surface (Fig. 15/5). One anvil from „Sardinia" (no. 98, no illustration.) has a very similar outline. Both anvils look like the so called (German) *Sperrhaken*. The T-shaped anvil from Boljanić (no. 6) with a collared shaft for better hafting in a wooden stump is similar to the Sardinian anvil (Fig. 15/6). The third exemplar from Boljanić (no. 7) looks like a clamp; and it was possible to work on the outside of the curved beaks (Fig. 15/7). A long (22.9 cm) and very heavy (1.8 kg!) bronze tool (composition with a high tin-content [13 %]) from the lake village of Bor di Pacengo (Upper Italy) (no. 82) has on both ends a round or oval working surface with clear traces of use. Perhaps it is an anvil or a pestle for a mortar to crush metal or other materials (Fig. 15/8).

Ad-hoc-anvils (Fig. 16)

Some Anvils were made from reused bronze material of different origin (Fig. 16). On the one hand, ingot fragments were used as flat anvils (plano-convex ingot: Maintal-Hochstadt [no. 53], Jarpice [no. 7], Pontpoint [no. 41], Gusteriţa [no. 103]; oxide-ingot:[59] Oberwilflingen [no. 56]; lead pick-ingot: Lachen-Speyerdorf [no. 53]) (Fig. 16/1(Fig. 16/1–7)). On the other hand, finished products were transformed for their use as anvils, like palstaves and flat axes (Damsholte [no. 17], Bromma [no. 106], Holmedal [no. 107]), a hammer (Augsdorf [no. 1]) or (probably) a full hilted chisel (Bologna-San Francesco [no. 81]; Redù [no. 88]) (Fig. 16/8–9. 11–13). A unique object is the so called bugle-shaped object reused as a small anvil from the Bronze Age final III-hoard of Nantes-Prairie de Mauves [no. 37] (Fig. 16/10).[60] Of course, the number of these so called *ad-hoc* anvils[61] will increase in the future if we pay more attention to this category, which is hard to find in Bronze Age metalwork.

Socketed hammerheads as anvils
(German: Tüllenambosse) (Fig. 17)

A specific group of socketed hammerheads were probably used as anvils.[62] The socketed hammerheads from Trenčianske Bohuslavice (Slovakia) and Deville-les-Rouen (France) have a short lateral beak in the middle of the body (Fig. 17/1). These objects combine features both of an anvil (beak) and a socketed hammer. The socketed hammerhead from Tise (Denmark) has a swage as a feature of an anvil on its working surface (Fig. 17/11). However, the best criteria to define socketed hammerheads as anvils are the much lower depth, the more irregular shape of the socket and/or the absence of a lateral loop. They were hafted over a straight wooden shaft.[63] Their body and their round, oval or square mouth is mostly rougher than in case of „normal" hammerheads. The flat, arched, hemispherical or gable-roofed striking surface (German: *Bahn*) of these tools is the same as that of the hammers for multi-purpose forging.[64] Hammerheads with a small flat, slightly rounded working surface could be used for hardening and sharpening blades of weapons (swords, daggers, spearheads, etc.) or tools (knives, razors, axes, sickles, etc.), for forging wires, belts, needles etc. or softer (organic) material (leather, bones or wood). For metalworking, especially to stretch, beat or thin sheet metal, socketed hammerheads with a gable-roofed or with a hemispherical striking surface (ball-peen hammer [German: *Kugelhammer*]; beating fist [German: *Treibfaust*]; reverse fixed) were especially suitable. In this study we present only a selection of these kinds of socketed hammerheads as anvils (German: *Tüllenamboss*) (Fig. 17 [all hammerheads Fig. 17 are in vertical reflection]).

Dating and Distribution

Dating

At the end of the European Early Bronze Age and the beginning of the Middle Bronze Age the rise copper-tin-technology laid the foundation for an almost explosive proliferation of all kinds of weaponry and tools. Casting provided the possibility of creating any individual form of objects. These include socketed implements and tools (spearheads, arrowheads, axes, hammers, chisels, etc.). Casting moulds for producing bronze tools and bronze anvils became specialised tools.

The history of metal anvils started in the Middle Bronze Age in different parts of Europe. One of the oldest bronze anvils, an anvil with a gable-roofed working surface (Fig. 8/3), was found in an early dated association from the hoard of Valdevimbre (no. 105) (Prov. Leon, Northwestern Spain) associated with a small saw, two argaroid flat axes, a socketed spearhead, a socketed ferrule and two dagger blades.[65] The hoard from Porcieu-Amblagnieu (no. 42) (Western Alps, France), which has also been dated to the advanced Middle Bronze Age (Bz B/C) includes an early Middle Bronze Age razor,[66] palstaves, knob-sickles, chisels, a socketed hammerhead and a plastic decorated complex anvil with a beak (Fig. 12/5). The anvil mould (for a similar anvil to that from Porcieu-Amblagnieu) from Cuiry-les-Chaudardes (no. 25) (Northern France) (Fig. 12/9) was associated with Late Early Bronze Age ceramic vessels and was dated into the early Middle Bronze Age.[67] The hoard of stone moulds from Omagh (no. 123) (Northern Ireland) includes moulds for Middle Bronze Age rapiers/dirks. On one mould a negative for casting a small pyramidal anvil with a beak is

[59] Lo Schiavo u. a. 2009.

[60] Jockenhövel 1972; Janas 2010: 391–394.

[61] Term after Jockenhövel 1983.

[62] Ohlhaver 1939: 25: Jockenhövel 1982; Gogâltan 2005; Nessel 2008; Dietrich/Ailincăi 2012; Dietrich/Dietrich 2013.

[63] See Tise (Fig. 17/11): Armbruster 2001: 11, fig. 2, a. b.

[64] Jockenhövel 1982.

[65] Monteagudo 1977: 98–99, no. 607 pl. 149, B 1; Armbruster et al. 2003: 258, fig. 1.

[66] Jockenhövel 1980: 55–56, no. 127, pl. 8.

[67] Letterlé 1982.

engraved. The small hoard with a fragment of a palstave and a complete small anvil with crossed swages on the small working surface from Sengeløse (no. 18) (Seeland, Denmark) can be dated to Period II of the Northern European Bronze Age (Fig. 12/2)[68]. The Serbian anvil from Velebit (no. 104) can be dated to the same time (Fig. 4/3; 5/4. 5; 12/7). The hoard from Velim (no. 9) (Bohemia) with an anvil (Fig. 10/4), three bronze moulds and gold jewellery can be dated to the late Middle Bronze Age, which is also the same period of the hoard from Oberwilflingen (no. 56) (Württemberg, Germany) with an *ad-hoc*-anvil reused from an oxide-ingot (Fig. 16/5. 5a). The anvils from Inshoch Wood (Scotland) (no. 121; Fig. 11/2,), Flax Bourton (England) (no. 115; Fig. 11/12) and Bishopsland (Ireland) (no. 75; Fig. 13/6) can be dated to the later Middle Bronze Age and/or the beginning of the Late Bronze Age in Western Europe (Jockenhövel 1975).[69] From that time, there are, for anvils, specific components of tool kits in many Late Bronze Age hoards, which were also found in settlements all over Europe:

BzD/Ha A-Dating: Augsdorf (no. 1); „Murnau" (no. 55); Golchen (no. 50); Sipbachzell (no. 3); Újezd (no. 8); Blučina (no. 10); Loučka (nos. 13–16); Jevičko (no. 12); Fratelia (no. 102); Gusteriţa (no. 103); Nadap (nos. 67–69)

Ha A-Dating: Génelard (nos. 28–31); Esztergom (no. 63); Lesenceistvánd (nos. 64 and 65); Tállya-Várhegy (nos. 70 and 71); Mátraszőlő-Kerekbükk (no. 66); Boljanić (nos. 4–6); St. Leonards (no. 119)

Ha A 2/B 1-Dating: Lachen-Speyerdorf (nos. 51 and 52); Steinkirchen (no. 61); Clos de La Blanche Pierre (Jersey) (no. 124); Fresné-la-Mère (no. 27); Nedilys'ka (Niedzielska) (no. 114); St. Denis-de-Pile (no. 46); Frattesina (no. 85); Contigliano (no. 83); Monte Cavanero (Chiusa di Pesio) (no. 87)

Ha B 3-Dating: Plestlin (no. 59); Ruthen (Holzendorf) (no. 60), Murchin (no. 54); Ochtendung (together with a Ha B1-bucket) (nos. 57 and 58), Witkovo (no. 101); Świnoujście-Międzyzdroje (no. 100); Przemyśl (no. 99); Graville-Sainte-Honorine (no. 32); Nantes-Prairie de Mauves (no. 37), Plainseau (Amiens) (no. 40); Bologna-San Francesco (nos. 80 and 81); Lusmagh (no. 117); Lichfield (no. 78)

Ha C/D-Dating: Hallstatt (no. 2)

Distribution

It should be noted that bronze anvils are an extremely rare class of tools in the European Bronze Age. To date only 124 bronze anvils have been recorded, mainly from hoards, some from settlements and, exceptionally, from funerary contexts (see list). Of course, regional and chronological differentiations have to be made because bronze anvils are found from the beginning of the Middle Bronze Age to the Earlier Iron Age, over an extended period of time of ca. 1,000 years.

In general, anvils have a dispersed distribution over a wide area of Europe (Map 2). The densest concentrations are found in Western Europe (The British Isles and Ireland), France (Burgundy and the Seine basin) and the western parts of Switzerland, due to an especially favourable situation of finding in hoards, settlements and rivers (or other wetland areas). Minor concentrations are known from Upper Italy, Sardinia, the Eastern Alps, from regions along the middle Danube (Lower Austria; Moravia,), from Slovakia, Hungary and from the Pannonian and Western Carpathian regions (Romania [esp. Transilvania], Vojvodina).[70] Further anvils are known from other parts of Central Europe (Bohemia, Poland, Bosnia and Herzegovina and Germany) and Southern Scandinavia.[71] The recently discovered Ha B1-hoard from Ochtendung (Middle Rhine) (Kr. Mayen-Koblenz, Rhineland-Palatinate) (nos. 57 and 58) with two anvils of different types (one beaked anvil and one block anvil [Fig 7/18; 12/1]) draws attention to regions which have long been considered rather empty of finds.[72] The stone mould from Velebit (no. 104) is the first example of casting a bronze anvil in Serbia and it is the oldest one in the Pannonian region (Fig. 4/3; 5/4. 5; 12/7). In many regions, however, there have been no finds of anvils from the European Bronze Age, though they must have been in use there.

Several anvil traditions can be distinguished. Firstly a pan European tradition includes most of the simple anvils of Class 1 (bench, block and pyramidal anvils), *ad-hoc*-anvils and socketed hammerheads/anvils with a distribution in all European Bronze Age regions. Anvils of Class 2 and its subclasses have a more limited distribution (Map 3). Cruciform anvils were

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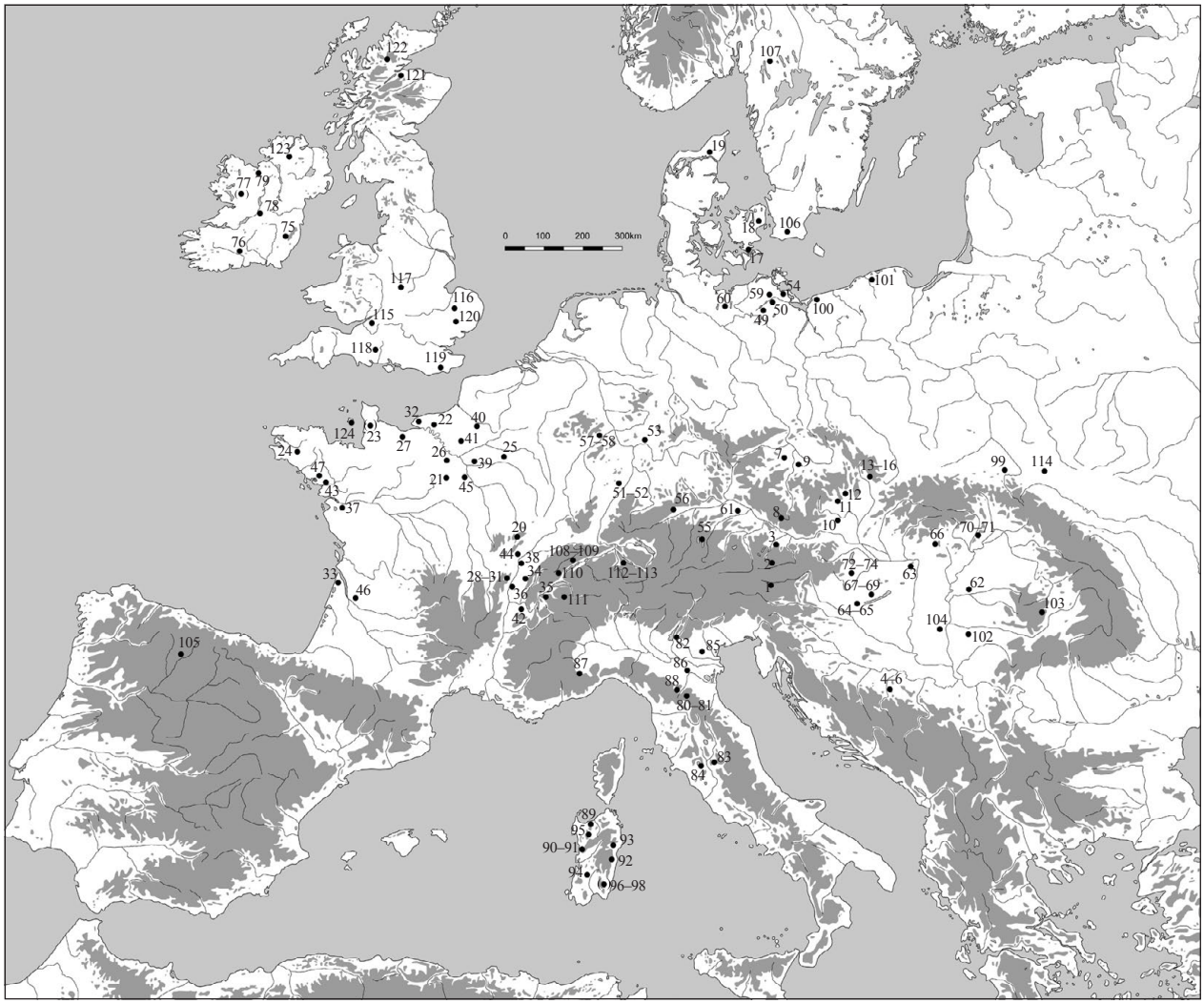
[68] Aner/Kersten 1973: 112 Nr. 339, pl. 59; Jantzen 2008: 256 Nr. 371.

[69] Jockenhövel 1975.

[70] Iaia 2014; Lo Schiavo 2018; Höglinger 1996; Girtler 1970; Salaš 2014; Pančiková 2008: 116–117, fig. 10, 1. 4; Mozsolics 1984: 42; Gogâltan 2005.

[71] Kytlicová 2007: 160–161; Gedl 2004: 72–73 160; König 2004; Jantzen 2008: 253–256

[72] von Berg 2005.



Map 2. Distribution of Bronze Age metal anvils in Europe (numbers correspond to the list)

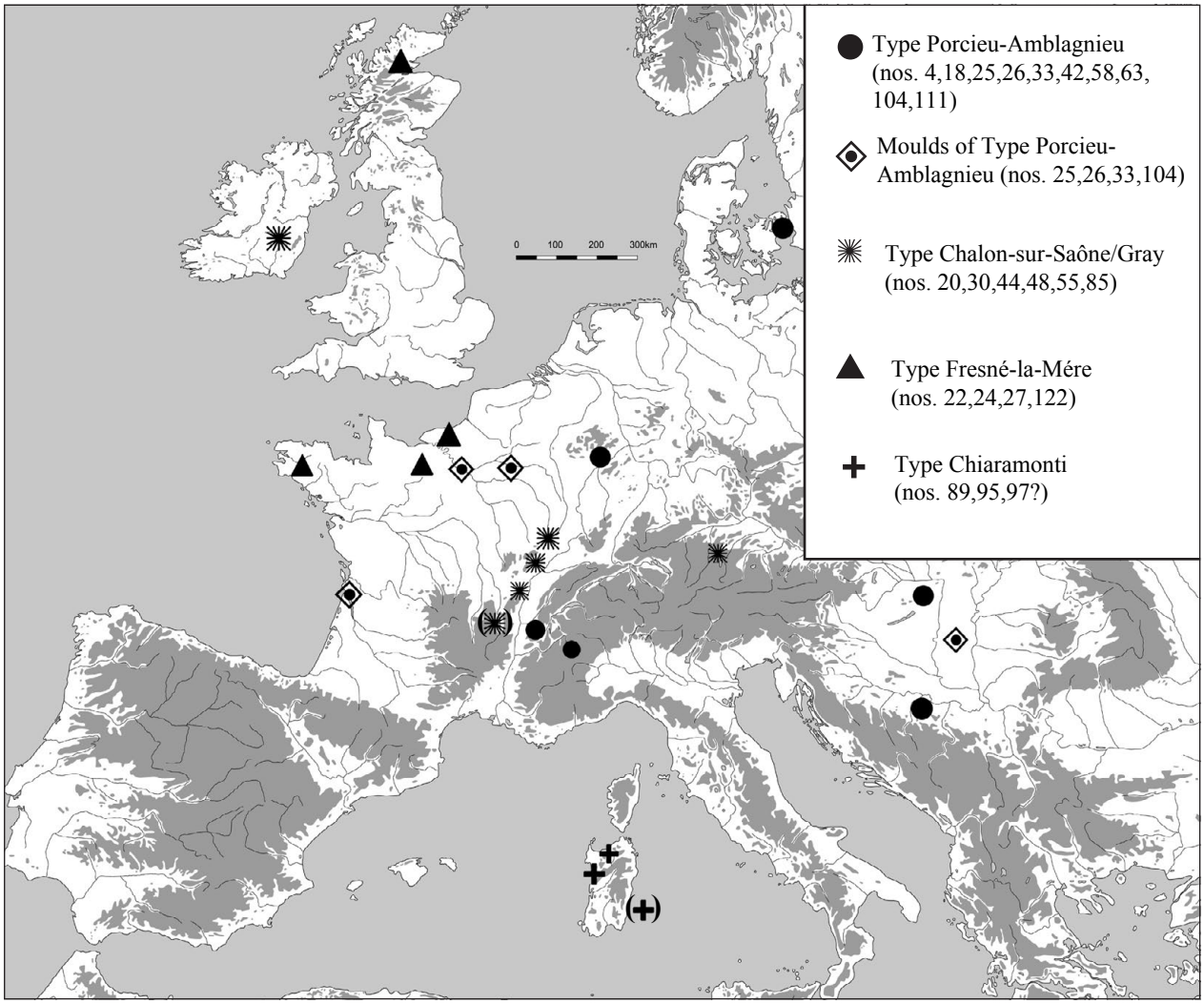
Карта 2. Распрострањеност металних наковања из бронзаног доба (бројеви одговарају приложеној листи у тексту)

distributed in Ireland, western France and, perhaps, in Southern Germany. Cruciform anvils of the type Chalon-sur-Saône/Gray were regionally limited to Burgundy (Eastern France)[73] and anvils of the type Chiaramonti were an endemic phenomena of the Sardinian island[74]. Anvils of the type Porcieu de Amblagnieu are common and were produced in France (see the three moulds in its western part). The second Western European anvil tradition is represented by the anvils of the type Fresné-la-Mère with finds from Scotland, Brittany, Normandy and the Seine basin. Bent anvils of Class 3 prevail in the middle Danube region. The mould for bent anvils and a finished bent stake from the hill fort of Velem-Szentvid (no. 72, 74; Fig. 14/8. 9) together with some other moulds and tools for metalworking indicate local production (workshops) on this prominent site.[75] The two beaked anvils from Loučka (no. 13. 15) are very similar to the third anvil, a block anvil (no. 10), from the same hoard, all probably made for a tool kit for a local metalworker. The anvils from Plainseau (Amiens) (no. 40) and Graville-Sainte-Honorine (no. 32) are also very similar (Fig. 8/1. 2).

[73] Nicolardot/Gaucher 1975: 33; „Saônnois“: Thevenot 1998: 128.

[74] Lo Schiavo 2018: 429.

[75] von Miske 1908.



Map 3. Distribution of some types of Bronze Age anvils in Europe

Карта 3. Расūросūрањеносūи ūојединих ūūйова меūалних наковања у бронзаном добу

They are regional anvil forms in North Western France as are the two mushroom-headed anvils from Ruthen (no. 60) and Świnoujście-Międzyzdroje (no. 100) (Fig. 8/3. 4) in the Southern Baltic Sea region. Also, the two Italian mushroom-headed anvils from Bologna-San Francesco (no. 80) and Contigliano (no. 83) look very similar (Fig, 8/1. 2).

In summary, the chronology and distribution patterns of the bronze anvils show that there is no evidence of a typological evolution from simple to complex forms/types.[76] On the contrary: to begin with (Middle Bronze Age) there were more complex anvil shapes, while later on (Later Bronze Age) more simple forms prevailed. This again underlines the relationship between the formal character and the specific work process. At the moment, any particular region of origin for metal anvils within a limited region in Europe cannot be identified.

The anvil mould from Velebit (no. 104) was discovered ca. 1,200–1,400 km from the next analogies in Western France (Map 3). The simultaneous emergence of the production and use of metal anvils demonstrates a supraregional innovation, a high mobility of people (perhaps also of „itinerant" metal workers) and a rapid exchange of technological knowledge and skills in the context of social, economic and religious networks. However, there is yet not enough evidence

[76] Ehrenberg 1981: 14.

to allow a final conclusion in this matter. The four moulds, probably all dating from the Middle Bronze Age, represent a standardised shape and unified workflow over a long distance. This might reflect a communication network of Bronze Age craftsmen and societies throughout Europe.

Function

Producing

The shape of metal anvils depends on their specific function in forging, and the desired shape of the final product. Therefore, generally, a great variety and diversity of anvils can be expected. Each artisan determined the final shapes („*The end justifies the means"*). In some cases, caster and smith might have been the same person.

All Bronze Age metal anvils were cast, most of them in two-piece stone moulds (sandstone, calcite etc.). Some socketed anvils (no. 31, 35: Fig. 9/6; 11/4) were been cast in multiple piece moulds, provided with a core, comparable with the casting of socketed hammerheads. To date, clay for anvils is unknown because the preservation conditions for fragile clay moulds are generally poor. Moreover, bronze moulds could have been melted down due to their high material value.

Compared to the number of ca. 120 metal anvils, only eight (!) casting moulds are known. This represents a very high ratio between finished anvils and their moulds (ca. 1:10). Stone moulds have been found in three lake villages in Central and Western Switzerland (Auvernier [no. 108]; Grandson-Corcelettes [no. 110]),[77] and a single find from South-Western France (La-Lède-du-Gurp [no. 33]),[78] from two Late Bronze Age settlements in Western and Northern France (Fort-Harrouard [no. 26]; Cuiry-lès-Chaudardes [no. 25]),[79] from a hoard of stone moulds in Ireland (Omagh [Ulster] [no. 123])[80] and from the a hill fort settlement in Transdanubia (Velem-Szentvid [no. 73]).[81] The Serbian stone mould from Velebit (no. 104) is the first mould for anvils outside Western Europe.

List of moulds for Bronze Age metal anvils

1. Auvernier (no. 108), canton Neuchâtel, Switzerland. – Late Bronze Age lake village (mostly Ha B). – One half of a two piece stone mould for a pyramidal anvil and a sickle (Fig. 7/12). – Rychner 1979: pl. 135, 3.

2. Cuiry-lès-Chaudardes (no. 25), dép. Aisne, France. – Middle Bronze Age (Bz D–C) settlement, structure 55. – Fragment of a half of a two piece stone mould for an anvil with two beaks/spikes (Fig. 12/10). – Letterlé 1982: fig. 5; Blanchet 1984: 186, fig. 99, 18.

3. Fort-Harrouard (no. 26), com. Sorel-Moussel, dép. Eure-et-Loir, France. – Middle /Late Bronze Age (Bz C–Ha B) hill fort; pit B 157 (associations: ceramic vessels, spindle whorl, perforated dent of a dog/wolf). – Fragment of a half of a two piece stone (calcite) mould for an anvil with two beaks/spikes; on the back a negative for a socketed object (spearhead?) (Fig. 12/8). – Mohen/Bailloud 1987:127, fig. 69; pl. 6, 11.

4. Grandson-Corcelettes (no. 110), canton Neuchâtel, Switzerland. – Late Bronze Age lake village (mostly Ha B). – Half of a two piece stone mould for a rectangular board anvil (?) (Fig. 14/3). – Gross 1883: pl. 29, 12.

5. La-Lède-du-Gurp (no. 33), com. Grayan-et-l'Hôpital, dép. Gironde, France. – Single find (1966) from beach of the Atlantic Sea. – One half of a two piece stone mould for an anvil with two beaks/spikes; traces of powder from the casting process (Fig. 12/9). – Moreau 1971: Gomez de Soto 1995: 101–102, fig. 32.

6. Omagh (no. 123), Co. Tyrone, Ulster/Northern Ireland. – Middle Bronze Age hoard of stone moulds. – Complete mould for a block anvil with a small beak on one side (Fig. 11/1); in combination with negatives for a rectangular ingot and bar-ingot; on the back a mould for a dirk. – Coghlan/Raftery 1961: 241–242, fig. 42.

7. Velem-Szentvid, Kom. Vas, Hungary. – Late Bronze Age (Ha B) settlement (hill fort). – Fragment of a half of a two piece stone mould for a bench anvil and a socketed hammer (Fig. 14/9). – von Miske 1908: pl. 22, 3.

8. Velebit, Serbia (Fig. 4/3; 5/4. 5; 12/7).

All metal anvils were cast in bronze. Some of them were made of a special alloy of copper with a high tin content ranging from 10 % to 30 %. This composition changes the mechanical and chemical properties of the alloy, such as hardness and colour, and makes the anvil harder than „ordinary" tin-bronze-alloy (10 % Sn). Hardness is required for percussion tools used for plastic shaping. A secondary effect of

[77] Wyss 1969: 10; Rychner 1979: pl. 135.3; Gross 1883: pl. 29, 12.

[78] Gomez de Soto 1995: 101–102, fig. 32.

[79] Mohen/Bailloud 1987: 127, fig. 69; pl. 6, 11; Blanchet 1984: 186, fig. 99, 18.

[80] Coghlan/Raftery 1961: 241–242, fig. 42.

[81] von Miske 1908: pl. 22, 3 (right negative).

this special alloy is its whitish-silvery shiny colour:[82] The Lachen-Speyerdorf (no. 51: Cu 76,81%, Sn 17,17%); Inshoch Wood (no. 121);[83] Kyle of Oykel (no. 122);[84] „Murnau" (no. 55);[85] La Tour de Langin (no. 35); [86] and the Clos de la Blanche Pierre, Jersey (no. 124) examples belong to this group.[87] The Late Bronze Age block anvil from Lichfield (no. 117) was made of a copper alloy containing lead (Pb 25%), antimony (Sb more than 5%) and „very little tin".[88] Further systematic analyses of the elementary alloy composition of Bronze Age anvils is necessary for a better understanding of the technical choices of the artisans.

There is little data available concerning the weight of the anvils: (e. g.) Génelard (no. 30: Type Gray [927 g]); Sipbachzell (no. 3: 912 g), Loučka 1–4 (no. 13–16: together ca. 800 g), Saône near Chalon-sur-Saône/ Gray (no. 44: 754 g), Fratelia (no. 102: 660 g), Boljanić 1–3 (no. 4–6: together > 430 g), Alise-Sainte-Reine/ Laumes (no. 20: 410 g), „Murnau" (no. 55: 348 g). All metalworking tools (anvils, socketed hammerheads) from the Génelard hoard have a total weight of about 3 kg of bronze (Fig. 18)! When these tools are melted down (in a recycling process) a complete cuirass or ca. 300 pins could be gained. It can be presumed that anvils contained a large amount of bronze!

Hafting

Anvils were inactive percussion tools that had to be fitted in a wooden stump. This fitting had a twofold function: On the one hand, the wooden support provided a means to absorb the shock of the percussion. On the other hand, it served the fixing of the inactive tool during the striking of the active hammer. Some details of the mounting methods can be deduced. Bench and block shaped anvils which were not equipped with a spike could be inserted into a block of wood provided with a depression corresponding to the block's dimensions. Anvils with beaks/spikes were also fitted in a wooden stump. The multiple use of certain complex anvils was possible: alternately on the beaks and/or on the working face (Fig.13/10a).

Use

The generally small-size working surfaces of these anvils were mostly rectangular or square, rarely round-spherical or round-oval. The dimension of the working surfaces ranged from ca. 3 cm to 8 cm. According to the specific working purpose, the surfaces were flat, slightly domed or gable-roofed. Each surface shape had, in combination with the working face of the hammer, a precise impact on the work piece that was to be deformed and shaped. The surfaces correlated largely with the striking faces of their counterparts, the bronze socketed hammerheads or other active percussion tools.[89] The working surfaces of the anvils had to be as smooth as possible, because even the slightest damage on them – as well as on the smith hammer – left a mark on the hammered object.

On the working surface or projecting beak there are sometimes slight or fine incised grooves or swages (German: *Sicken*) which appear in different shapes (half-round, V-shaped etc.), widths and depths. They were apparently intended for the shaping of bronze pins, needles, awl, rods or wire of round, quadrangular or triangular section, and probably also for small gold objects.

Some anvils have a perforation through the centre of their body, so-called punching holes (Fig. 6/1. 6; 13/1–4. 8). Their diameter ranges between 1–8 mm. Despite the term „punching hole", the function of this hole might rather have been to bend rods and wires than to perforate objects. The frustrum-anvil from Fratelia (no. 102) has a row of little bosses on two sides of its body (Fig. 7/3).

Due to the size and different nature of the working surfaces, of the beaks/spikes and swages, a differentiated use of the anvils can be postulated. It ranges from coarser to finer forging.[90] Some anvils have clear traces of a long lasting use in the form of deformation (German: *Bart*), hammer marks and scratches (par example: Fig. 7/1. 6. 9. 11. 14; 8/1; 10/1; 11/11; 16/3. 4. 10–13).[91]

Anvils as an essential element
of the Bronze Age metalworker's tool kits

It can be assumed that anvils (of stone or metal) were part of the basic equipment of every specialised metalworker's tool kit or workshop. Anvils can be found wherever forging of metal objects was practiced on a

[82] Salaš 2014: 73–74, fig. 21. 23 for eight anvils (range: 78–88% Cu, 10, 5–20, 2% Sn) (one anvil of copper!).
[83] Childe 1945/46 (70% Cu, 30 % Sn).
[84] Smith 1881: 24: (70, 4% Cu; 26, 4% Sn).
[85] Silvery shining: Nessel 2009: 56.
[86] Ohlhaver 1939, 110 (B 52 „Genf") (84% Cu, 16% Sn).
[87] Coombs 1988: 325 (Cu ca. 79%; Sn 19,04%).
[88] Needham/Meeks 1993: 127.
[89] Jockenhövel 1982.
[90] Ohlhaver 1939: 23; Armbruster 2001: 17.
[91] Loučky (Moravia): Salaš 2014: 71 fig. 18.



Fig. 18. Génelard (Burgundy, France). Late Bronze Age tool kit (Photograph B. Armbruster)

Сл. 18. Génelard (Бургундија, Француска): група алатки из касног бронзаног доба (фото: B. Armbruster)

smaller or larger scale. It is impossible to mention all finds in our study, especially all hoards with elements of a metalworker's tool kit. Mainly in large European hoards with numerous objects there is often a combination of anvils with socketed hammerheads and other tools for metalworking.[92]

The most complete tool kit is known from the Ha A 2-hoard of Génelard (no. 28–32) (Burgundy, France). It consists of anvils of different kinds, socketed hammer heads, a swage block, chisels, a set of five punches with concentric circles (German: *Ringpunzen*) and four other punches, one half of a little bronze mould for small rings and some other tools.[93] In addition to the bronze tools, a stone hammer that might also have been used as an anvil was associated to this outstanding assemblage (Fig. 18). Another significant eastern French tool assemblage, belonging to the Larnaud hoard (Jura, France), consists of a doming block (no. 34) (Fig. 14/4), a socketed hammerhead and several punches for plastic decorations. Assuming that it is a closed find, in the Bz D-hoard from „Murnau" (Upper Bavaria) an anvil (no. 55) (Fig.13/5) is associated with 18 punches, also specialised punches for sheet decoration (German: *Ringpunzen*, *Faulenzerpunzen* [„faineant"-punches], a wheel-shaped punch) and two small hammers for fine forging.[94] From the West Balkans, in the Ha A-hoard from Boljanić (no. 4–6) (Bosnia and Herzegovina) are incorporated three anvils of different shapes which are associated with three socketed hammerheads, a small blade of a saw, two chisels (for wood-working) and five metal cores for casting socketed tools.[95] We can also mention

[92] Hansen 1994:127–129. 140, fig. 77; Nessel 2009; Medeleț 2005; Jockenhövel 2019.

[93] Thevenot 1998; Armbruster 2008.

[94] Nessel 2008.

[95] König 2004.

the combination of three anvils (no. 13–15) and three socketed hammerheads from the Ha A-hoard of Loučka (Moravia) (Fig. 10/2. 3; 11/9).[96] Some other hoards with an anvil and its counterpart, the socketed hammerhead, are known from the Danube Region, e. g. Fratelia (no. 102) (Romania), Nadap (no. 67–69) (Hungary), and Schiltern (Austria), from Central and Western Europe, e. g. Porcieu-Amblagnieu (no. 42) (Eastern France), Fresné-la-Mère (no. 27) (Normandy), Inshoch Wood (no. 121) (Scotland), Lusmagh (no. 78) and Bishopsland (no. 75) (both Ireland). The Middle Bronze Age casting stone moulds from Omagh (no. 123) (Northern Ireland) demonstrate which objects could be cast together: a small beak anvil, a dirk blade, a bar and a flat piece of metal (probably another bar). This is a combination of weapons and semi-finished products or crude metal.

Anvils and gold working

Bronze Age anvils are typical tools for copper, bronze and gold working. Consequently, these small fine metal working tools could have been used for both precious metals and copper based alloys (bronze).[97] Their use in gold working[98] has been evidenced in several cases, as on the working face of some anvils tiny gold particles were detected: „North Sligo" (no. 79); Lusmagh (no. 78) (both Ireland); Lichfield (no. 117) (England) and Fresné-la-Mère (no. 27) (Normandy, France).[99] On the surfaces of the bronze bench block with a high content of tin from Lachen-Speyerdorf (no. 51) (Southwestern Germany) traces both of gold and bronze were found (Fig. 14/1). In the Bronze Age hoards from Fresné-la-Mère (Normandy) and Velim (no. 9) (East Bohemia, Czechia) anvils are associated with gold jewellery.[100] This combination suggests the use of some anvils by goldsmiths as well. The socketed hammerhead and the anvil provided with a work face angle below 90° from the Fresné-la-Mère hoard (fig. 13/10) are particularly well suited to producing flange twisted gold torcs, the large ornament they were associated with. A special investigation of anvils by means of a high-resolution microscope might increase the number of Bronze Age anvils for gold and silversmiths in the future.

Summarising we can realise that Bronze Age bronze anvils were mainly used for lightweight fine metalworking of small objects (i.e. ornaments, rods, wire, thin plates or sheets, plastic decoration, etc.) of bronze, gold or silver. Larger anvils might also have been used for hammering and sharpening blades of weapons (i.e. swords, daggers, spearheads) or tools (i.e. sickles, knives or razors). However, these bronze anvils with mostly very limited working surface tools seem to be less appropriate for shaping larger and heavier bronze sheet objects (i.e. helmets, shields, cuirasses and vessels).

Social context

Almost all Bronze Age anvils were found in bronze hoards and settlements. Some of them were river finds, perhaps offerings. In the contexts of many hoards, anvils represent an integral component of a metalworker's tool kit. In some settlements, they were found together with other archaeometallurgical tools (moulds, hammerheads, chisels, punches, etc), and thus represent more or less workshops. Only six anvils were found in graves.

Which persons owned these anvils?

Graves with bronze anvils

Hallstatt, Pol. Bez. Gmunden, Upper Austria, Austria. – Grave 469; incineration. – Bronze socketed hammerhead (anvil); bronze alloy with high content of tin (white-shiny), ribs on the mouth, marks on one side (owner marks?); flat rectangular working surface (Fig. 17/10). – Associations: *bronze* – parts of a cuirass, file/rasp, two pins, six small rings; *iron* – long sword, short sword, three socketed spearheads, two socketed hammerheads, socketed chisel, knife, fragments of unidentified iron objects. – Dating: Ha C. – Kromer 1959: 110, fig. 91, pl. 82–84.

Lachen-Speyerdorf (nos. 51. 52), com. Neustadt an der Weinstraße, Rhineland-Palatine, Germany. – Grave 3; cremation. – Two anvils; *anvil 1 (no. 51)*: bench shaped anvil; fahlore-based bronze with high content of tin (Cu 76.81%, Sn 17.17%; Pb 1.15%, As 0.57%; Ni 0.34%, Sb 0.60%, Co 0.04%, Zn 0.07%, Au <0.01, Bi<0.025%, Cd <0.001); swages (German: *Sicken*) on three (of four) working faces; length 6.9 cm; weight 155 g; on four sides traces of forging; after REM-investigation traces of *gold* (on one working face) *and bronze* (on another surface) (Fig. 14/1). *Anvil 2 (no. 52)*: Half of a „pick-ingot"; lead (!); length 13.2 cm

[96] Salaš 2014.

[97] Jockenhövel 2003.

[98] Oldeberg 1943: 16–17; Eluère 1987: 19–20; Armbruster 1995: 181; idem 2001.

[99] Ehrenberg 1981: 15; Maryon 1938: 249, fig. 17; Meeks/Needham 1993; Taylor 1980: 12.

[100] Eluère 1987: 20; Kytlicová 2007: 312 Nr. 251, pl. 159. 160).

(Fig. 16/7). – Associations (only metal objects preserved): two knives, fragments of two razors (Type Eschborn after Jockenhövel 1971: 145). – Dating: Ha B 1. – Müller-Karpe 1959: 316, pl. 11, K; Jockenhövel 1971: 146, no. 274. 279; Jockenhövel 1973: 23, fig. 2; Sperber 2000; Bachmann u. a. 2003: 92, fig. 12.

Steinkirchen (no. 61), Lkr. Deggendorf, Lower Bavaria, Germany. – „Steinfeld"; grave 10, cremation. – Bronze block-anvil with three swages on the working face; length 1.6 cm (Fig. 7/21). – Associations: razor, fragment of a knife, shaft of a pin, five ceramic vessels. – Dating: Ha A 2. – Müller-Karpe 1969; Jockenhövel 1971: 100, no. 132, pl. 70, A.

Graves with iron anvils

Hallstatt (no. 2), Pol. Bez. Gmunden, Upper Austria, Austria. – Grave 283; cremation. – *Iron* block anvil; length 7 cm (Fig.7/9). – Associations: *bronze* – five *phalerae* (from a cuirass?), pins; *iron* – socketed spearhead, winged axe, four fittings; ceramic sherds, animal bones. – Dating: Ha C. – Kromer 1959: 82, fig. 50, pl. 44, 1–8.

Falerii (no. 84), Civita Castellana, Viterbo, Lazio, Italy. – Mazzano Romano; from a grave (unknown associations). – *Iron* pyramidal (frustrum-) anvil; length ca. 10.5 cm (Fig. 7/19). – Montelius 1905/1910: pl. 329, B.

Boddin, Lkr. Güstrow, Mecklenburg-Vorpommern, Germany. – Grave 4; cremation (woman? [ca. 30–40 years old]). – *Iron* block anvil; length 2.7 cm (no illustration). – Assocations: small iron belt hook. – Dating: Early Jastorf Culture (ca. La Tène A/B). – Keiling 1972.

The grave of Lachen-Speyerdorf can be addressed as a metalworker's grave.[101] Both anvils show intense traces of use (fig. 14/1; 16/). The tin-rich bronze anvil was used for forging bronze *and* gold. Apart from the two anvils, this grave is characterised by the association of two razors and a knife. Razors are considered typical adult-male accessories.[102] As pointed out by H. Müller-Karpe, the small anvil with swages on the working surface (fig. 7/21) from the razor/knife-grave of Steinkirchen (Lower Bavaria) could have be used as a „*Toreutengesenk*" i.e. a special tool used to produce plastic ribs on sheet bronzes, like the ribs on buckets or vessels.[103] If a bronze vessel as a finished product had been included in this grave, it would undoubtedly have been one of the most important and highest ranking graves in Lower Bavaria during the earlier Urnfield period.

Grave No. 469 at Hallstatt is characterised by the extraordinarily rich warrior equipment and can be compared with other similar graves of the well known Early Iron Age (Ha C) salt miner cemetery. The anvil there is associated with other tools: a file/rasp and a chisel. The union of a warrior's and a metalworker's or other craftsman's (wood-worker?) profile is comparable with that of other rich warrior graves in the Eastern Alpines.[104] In contrast, grave No. 283 at Hallstatt is different from grave No. 469 as it contains only a spearhead and a winged axe, whereas the fittings (phalera) of a cuirass (?) connect this grave with other Eastern Alpine warrior graves of Hallstatt nobility. These male graves have their counterparts in some rich female graves with utensils from the extensive textile production of that time.[105]

The very small iron block anvil of Boddin (Mecklenburg) was the burial gift for a 30–40 year-old person, probably a woman. If the anthropological investigation was correct – based on weak muscle marks on the long bones and skull – it would be one of the few female graves to include a metalworking tool.[106] However, on the anvils of the Northern German Jastorf Culture, according to H. Keiling, „delicate iron objects were made, such as the small tongue belt hooks from the same grave or the characteristic bronze *Segelohrringe* earrings and iron pins" (translation: A. J.).[107]

However, similarly to other tools, anvils as grave goods deviate from the canonical associations special gifts have in Bronze Age graves. They emphasise the special position of the deceased and/or the significance of the craftsmanship. Regardless of whether the anvil was the property of a craftsman or a general sign of his community's appreciation of that profession, represented by anvils and their physical characteristics (form and weight), metal anvils were held in high esteem, which was conferred on their owners –craftsmen working with copper, bronze and gold.

This may explain why they are very rarely encountered as grave goods. Such special tools, and perhaps even the associated complementary tools (the

[101] Sperber 2000.
[102] Jockenhövel 1971: 247.
[103] Jacob 1995: 98.
[104] Teržan 1994; idem 2003.
[105] Eibner 2005; idem 2014.
[106] Jockenhövel 2018, 274–275.
[107] Keiling 1972, 179.

counterpart socketed hammerheads), were likely handed on to successors, within the family, clan or tribe, or they were melted down when their usability had significantly diminished.

Anvils and symbolism

Like other tools, some of the anvils are decorated with plastic decorations (Fig. 10/5; 11/2–7. 9; 11/3. 5; 13/10; 14/11). This relates them to comparable ornaments on socketed hammerheads and socketed axes. The plastic decoration in the form of a rosette („belle marguerite")[108] on the body of the Early Middle Bronze Age anvil from Porcieu-Amblagnieu (no. 42) (Eastern France) makes it a singular object (Fig. 11/5). The outline and plastic decoration on the socketed hammerhead/anvil of Génelard has female features (Fig. 17/8; 18). This pattern underlines a symbolic embedding of this special type of metalworking tool.

Translated by Stefan Milošević

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[108] Moreau 1971, 267.

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The moulds from Velebit and European Bronze Age metal anvils (139–182)

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ЛИВАЧКИ КАЛУПИ ИЗ ВЕЛЕБИТА И МЕТАЛНИ НАКОВЊИ ИЗ БРОНЗАНОГ ДОБА У ЕВРОПИ

Кључне речи – Бронзано доба, Карпатски басен, Култура гробних хумки, наковњи, калупи, накит, металургија

Пре скоро пола века изведена су систематска истраживања некрополе из бронзаног доба и касне антике / раног средњег века на једном локалитету који се налазио на улазу у село Велебит код Кањиже. Том приликом откривена је једна праисторијска остава камених калупа за ливење предмета од бронзе, међу којима се издвајао један тип за који је професор А. Јокенховел потврдио да припада калупу за израду наковања.

Старији хоризонт сахрањивања на овој некрополи припадао је Култури гробних хумки средњег бронзаног доба у централној Европи, а наведени калуп из тог контекста представља за сада једини налаз који се повезује с постојањем наковања на територији централног Балкана у бронзаном добу, тако да је циљ овога рада да укаже на везе које је овај простор имао са развојем продукције бронзаних предмета на целој територији Европе.

Историја истраживања наковања из праисторије почиње у 19. веку првим радовима на ту тему чији је аутор В. Г. Чајлд, а настављају је својим радовима Ј. Николард, Г. Гушер, М. Р. Еренберг и Д. Јанцен. Испрва су наковње представљали примерци од камена, као уосталом и остале алатке за обраду бронзаних полупроизвода током периода Културе звонастих пехара и раног бронзаног доба у Европи, као и у Çukuriçi Höyük у Анадолији, а њихова употреба се продужава кроз целокупно трајање бронзаног доба. Чак се у појединим контекстима заједно може наћи камени и метални алат за обраду метала, као што је пример на локалитету Génelard у Француској.

Због терминолошких разлика у називу за наковње, у овом раду је коришћен термин *anvil*, који подразумева различите врсте статичних подлога, сачињених од дрвеног и металног дела, које се користе у процесу искуцавања. Наковње смо поделили у следеће категорије и поткатегорије:

Категорија 1: Пљоснати и пирамидални наковњи (frustrum) – равни наковњи Brett-, Blockambosse);

Поткатегорија 1a: Пљоснато-равни наковњи (Brettambosse), сл. 6;

Поткатегорија 1b: Пирамидални (frustum) наковњи (сл. 7);

Потклаcа 1c: Наковњи с једном радном површином (сл. 8);

Потклаcа 1d: Пљоснати наковњи петоугаоног пресека са усадником (сл. 8);

Потклаcа 1e: Наковњи у облику „печурке” (сл. 9);

Потклаcа 1f: Наковњи са равном или калотастом главом (сл. 9);

Класа 2: Наковњи с једним или два рожаста испупчења (Hornambosse);

Потклаcа 2a1: Наковњи с једним латералним клинастим испупчењем које се налази на истом нивоу са радном површином (сл. 10);

Потклаcа 2a2: Наковњи с једним латералним клинастим испупчењем које се налази близу радне површине (сл. 11);

Потклаcа 2b: Наковњи са два латерална клинаста испупчења која су фиксирана на средишњем делу (сл. 12);

Потклаcа 2c: Наковњи са две радне површине и са два латерална клинаста испупчења (наковњи у облику слова „T” / тип Chalon-sur-Saône/Gray), сл. 13/1–6;

Потклаcа 2d: Наковњи с једном радном површином, једним клинастим испупчењем и једним усадником (тип Fresnè-la-Mère), сл. 13/7–10;

Класа 3: Равни наковњи са испупчењима и удубљењима (Riefenanken, Kugelanken), сл. 14/1–6;

Класа 4: Наковњи савијени под углом Biegestöcke), сл. 14/7–11;

Класа 5: Наковњи за искуцавање (Treibfäuste), сл. 15/1–3;

Наковњи специфичних облика (сл. 15/5–8);

Ad hoc наковњи (сл. 16);

Наковњи у облику чекића са усадником (Tüllenambosse), сл. 17.

До сада је констатовано око 124 предмета што су имала функцију наковња, и то претежно у бронзаним оставама, док су поједини налажени и на локалитетима као и у контексту сахрана. Највећа количина ових предмета потиче са британских острва и из Ирске, Француске као и појединих делова Швајцарске. Мање количине су констатоване у Италији, Источним Алпима, Подунављу, Панонији и западном Карпатском басену. Калуп за израду наковања са Велебита представља први примерак у Србији и најстарији у Панонији, док у многим крајевима Европе такви калупи нису уопште нађени. Занимљиво је да се слични типови наковања налазе тек на удаљености од 1200 км до 1400 км на западу у Француској. Хронолошки гледано, најсложеније форме јављају се током средњег бронзаног доба, док на крају тог доба доминирају једноставнији облици. Сви су изливени од бронзе (CuSn), а поједини су направљени од

посебне легуре бакра с високом концентрацијом калаја од 10% до 310%, док су неки садржали и олово (Pb 25%), антимон (Sb мање од 5%%) или веома малу количину калаја.

Из претходне расправе можемо закључити да су наковњи представљали незаобилазне делове ковачке опреме за израду металних предмета мањих или већих димензија. Најбоља илустрација за опрему једног ковача јесте остава Génelard из Француске (Fig. 18), са сетом алата за израду различитих врста употребних предмета и накита. У суседству Србије најзначајнија је остава Бољанић (БиХ), а нашу везу са Подунављем представљају оставе Nadap (у Мађарској) и Fratelia (у Румунији).

Током бронзаног доба наковњи су такође били неопходни и приликом стварања и обраде предмета од злата, о чему у неколико случајева сведоче налази: „North Sligo" (no. 79); Lusmagh (no. 78, Ирска); Lichfield (no. 117, Енглеска) и Fresné-la-Mère (no. 27, Нормандија). То потврђују трагови златних честица откривени на наковњу из Lachen-Speyerdorf-a (no. 51, Југозападна Немачка), али се сматра да су примерци из остава Fresné-la-Mère (Нормандија) и Velim (no. 9, Источна Чешка) такође имали везе са обрадом злата.

На крају можемо закључити да су представљени наковњи из бронзаног доба претежно коришћени за обраду мањих предмета, израду орнамената и за моделовање предмета у облику жице, трака и пластичне декорације од бронзе, сребра и злата. На њима су се могле не само правити оштрице алата и оружја већ и додатно оштрити. Највећи број наковања нађен је у оквиру остава, а само шест у контексту гробова. Они су услед веће количине бронзе, од које су морали да буду направљени, вероватно имали већу вредност, па су се преносили наследством са оца на сина. У том би смислу требало посматрати и налаз са некрополе Велебит, односно – да је са ковачем из бронзаног доба похрањен само фрагментовани калуп, а не цео наковањ.

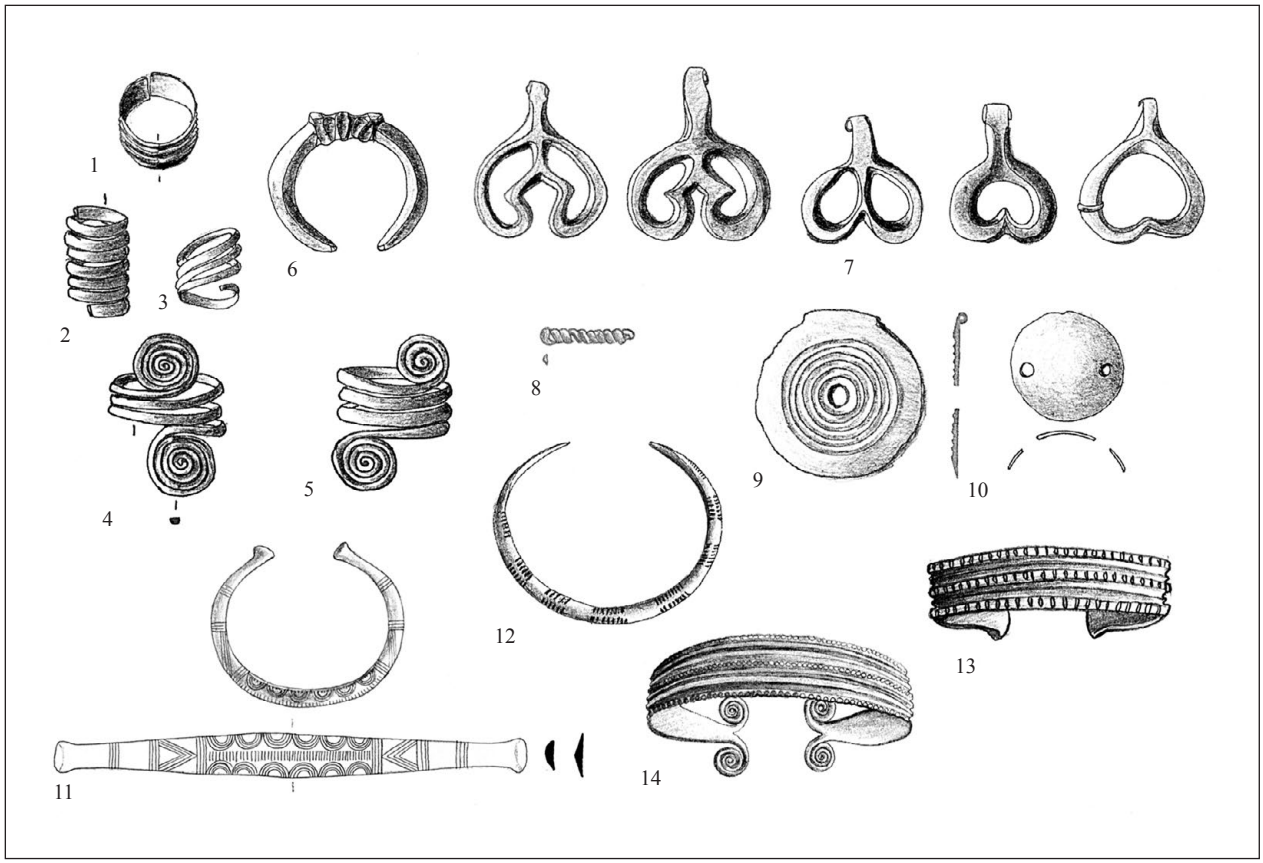


Plate I – Velebit. Bronze finds from the cemetery

Табела I – Велебит: налази бронзе са некрополе

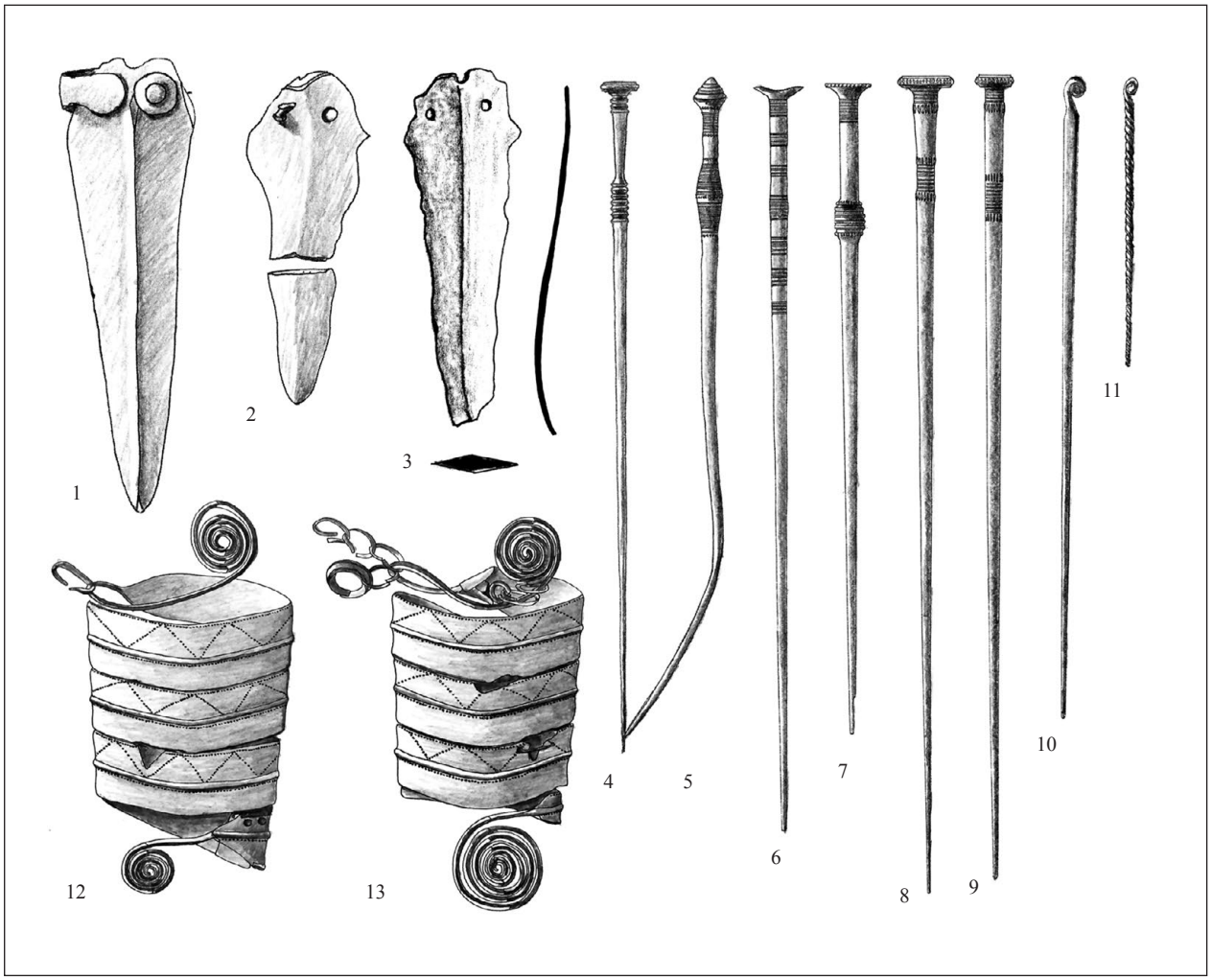


Plate II – Bronze finds from the Velebit necropolis

Табела II – Велебиш: налази бронзе са некрополе

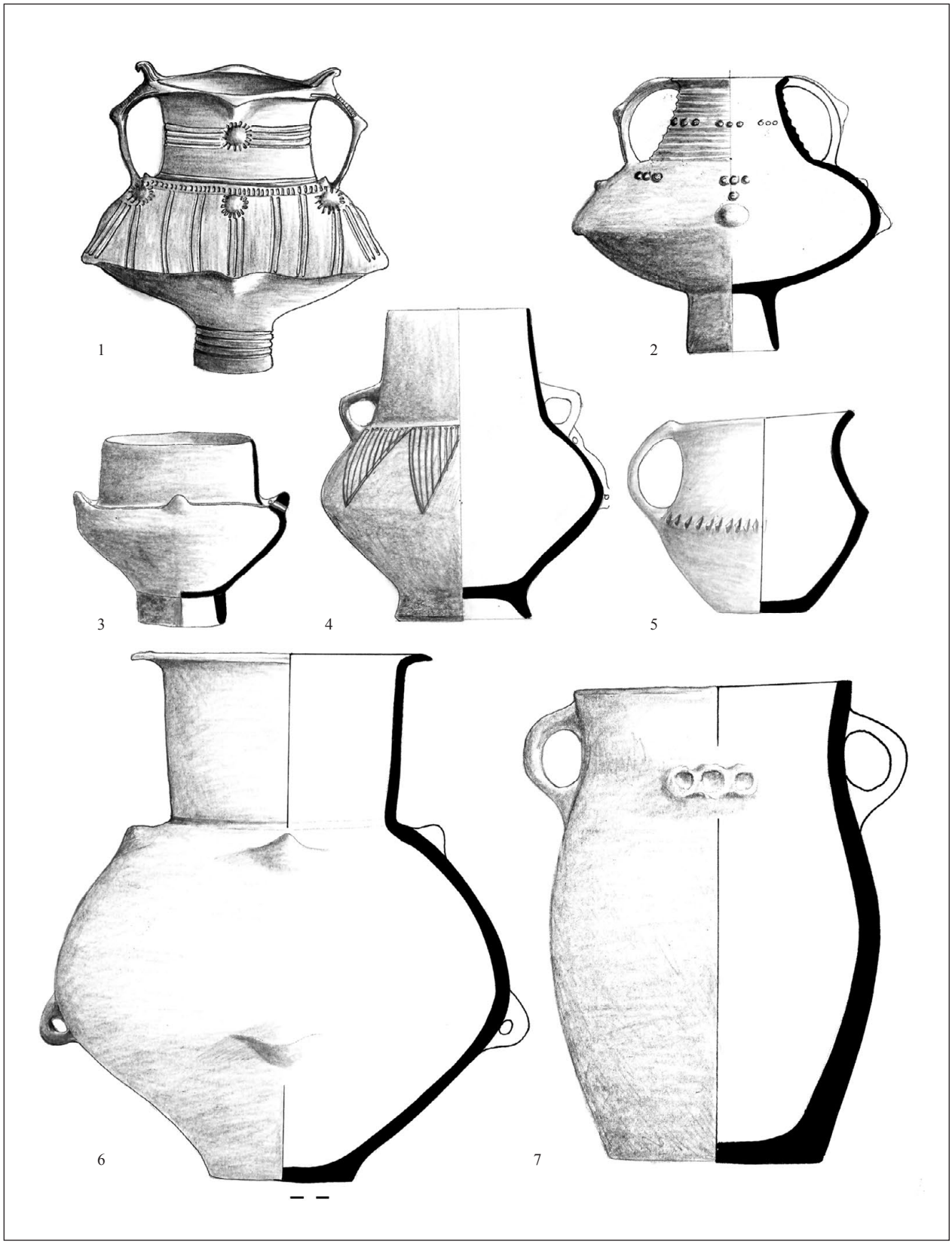


Plate III – Pottery finds from the Velebit necropolis

Табела III – Налази керамике са некрополе Велебит

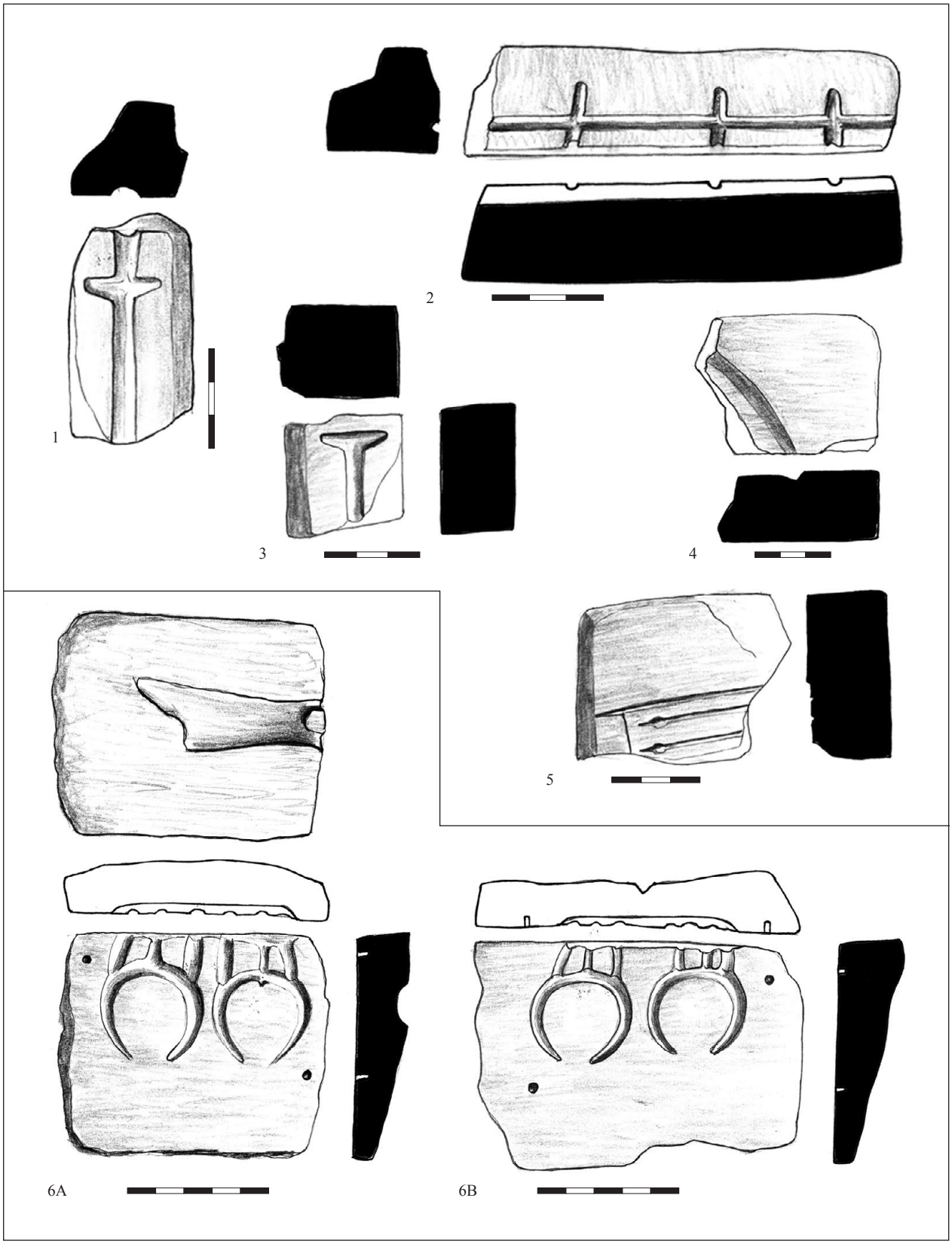


Plate IV – Moulds from the Velebit necropolis

Табла IV – Велебит: камени калупи са некрополе

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