

2 Helmets

Around 120 metal helmets from the European Bronze Age are presently known. These helmets are widely distributed all over Europe, with just a few exceptions (Fig. 2.1).²⁹ These include the Nordic region, where only two bronze helmets from Viksø have been found. Helmets are also unknown from Ireland and the British Isles. Finds of helmets are also scarce in the Iberian Peninsula, with only a few fragments from a small number of associated deposits being known, though there are several more depictions of helmets on contemporary stelae. European Bronze Age helmets can be divided typologically and geographical into two main groups: western European helmets, which comprise cap helmets without knob, cap helmets with a crest and crested helmets, and central and eastern European cap helmets with knob.

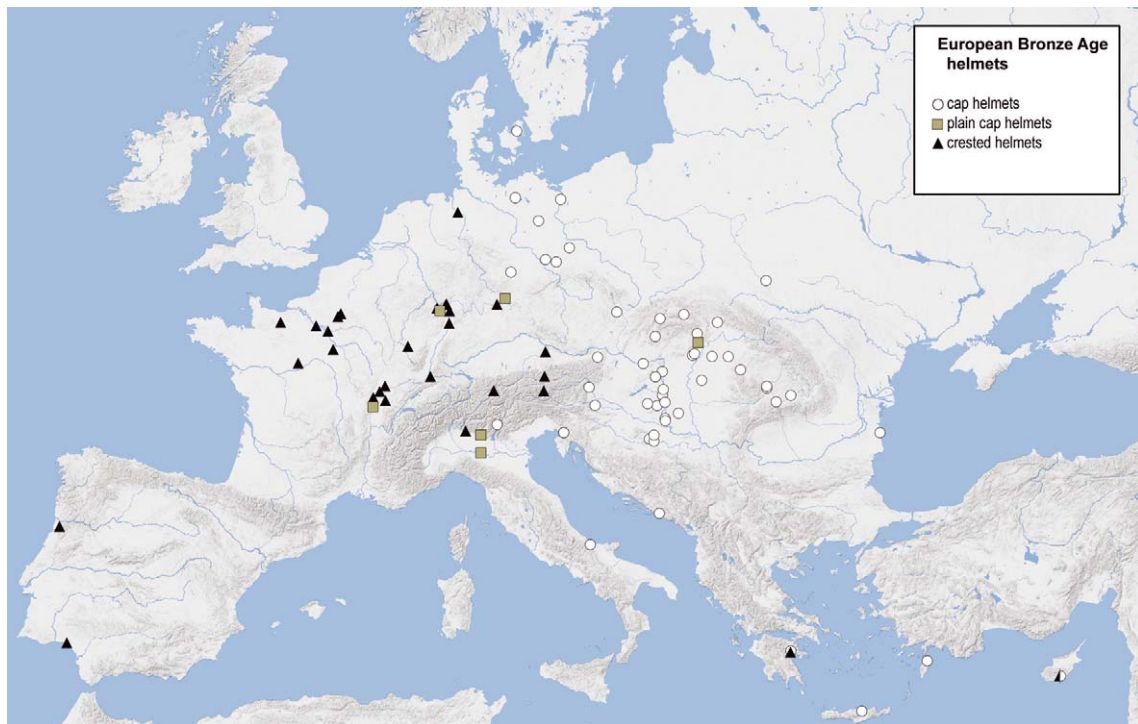


Fig. 2.1 Archaeological distribution of Bronze Age helmets. ○ Cap helmets. □ Plain cap helmets (Type Montbellet). ▲ Crested helmets. Helmets with unknown or unsecure find locations are not mapped.

Even before the first scientific publications of helmet finds of the 19th century had appeared, the early helmets from Pass Lueg and Bernières d'Ailly had been incorporated rapidly into contemporary art connected with the end of the Iron Age and the depiction of Vercingetorix. The most famous of these were produced by F.-E. Ehrmann and others, who combined elements of these two helmets.³⁰

²⁹ Mödler 2016a; Mödler 2016b.

³⁰ F.-É. Ehrmann 1869: *Vercingetorix appelant les Gaulois à la défense d'Alésia*, Musée d'Art Roger-Quilliot, Clermont Ferrand; H.-P. Motte 1886: *Vercingetorix se rendant au camp de César*, Musée Crozatier, Le Puy-en-Velay; L.-N. Royer 1899, using the Pass Lueg helmet: *Vercingetorix jette ses armes aux pieds de César*, Musée Crozatier, Le Puy-en-Velay.

The first comprehensive study of Bronze Age helmets was by G. v. Merhart in the 1940s,³¹ and much of his classification remains valid. He distinguished helmets formed from a single bronze sheet (*Kappenhelme* [cap helmets] and *Glockenhelme* [bell helmets]) and those constructed from two sheets (*glatte Kammhelme mit runder Haube* [undecorated crested helmets with round cap], *glatte Kammhelme mit Spitzhaube* [undecorated crested helmets with pointed cap], and *verzierte Kammhelme mit Pickelhaube* [decorated crested helmets with spiked cap]). The helmet from Pass Lueg as well as the two helmets from Škocjan were assumed to be deviant types. G. v. Merhart's study was based on the entry of E. Sprockhoff in the 'Reallexikon der Vorgeschichte',³² who divided Bronze Age helmets into cap helmets, bell helmets and crested helmets. Nevertheless, it is v. Merhart's study which remains the more widely cited of these early works. Based on new finds, A. Mozsolics subsequently separated G. v. Merhart's groups A and B into three types: Type Kisköszeg with hemispherical cap, Type Hajdúböszörmény with bell shaped cap and Type Lúčky with conical cap.³³ In a further, more comprehensive study, H. Hencken discussed all European Bronze Age and Early Iron Age helmets discovered up to the 1970s, which represents the most extensive monograph on helmets. He divided the helmets into bell helmets (conical and rounded), Italian and non-Italian crested helmets (both distinguished between round/conical cap and pointed cap), cap helmets (helmets without knobs or sockets; helmets with star decoration; helmets with cast knobs; helmets with plain socket) and finally conical helmets with double crest. However, he did not significantly modify G. v. Merhart's classification.³⁴ J. Borchhardt published just one year after Hencken his wide study on 'Homerische Helme', which focussed mainly on Aegean and oriental helmets.³⁵ P. Schauer discussed the development and typology of helmets in several studies, claiming an origin for European helmets in the eastern Mediterranean.³⁶ With the recent discovery of the two new helmets from Anlaufstal and Piller Sattel, the discussion on the chronology of the crested helmets of Type Lueg led to several new publications with different chronological approaches.³⁷ D. Brandherm analysed the connection between western European and eastern Mediterranean crested helmets and their development, influence and chronology, based on their cap profiles, and pointed out the potential connection between crested and horned helmets.³⁸ With the identification of so far unrecognised fragments of greaves (cat. nos. 186–187) and potentially also a helmet in the cemetery of Volders, Tyrol, L. Sperber also recently discussed the origin, chronology and typology of these crested helmets.³⁹ As is evident, the chronology and origin of European bronze helmets remains very much a matter of discussion.

Since the traditional classification of types for helmets never incorporated the full range of attributes needed to understand both technological and stylistic dimensions, a new hierarchical scheme of classification is proposed (Fig. 2.2). So far, numerical approaches to artefact taxonomy,⁴⁰ which usually attempt to incorporate all attributes, have rarely produced meaningful type classifications. There is then clearly still a need to make value judgements on those attributes deemed most important to the archaeologist, and which are considered to have been meaningfully selected in the past.⁴¹ Therefore, a form of nested, hierarchical approach to attribute classification,⁴² which groups selected attributes, or 'primary' variables, according to tech-

³¹ v. Merhart 1941.

³² Sprockhoff 1926.

³³ Mozsolics 1955.

³⁴ v. Merhart 1941; Hencken 1971.

³⁵ Borchhardt 1972.

³⁶ Schauer 1979/1980; Schauer 1982c; Schauer 1988.

³⁷ Egg 2002; Egg – Tomedi 2002; Schauer 2003; Tomedi 2004; Tomedi 2007; Lippert 2011.

³⁸ Brandherm 2011.

³⁹ Sperber 2011.

⁴⁰ E.g. Doran – Hodges 1975, 216–264.

⁴¹ E.g. Sørensen 1997.

⁴² Cf. Clarke 1978, 205–244.

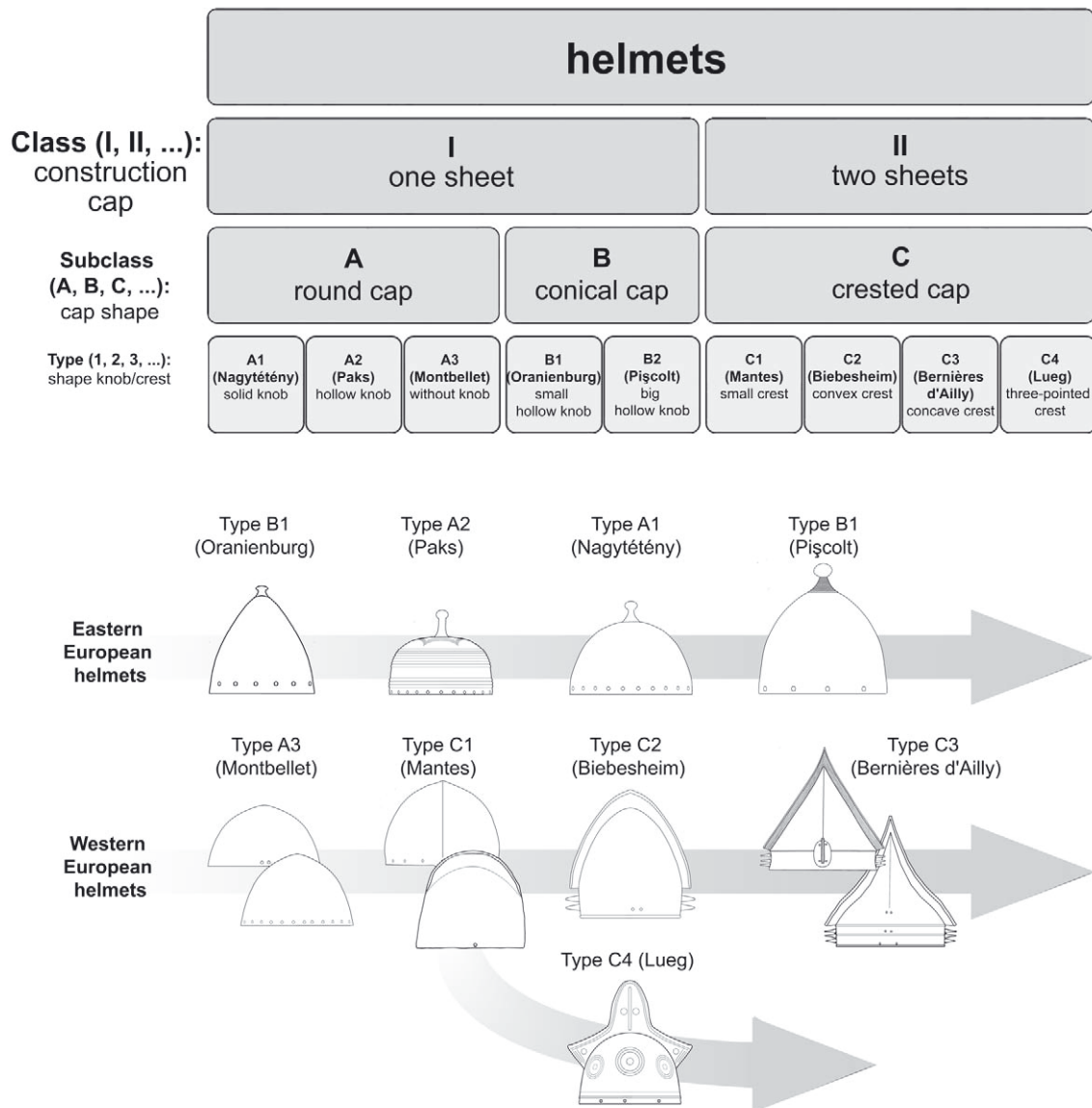


Fig. 2.2 Classification and development of eastern and western European Bronze Age helmets. Each helmet type specified consists of at least three helmets. Other helmet types, represented by less than three helmets such as Type Szczecin-Zdroje (cat. no. 59), Type Malpensa (cat. no. 61), and Type Viksø (cat. no. 121), all fall under Class IA and are described in Chapter 2.1.5 (cat. nos. 59 and 61) and in Chapter 2.3 (cat. no. 121) respectively. Only helmets of Type Tiryns (cat. no. 120) fall under Class IIC. Both helmet types Montbellet and Oranienburg derive from organic ancestors, though from different geographical regions.

nological and stylistic dimensions,⁴³ is used. The latter can be defined as effecting the form of artefacts without effecting the overall engineering of its function, which here is termed a 'type'. The former concerns aspects of technology, which we have termed a 'Class'. Each can incorporate further levels of variation or subclasses but the types, as stylistic aspects, will always derive from the organisation of the different classes, as illustrated in Fig. 2.2.

The geographical separation between western European crested helmets (including cap helmets without knob, hereafter: helmets of Type Montbellet) and eastern European cap helmets remains constant for several centuries during the Late Bronze Age, suggesting separate regional workshops and working traditions, and potentially also material requisitions (Fig. 2.1). This appears to have led only occasionally to an exchange of helmets, as the rare examples of import/

⁴³ Needham 1983, 30–33, fig. 127.

export demonstrate, such as the helmet of Type Montbellet from Szikzó (cat. no. 74), the unprovenanced crested helmet (cat. no. 100), and the helmet of Type Pişcolt from Monte Altino (cat. no. 49). As will be discussed in detail in this chapter, we can determine the development of both crested and cap helmet from organic precursors, from different geographical areas, and not necessarily just from Near Eastern ancestors alone (Fig. 2.2). While these western European helmets seem to derive from local organic head protection, the eastern European metal helmets instead have their origin in the Aegean, as we can see from the development of helmets of Type Oranienburg.

Without question, the oldest European metal helmets are the helmets of Type Oranienburg from Knossos (cat. no. 2) and an unprovenanced helmet of the same type with boar tusk decoration (cat. no. 1). The latter has an incised decoration of boar tusks, arranged in the same way as on actual boar tusk helmets. This makes this piece a perfect transitional form between the older boar tusk helmets proper and the helmets of Type Oranienburg and suggests a date prior to that of the helmet from Knossos but after the helmet from Dendra (cat. no. 63), indicating a rather rapid adoption of metal around 1400 BC in the construction of helmets.⁴⁴ This is so far the oldest European metal helmet type, which clearly derived from the Aegean boar tusk helmets, spreading quickly into the Carpathian Basin and northwards as far as Biecz in Poland. These finds indicate a main period of use for the helmets of Type Oranienburg from the 15th century in Greece and as late as the 13th century in eastern Europe. Helmets Type Paks, Type Nagytétény, and Type Pişcolt then followed these helmets.

The origin of crested helmets in western Europe is a more particularised case. Though not considered as ‘real’ crested helmets so far, helmets of Type Mantes, which bear a basic crest or ridge on the cap, can be considered the local precursor of crested helmets of Type Biebesheim, Bernières d’Ailly and Lueg. Therefore, helmets of Type Montbellet with their plain, undecorated caps, whose distribution overlaps more with western European crested helmets than with eastern European cap helmets, are most likely older than Type Mantes, and might be considered the oldest helmet type for western Europe, developing locally from organic ancestors and having a rather long lifespan.⁴⁵ A very similar development from basic, undecorated cap helmets to crested helmets can also be identified in Mesopotamia, where a plain, undecorated Sumerian cap helmet found in Ur (2nd half of the 3rd millennium BC) also bears a basic ridge⁴⁶ similar to Type Mantes. Only shortly after, more elaborate helmets with organic crests appear (see the helmet on the trophaion from Mari).

Ancestors to or, more likely, simply older metal helmets than the European ones, are found in the Near East, such as the three bronze cap helmets from the early dynastic III king’s grave at Ur, and the depiction of a cap helmet at Lagash (middle of 3rd millennium BC).⁴⁷ Sumerian or Acadian helmets are further depicted on the so-called battle stela, as well as other stela from Nasiriya and Sippar.⁴⁸ From Mari, three further depictions of helmets are known, comprising a small relief of a warrior or god wearing a helmet, the head of a warrior made out of alabaster, and the remnants of a fresco from the palace.⁴⁹ No metal helmets but only their depiction – and/or depictions of head protection, be it organic or a combination of organic materials with metal – are known from Egypt, noted from the XIX dynasty onwards.⁵⁰ The oldest depictions of Syrian helmets⁵¹ derive from three statuettes from Tell-el Judeideh dated to the 1st half of the 3rd millennium BC. The helmets did not change much during the following centuries, as the depiction of a Syrian legate with three helmets in a tomb from the second half of the 15th century BC

⁴⁴ Mödler 2013a.

⁴⁵ See Chapter 2.2.1, p. 94.

⁴⁶ Borchhardt 1972, 94, pl. 19.2–3.

⁴⁷ Borchhardt 1972, 94–95, pl. 19.

⁴⁸ Borchhardt 1972, 95, pls. 12.1; 21.1.

⁴⁹ Borchhardt 1972, 96, pls. 19.4; 21.2–3.

⁵⁰ Borchhardt 1972, 88–89.

⁵¹ Borchhardt 1972, 90–93, pls. 23–24.

shows. The same tomb bears depictions of three further helmets, one potentially made out of metal.⁵² Further depictions of Syrian helmets are known from the coach body of Thutmose IV (Thutmose defeats the Syrians). From Israel, no helmets but depictions of philistine helmets or crowns (?) are documented (Beth Shan, Tell Halaf and Tell el Farah).⁵³

Less so, amongst the small number of actual metal helmets, the more numerous depictions of helmets from the Aegean and the Near East demonstrate a wide variety of different types from the 3rd – 2nd millennium BC. Certainly, there were influences flowing from one type to another, and there was not necessarily any straight line of development. We have to bear in mind why helmets were invented and that the need for body and head protection arose significantly with the growing effectiveness of arms and the appearance of new fighting techniques. Therefore, we do not necessarily need to look for *the* ancestor of all cap helmets and/or crested helmets but might give more weight to local organic ancestors, particularly in the case of crested helmets. That does not necessarily mean we have to neglect influences or adaption of other metal helmets but rather that we must also take into account the possibility of the independent development of helmets.

Excluding the Greek helmets and cheek plates with known find circumstances (Dendra, Knossos, Ialysos, and Tiryns), the Bronze Age European helmets are deposited either in associated deposits, votive deposits, or in wet contexts, such as rivers. Only the cemetery of Volders, Austria, might contain potential fragments of a crested helmet.⁵⁴ In the following discussion, only helmets with known find circumstances are taken into account (Tab. 2.1).

Context	Eastern Europe (helmets Class I, apart Type A3)	Western Europe (helmets Class II, and Type A3)	Total
associated deposit	31 (45%)	17 (34%)	48 (40%)
votive deposit	3	1	4
river/bog	8 (11%)	26 (52%)	34 (28%)
grave (Greece only)	4	1	5
unknown	23 (33%)	5 (10%)	28 (23%)
total	69	50	119

Tab. 2.1 Bronze Age helmets: find context of helmets in western Europe (i.e. crested helmets) and eastern Europe (i.e. cap helmets). Helmets of Type Montbellet are considered according to their main appearance as western European helmet type. The organic cap or helmet from Fiafé and the helmets from Viksø are not considered in the table.

The only bog find seems to be the single finds of the helmets from Sehlsdorf (cat. no. 41) and Iseo (cat. no. 76), as well as the associated deposits from Biecz (cat. no. 3) and Viksø (cat. no. 121), while the helmets from the associated deposit of Bernières d'Ailly were deposited 10m away from the moat of château d'Ailly in a humid zone (a previous bog?) (cat. nos. 101–110). The generalisation that western European helmets were deposited in rivers and eastern European helmets in associated deposits⁵⁵ has to be slightly revised. As visible in Tab. 2.1, western European helmets were not in every case deposited in rivers or wet contexts, whilst at least a third of the western European helmets known (mainly represented by fragments) derive from associated deposits. Several associated deposits with fragments of Type Bernières d'Ailly are known from the Iberian Peninsula as well as central France (Huelva, Monte do Crasto, Larnaud). We have to note that in these associated deposits, helmets are present only in a severely fragmented state or even by a single fragment only. As indicated by the presence of these fragments in French and Iberian associated deposits, we might identify even more fragments of hel-

⁵² Hood – de Jong 1952, 258, note 74.

⁵³ Borchhardt 1972, 92–93.

⁵⁴ Sperber 2011.

⁵⁵ Hansen 1994, 19.

metals in western European associated deposits. So far, only three associated deposits with complete examples of Type Mantes, Biebesheim and Bernières d'Ailly are known (Oggiono-Ello, Le Theil and Bernières d'Ailly). Only two examples of Type Bernières d'Ailly were actually deposited in rivers (Armancourt, Mainz), while all helmets of Type Biebesheim, with the exception of the associated deposit from Le Theil, were deposited in rivers. As the fragmented helmet from Roxheim demonstrates – which must also have been burnt before its deposition – not only complete helmets but also fragmented ones, as well as potentially just fragments, were deposited in rivers. The lack of river finds of helmet fragments most likely relates to their small size and therefore unlikely recovery, as well as to the difficulty in identifying such fragments as such. The most probable explanation for the lack of river deposits is that these remains were not retained or collected rather than that there was an actual lack of deposition in rivers.⁵⁶

Helmets Type Montbellet are known only as complete deposited objects, which again might also be related to the difficulty in identifying their fragments as such. The Northern Italian and French finds were deposited in wet contexts (rivers and bog), while the imported find from Szikzó derives from an associated deposit, indicating the adoption of local depositional habits, whilst the find circumstances and the associated finds of the two alleged German associated deposit finds from Thonberg and Wonsheim are not secure (cat. nos. 72 and 73). The central Alpine helmets of Type Lueg (cat. nos. 83–85) so far demonstrate the widest variation in depositional circumstances and condition: the partially preserved helmet from the Piller Sattel is part of a votive deposit, the partially preserved helmet from Anlaufstal is a single river find, and the complete helmet from Pass Lueg was most likely part of an associated deposit.

The deposition practice in eastern Europe differs slightly from western Europe, since most of the helmets with known find spots derive from associated deposits (45%). Only six helmets (9%) were found in rivers. Unlike the western European helmets, a significantly higher percentage of eastern European helmets lack any information regarding their find spot (10% versus 33%).

Around a third, meaning nine out of the 33 secure associated deposit finds from eastern Europe contain complete or almost complete helmets (Biecz, Lúčky, Keresztété, Nadap, Sâg (fragmented), Mezőnyárád, Endrőd, Șoarș, Batina), and more than half of them are helmets of Type Oranienburg. When deposited in associated deposits, usually only one fragment of the helmet or, most likely, one fragment per helmet is present (associated deposits with more than one helmet fragment include Pázmándfalu and Nadap), as recently shown for shields.⁵⁷ More than half of the helmet fragments derive from the cap, whilst a quarter of them are knobs, and a further quarter of them are complete or fragmented cheek plates. The helmets from the votive deposit from Škocjan are all fragmented. Further complete helmets derive from rivers. The six helmets deposited in rivers are helmets of Type Oranienburg (Oranienburg, Dunaföldvár), one helmet of Type Paks (Paks), one helmet of Type Nagytétény (Nagytétény), one helmet of Type Pișcolt (Endrőd) and a single helmet of Type (Type Szczecin-Zdroje). The find spot for the helmet of Type Pișcolt from 'Mantova' is a recent invention (cat. no. 50).

As for the construction of other bronze sheet objects, the initial step is the casting of a flat, thin disc of tin-bronze, which is flattened and expended by several cycles of annealing, quenching – in order to avoid the formation of brittle metal phases – and hammering in an open die (Fig. 2.3). The primary use of an open die instead of a high bowed stake with rounded face is indicated by the profile of the cap helmets, which have a significantly thicker rim, a rather thin, delicate middle section and again a slightly thicker cross section at the top of the cap. The manufacture of cap helmets is discussed in detail for helmets of Type Pișcolt,⁵⁸ which includes also the process of casting-on of the knob or socket.

The production steps described are also valid for all other cap helmets despite the creation of rivet holes. While rivet holes on the thicker helmets of Type Pișcolt are mainly cast and widened

⁵⁶ See mainly Sperber 2006a; Sperber 2006b.

⁵⁷ Mödler et al. 2013; Mödler – El Morr 2014.

⁵⁸ See Chapter 2.4, p. 148.



Fig. 2.3 Hammering traces on the inside of the helmets of Type Pișcolt from Șoarș, Romania (above) and Pișcolt, Romania (below).

afterwards, we find that they are generally punched through from the outside to the inside on the other, much thinner, helmet types. Some helmets though, such as the helmet of Type Oranienburg from Oranienburg, show rivet holes, which were punched through from the inside to the outside. The production of the bronze sheets for crested helmets follows the same principle as the manufacture of cap helmets. We might also assume for crested helmets the use of an open die for flattening and expanding the cast bronze disc to achieve their three-dimensional, semi-spherical shape. One of the halves or plates also had folds or tabs on the crest, which were then folded over the edge of the crest of the other half of the helmet. The two halves were additionally held together front and back by rivets of various form and shapes just above the rim at the place where the two plates or halves overlap. Moreover, some of the helmets of Type Bernières d'Ailly bear on their sides riveted on, hollow bronze attachments of various shapes to hold organic decorative elements. Crested helmets with thin rim might have a wire, around which the rim was folded, in order to stabilise the helmet (types Lueg, Biebesheim and Bernières d'Ailly). The older, more solid helmets of Type Mantes did not need such reinforcement. Helmets with such a rim usually do not have rivet holes all along the edge, indicating that a separate organic cap was worn under the metal helmet. But not only is the production of the two main helmet forms different, the amount of bronze used for the helmets itself differs from type to type (Fig. 2.4).

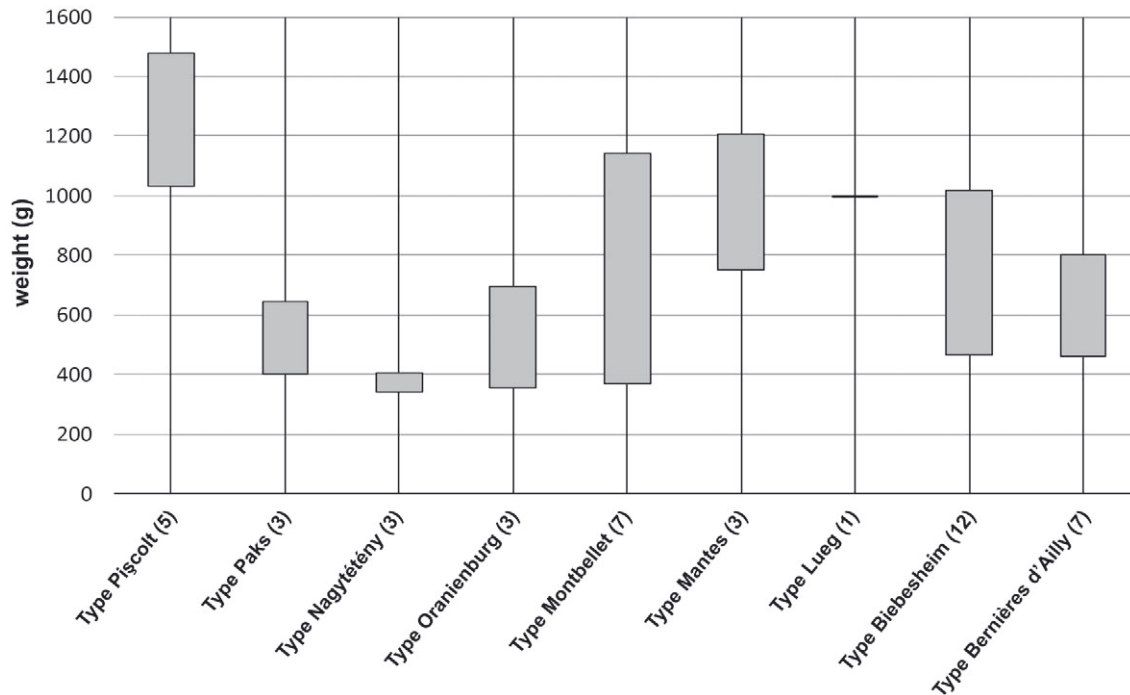


Fig. 2.4 Weight distribution of different types of Bronze Age helmets. Only complete helmets are included.

Traces of use on Bronze Age helmets are generally rare, which indicates either a non-practical or ritual use as armour – though due to the higher level of protection they offered in comparison with organic headgear, this seems unlikely – or a short duration of use, obviously with skilled (or lucky) owners, and their deposition after combat and repair. No helmet has evidence of any complete perforation, such as by spear or sword, as is known from Bronze Age shields⁵⁹ but they do show side impacts, most likely from sword edges. These sword impacts are found on helmets of Type Pişcolt (Hajdúböszörmény; cat. no. 44), helmets of Type Nagytétény (Brodi/Ternopil; cat. no. 38), helmets of Type Oranienburg – the helmet from Oranienburg (cat. no. 4) has at least three severe sword impacts on the side, whilst the one from Dunaföldvár (cat. no. 10) has four almost parallel, linear impressions, which might also be the result of sword impacts –, crested helmets of Type Biebesheim (Blainville, Auxonne and Montmacq A and B, with the latter being river finds cat. nos. 92, 94, 96 and 97), and helmets of Type Montbellet from Brancere and Wonsheim (cat. nos. 73 and 75). The helmet of Type Mantes from Oggiono-Ello (cat. no. 81) bears an impression similar to a sword cut on the front or back (Fig. 2.5). Another helmet of Type Mantes – the *Leitfossil* from Mantes itself (cat. no. 79) – bears a round impression, though whether this can be associated with a weapon impact or is due to depositional processes is not clear. Additional to the sword impact, which seems to have almost split the helmet, the cap helmet with solid knob from Brody/Ternopil also bears a round impression opposite the sword impact.

In order to increase the comfort of wearing bronze helmets and to absorb the shock of potential weapon impacts, an organic cap was worn directly under the helmet or the helmet contained an organic lining, which was attached by means of the rivets on the helmets. We also have to consider a combination of different organic materials. For example, Aristotle notes in his history of animals the use of sponges for helmets and greaves to better absorb weapon impacts.⁶⁰ The helmet from Thonberg also shows (as do many helmets of Type Pişcolt),⁶¹ a black band of different corrosion products on the outside, right above the rim, indicating the presence of an attached organic lining.

⁵⁹ Uckelmann 2012.

⁶⁰ Aristotle V, 16 in Buchholz et al. 2010, 142.

⁶¹ See Chapter 2.4, Fig. 2.49.



Fig. 2.5 Helmet of Type Mantes from Oggiono-Ello, Italy. Note the potential sword impact on the front or back.

Repairs to the helmets do not necessarily provide secure indications of their use as armour in combat. Certain repairs, such as on the helmet of Type Pişcolt from Pişcolt (cat. no. 48), were most likely carried out during the production of the helmet due to material defects or manufacturing mistakes (Fig. 2.6). Helmet F from Bernières d'Ailly (cat. no. 106) also underwent considerable repair, with the attachment of a large bronze plate or sheet, secured with rivets besides



Fig. 2.6 Helmet of Type Pişcolt from the eponym find spot in Romania. Details of the riveted on decorated bronze on the outside of the helmet (below). On the inside, another sheet was applied (above). The overlapping hammering traces indicate that it was applied during the manufacture process.

one of the lateral attachments on the cap.⁶² It seems rather unlikely that this extensive repair occurred during manufacture, as the plate has a much higher occurrence of lead than found on the actual crest.⁶³ It might therefore indicate the use of the helmet in combat and therefore that the helmets were deposited after they had been used.

The number of repairs on helmets of Type Biebesheim – and therefore an indicator of their extent of use – is particularly high. The helmet from Biebesheim (cat. no. 86) bears on the front and back one pair of rivets. On one side, the lower rivet was replaced with a brace to fix an ancient crack, leaving no space to apply another or the original rivet again. The crest from the helmet of Paris (cat. no. 98) bears a crack running from the edge to the beginning of the cap. This crack had already been repaired during the manufacture of the helmet by means of a short, round wire, which passes through from the outside to the inside through holes punched either side of the crack. The helmet from Seurre (cat. no. 99) also demonstrates a repair to the crest. A small bronze sheet was riveted to the crest on the upper third of the helmet with two flat rivets, most likely to cover a crack. Cracks on the same area on the helmet from Blainville, however, appear to have remained unrepaired. All damage on these three helmets is in the same area, on the half of the crest around which the other half was folded over.

2.1 Eastern European Helmets

Eastern European helmets comprise all helmets Class I apart helmets of Type Montbellet, which are distributed in western Europe. Helmets with knob and round or conical cap as helmets of Type Oranienburg, Type Paks, Type Nagytétény, and Type Pişcolt are distributed mainly in eastern Europe (Fig. 2.7). The caps on all these helmets are made of one single metal sheet with

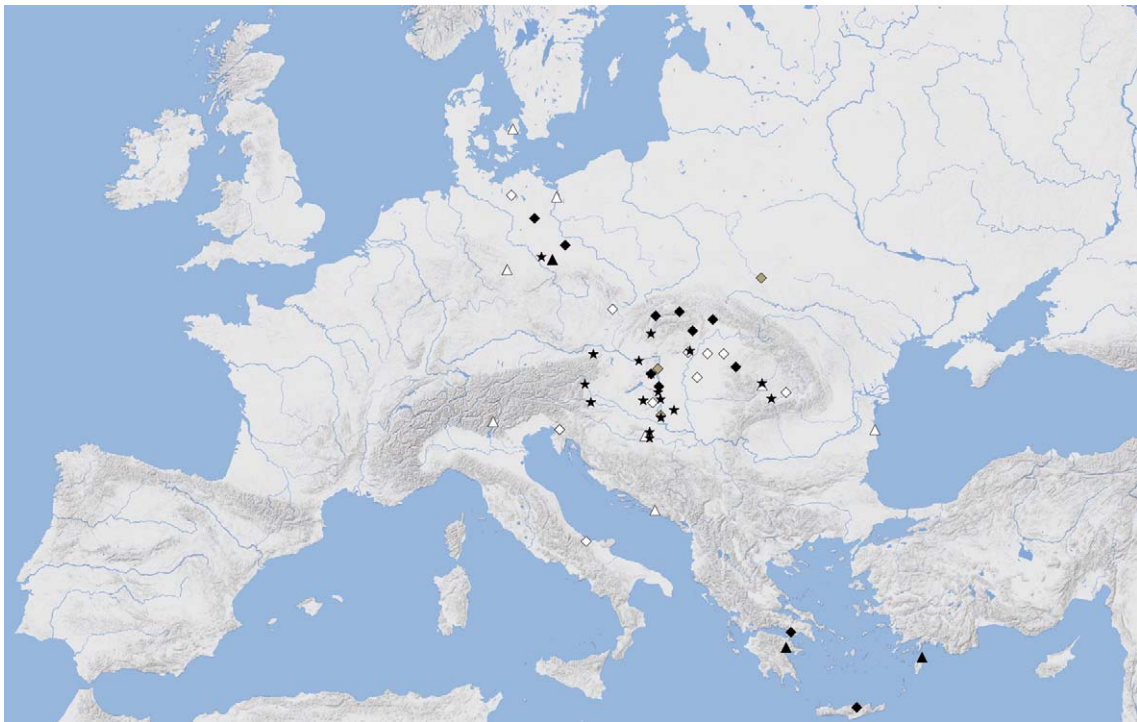


Fig. 2.7 Archaeological distribution of eastern European Bronze Age helmets: ◆ Helmets of Type Oranienburg. ★ Helmets of Type Paks. ◇ (grey) Helmets of Type Nagytétény. ◇ Helmets of Type Pişcolt. ▲ Greek cheek plates. △ Single helmet types, cheek plates and knobs. Helmets with unknown or unsecure find location are not mapped.

⁶² Hencken 1971, 67, fig. 45.

⁶³ Brun et al. in preparation.

a normally cast-on knob or socket positioned in the centre of the top. In a few cases, the knob was also riveted on or made out of the same metal sheet as the cap. The knob served to hold a plume or crest made out of organic material, such as that known from older depictions of boar tusk helmets. Helmets Type Oranienburg can be considered the oldest European helmets.⁶⁴ In eastern Europe, helmets of Type Paks, Type Nagytétény, and Type Pişcolt follow them.⁶⁵

2.1.1 Helmets of Type Oranienburg

The description and interpretation of the helmets of Type Oranienburg was recently published elsewhere by the author.⁶⁶ Most of the helmets of Type Oranienburg are complete or at least were deposited complete but damaged after deposition: Nadap (cat. no. 9), Knossos (cat. no. 2). Consequently, only the Slovakian finds from Spišská Belá (cat. no. 6) and Žaškov (cat. no. 5) retain the spool-shaped knobs. Though the helmet from Keresztéte survives now as just a single fragment, an earlier photograph published by Mozsolics demonstrates that it had originally been recovered intact, and therefore had been deposited complete.⁶⁷

Helmets Type Oranienburg are rather thin and light compared to the later heavy and solid helmets of Type Pişcolt. Inside the helmets, we can note horizontal traces of hammering. All helmets of Type Oranienburg resemble each other closely in profile, size and weight. As described in detail for helmets of Type Pişcolt,⁶⁸ as well as on helmets of Type Oranienburg, the knob or spool-like knob was usually cast-on in the centre of the conical cap. The origin of the form of the spool-shaped knob might be skeuomorphic, reflecting the closing of the top of leather paddings or organic helmets with a band, such as on boar tusk helmets.⁶⁹ Doing so, results in a spool-shaped form, as seen for example on the ivory plaques from Mycenae. Generally, depictions of helmets with spool-shaped knobs are known from the Argolid and Crete until LH/LM IIIA.⁷⁰ Unfortunately, the upper parts of the cap on the helmets from Dunaföldvár (cat. no. 10) and Keresztéte (cat. no. 8) are no longer preserved, but based on their comparison with other related helmets, it seems likely that they too bore a similar knob. Unlike the central European helmets, the helmets from Knossos and the related unprovenanced helmet (cat. no. 1) show a different attachment or construction of the knob. While the knob from the Knossos helmet was not cast-on to the cap, but rather held in place by seven rivets, the knob of the unprovenanced helmet was worked up directly out of the sheet of the helmet. Moreover, this helmet is the only helmet of Type Oranienburg decorated, having abstract motifs in the form of incised decoration of running spirals and boar tusks, arranged in the same way as that known from real boar tusk helmets. According to the decoration, an Aegean or even Greek origin for the helmet seems very likely.⁷¹ The different manufacturing processes of these two Aegean helmets most likely indicates a production site separate from those of the European helmets of Type Oranienburg.

Rivet holes are regularly distributed parallel to the lower edge of the cap on the helmets of Type Oranienburg. Only the helmet from Biecz (cat. no. 3) has just rivet holes on the broader sides, with three each side to most likely attach cheek plates, and three further holes on the neck to attach a neck guard. The lack of further rivet holes indicates the use of an organic cap worn separately under the helmet. The helmets with regularly distributed rivet holes most likely had an inner padding permanently attached to the helmet, wrapped around to the outside surface and fixed with the rivets all along the edge from both outside and inside, as indicated by the band of different corrosion products on the outside of the helmets right above the rim, as seen

⁶⁴ Mödler 2013a.

⁶⁵ Mödler 2013b; Mödler 2014a.

⁶⁶ Mödler 2013a.

⁶⁷ Mozsolics 1985, pl. 150.9.

⁶⁸ See Chapter 2.4, p. 148.

⁶⁹ Buchholz et al. 2010, 158, figs. 74–75.

⁷⁰ Borchhardt 1972.

⁷¹ Buchholz et al. 2010, 201.

Cat. No.	Find Circumstances	Find Site	State	Condition	High Cap (cm)	High Knob (cm)	Dm (cm)/ Fragments	Thickness Cap/Rim (mm)	Weight (g)
1	unknown	unprovenanced	GR (?)	complete	17.8	c. 1.8	19.5 × 21	< 1	497
2	grave	Knossos	GR	not complete	17	3.9	21 × 24	1–1.5 / –	695
3	associated deposit (bog)	Biecz	PL	complete	18	1.8	19.5 × 21.5	– / 3	353
4	river	Oranienburg	DE	complete	21	2.8	? × 22.5	0.3 / 3	638
5	associated deposit	Žaškov	SK	knob	–	2.7	–	–	–
6	associated deposit	Spišská Belá	SK	knob	–	2.2	–	–	–
7	associated deposit (?)	unprovenanced (Lučky?)	SK (?)	complete	19.5	2.8	20 × 21	– / 2	–
8	associated deposit	Keresztéte	HU	fragment cap	–	–	–	– / 2	32
9	associated deposit	Nadap	HU	not complete	18.5	1.8	–	0.1–0.3 / –	–
10	river	Dunaföldvar	HU	not complete; without knob	16.9	–	21.1 × 22.2	0.4 / 2	488
11	associated deposit	Ság	RO	not complete	> 10 cm	2.5	–	0.1 / 1.1	112
12	unknown	unprovenanced	HU (?)	not complete	–	2.7	–	0.1 / 2	165

Tab. 2.2 Helmets of Type Oranienburg.

on the helmet from Dunaföldvár. The rivet holes were usually punched through from the outside to the inside of the helmet, with only the rivet holes on the helmet from Oranienburg (cat. no. 4) having been punched from the inside to the outside.

To permit the wearer of these helmets a greater degree of movement of the head, the four helmets from Oranienburg, Lúčky (?) (cat. no. 7), Keresztéte and Biecz show a small alteration to the lower edge of the profile. This is in the form of either the removal of a shallow semi-circular area or a gentler upward curve in its line.⁷² Here again, the helmet from Biecz is slightly different, having a larger cut-out in the front and a smaller one at the back.

In order to stabilise the helmet, they usually have a much thicker rim. Some helmets, such as the one from Biecz, even show hammering traces on the base of the rim in order to broaden and flatten it even more to increase stability.

2.1.1.1 Research History

Conical cap helmets with small, spool-shaped knobs or, as in the following, helmets of Type Oranienburg, were described first as *Kegelhelme* by v. Merhart, within his group of bell helmets.⁷³ This included at the time the helmets from Oranienburg, Biecz and Lúčky. Mozsolics subsequently called them ‘helmets of the Lúčky type’ or later as ‘helmets with spool-like knob’.⁷⁴ Hencken, however, retained the classification of v. Merhart, calling them ‘conical bell helmets’, dividing them from the ‘rounded helmets of Type Pişcolt’.⁷⁵ Moreover, he added to his group of conical bell helmets the new finds from Žaškov, Spišská Belá, Keresztéte, and Knossos. Borchhardt included in his *Kegelhelme* corpus the helmets from Biecz, Oranienburg, Keresztéte, Lúčky and Csöngé.⁷⁶ However, the helmet from Csöngé dates to Ha C/D and its shape is different from other helmets of Type Oranienburg. Therefore, this helmet will not be discussed here. More recently, Clausen has discussed helmets of Type Oranienburg as *Helme mit konischer Kalotte und Scheitelknäuf*.⁷⁷ He augmented Hencken’s group of conical helmets of Type Pişcolt with new finds from Sâg (cat. no. 11), Dunaföldvár and Nadap. In the following, we have added another unprovenanced helmet, which was sold at Christie’s in New York on 18 December 1998.⁷⁸ Analyses of its alloy composition and the microstructure of the metallic matrix carried out by the Metropolitan Museum of Art clearly demonstrated the authenticity of the helmet.⁷⁹ Another helmet of Type Oranienburg, unfortunately unprovenanced, was recently published.⁸⁰ Today, twelve helmets of Type Oranienburg, including the unprovenanced helmets, are therefore known (Tab. 2.2).

2.1.1.2 Distribution and Deposition

The twelve helmets of Type Oranienburg have, in their recovery, a rather wide archaeological distribution, ranging from the Havel-Oder region in northern Germany to the Carpathian Basin and the Aegean (Fig. 2.8). Since these helmets do not closely resemble any other form of helmet, we have to assume a close connection between them and the regions they were found in. Further finds of imported Aegean goods found in the Havel-Oder region indicate the existence of such connections. This includes the spearhead from the associated deposit at Kyhna,⁸¹ as well as

⁷² Mödler 2013a.

⁷³ v. Merhart 1941, 5, fig. 2.4–6.

⁷⁴ Mozsolics 1955, 35–36; Mozsolics 1985, 24.

⁷⁵ v. Merhart 1941; Hencken 1971, 33–34.

⁷⁶ Borchhardt 1972, 126.

⁷⁷ Clausen 2001, 217.

⁷⁸ Christie’s 1998; Buchholz et al. 2010.

⁷⁹ Mödler 2013a.

⁸⁰ Tarbay 2015.

⁸¹ Hänsel 2003, 82.

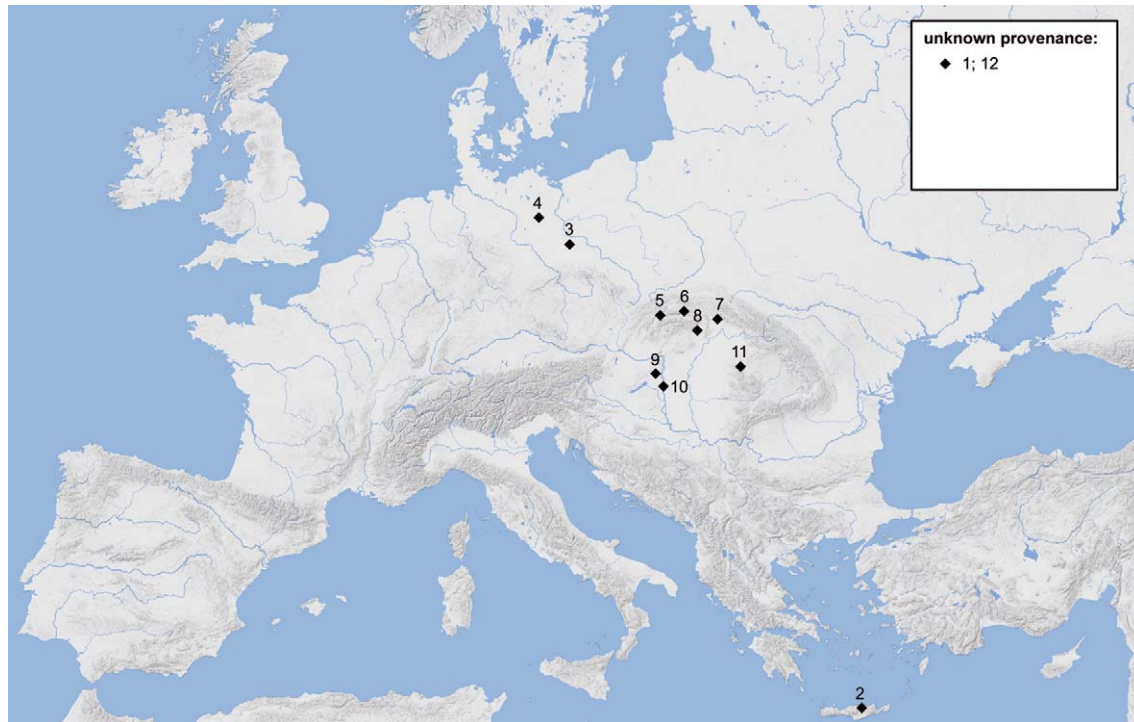


Fig. 2.8 Archaeological distribution of helmets of Type Oranienburg: 1. Unprovenanced; 2. Knossos; 3. Biecz; 4. Oranienburg; 5. Žaškov; 6. Spišská Belá; 7. Lúčky (?); 8. Keresztété; 9. Nadap; 10. Dunaföldvár; 11. Sâg; 12. Unprovenanced. Numbers correspond to the catalogue numbers.

the fact that such high quality sheet metalworking in bronze is scarce in the Nordic Bronze Age during this period. If we rule out the idea that all helmets of Type Oranienburg were exported from the Aegean, their wide distribution suggests a potentially large production area.

While Hencken saw the area of production for his ‘conical helmets bell helmets’ generally in the region of Slovakia, H. Buchholz and colleagues assumed for the unprovenanced helmet a production area north of the Gulf of Corinth or in the Peloponnese.⁸² M. S. F. Hood and P. de Jong suggested different centres of production but with an ultimate origin in the Aegean, if not specifically in the Minoan culture.⁸³ They mentioned that the lighter Biecz helmet was of ‘worse’ quality than the Knossos helmet and therefore more likely produced ‘at some provincial centre’.⁸⁴ While the latter interpretation is questionable (the helmet is certainly not of poorer quality), an Aegean origin for helmets of Type Oranienburg seems, based on those examples so far recovered, extremely likely. The question of provenance, however, can only be reliably addressed by means of detailed material analyses, preferable by the application of lead isotope analyses, of all helmets of Type Oranienburg. Even when taking into account different habits of deposition and recycling, the relatively high number of helmets of Type Oranienburg in the Carpathian Basin is surprising. For these helmets, we might consider a second, this time local, production area, with an initial production centre in the Aegean for some helmets, such as that of Biecz, and then exported northwards.

So far, only almost complete helmets and knobs of helmets of Type Oranienburg are known. Fragments from the cap are unknown, though there is a possibly lost cap fragment from the associated deposit from Žaškov.⁸⁵ This pattern might be either connected with depositional practices in general or the difficulties in clearly identifying fragments of bronze sheets as com-

⁸² Hencken 1971, 9; Buchholz et al. 2010, 201.

⁸³ Hood – de Jong 1952, 258.

⁸⁴ Hood – de Jong 1952, 259, note 86.

⁸⁵ Hencken 1971, fig. 17a–c.

ing from a helmet. Unlike the partly contemporary helmets of Type Paks, the deposition of helmets of Type Oranienburg follows no recognisable pattern, with complete helmets known as grave finds (Knossos), river finds (Dunaföldvár and Oranienburg), and associated with associated deposits (though mainly only in the form of the knobs). Moreover, the composition of those associated deposits with helmets of Type Oranienburg is also different. While the helmet from Biecz was allegedly deposited with two ingot torques and one triangular blade of an Early Bronze Age dagger of Type Oder–Elbe, the helmet from Nadap derives from one of the largest European Bronze Age associated deposits, which includes almost all categories of known bronze objects.⁸⁶ It is furthermore the only associated deposit that contains fragments of all the different categories of Bronze Age defensive armour. The associated deposit from Keresztéte consists of the helmet, one cauldron with both triangular handles and a thick, round-sectioned wire that served for the cauldron's suspension-handle, a biconical jug of sheet bronze, a fragmented bronze disc, spearheads (one with a profiled knob, three similar examples, and a smaller spearhead), 16 bracelets (with round cross-section and chevron decoration, one of which has a rhomboid cross-section), and one ring.⁸⁷ In addition to the helmet, the associated deposit from Sâg contains a vessel of Type Hajdúböszörmény, a handle of another vessel, further vessel fragments with cross-shaped handles, a spearhead, several bracelets, phalerae fragments, five bronze cups of Type Kirkendrup and Fuchsstadt, sickle fragments, a fragment of a knife, a possible fragment of a saw, and two knobbed axes with double V-ribs.⁸⁸ The find circumstances of the associated deposit from Lúčky are not completely certain, as it was purchased from an itinerant salesperson, so the composition of the associated deposit remains questionable. For example, some of the allegedly associated objects, such as the situla of Type Hajdúböszörmény and a cauldron with cross-shaped handles, show significantly different corrosion from that on the helmet. The associated deposit from Žaškov comprises the spool-shaped knob of the helmet, knobbed axes, a knobbed chisel, rings, two spearheads, the hilt of a sword of Type Liptau, a bowl of Type Satteldorf, pins, sickles, and two ingots. Lastly, the associated deposit from Spišská Belá consists of the spool-shaped knob of the helmet of three spearheads, parts of two cups of Type Spišská Belá and four plain bracelets (one with rhomboid section, three with oval section). Part of the associated deposit is now missing, including four spearheads, three knobbed axes (one with ribs parallel to the rim of the knob, two with *Schnabeltülle*), a round object, and four bracelets.⁸⁹

2.1.1.3 Chronology

The development of the first European metal helmets and the rapid adoption of metal in their construction, is clearly demonstrated by three Greek helmets: the boar tusk helmet with metal cheek plates from Dendra (cat. no. 63), which is the oldest, the single decorated example of a helmet of Type Oranienburg, and the helmet of Type Oranienburg from Knossos. The latter is considered the oldest European metal helmet so far and therefore is the oldest helmet of Type Oranienburg with spool-shaped knob. It is dated to the 15th century BC,⁹⁰ while the Dendra grave 12 with the boar tusk helmet is dated to the first half of the 15th century BC.⁹¹ The cheek plates on both helmets closely resemble each other, testifying to a close relationship between them.⁹² Unfortunately, the cheek plates of the unprovenanced helmet have not survived. Though the Dendra helmet is still a boar tusk helmet, it demonstrates in its use of bronze for the cheek plates, the first adoption in Europe of metal in the construction of helmets. We can assume then

⁸⁶ Makkay 2006.

⁸⁷ Mozsolics 1985, 135.

⁸⁸ Soroceanu 2011; Mödler 2013a.

⁸⁹ Hencken 1971, 33.

⁹⁰ E.g. Müller-Karpe 1962a, 271; Hencken 1971, 20.

⁹¹ Verdelis 1967, 7.

⁹² Hood – de Jong 1952, fig. 12; Borchhardt 1972, 58, pl. 6.2–3. See cheek plate Type IA, fig. 6.

that the unprovenanced helmet is more recent, since it is manufactured completely from metal. It closely resembles the helmet from Knossos in its profile and shape (even when considering the heavily fragmented state of the Knossos helmet at the time of its discovery), and spool-shaped knob, and forms, in association with its abstract decoration of boar tusks, the bridge to the older boar tusk helmets with spool-shaped knob, as seen on the ivory appliques from Mycenae and on further depictions from Mycenae and Delos.⁹³ We can therefore date the unprovenanced helmet to around 1400 BC, having an intermediary position as a transitional form between the older boar tusk helmets proper from Dendra and the helmet of Type Oranienburg from Knossos. Such a premise is consistent with dates in Late Helladic II⁹⁴ and LM IIIA respectively, being the middle of the 15th century BC, in accordance with its decoration.⁹⁵

This helmet also suggests the possibility that the Aegean depictions of boar tusk helmets might actually represent decorated metal helmets and not true organic boar tusk helmets. Also, the contemporaneity of boar tusk helmets and bronze helmets might be indicated by the 13th century BC frescos at Pylos: white coloured boar tusk helmets, yellow (bronze?) helmets with several registers similar to the first helmets, whilst further yellow (bronze?) helmets with bosses, nose guards and knobs are depicted together.⁹⁶ The ship fresco from Thera-Akrotiri (16th century BC) also depicts both white boar tusk helmets and yellow (bronze?) helmets with knobs. The helmets hang from the ship timbers right above their owners. One of the Mycenae frescos (c. 1400 BC) also depicts a similar yellow (bronze?) helmet with knob,⁹⁷ which resembles the later European helmets of Type Pişcolt or cap helmets with solid knob, but is most likely not connected with them.

Another early helmet of Type Oranienburg with spool-shaped knob is the helmet from Biecz, Poland. B. Hänsel convincingly concluded that the helmet from Biecz was deposited together with an Únětice dagger and ingot torques, which might suggest a deposition late in the Early Bronze Age (around 1600 BC).⁹⁸ Significant effort has been expended in attempting to explain the contradiction of such a helmet deposited together with Early Bronze Age objects, including suggesting that the life span of the dagger was prolonged,⁹⁹ the find context,¹⁰⁰ or even the helmet, ignored.¹⁰¹ Nevertheless, after Hänsel discussed in detail the circumstances surrounding the finds and their first recording, there can be little doubt regarding the unity of the associated deposit.¹⁰² In doing so, Hänsel follows the interpretation of Hencken, who was severely criticised for concluding so.¹⁰³

One must bear in mind that the associated deposit from Biecz is not the only one where significantly earlier objects were deposited together with much later ones. Similar cases include the Spindlersfelder associated deposit (Bz B/C–Ha B1) and the Mušov associated deposit (Bz C1–Ha A). Moreover, if we consider a possibly earlier date for the Middle Bronze Age in the Carpathian Basin¹⁰⁴ and a longer duration of the Únětice culture in the Oder region, we might infer similar depositional circumstances for the Spindlersfeld associated deposit. The composition of the Biecz associated deposit is also significantly different from other Urnfield period associated deposits. The presence of further Aegean objects in the same region (such as the spearhead in the associated deposit from Kyhna), might suggest that the associated deposit from Biecz

⁹³ Borchhardt 1972, cat. nos. 3–5, 9.

⁹⁴ Hereafter LH II. Similar also for Late Helladic I (LH I), Late Helladic IIIA (LH IIIA), and so on.

⁹⁵ Buchholz et al. 2010, 193, 201; Mödler 2013a.

⁹⁶ Borchhardt 1972, pls. 5.1; 11.1.

⁹⁷ Borchhardt 1972, pl. 37.3.

⁹⁸ Hänsel 2003, 77–84.

⁹⁹ Goetze 1984, 36.

¹⁰⁰ Breddin 1969, 42; Schauer 1988, 185, note 37.

¹⁰¹ Billig 1963, 247.

¹⁰² Hänsel 2003, 80.

¹⁰³ Hencken was criticised by: e.g. Sprockhoff 1956, 85; v. Merhart 1956/1957, 144; Hachmann 1957, 176; Gimbutas 1965, 58.

¹⁰⁴ Della Casa – Fischer 1997.

included bronzes which were collected over a longer time span, including a helmet which was imported or at least heavily influenced by the Aegean. B. Hänsel thus pleads for a dating of both the associated deposit and the helmet to the Early Bronze Age.¹⁰⁵

Dating the Biecz helmet to the late Early Bronze Age would make it the oldest European helmet, and consequently undermine the above suggested development – from boar tusk helmets to the first European metal helmets in the Aegean – with the unprovenanced helmet as a direct connection between the boar tusk helmets and helmets of Type Oranienburg. On the basis of the close relationship in their profile, shape and weight of the helmet from Knossos and the presence of Early Bronze Age finds in the Biecz associated deposit, it is more reasonable to date the helmet and the deposition of the associated deposit to no earlier than the later Middle Bronze Age or Bz C2 (14th century BC). This would make the helmet from Biecz slightly later in date than that from Knossos.¹⁰⁶ The Biecz helmet would nevertheless remain one of the oldest bronze helmets from central and eastern Europe (if the helmets from Oranienburg and Dunaföldvár were not also placed in their rivers earlier).

The helmets from Nadap,¹⁰⁷ Spišská Belá, Žaškov, and Keresztéte¹⁰⁸ can all be dated to Bz D–Ha A1. While the associated deposits from Žaškov and Spišská Belá are dated generally to Ha A by M. Novotná, the associated deposit from Keresztéte is more specifically dated to early Ha A or Ha A1.¹⁰⁹ The associated deposits from Lúčky and Sâg are dated according to the presence of fragments of vessels of Type Hajdúböszörmény, which date to Ha B1, even though the find spot and the association of the finds from Lúčky are not secure.¹¹⁰ The helmets from Oranienburg and Dunaföldvár were found in rivers, and therefore can only be dated based on their resemblance to other helmets of Type Oranienburg. M. Egg and G. Waurick dated the helmet from Oranienburg to the 12th–13th century BC.¹¹¹ G. Szabó dated the helmet from Dunaföldvár to Ha A–B, following É. Petres' date for Nadap and Mozsolics' date for Keresztéte.¹¹²

Ironically, the helmet from Biecz, which is chronologically the closest to the Aegean helmets or perhaps even an export from there, is the find located the furthest distance from the Aegean. As pointed out before, it is likely that this helmet dates to Bz C2 (14th century BC), which is chronologically closer to the helmet from Knossos (15th century BC) and the just slightly older unprovenanced helmet. Briefly, we can note that, excluding the helmets from Biecz and Knossos, all helmets of Type Oranienburg with firm find circumstances, as well as associated finds (Nadap, Spišská Belá, Žaškov, Keresztéte) all date to Bz D–Ha A1 or, according to the presence of vessels of alleged Type Hajdúböszörmény at Sâg, as late as Ha B1. Taking into account their development in the Aegean and the alleged finds from the associated deposit of Biecz, it is reasonable to assume that the helmets of Type Oranienburg found in other associated deposits can be regarded as belonging to the oldest objects within each associated deposit. In the case of the associated deposit from Sâg, which was deposited in Ha B1, the helmet of Type Oranienburg was likely an antique object. Assuming this is the case, it suggests a main period of use for helmets of Type Oranienburg from the 15th century in Greece down to the 13th century BC in eastern Europe.

Catalogue

Cat. no. 1. Unprovenanced (Greece?) – complete helmet. Measurements: height: 17.8cm; diameter: 19.5 × 21cm; thickness: cap: < 1mm; knob: 1–2.5mm; knob: height: circa 1.8cm;

¹⁰⁵ Hänsel 2003, 77–84.

¹⁰⁶ Cf. Mödinger 2013a.

¹⁰⁷ Most recently: Uckelmann 2012.

¹⁰⁸ Schauer 1988, 183.

¹⁰⁹ Müller-Karpe 1959, 158, note 3; Novotná 1964, 21; v. Brunn 1968; Mozsolics 1985, 135.

¹¹⁰ Patay 1969, 205; Soroceanu – Lakó 1981, 156; Schauer 1988, 184–191.

¹¹¹ Egg – Waurick 1990, 14.

¹¹² Petres 1983, 58; Mozsolics 1985, 24; Szabó 1994, 224.

weight: 497g – private collection – Pl. 1.1. References: Christie's 1998; Born 2009, fig. 24; Buchholz et al. 2010; Mödlinger 2013a.

Before appearing on the market in Massachusetts in 1952, the helmet and other possibly associated finds had already been offered to the Museum of Fine Arts in Boston.¹¹³ As indicated by the nature of the corrosion, the helmet was most likely found in a grave close to the sea. The knob is the only known one on a Bronze Age helmet, which was worked up directly out of the sheet of the helmet. Inside the helmet, horizontal traces of hammering can be observed.¹¹⁴ Also, two ancient repairs can be identified, including a 5.5cm long crack repaired by a now lost bronze sheet patch, which was fixed on both sides of the crack by two rivets, which are also now lost. Since the repair did not affect the decoration, it might be possible that the helmet already underwent repair during manufacture, before the decoration was applied.¹¹⁵ A further crack immediately below the knob was also repaired with the addition of three rivets and a bronze sheet patch, while two further cracks from the knob downwards were left unrepaired. The depressed knob and the latter cracks might have resulted from an impact sustained during fighting, or a consequence of post-depositional processes. The punched and probably originally infilled decoration consists of registers of punched ornament, with two below the finial and two above the bottom edge. From the top down to the rim, the registers become broader, as can also be observed on the actual boar tusk helmets. The registers are all filled with simplified boar-tusk motifs. The lowest register also bears four counter-clockwise running spirals. The 'lines' making up the patterns are similar to the ladder motif seen on the well-known Cypriot 'White slip Ware'.¹¹⁶ Similar decoration can also be found on LH III ceramics (e.g. Kallithea, Crete or Tiryns), bronze vessels (e.g. Knossos), and silver vessels and gold cups (e.g. Mycenae, Dendra). The central and broadest register lacks any decoration or indication of gilding or silvering.¹¹⁷ Parallels for such a large blank register in combination with others filled with boar tusks are scarce, though blank registers in general are known, such as the ceramic vase from Isopata (grave 5) or the marble engraving from Ayia Irini, Keos. Spiral decoration is so far unknown on other bronze helmets or from their depiction. The closest similarity can be seen in the depicted circles on the ivory miniature helmet from Knossos. Similar spirals are known from Gournia, Crete, on Late Minoan II¹¹⁸ ceramics, and on a bronze pan from Isopata, Crete. As Buchholz and colleagues pointed out, usually only precious goods or luxury objects have such spiral decoration.¹¹⁹ The helmet was sold at an auction at Christie's in New York on 18 December 1998.¹²⁰

Cat. no. 2. Knossos, Crete, Greece – grave find (grave no. 5) – fragmented helmet. Measurements: height: 17cm; diameter: 24 × 21cm; knob height: 3.9cm; diameter at the knob's base: 5cm; thickness: 1–1.5mm; total weight helmet: 695g; Cheek plates measurements: 16.5 × 9cm; weight cheek plates together: 214g – Heraklion Archaeological Museum (Αρχαιολογικό Μουσείο Ηρακλείου), inv. no. unknown – Pl. 1.2. References: Hencken 1952, 107; Hood – de Jong 1952, 252–260, pls. 50–51; 52a; Matz 1956, 126; Ventrìs – Chadwick 1956, 377, fig. 26A; Zervos 1956, fig. 719; Hachmann 1957, 176; Marinatos 1959, 113; Schachermeyr 1960, 63, 66, fig. 54; Yalouris 1960, 55; Müller-Karpe 1962a, 271–272; Borchhardt 1972, 56–60, cat. no. 11.I; Hencken 1971, 20, fig. 3e–g; Bouzek 1981, 21–23, fig. 1.1, 3; Kilian-Dirlmeier 1985, 196–197, 199, tab. 1; Schauer 1988, 183; Vasilakis 1999, 114, fig. on the right; Clausen 2001, 218; Buchholz et al. 2010; Mödlinger 2013a.

¹¹³ Buchholz et al. 2010, 139, 192.

¹¹⁴ Buchholz et al. 2010, fig. 57.

¹¹⁵ Buchholz et al. 2010, 149.

¹¹⁶ Cf. Mödlinger 2013a.

¹¹⁷ Buchholz et al. 2010, 156.

¹¹⁸ Hereafter LM II. Similar also Late Minoan I (LM I), Late Minoan IIA (LM IIA), and so on.

¹¹⁹ Buchholz et al. 2010, 180.

¹²⁰ Christie's 1998.

After two years of excavation at Ayios Ioannis and the new hospital site in Knossos, the helmet was published in 1952. It was found in grave V from the latter site. With it were a spear-head and a rapier, as well as stone vases (three of alabaster and two of other materials). In close vicinity to the helmet, a lead disc 5.5cm in diameter with a cover of bronze was found. The disc might have served as an extra weight attached to an organic neck guard, so that it would not shift about. Unfortunately, the tomb chamber collapsed and left the helmet smashed into over a hundred fragments. As a consequence, any possible traces of use or manufacture that may have been preserved are almost impossible to detect. The Knossos helmet is the only helmet of Type Oranienburg with surviving cheek plates. It is not clear if the cheek plates overlapped with the bottom of the helmet or if they were fitted edge to edge. Both cheek plates have 18 small rivet holes between 1.5–2mm in diameter.¹²¹

Cat. no. 3. Biecz (Beitzsch), woj. Lubuskie, Poland – associated deposit (bog find) – complete helmet. Measurements: height: 16.2cm (cap); 1.8cm (knob); diameter: 19.5 × 21.5cm; weight: 353g – British Museum, reg. Num. 1868.1228.248 – Pl. 1.3. References: Klemm n.d. V, 13 ('Kopfbekleidung. Helme'); Klemm 1851, 52, note 2; Klemm 1854, 157; Lindenschmit 1858, pl. 1.1; Kemble 1863, 52, 170, pl. 12.6; Klemm 1868, no. 429 ('bei Pforten'); Genthe 1874, 170–171; Dahn 1881, 48; British Museum Guide 1904, 97; Uenze 1938, 37, 83; v. Merhart 1941, 11, fig. 2.6; Hencken 1952; Hundt 1955, 105; Sprockhoff 1956, 85; v. Merhart 1956/1957, 144; Hachmann 1957, 176; Gimbutas 1965, 58; Patay 1969, 205, note 122; Hencken 1971, 33, fig. 13c–d; 37; Borchhardt 1972, 127, cat. no. 28.1; Bukowski – Dąbrowski 1972, 116; Bouzek 1981, 23, fig. 1.2, 4; Jazdzewski 1981, 288; Otto 1981, 60; Goetze 1984, 36; Schauer 1988, 185; Blajer 1990, 28, 33, 102; Egg – Waurick 1990, 14; Uenze 1990, 23, 41, no. 51, pl. 5.2; Albrecht 1991; Calzecchi-Onesti 1991, 74, fig. 3; 76, no. 4; Clausing 2001, 218; Hänsel 2003, 77–84, fig. 2; Clausing 2005, 36–38; Buchholz et al. 2010, 201; Mödlinger 2013a.

The helmet was likely found together with two ingot torques and one triangular blade of a dagger of Type Oder-Elbe below a pine trunk in a peat bog in 1847. The associated deposit was purchased from Johannes Gustav Klemm (collection in Dresden) and is today kept by the British Museum, London. Analyses carried out at the British Museum in 1952 mention the presence of small fragments of charred oak and plum wood inside the cap of the helmet. These were not observed in 2013 when the helmet was studied by the author.

Cat. no. 4. Oranienburg, Lkr. Oberhavel, Brandenburg, Germany – single river find (river Havel) – complete helmet. Measurements: height: 21cm; diameter: approx. 22.5cm; thickness: 0.3–3mm; knob height: 2.8cm; weight: 638g – Heimatmuseum Oranienburg, inv. no. III.51 – Pl. 1.4. References: Sprockhoff 1930, 44, pl. 9a; v. Merhart 1941, 11, fig. 2.4; Hencken 1971, 33, 37, fig. 13e; Borchhardt 1972, 127, cat. no. 28.2; Bouzek 1981, 23, fig. 2.3; Albrecht 1991; Clausing 2001, 218; Hänsel 2003, 82, fig. 1; Born 2009, figs. 21–22; Lippert 2011, 31; Mödlinger 2013a.

The helmet was recovered from the river Havel as a single find before the 1930s. On one side of the helmet at least three severe sword impacts are visible.

Cat. no. 5. Žaškov, okr. Dolný Kubín, Slovakia – associated deposit – knob. Measurements: height: 2.7cm; diameter: 2.1cm (above), 1cm (shaft), 2.8cm (base); weight unknown – Slovenské národné múzeum Martin, inv. no. 3504 – Pl. 1.5. References: Hampel 1892, 173; Eisner 1933; Novotná 1964, 21; Novotná 1970, 53–56; Hencken 1971, 37, fig. 17a–c; Müller-Karpe 1980, pl. 387.B; Mozsolics 1985, 24; Schauer 1988, 183; Calzecchi-Onesti 1991, 75, fig. 4b, no. 3; Novotná 1991, 14, no. 5; 24, no. 18; Hansen 1994, 509, CS 731; Clausing 2001, 218; Furmánek – Novotná 2006, 38, nos. 173–177; Mörtz 2011a, 370; Mödlinger 2013a.

Other than the date, having been found in June 1876, the find circumstances of the associated deposit are unknown. As well as the spool-shaped knob of the helmet, the associated deposit

¹²¹ Mödlinger 2013a.

consists of rings, a bowl of Type Satteldorf, knobbed axes, two spearheads, the hilt of an early Type Liptau sword, pins, a knobbed chisel, sickles, and two ingots. A fragment of a helmet cap is depicted by Hencken¹²² but was not found at the museum. Fragments of the cap of a helmet are still attached to the cast-on, spool-shaped knob, however. The knob itself had been repaired, where the upper part was cast onto the lower, thus resulting in the upper part being solid, with only the lower being spool-like in cross-section. From the inside of the helmet, a drop of metal from the upper and later repaired part of the knob can be seen inside the central hole, which once passed completely through the original knob.¹²³

Cat. no. 6. Spišská Belá, okr. Kežmarok, Slovakia – associated deposit I (1891) – knob. Measurements: height: 2.2cm; diameter: 2.2cm (above), 1cm (shaft), 3.2cm (base); weight unknown – Podtatranské múzeum Poprad, inv. no. MK 882 – Pl. 1.6. References: Novotná 1964; Novotná 1970, 53–56; Hencken 1971, 33, 35, fig. 15f–h; Schauer 1988, 184; Calzecchi-Onesti 1991, 76, no. 2; Novotná 1991, 22, nos. 10–11, pl. 19.A3; Clausen 2001, 218; Vachta 2008, 123, list V.1.5, no. 14; Mörtz 2011a, 370; Mödler 2013a.

As well as the parts of the spool-shaped knob from a helmet, the associated deposit consists of two cups, four plain bracelets and three spearheads. Other finds, namely three knobbed axes, four bracelets, four spearheads and a round object, are now missing.¹²⁴

Cat. no. 7. Unprovenanced (probably Lúčky, okr. Ružomberok, Slovakia) – associated deposit (?) – complete helmet. Measurements: height: 19.5cm; diameter: 20 × 21cm; knob: height: c. 2.8cm; weight: unknown – Archeologické múzeum SNM, 4518 – Pl. 1.7. References: v. Merhart 1941, 11, fig. 2.5; v. Merhart 1952, 63, 70; Mozsolics 1955, 42, 44, fig. 9.1; Müller-Karpe 1959, 114, 204; Novotná 1970, 53–56; Hencken 1971, 32, fig. 13a–b; Borchardt 1972, 127, cat. no. 28.4; Bouzek 1981, 23, fig. 2.1; Calzecchi-Onesti 1991, 76, no. 1; Novotná 1991, 47, no. 48; 58, no. 54; Clausen 2001, 218; Mödler 2013a.

The actual find location of this possible associated deposit is unknown, though it is usually named as coming from Lúčky. An itinerant salesperson sold the helmet and other bronzes to the museum in Martin. The helmet was supposedly found together with a situla of Type Hajdúböszörmény and a cauldron with cross-shaped handles. The corrosion of the three objects is significantly different,¹²⁵ which might indicate that the objects were not originally associated, though the composition of the associated deposit resembles that from Mezökövesd, which contained a helmet of Type Pişcolt (cat. no. 45). The helmet is partly broken and distorted. On the inside, horizontal traces of hammering are visible. Over 1.2cm above the rivet holes, a small step or stage with respect to the rest of the cap is visible on the inside of the helmet. In this area, several vertical cracks, caused by material tension, are visible.

Cat. no. 8. Keresztéte, kom. Borsod-Abaúj-Zemplén, Hungary – associated deposit – two fragments. Measurements: 12 × 5.3cm; weight: 32g – Magyar Nemzeti Múzeum, inv. no. 31/1941/8 – Pl. 1.8. References: Mozsolics 1955, 41, fig. 7.7; Müller-Karpe 1959, 158; Hencken 1971, 39, fig. 18a; Kemenczei 1984, 149, no. 17; Mozsolics 1985, 24, 135, 388, pl. 150.9; Schauer 1988, 184; Patay 1990, 19, no. 3; Hansen 1994, 541, H 330; Clausen 2001, 218; Vachta 2008, 123, list V.1.5, no. 4; Mörtz 2011a, 362; Mödler 2013a.

The associated deposit was found during ploughing at the end of the 1930s and consists of the helmet without knob, a cauldron, a bronze boss (diameter 11.5cm), five spearheads, 16 bracelets and rings, and a biconical jug of sheet bronze. Today, only two fragments (soldered together) from the helmet survive, with the rest of the helmet probably having been lost during the Second World War.

¹²² Hencken 1971, fig. 17c.

¹²³ Cf. Mödler 2013a.

¹²⁴ Hencken 1971, 33.

¹²⁵ Hencken 1971, 32.

Cat. no. 9. Nadap, kom. Fejér, Hungary – associated deposit – almost complete helmet. Measurements: height (total): 18.5cm; thickness (cap): 0.1–0.3mm; height (knob): 1.8cm; diameter (knob base): 2.2cm; weight: not possible to measure, since the helmet is permanently attached to a modern bronze sheet – Szent István Király Múzeum, Székesfehérvár, no inv. no. – Pl. 2.9. References: Petres 1983, 57, fig. 1a–b; Schauer 1988, 184, fig. 4; Calzecchi-Onesti 1991, 77, no. 12; 1994, 546, H451; Jankovits 1998/1999, fig. 1.2; Jankovits 1999/2000, fig. 1.2; Clausen 2001, 218; Makkay 2006, 7, pl. I; Uckelmann 2012, 18–19; Mödler 2013a.

The associated deposit was found in spring 1970 at Jánoshegy, most likely as a consequence of the heavy ploughing in the autumn of 1969.¹²⁶ Over an area of about 25sqm more than 350 bronze objects and several thousands of sherds were recovered over the following months. Mozsolics and S. Hansen refer to 713 objects with approximately 80 fragments, whilst M. Uckelmann mentions 628 objects/fragments, and J. Makkay 567 or 568 objects.¹²⁷

The associated deposit from Nadap is the only associated deposit containing likely fragments of all categories of defensive armour, comprising a helmet of Type Oranienburg, fragments helmets of Type Paks (see cat. no. 27), two pairs of greaves (see cat. nos. 165. 170–172), a fragment of a shield of Type Nyírtura, further possible fragments from the edge of a shield, and a fragment of a cuirass (see cat. no. 132). The associated deposit also contained the hilts of two Type Dreiwalst swords, fragments from 13 flange hilted swords, fragments from eight flange hilted daggers, 15 spearheads, two ferrules, five socketed hammers, ten different chisels and punches, an anvil, ten socketed axes and fragments of another, four winged axes and the fragments of a further five, 28 sickles, fragments of eight knives, fragments of possibly 12 saws, fragments of two sceptres (?), a razor of variant Ciumești, two razors of Type Großmugl, variant Mixnitz, a fragment of a razor of Type Großmugl, variant Mesić, and two handles of further razors, a total of 14 vessels, including bronze vessels of Type A, variant A2, a bronze cup of Type Gusen, a bronze cup of Type Gusen/Blatnica, fragments of eight bronze cups of Type Blatnica, a further bronze cup and bowl, a sieve, fragments of six fibulae, four pins and two pin heads, neck rings, 31 arm rings and three fragments, nine arm bands and three fragments, fragments of four arm spirals, pendants, three belt plates and fragments of a further two, 17 more belt sheet fragments, pieces of bronze, casting cakes, off-casts, four different tutuli, ten bronze pearls, four scales (?), a large phalerae or star-like decorated disc,¹²⁸ 17 smaller phalerae, *Riemverteiler*, four fragments of three phalerae or mirrors, potential fragments of a miniature wagon, three rings, further unidentified fragments and objects, and a large quantity of sherds, most likely from a pot containing the bronzes. The list of associated finds differs across various publications, and the above is based on that of M. Uckelmann.¹²⁹

Presently, less than a third of the helmet's cap survives. What remains is severely corroded and has several cracks. Seven rivet holes differing in size from 5–8mm in diameter are still preserved. They were punched through from the outside to the inside of the helmet.

Cat. no. 10. Dunaföldvár, kom. Tolna, Hungary – single river find (river Danube) – complete helmet. Measurements: height (without knob): 16.9cm; diameter: 21.1 × 22.2cm; thickness: 2mm (rim); 0.4mm (cap); weight: 488g – Adám Béni Balogh Museum Szekszárd, inv. no. O.93.33.1 – Pl. 2.10. References: Szabó 1994, 219, pl. 1; Clausen 2001, 218; Mörtz 2011a, 369; Mödler 2013a.

The helmet was bought from the private collection of Lajos Dánó by the museum after it was found in the Danube at Dunaföldvár in 1986. Despite the knob having been broken off and lost, the helmet is complete. Two cracks can be identified but otherwise the cap does not show any significant damage.

¹²⁶ Makkay 2006.

¹²⁷ Mozsolics 1985, 151; Hansen 1994, 546; Makkay 2006, 6; Uckelmann 2012, 18.

¹²⁸ Mödler 2013b.

¹²⁹ Uckelmann 2012, 17.

Cat. no. 11. Sâg (Sîg), jud. Sălaj, Romania – associated deposit – almost complete helmet. Measurements: height incomplete cap: 10cm; knob: height: 2.5cm; thickness: 0.1mm (cap); 1.1mm (rim); weight: 56g (cap); 56g (knob) – Muzeul Județean de Istorie și Artă-Zalău, no inv. no. – Pl. 2.11. References: Petrescu-Dîmbovița 1977, 134, pl. 318.14; Soroceanu – Lakó 1981, 147, 153, fig. 9.4; Schauer 1988, 184–185, fig. 5.8; Rusu 1990, 77; Clausing 2001, 218; Soroceanu 2008, 58, nos. 17–19; Vachta 2008, 123, list V.1.5, no. 12; Mörtz 2011a, 370; Soroceanu 2011, 237, fig. 17; Mödlinger 2013a.

The associated deposit was found in 1972 in Sâg (Sălaj) at a depth of 60cm, approximately 150m west of the new school building. The associated deposit consists of the helmet, a situla of Type Hajdúböszörmény, further situla fragments with cross-shaped handles, a handle of a vessel, bracelets, phalerae, five bronze cups of types Kirkendrup and Fuchsstadt, sickles, a spearhead, two knobbed axes, and a possible fragment of a saw. The heavily corroded fragments of the helmet's cap, as well as the knob, were sand blasted and are now in a delicate condition. The central hole of the knob is only 3mm deep and of not much practical use.

Cat. no. 12. Unprovenanced (Hungary?) – knob with three fragments of the cap. Measurements: knob: height: 2.7cm; width: base 2.7cm; weight: 40g; fragment 1: 13.2 × 6.2cm, thickness 0.1–2cm, weight 90g; fragment 2: 7.9 × 3.6cm, thickness 0.1cm, weight 24g; fragment 3: 4.8 × 1.9cm, thickness 0.2cm, weight 11g – Hadtorteneti Múzeum, Budapest inv.no. 1993.791.II – Pl. 2.12. References: Tarbay 2015, figs. 6, 15.3.

The assemblage of different objects, including fragments of the helmet, were acquired by the museum in the early 1990s. The exact find spot and find circumstances are unknown. The assemblage contains a flange hilted sword with pommel tang of Type Allerona, three flange hilted knives of Type Pustiměř, a helmet of Type Oranienburg, a pair of greaves of Type Desmontă (cat. nos. 166–167), a cup of Type Fuchsstadt, a ribbed tube and further sheet metal fragments.

J. G. Tarbay points out that due to the condition of the objects in the assemblage (all of the objects show damage due to intentional destruction, such as bending, crushing, melting, and/or breakage), they were very likely associated and dates the deposit to Ha B1.

From the helmet, only the central, cast-on and undecorated knob, and three fragments of the cap, survive, and all have been seriously damaged by exposure to fire.

2.1.2 Helmets of Type Paks

Helmets Type Paks are the only eastern European decorated helmet type. Only a few other helmets from southern and eastern Europe are also decorated, such as the helmet from Szczecin-Zdroje (cat. no. 59), an unprovenanced helmet of Type Oranienburg (cat. no. 2), and the only crested helmet in eastern Europe, which is unprovenanced (cat. no. 100). The thin, delicate hemispherical cap of helmets of Type Paks has a central, cast-on knob. According to the decoration, we can distinguish two variants of the helmet type, being those with two or three horizontal ribs above the many rivet holes placed immediately above the rim, and those with both ribs and central star decoration around the knob. The star motif consists of individual arcs arranged in a ring, with the ends of the arcs facing outwards, which are then encircled by ribs.

In the case of fragments, distinguishing between the two variants can be rather difficult, especially where only rim fragments have survived. Bronze sheet fragments from decorated bronze discs, which also have the same star-motif, have also often been mistaken for helmets. Analysis of the relevant fragments in their various museum collections by the author has established that, with the exception of the two fragments from Pázmándfalu (cat. no. 26), all fragments with star motif most likely belong to these discs and not to helmets.¹³⁰ These disc fragments are completely flat and usually show a natural rather than broken edge parallel to the rib

¹³⁰ For details, see Mödlinger 2013b, 65.

decoration. Most of the fragments were published only in the form of poor quality drawings and without accompanying photograph, making it impossible to reconstruct their shape and size with precision. The misidentification of disc fragments as coming from helmets, such as in the case of the fragments from the associated deposits at Nagyvejke, Poljanci I, and Veliko Nabrđe, is therefore not surprising.

The star motif found on helmets and discs is also known on other objects, including bronze and ceramic cups, as well as the bronze sheet object from Sacoti, Romania, which might be a fragment of a belt plate.¹³¹ The star motif first appears on cast bronze objects during the Middle Bronze Age in southeastern and central Europe. Here, the motif consisted of a circular arrangement of separate arcs with points that usually did not meet. Similar decoration occurs on the pommel discs of solid-hilted swords and disc-headed axes from central and southern Europe.¹³² As the decorative motif developed, the ends of the individual arcs become joined, forming the star-like shape. The developed star motif on these decorated discs represents the first bronze sheet object to bear this decoration, and seems to have taken place as early as Bz D2 or with the beginning of Ha A1. The motif then spread northwards, where it was adopted onto these helmets. It is possible that the helmets of Type Paks without star motif are somewhat earlier but as the find circumstances of the only two complete examples of helmets of Type Paks without star motif are unknown, there is currently no way to be sure. The later adoption of the star motif onto bronze cups¹³³ was probably influenced not only by its occurrence on the cap helmets but also on garland-decorated pottery, while its appearance on pottery cups was likely influenced only by the helmets of Type Paks, decorated with the star motif. The star motif appears to have largely gone out of fashion on sheet-bronze objects such as helmets by Ha A2 and on bronze cups by Ha B1.

Today, there are at least seven complete helmets of Type Paks with rib and star decoration, and two complete helmets of Type Paks with rib decoration only. On the basis of two helmets with rib (unprovenanced; cat. no. 21), and rib and star decoration (Žiar nad Hronom; cat. no. 16), found together with their cheek plates intact, we can assign similar cheek plates, such as those from Wöllersdorf (cat. no. 30), Hočko Pohorje (cat. no. 31), Uioara de Sus (cat. no. 32), Újszöny/Komárom (cat. no. 33), Pázmándfalu (cat. no. 35), and Mezőnyárád (cat. no. 34), to this helmet type. The kidney-shaped cheek plates have a convex middle section with rivet holes lining the edge. In addition, the cheek plate fragments from Hočko Pohorje and Uioara de Sus have rivet holes across the embossed section to attach an organic lining. One of the two fragments from Uioara de Sus, however, shows no rivet holes on the preserved fragment. Fragments of further helmets of Type Paks are known from eight different find spots.

Assuming that the fragments of helmets in deposits do not come from a single helmet but belong instead to different helmets, having been deposited as *pars pro toto*, wherein the fragment stands in for the whole, as recently suggested for shields from the associated deposits from Otok Privlaka, Croatia, and Keszőhidegkút, Hungary,¹³⁴ then the total number of individual helmets of Type Paks known would be at least nine, the number of separate cheek plates seven and the total number of fragments of further helmets at least fourteen (the associated deposits with more than one fragment are Nadap (two fragments; cat. no. 27) and Pázmándfalu (four fragments)). With the most recent Hungarian find from Pázmándfalu, we know of between 26 and 30¹³⁵ examples of helmets of Type Paks, making it the most well represented of all known Bronze Age helmets (Tab. 2.3).

¹³¹ Mödlinger 2013b.

¹³² Coblenz 1951, 156, note 69; Martin 2009, 49, note 89; Mödlinger 2013b, 68–71.

¹³³ Mödlinger 2013b, nos. 67–70, pl. 5.

¹³⁴ Mödlinger – El Morr 2014; Mödlinger et al. 2014.

¹³⁵ The varying numbers result from the fact that we do not know if the fragments from deposits such as Nadap or Pázmándfalu belong to a single helmet or perhaps come from several individual helmets.

Cat. No.	Find Circumstances	Find Site	State	Condition	High Cap (cm)	High Knob (cm)	Dm (cm)/ Fragments	Thickness Cap/Rim (mm)	Weight (g)
13	unknown	unprovenanced (Hungary?)	–	not complete	13.5	–	13 × 20.8	0.4 / 1	–
14	unknown	unprovenanced (northern Hungary?)	–	complete	13.1	–	17.2 × 20.9	0.4 / 1	292
15	river	Paks	HU	complete	11.5	3.5	17.0 × 20.5	0.3 / 1	340
16	unknown	unprovenanced (Žiar nad Hronom?)	–	complete	12.1	5.5	20.8 × 18.2	0.4 / 2	–
17	unknown	unprovenanced	–	complete	total height: 19.5		22.5	–	–
18	unknown	unprovenanced (Bajmok?)	–	complete	–	–	–	–	–
19	unknown	unprovenanced (Dusnok?)	–	complete	–	–	–	–	–
20	unknown	unprovenanced	–	complete	13.5	5	20.8 × 18	0.5–0.8 / –	345
21	unknown	unprovenanced	–	complete	11.5	5	21 × 16	– / 1–2	407
22	associated deposit	Markovac-Grunjac	HR	fragment cap	–	–	6 × 4.1	–	10.1
23	associated deposit	Veliko Nabrđe	HR	fragment cap	–	–	11.5 × 5.8	–	28
24	associated deposit	Poljanci I	HR	fragment cap	–	–	7.1 × 10.5	0.4–0.8 / 3	23.5
25	associated deposit	Elsterwerda	DE	fragment cap	–	–	5.9 × 3.75	0.25 / –	–
26	associated deposit	Pázmándfalu	HU	3 fragments cap	–	–	c. 12.5 × 4.5 c. 16.2 × 5.2	–	–
27	associated deposit	Nadap	HU	2 fragments cap	–	–	9.1 × 8.7 7.7 × 5.9	–	–
28	associated deposit	Strassengel	AT	knob	–	4.4	–	–	63.2
29	associated deposit	Guşterița	RO	knob	–	4.1	–	–	–
30	associated deposit	Wöllersdorf	AT	cheek plate	–	–	8.5 × 5.2	0.7–0.8	28
31	associated deposit	Hočko Pohorje	SI	cheek plate	–	–	3.9 × 3	–	3.5
32	associated deposit	Uioara de Sus	RO	2 cheek plates	–	–	3.3 × 3.6 6.0 × 4.2	–	–
33	associated deposit	Újszőny/Komárom	HU	cheek plate	–	–	–	–	–
34	associated deposit	Mezőnyárád	HU	cheek plate	–	–	10.5 × 7.9	–	–
35	associated deposit	Pázmándfalu	HU	cheek plate	–	–	5 × 8.7	–	–

Tab. 2.3 Helmets of Type Paks.

2.1.2.1 Research History

J. Hampel was the first to describe the helmet of Type Paks, which at the time was represented by only a single example. Due to a lack of similar finds, it was misidentified as a bowl.¹³⁶ It was later recognised as a helmet by v. Merhart, and included as part of his group of ‘decorated cap helmets’, despite the fact that all other examples in this group are without knob.¹³⁷ It was Hencken who provided an alternative corpus of ‘cap helmets with star decoration’ and added further, possibly related fragments.¹³⁸ Soon after, Borchhardt discussed these helmets following the classification of v. Merhart and included in his group of ‘decorated caps with knob or top’ the unprovenanced helmet cat. no. 13 and the helmets from Straßengel (cat. no. 28), Szczecin-Zdroje (cat. no. 59), Fermo and Cuneo.¹³⁹ The group of helmets of Type Paks was most recently expanded upon by Clausning.¹⁴⁰ It has been during the last 15 years, however, that the number of helmets of Type Paks has significantly increased, especially in terms of complete examples, including both new finds and previously unpublished examples. These complete helmets includes those from Žiar nad Hronom,¹⁴¹ and from the Danube at Paks (cat. no. 15).¹⁴² The helmet from Paks represents the only known complete helmet with a reliable provenance. Two illegally found and sold helmets, presumably deriving from Bajmok and Dusnok (cat. nos. 18 and 19), were recently published by G. V. Szabó.¹⁴³ Two further unprovenanced helmets were sold in 2002 and again later (cat. nos. 20 and 21).¹⁴⁴ Another helmet was sold in 2002 in Basel (cat. no. 17).¹⁴⁵ A further helmet (or the helmet from Bajmok) was presented to the museum of Subotica, Serbia, 25 years ago.¹⁴⁶ The current location of these five or six helmets remains unknown.

As well as the bronze sheet fragments, which were recently identified as belonging to decorated discs rather than helmets of Type Paks, further bronze sheet fragments previously associated with helmets of Type Paks were also recently excluded.¹⁴⁷ This includes fragments from Uioara de Sus,¹⁴⁸ Palotaboszók,¹⁴⁹ Bizovacs,¹⁵⁰ Bonyhád,¹⁵¹ Keszőhidegkut,¹⁵² Suseni¹⁵³ and Guşteriţa.¹⁵⁴ Another fragment from Uioara de Sus may, however, indeed belong to a helmet of Type Paks (inv. no. III-6003).¹⁵⁵ The 3 × 2.5cm fragment has rivet holes parallel to the edge with a distance of 1cm between each one and above the rivet holes three preserved ribs parallel to the rim. The potential knobs from helmets of Type Paks from the associated deposits from Špálnaca and Techirghiol, Romania (cat. nos. 68 and 69)¹⁵⁶ cannot be added to the list of helmets of Type Paks due to their poor preservation, with both knobs being highly fragmented, and missing both the upper and lower end, and are therefore discussed separately in Chapter 2.1.6.

¹³⁶ Hampel 1887, pl. 66.5.

¹³⁷ v. Merhart 1941, 4.

¹³⁸ Hencken 1971, 146.

¹³⁹ v. Merhart 1941; Borchhardt 1972, 125.

¹⁴⁰ Clausning 2001.

¹⁴¹ Bartík 2009.

¹⁴² Gaál 2001.

¹⁴³ Szabó 2013.

¹⁴⁴ Clausning 2001, 215, fig. 7.

¹⁴⁵ Clausning 2001, 212, 214, fig. 9.2.

¹⁴⁶ Szabó 2013, 805, note 23.

¹⁴⁷ Mödler 2013b, 73–74.

¹⁴⁸ Petrescu-Dîmboviţa 1978, 133, no. 184, pl. 198.1026–1027. The fragments have no ribs but incised decoration.

¹⁴⁹ Clausning 1996, 419, fig. 5.38. The fragment belongs more likely to a cist.

¹⁵⁰ Mozsolics 1985, 26; Clausning 2001, 208. The ribs of the fragment bear cord-like impressions.

¹⁵¹ Mozsolics 1985, pl. 40. The fragment does not have any parallel ribs or (rivet) holes.

¹⁵² Schauer 2003, fig. 3.3. The ribs of the fragment are too thin and widely spaced.

¹⁵³ Rusu 1990, 70, pl. I.1. The fragment does not bear any rivet holes.

¹⁵⁴ Clausning 2001, 214.

¹⁵⁵ Rusu 1990, 76.

¹⁵⁶ Petrescu-Dîmboviţa 1978, pls. 115.277; 157.614.

2.1.2.2 Distribution and Deposition

The helmets were deposited either complete, as single finds in rivers, or as fragments of cap or knob in associated deposits. The only complete helmet with secure find circumstances is the helmet from Paks, with the find circumstances of all other complete helmets being unknown. One unprovenanced helmet (cat. no. 21) was reputedly found together with two disc pendants, two bracelets and an arrow head.¹⁵⁷ Due to the history of the find, however, the veracity of the association must be questioned.

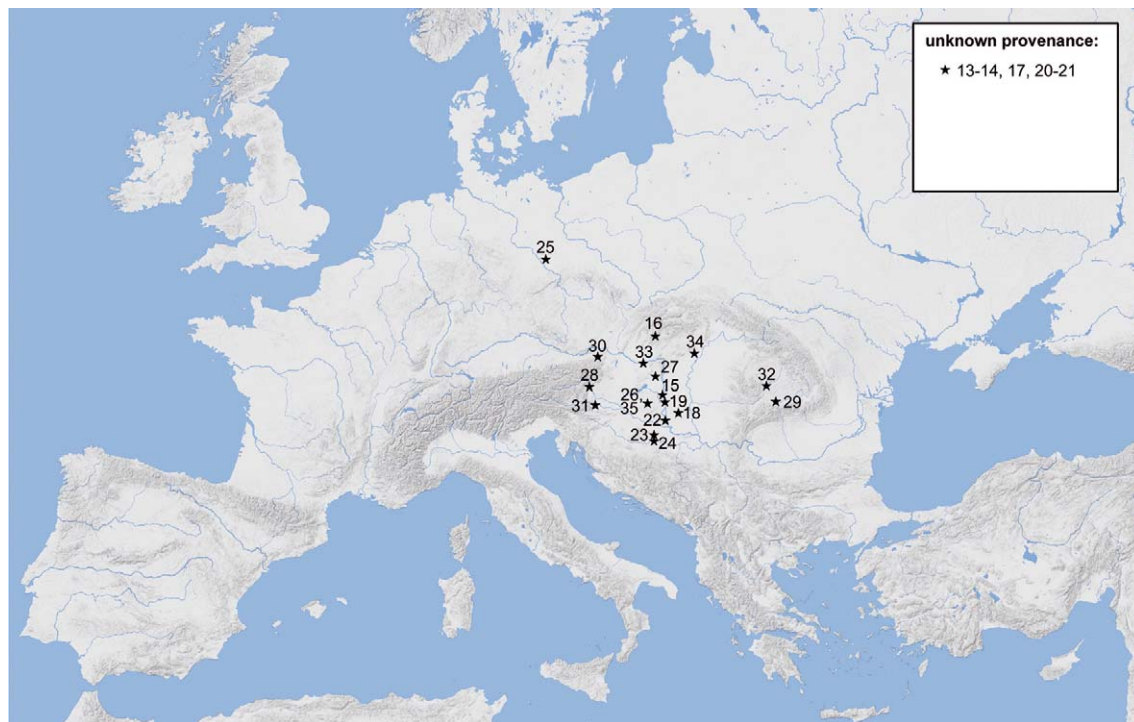


Fig. 2.9 Archaeological distribution of helmets of Type Paks: **13–14**. Unprovenanced; **15**. Paks; **16**. Žiar nad Hronom (?); **17**. Unprovenanced; **18**. Bajmok (?); **19**. Dusnok (?); **20–21**. Unprovenanced; **22**. Markovac-Grunjac; **23**. Veliko Nabrđe; **24**. Poljanci; **25**. Elsterwerda; **26**. Pázmándfalu; **27**. Nadap; **28**. Strassengel; **29**. Gușterița; **30**. Wöllersdorf; **31**. Hočko Pohorje; **32**. Uioara de Sus; **33**. Újszöly/Komárom; **34**. Mezőnyárád; **35**. Pázmándfalu. Numbers correspond to the catalogue numbers.

The main distribution area of these helmets reaches from the Carpathian Basin until the beginning of the eastern Alps (Fig. 2.9). Associated deposits with fragments of helmets of Type Paks are known from Elsterwerda, Germany (cat. no. 25), in the north, to Gușterița, Romania (cat. no. 29), in the east, and from Straßengel, Austria, in the west, to Poljanci, Croatia (cat. no. 24), in the south. Two bronze sheet fragments from the Nadap associated deposit, Hungary¹⁵⁸ also belong to helmets of Type Paks. These were placed in the same associated deposit as an older helmet of Type Oranienburg (cat. no. 9).¹⁵⁹

2.1.2.3 Chronology

Complete helmets *per se* cannot be accurately dated, since their find circumstances are unknown or because they frequently occur as single finds, such as the helmet from Paks. The

¹⁵⁷ Born – Hansen 2001, 64, fig. 58.

¹⁵⁸ Makkay 2006, pl. 5.10–11.

¹⁵⁹ See cat. no. 9 and Mödler 2013a.

chronological classification is therefore based on the various associated deposits which contain fragments of helmets of Type Paks. So far, we can only assign these helmet fragments to the general group of helmets of Type Paks, rather than to any of the two specific variants, but aspects of chronological variation are at least apparent, on the basis of the occurrence of rib decoration only or ribs and star motif.

The associated deposits are dated, without exception, to the period Bz D–Ha A, on the basis of those from Wöllersdorf,¹⁶⁰ Veliko Nabrdé (cat. no. 23),¹⁶¹ Poljanci I,¹⁶² Nadap,¹⁶³ and Gușterița,¹⁶⁴ and to Ha A in the case of Hočko Pohorje.¹⁶⁵ Some of these associated deposits can be narrowly associated with Ha A1, including those from Markovac-Grunjac (cat. no. 22),¹⁶⁶ Straßengel,¹⁶⁷ Elsterwerda,¹⁶⁸ Mezőnyárád,¹⁶⁹ Uioara de Sus,¹⁷⁰ Újszöny/Komárom¹⁷¹ and Pázmándfalu.¹⁷²

Decorated discs, such as those with star motif and their precursors, all fall within a very limited chronological horizon of Bz D–Ha A1 based on these associated deposits, indicating a rapid adoption of known decorative elements, such as the ring-and-dot and circular arrangement of arcs of ‘star motif’.¹⁷³ The distribution of the different types of discs widens with the increasing complexity of the decoration.¹⁷⁴ The distribution area of the discs with star motif overlaps then with the distribution for helmets of Type Paks, indicating their direct influence and rapid adaptation of the motif for the helmets in Ha A1, which is confirmed by the narrow chronological range of most of the deposits to this phase.

It remains unclear why the ring-and-dot motif was not also adopted to decorate the helmets. The motif is also lacking on bronze cups, while the rib decoration of the helmets was transformed into a row of bosses on cups. It seems as if the helmets of Type Paks had largely gone out of use during Ha A2 (in so much as they are not recognised amongst the finds record for this phase). Considering the geographical distribution and chronological classification of discs, helmets and cups, the Ha A1 helmets of Type Paks seem the most likely medium by which the star motif was transmitted from the southeastern European Bz D–Ha A1 discs to the northwestern European Ha A2–Ha B1 decorated bronze cups.¹⁷⁵

Catalogue

Helmets Type Paks with Rib and Star Decoration

Cat. no. 13. Unprovenanced (Hungary?) – almost complete helmet. Measurements: height: 13.5cm; diameter: 13.0 × 20.8cm; weight: not possible to measure, since fixed with modern bronze sheet – Magyar Nemzeti Múzeum, inv. no. 62.1.213 – Pl. 2.13. References: Hampel 1886a, pl. LXVI.5a–b; Hampel 1887, pl. 66.5a–b; Mozsolics 1955, 37, fig. 3; Müller-Karpe 1959, 113; Kemenczei 1979, 79–80, fig. 4.5; Born – Hansen 2001, 63, fig. 56; Clausen 2001, 215; Gaál 2001, 49; Schauer 2003, 196, fig. 3.1; Mödler 2013b, cat. no. 50.

¹⁶⁰ Pittioni 1954, 534; Müller-Karpe 1962a, 272.

¹⁶¹ Vinski-Gasparini 1973, 186.

¹⁶² Miklik-Lozok 2009.

¹⁶³ Makkay 2006; Uckelmann 2012.

¹⁶⁴ Petrescu-Dîmbovița 1978, 120–122.

¹⁶⁵ Črešnar 2010, 52.

¹⁶⁶ Jovanović 2010, 81.

¹⁶⁷ Clausen 2001, 214.

¹⁶⁸ Martin 2009, 120.

¹⁶⁹ Kemenczei 1984, 51.

¹⁷⁰ Petrescu-Dîmbovița 1978, 132–135; Mozsolics 1985, 25.

¹⁷¹ Mozsolics 1985, 25.

¹⁷² Szabó 2013, 811.

¹⁷³ Mödler 2013b.

¹⁷⁴ See Mödler 2013b, figs. 1, 5.

¹⁷⁵ Martin 2009, 46; Mödler 2013b.

The helmet was joined together with modern bronze sheets during restoration before 1954. Today, the original helmet is riveted together with these recent metal sheets.

Cat. no. 14. Unprovenanced (Northern Hungary?) – almost complete helmet. Measurements: height: 13.1cm; diameter: 17.2 × 20.9cm; weight: 292g – Magyar Nemzeti Múzeum, inv. no. 77.4.1 – Pl. 2.14. References: Kemenczei 1979, 79–89, figs. 1–3; Mozsolics 1985, 25, 208, pl. 136.2; Born – Hansen 2001, 62, fig. 55; Clausen 2001, 215, fig. 7.1; Gaál 2001, 46–49; Mödler 2013b, cat. no. 51.

The helmet was bought by the Magyar Nemzeti Múzeum from a private collection in 1977, decades after its discovery. The former owner suggested a find location in the border region between Hungary and Slovakia, close to the Danube.

Cat. no. 15. Paks, kom. Tolna, Hungary – single river find (river Danube) – complete helmet. Measurements: height: 11.5cm (cap), 3.5cm (knob); diameter: 17.0 × 20.5cm; thickness: 0.3–1 (rim); weight: 340g – Városi Múzeum Paks, inv. no. 2002.11 – Pl. 2.15. References: Clausen 2001, 215, fig. 9.1; Gaál 2001, 46–47, figs. 4–5; Mödler 2013b, cat. no. 52.

The helmet was found by J. Bánya amongst the sand of a popular swimming location belonging to Paks in 1999. The helmet is complete and was only slightly compressed during its recovery. A year later, the finder sold the helmet to the Városi Múzeum in Paks.

Cat. no. 16. Unprovenanced (most likely Žiar nad Hronom, okr. Žiar nad Hronom, Slovakia?) – find circumstances unknown – complete helmet. Measurements: height: 12.1cm (knob: 5.5cm); diameter: 20.8 × 18.2cm (knob: 12.5 × 36.0mm); cheek plates: 11.0 × 8.4cm; thickness: cap edge: 0.8mm; cheek plates: approx. 0.5mm; weight: cap 385g, cheek plates: 33.3g and 39g – Archeologické múzeum SNM, inv. no. AP 75.990 – Pl. 3.16. References: Bartík 2009, 37–48, figs. 1–6; Mödler 2013b, cat. no. 53.

The helmet was donated to the Archeologické múzeum SNM by PhDr. Jiří Janošík, CSc in 2008.

Cat. no. 17. Unprovenanced – complete helmet. Measurements: height: 19.5cm; max. diameter: 22.5cm; weight: unknown – present repository unknown; sold at the auction Cahn in Basel on 19. October 2002; formerly in private hands in North Rhine-Westphalia, Germany – Pl. 2.17. References: Clausen 2001, 212, 214–215, fig. 9.2; Cahn Auktionskatalog 2002, 64, no. 315, pl. 57.315; Mödler 2013b, cat. no. 54.

Cat. no. 18. Unprovenanced (Bajmok, Serbia?) – complete helmet. Measurements unknown – Pl. 3.18. References: Mödler 2013b, 77, fig. 6.A1; Szabó 2013, 805, fig. 11.

The helmet with rib and star decoration (four ribs arranged in a star shape on the top, six ribs about the middle, and three ribs at the rim) was presented to the Municipal Museum of Subotica, Serbia, in February 2011. Another similar, or perhaps even the same, helmet had been presented to the museum some 25 years ago.¹⁷⁶ The current location of the helmet is unknown.

Cat. no. 19. Unprovenanced (Dusnok, Hungary?) – complete helmet. Measurements unknown – Pl. 3.19. References: Mödler 2013b, 77–78, fig. 6.A2; Szabó 2013, 806, fig. 12.1.

The helmet was offered for sale by a person working in Dusnok, Hungary, on a dredging boat at the end of the 1990s. The helmet was sold later in Germany.¹⁷⁷

¹⁷⁶ Szabó 2013, 805.

¹⁷⁷ Szabó 2013, 806.

Helmets Type Paks with Rib Decoration

Cat. no. 20. Unprovenanced – complete helmet. Measurements: height: 18.5cm; diameter: 20.8 × 18.0cm; thickness: 0.5–0.8mm; knob: height: 5cm; hole in the knob: 3.2cm deep; knob diameter: 1.6 × 1.5cm; base diameter: 3.6 × 3.0cm; helmet weight: 345g – present repository unknown; Guttman collection, inv. no. AG 246 – Pl. 3.20. References: Born – Hansen 2001, 61–65, 175, 231–235, 270, 323, figs. 178–182, pls. IX–X; Clausen 2001, 215, fig. 7.2; Schauer 2003, fig. 2; Christie's 2002; Mödler 2013b, cat. no. 59.

The helmet was sold at auction at Christie's in London on 6 November 2002.¹⁷⁸

Cat. no. 21. Unprovenanced – complete helmet. Measurements: height: 16.5cm; diameter: 21 × 16.0cm; thickness: 1–2mm (rim); left cheek plate: 11.2 × 7.4cm; right cheek plate: 11.4 × 7.8cm; knob: height: 5cm; rectangular opening: 0.9 × 1.0cm, deepness 5cm; thickness knob: on top 1.8cm, in the middle 1.5cm and on the base 2.7cm; helmet weight: without cheek plates 407g; left cheek plate: 36g; right cheek plate: 40g; total weight: 483g – present repository unknown; Guttman collection, inv. no. AG 1126 – Pl. 3.21. References: Born – Hansen 2001, 62–66, 68, 74, 175, 235–236, 242, 270, figs. 183–191, pls. XI–XII; Clausen 2001, 215, fig. 7.3; Hermann Historica 2008; Mödler 2013b, cat. no. 60.

The helmet was reputedly found with a number of other objects, including two disc pendants, two bracelets and one arrow tip.¹⁷⁹ The helmet was part of the Guttman collection (bought in Munich in 1994) and put up for auction (Lot 4, not sold) at Christie's in London on 28 April 2004. It was later sold at Hermann Historica on 8 October 2008,¹⁸⁰ but has recently reappeared on the art market in Vöcklabruck, Austria, at the Galerie Kunst der Antike.

Fragments

Cat. no. 22. Markovac-Grunjac, Serbia – associated deposit – fragment. Measurements: 6 × 4.1cm; weight: 10.1g – Gradski muzej Vršac, inv. no. 10.755 – Pl. 3.22. References: Jovanović 2010, 70, 98, pl. 59.497; Mödler 2013b, cat. no. 55.

The associated deposit was discovered in 1958 and consists of 1008 objects with a total weight of 19.3kg, which makes it the largest Bronze Age associated deposit from Serbia. Almost all objects are fragmented or represented by unsuccessful casts. Another fragment from the associated deposit is also possibly from a helmet.¹⁸¹ The associated deposit also contains a fragment of a greave Type Lengyelóti (cat. no. 182). Single objects from the associated deposit have been published by various authors.¹⁸²

Cat. no. 23. Veliko Nabrđe, Osječko-baranjska županija, Croatia – associated deposit – fragment. Measurements: 11.5 × 5.8cm; weight: 28g – Arheološki muzej u Zagrebu, inv. no. 10.237 – Pl. 3.23. References: Vinski-Gasparini 1973, 186, pl. 44.2; Hansen 1994, 574, JU 315; Clausen 2001, 216, fig. 8.5, 11; Schauer 2003, fig. 3.6; Karavanić 2009, 111–118; Mödler 2013b, cat. no. 56.

The associated deposit was found during field work in 1922. No further information is available. It consists of 224 bronze objects, comprising arm rings, pendants, pins, fibulae, buttons, fragments of vessels, greaves of Type Kuřim (cat. nos. 191–192), helmet and appliqués, spearheads, fragments of flange hilted swords of Type Reutlingen, sickles, socketed axes, winged axes, saws, rings, bands, wires, stabs, and rolls.¹⁸³

¹⁷⁸ Christie's 2002.

¹⁷⁹ Born – Hansen 2001, 64, 73, fig. 58.

¹⁸⁰ Hermann Historica 2008.

¹⁸¹ Jovanović 2010, pl. 59.481.

¹⁸² E.g. Vasić 1994; Harding 1995; Vasić 1999; Vasić 2003.

¹⁸³ Vinski-Gasparini 1973, 186, 221.

Cat. no. 24. Poljanci I, Brodsko-posavska županija, Croatia – associated deposit – fragment. Measurements: 10.5cm × 7.1cm; thickness: 0.4–0.08mm; weight 23.5g – Brodsko Posavlje Muzej Slavonski Brod, inv. no. A-1805 – Pl. 3.24. References: Vinski-Gasparini 1973, 87, 183, 218, pl. 48.31; Clausing 2001, 210, 216, fig. 8.9; Clausing 2003, fig. 65.50; Schauer 2003, fig. 3.8; Karavanić 2009, 101, no. 39; 116–118; Miklik-Lozuk 2009, 69, cat. no. 88; Mödlinger 2013b, cat. no. 57.

The associated deposit was found in 1958 during ploughing and consists of 178 bronze objects stored in a ceramic vessel. The associated deposit comprised arm rings, neck rings, fibulae, decorated discs, buttons, pendants, a small cow figurine made of bronze, pins, fragments of flange hilted swords, knives, winged axes, chisels, sickles as well as fragments of a helmet and the fragment of a greave (cat. no. 163).¹⁸⁴ Vinski-Gasparini published only 55 objects from the associated deposit.¹⁸⁵

Cat. no. 25. Elsterwerda, Lkr. Elbe-Elster, Brandenburg, Germany – associated deposit – fragment. Measurements: 5.9 × 3.75cm; thickness: 0.25–0.3mm; weight: unknown – Landesmuseum Sachsen-Anhalt, Halle, inv. no. 10.727 – Pl. 3.25. References: Bornschein – Gandert 1929, 145–146; Sprockhoff 1937, 8, fig. 3; Agde 1939, 170, fig. 4; Grünberg 1943, 78, 91; v. Brunn 1968, 143, 156, 317, no. 57; Hansen 1994; Clausing 2001, 208–216; Martin 2009, 99, no. 133d, pl. 41.133d; Mörtz 2011a; Mörtz 2011b, 102; Mödlinger 2013b, cat. no. 58.

The associated deposit was found around 1887 in the centre of a small hill in a ceramic vessel. The bronzes have a total weight of 3.2kg. As well as the helmet fragment, the associated deposit consists of possible fragments of a situla of Type Hajdúböszörmény, four fragments of sword blade(s),¹⁸⁶ two fragments of spearhead, 53 fragments of sickles, 15 fragments of winged and knobbed axes, six fragments of knives (one modified to a punch), six fragments of saws, 14 fragments of bracelets, a fragment of a pin and a spiral, two buttons, 32 fragments of rings, eight further fragments of jewellery, two fragments of ingot (three others which were modified to chisels and punch), wire, bronze sheet fragments, 64 fragments of casting cake and several other unidentified fragments.¹⁸⁷

Cat. no. 26. Pázmándfalu, Hungary – associated deposit I – four fragments. Measurements unknown. References: Mödlinger 2013b, 77, fig. 6.A2; Szabó 2013, 811; Szabó 2016, 182–184, fig. 18.

For description of the associated deposit, see cat. no. 131.

Cat. no. 27. Nadap, Kom. Fehér, Hungary – associated deposit – two fragments. Measurements: 9.1 × 8.7cm; 7.7 × 5.9cm – Szent István Király Múzeum Székesfehérvár, inv. no. unknown – Pl. 3.27. References: Petres 1983, 61–62, fig. 10; Makkay 2006, 7, pl. V.10–11; Uckelmann 2012.

For description of the associated deposit, see cat. no. 9.

Knobs

Cat. no. 28. Straßengel, Styria, Austria – associated deposit – fragment of a knob. Measurements: height: 4.4cm; diameter: 1.4cm (knob), 2.8cm (base); weight: 63.2g – Universalmuseum Joanneum Graz, inv. no. 7219 – Pl. 4.28. References: Pittioni 1954, 517; Müller-Karpe 1959, 113, note 5, 277, pl. 126.A1; Hencken 1971, 155, fig. 122; Primas 1986, 91–92, no. 527; Hansen 1994, 526, A 498; Clausing 2001, 214–215; Gleirscher 2007, 48–53, fig. 4.4; Mödlinger 2013b, cat. no. 61.

¹⁸⁴ Miklik-Lozuk 2009, 45.

¹⁸⁵ Vinski-Gasparini 1973.

¹⁸⁶ Wüstemann 2004, nos. 628–629, 629 A, 655.

¹⁸⁷ After Martin 2009, 99, no. 133.

The associated deposit was found in 1891 in two ceramic vessels. As well as the knob, the initial contents comprised a fragment of an axe,¹⁸⁸ sword fragments, fragments of spearhead(s), and knife fragments,¹⁸⁹ as well as fragments of arm rings, bracelets, bronze sheets, and a cast handle. Further finds were also later brought to the museum, including sickles,¹⁹⁰ another sword fragment,¹⁹¹ a fragment of a spearhead, another arm ring fragment, and a cast disc with loops on the back.

Cat. no. 29. Gușterița (Szent Erzsébet/Hammersdorf), Romania – associated deposit – fragment of a knob. Measurements: height: 4.1cm; diameter knob: 1.96cm; shaft length: 2.81cm; diameter hole in knob: 8mm; diameter base: 2.0 × 1.8cm; diameter hole on the base: 4.5mm; weight: unknown – Muzeul National Brukenthal, archaeological collection, inv. no. 546 (old and new) – Pl. 4.29. References: Reissenberger 1872; Gooss 1876, 226; Hampel 1886a, 56; Hampel 1892, 143–155; v. Merhart 1941, 12, note 15, no. 10; Holste 1951, 24–27; Mozsolics 1955, 39; Petrescu-Dîmbovița 1960, 148; Holste 1962, pl. 8; Petrescu-Dîmbovița 1978, 120–122, no. 141, pl. 115.277; Bader 1983, 38, no. 22; Schauer 1988, 184; Rusu 1990, 70–71, pl. V.5; Bader 1991, 92, no. 190; Clausen 2001, 215, fig. 10; Gleirscher 2007, 48–53, fig. 4.2; Soroceanu 2008, 85, no. 33–34; Mödler 2013b, cat. no. 62.

G. v. Merhart dated the associated deposit on the basis of similar early Hungarian associated deposits of Bz D–Ha A. G. Kossack placed the associated deposit more narrowly in Ha A1, and Mozsolics, on the basis of later finds at the Magyar Nemzeti Múzeum, to the transitional horizon between Ha A and Ha B.¹⁹² M. Petrescu-Dîmbovița notes some older Bz D objects in the associated deposit, and assigns the deposition of the associated deposit to Ha A, as does Müller-Karpe.¹⁹³ M. Rusu placed the associated deposit in Ha A1, as does Schauer.¹⁹⁴ M. Gimbutas dated it to Bz D.¹⁹⁵ It is clear that the associated deposit can only be dated accurately if all various objects in the different museums were studied systematically.

Cheek Plates

Cat. no. 30. Wöllersdorf, Lower Austria, Austria – associated deposit – fragments. Measurements: 8.5 × 5.2cm; thickness: 0.7–0.8mm; weight: 28g – Naturhistorisches Museum, Vienna, inv. no. 37.404 – Pl. 4.30. References: Szombathy 1905, 42, pl. 1.38; Pittioni 1954, 411–414, figs. 287, 417, 814, note 686; Müller-Karpe 1959, 108–110, 113–114, 226, pls. 135.B, 136; Müller-Karpe 1962a, 272; Hencken 1971, 179, fig. 146; Borchardt 1972, 44, fig. 6.A3; Primas 1986, no. 499; Bartík 2009, 44; Mödler 2013b, cat. no. 63.

The associated deposit was found before 1905. As well as the cheek plate, the associated deposit comprises a fragment of a knife, two bronze sheets, a median-winged axe, a knobbed axe, a fragment of another axe, three fragments of sword blade(s), two pin fragments, one fragment of an arm ring, two cast discs, a sheet buckle, a decorated bronze sheet, fragments of twisted neck rings, a bronze bar and 14 sickles. The cheek plate survives only as a fragment of its lower end. In the central area it is slightly raised. Around the flattened rim there is a row of holes to hold the organic lining. A wire ring, still attached in the hole at the end, indicates that the cheek plate could have been fixed with the second cheek plate right under the chin.

Cat. no. 31. Hočko Pohorje, (Maribor), Slovenia – associated deposit – fragment. Measurements: 3.9 × 3cm; weight: 3.5g – Pokrajinski muzej Maribor, inv. no. 2146 – Pl. 4.31. Referenc-

¹⁸⁸ Mayer 1977, no. 1113.

¹⁸⁹ Říhovský 1972, nos. 43, 292.

¹⁹⁰ Primas 1986, nos. 479, 492, 527.

¹⁹¹ Schauer 1971, no. 598.

¹⁹² v. Merhart 1941, 13; Kossack 1954, 17; Mozsolics 1955, 46.

¹⁹³ Petrescu-Dîmbovița 1960, 148; Müller-Karpe 1962a, 271.

¹⁹⁴ Rusu 1963, 184; Schauer 1988, 184.

¹⁹⁵ Gimbutas 1965, 328.

es: Baš 1933, 37; Smodič 1955, 92; Müller-Karpe 1959, 279; Pahič 1962, 189, 193; Pahič 1975, 330; Gabrovec 1983, 75; Hansen 1994, 564, JU 96; Kajzer 1995, 177–196; Šinkovec 1995, 178 [no. 13], pls. 83.168, 156.5; Črešnar 2010, 52; Mörtz 2011a, 371; Mödler 2013b, cat. no. 64.

The associated deposit was discovered in 1932 during field work. More than 12kg of the associated deposit were taken to a smelting company, and only 4kg now survive. Since inventory numbers were not immediately allocated by the museum, the certainty of which finds belong to the associated deposit is not entirely clear. Presently, the associated deposit is divided into three association groups, represented by those objects of certain association, those of probable association, and those recently attributed to the associated deposit.

Cat. no. 32. Uioara de Sus (Felsőmarosújvár), jud. Alba, Romania – associated deposit – fragments of two cheek plates. Measurements: ca. 3.3×3.6 cm and 6.0×4.2 cm – Muzeul de istorie Cluj, inv. no. III 6005 and III 5319 – Pl. 4.32. References: Petrescu-Dîmbovița 1960; Rusu 1963, 184–187; Hencken 1971, 180, fig. 148a–b; Petrescu-Dîmbovița 1978, 132–135, pl. 198.1025, 1030; Mozsolics 1985, 25; Rusu 1990, 76; Schauer 2003, 197, fig. 3.5–6; Mödler 2013b, cat. no. 65.

The associated deposit was found in 1909 during excavations after an axe had appeared during ploughing. The associated deposit weighed some 1.1 tons, and consisted of about 5812 objects buried in a deep pit some 1.2m deep and with a diameter of 1.5m. After the excavation, further pieces of rough bronze, as well as a piece of pure tin, were also found.¹⁹⁶ The associated deposit was bought by the Muzeul de istorie Cluj, though some objects from the associated deposit now also belong to the museum in Gothenburg. Petrescu-Dîmbovița lists nine fragments of helmets and seven cuirass fragments.¹⁹⁷ M. Rusu notes that three knobs (?), one cylindrical, one tubular and one with a ribbed cross section (inv. no. III 6158, III 6154 and III 6178), are part of the deposit.¹⁹⁸ However, these knobs do not look like other knobs known from helmets, which are much smaller. Here, only the fragments of the two cheek plates are considered as coming from a helmet.

Cat. no. 33. Újszöny/Komárom, kom. Komárom-Esztergom, Hungary – associated deposit – fragment. Measurements and weight unknown – Magyar Nemzeti Múzeum, Budapest, inv. no. 64/1885/1–36; the cheek plate fragment cannot be found – Pl. 4.33. References: Hampel 1886b, pl. CXXV.25, 29; Hampel 1887, pl. CXXV.47; Lindgren 1938, note 26; v. Brunn 1954, 293, note 24; Schauer 1975, 310; Müller-Karpe 1980, pl. 376.B; Peschel 1984, 84; Mozsolics 1985, 25, 207; Patay 1990, 52, no. 74; Hansen 1994, 556, H 746.

The associated deposit was bought from a merchant in 1885, saying the find location was Újszöny. Hampel mentioned the find location might have actually been Bánhida or the surrounding of Tata.¹⁹⁹ Today, the associated deposit contains fragments of a cup of Type Blatnica, fragments of another cup of unknown type, two fragments of knobbed axes, one sickle and 13 further sickle fragments, two fragments of sword blade(s), a fragment of a cheek plate, a hilt from a razor, massive open arm ring, broad arm ring with C-shaped cross section, one fragment of an arm ring with torsion, wire spiral, rings, three cast tutuli, seven different phaleræ, five different buttons, two bronze sheet fragments, bronze stick and five unidentified bronze fragments.

Cat. no. 34. Mezőnyárád, kom. Borsod-Abaúj-Zemplén, Hungary – associated deposit – one almost complete cheek plate. Measurements: 7.9×10.5 cm; weight unknown – Herman Ottó Múzeum Miskolc, inv. no. 74.38.1 (not to be found in the museum) – Pl. 4.34. References: Kemenczei 1979, 51, 83, note 14; Kemenczei 1984, 149, no. 20; Mozsolics 1985, 149–150; Patay

¹⁹⁶ Petrescu-Dîmbovița 1978, 132.

¹⁹⁷ Petrescu-Dîmbovița 1978, 133: nine fragments of helmet (pl. 198.1023–1030) and seven fragments of cuirass (pl. 198.1031–1033). See Chapter 3, p. 171.

¹⁹⁸ Rusu 1990, 76, pl. II.2–3.

¹⁹⁹ Hampel 1886b; Hampel 1887.

1990, 19, no. 4; Hansen 1994, 545, H 426; Hellebrandt 1999/2000; Born – Hansen 2001, 64, fig. 57; Vachta 2008, 123, list V.1.5, no. 9; Mödlinger 2013b, cat. no. 66.

The associated deposit consists of 56 pieces, comprising a vessel with triangular attachments, two cups of Type Blatnice, one vessel, nine spearheads, two arm spirals, eight bracelets, two fragmented phalerae, 33 spirals, a necklace, and a single cheek plate.

Cat. no. 35. Pázmándfalu, Hungary – associated deposit I – fragmented. Measurements unknown. References: Mödlinger 2013b, 77, fig. 6.A2; Szabó 2013, 811; Szabó 2016, 182–184, fig. 18.

For description of the associated deposit, see cat. no. 131.

2.1.3 Helmets of Type Nagytétény

The helmets of Type Nagytétény bear a small, solid knob on the cap. The knobs rise from a base in the shape of a disc. The shape of those knobs which are plain and undecorated resembles that on helmets of Type Pişcolt, though smaller. Without the application of radiography, we cannot say if the knob was cast on, and then additionally fixed with the lining disc, or if the knob was cast separately with a ‘rivet’ at the base, which then passed through a small central hole in the cap and was fixed with a lining disc.

The hemispherical cap of these helmets is thinner at the centre, with a maximum thickness of just 0.2–0.4mm (e.g. cat.no. 38), and gets thicker toward the rim, with a thickness of 2–2.5mm (e.g. cat. no. 39). These helmets weigh less than a third of the average weight of the helmets of Type Pişcolt.

The helmet from Nagytétény (cat. no. 37) has 25 rivet holes running along the edge, each with a diameter of 0.4–0.6cm, punched from the outside to the inside. On the inside of the helmets from Batina (cat. no. 36), and the two unprovenanced helmets (cat. nos. 39 and 40), traces of hammering are clearly visible.²⁰⁰ Inside one of the unprovenanced helmets (cat. no. 40), vertical radial traces are visible on the upper area, and horizontal traces on the lower area, and again vertical traces close to the rim. The helmet from Brodi/Termopil (cat. no. 38) has 14 rivet holes along the edge. The rivet holes were punched through from the inside to the outside, while the cap was placed on a small ring, as indicated by the round impression all around the rivet holes. On the outside of the helmet, all along the rim and above the rivet holes, the corrosion differs, indicating the application of an organic lining, which was bent from the inside to the outside and fixed with rivets. Hammering traces parallel to the rim are visible all over the inner surface. The edge is thicker than the cap and flattened, so it bends slightly inwards. The helmet from the Römisch-Germanisches Zentralmuseum Mainz (cat. no. 39) has 17 rivet holes with a diameter of 4–5mm, which were applied from the inside to the outside. The organic filling of the helmet was folded on to the outside to a height of about 1.5cm, as visible from the different corrosion products above the rim on the outside of the cap. During restoration, around the rivet holes the impressions left by the lining discs for the rivets were just possible to discern. No rivets or lining discs are now preserved. The outside of the helmet is covered with vertical traces of polishing. One of the unprovenanced helmets (cat. no. 40) has a row of 27 rivet holes, with a diameter of 0.4–0.6cm, running parallel to the rim. The rivet holes were punched through from the outside to the inside of the helmet, as indicated by the supplanted sheet metal. The patina of the cap indicates that the inner lining of the helmet was fixed by means of the rivets on the outside as well, reaching up to a height of 2.2–2.5cm above the rim. While attaching the knob to the cap, the metal sheet was slightly deformed. On one side, the knob bears a casting failure. On the inner side of the helmet, a 2.4×2.5 cm lining disc with a centrally visible flat-headed rivet supports the attachment of the knob.²⁰¹

²⁰⁰ Clausen 2001, fig. 2; Clausen 2005, 31–38, figs. 1–5.

²⁰¹ Clausen 2005, 31–38, figs. 1–5.

2.1.3.1 Research History

Hencken included in his group of ‘cap helmets with cast knobs’ the helmets from Cuneo, Veji, Batina, and Nagytétény.²⁰² Schauer used the same grouping but excluded without explanation the helmet from Cuneo, and added the fragment of a knob from Škocjan.²⁰³ Borchhardt included in his group of *schlichte Kappen mit Knauf* only the helmets from Nagytétény and Batina.²⁰⁴ Based on the three new finds, comprising the possible ‘Hungary’ helmet and the one from the Ukraine, this helmet type can now be characterised more precisely. The decorated helmets from Cuneo and Veji have been excluded because of their decoration, and the different dimensions (such as thickness) and profile, of both cap and knob. They are associated with more recent Iron Age types, even though on the helmet from Cuneo the method of joining cap and knob is the same as on the helmets of Type Nagytétény. Presently, five helmets of Type Nagytétény are known (Tab. 2.4).

Cat. No.	Find Circumstances	Find Site	State	Condition	High Cap (cm)	High Knob (cm)	Dm (cm)	Thickness Cap/Rim (mm)	Weight (g)
36	associated deposit (?)	unprovenanced (Batina?)	–	almost complete	15.4	3	18.8 × 23.2	–	643
37	river	Nagyttény	HU	complete	12.5	3.5	20.4 × 22.3	0.2 / 1.2	402
38	unknown	Brodi/Ternopil	UA	complete	14	3	20 × 21.6	–	–
39	unknown	unprovenanced	–	complete	13.3	3.5	22 × 22.7	0.22 / 4	530
40	unknown	unprovenanced	–	complete	c. 14	4.1	21.8 × 23.5	– / 2–2.5	–

Tab. 2.4 Helmets of Type Nagytétény.

2.1.3.2 Distribution and Deposition

Since four out of the five helmets are unprovenanced or have unsecure find histories (cat. nos. 36, 38–40), little can be said regarding the depositional norms for this type of helmet. We know only that the helmet from Nagytétény was dredged with a ‘rapier Type E’ from the Danube in 1952.²⁰⁵ This helmet and the unprovenanced helmet said to be from ‘Batina’ (cat. no. 36), point to a distribution in the Carpathian Basin, and extends as far as northwestern Ukraine (Fig. 2.10). The helmet from Brodi/Ternopil was said to have been discovered as a single find, though as the finder was apparently in a hurry, it is possible they would have missed any other associated finds. The extent to which this helmet type was originally distributed will only be revealed as further finds are made.

2.1.3.3 Chronology

Due to their unknown or uncertain find circumstances, the helmet from Batina and the two unprovenanced helmets cannot be provided with a secure chronological association. J. Harmatta dates the helmet from Batina to late Ha B, and v. Merhart dates it to early Ha C.²⁰⁶ Mozsolics notes that the helmet from Batina is older than that from Haydúböszörmény,²⁰⁷ and dates the

²⁰² Hencken 1971.

²⁰³ Schauer 1988, 182.

²⁰⁴ Borchhardt 1972, 121–124.

²⁰⁵ Kemenczei 1988, 42, no. 173.

²⁰⁶ Mozsolics 1955, 35.

²⁰⁷ Foltiny 1961, 187.

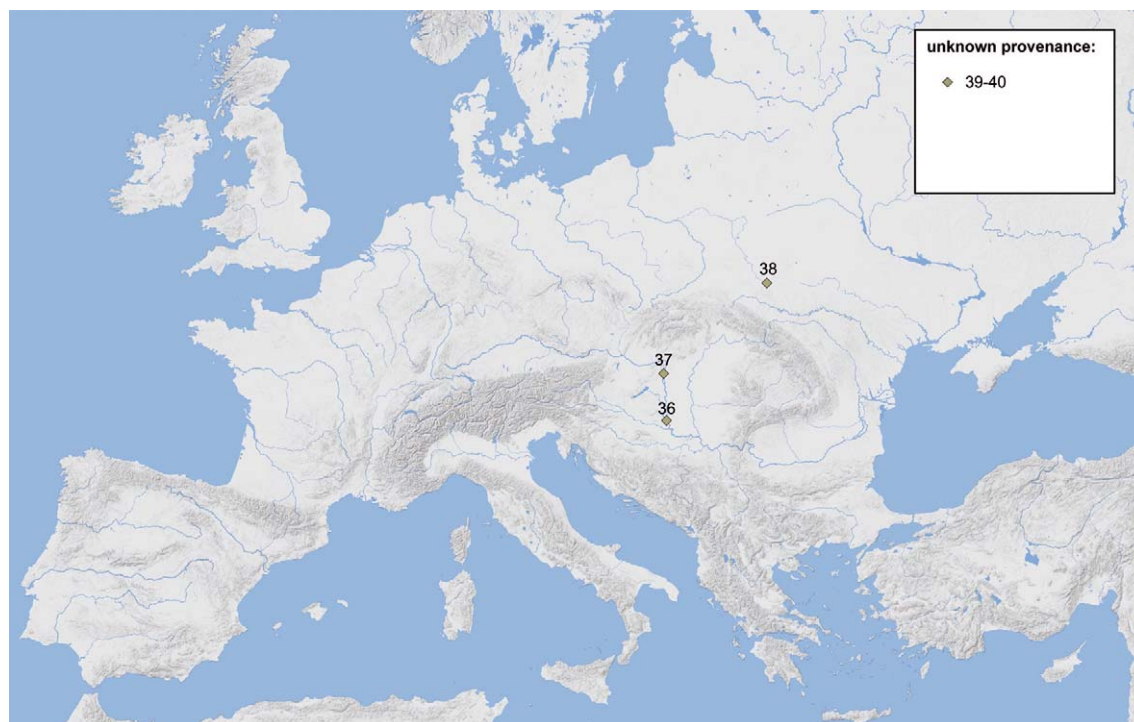


Fig. 2.10 Archaeological distribution of helmets of Type Nagytétény: **36.** Unprovenanced, probably Batina; **37.** Nagytétény; **38.** Brody/Ternopil; **39–40.** Unprovenanced. Numbers correspond to the catalogue numbers.

helmet from Nagytétény to Ha B.²⁰⁸ Clausen instead dates the helmet to the 9th–8th century BC.²⁰⁹ According to J. Šimić, the helmet belongs to the older Dalj group.²¹⁰ The two unprovenanced helmets (cat. nos. 39 and 40) are also dated by Clausen to the 9th century BC.²¹¹

However, if the helmet from Nagytétény is indeed an associated find, and can be related to the rapier with which it was dredged in 1952, then the consequences for its chronology are significant. The rapier belongs to those of Type E in the classification of T. Kemenczei.²¹² These rapiers are closely related to the late Middle Bronze Age or early Urnfield period rapiers of types B and C (Bz C2/D), which would indicate that they were possibly contemporary with both helmets of Type Oranienburg and helmets of Type Paks. Based on stylistic similarity, helmets of Type Nagytétény more closely resemble a smaller, lighter version of helmets of Type Pişcolt with a rounder cap. The large number of rivet holes and the thin cap, common to both helmets of Type Paks and most of the helmets of Type Oranienburg, instead point to influences from an older type than that of helmets of Type Pişcolt. We might therefore posit a development from helmets of Type Oranienburg to helmets of Type Nagytétény, dated to Bz D/Ha A, and then to helmets of Type Pişcolt.

Catalogue

Cat. no. 36. Unprovenanced (probably Batina, Osječko-baranjska županija, Croatia (former Kiskőszeg, Hungary) – associated deposit (?) – complete helmet. Measurements: height: 18.4cm (helmet), 3cm (knob); diameter: 18.8 × 23.2cm; weight: 643g – Römisch-Germanisches Zentralmuseum Mainz, inv. no. O.1756 – Pl. 5.36. References: Reinecke 1907, 42, fig. 6h; v.

²⁰⁸ Mozsolics 1955, 37.

²⁰⁹ Clausen 2005, 34.

²¹⁰ Šimić 2008, 66, fig 11; 179.

²¹¹ Clausen 2005, 34, 38.

²¹² Kemenczei 1988, 42, no. 173.

Merhart 1941, 5, fig. 2.2; Harmatta 1948, 109–111; Mozsolics 1955, 35, fig. 1; Foltiny 1961, 178, 187, pl. 71.1; Hencken 1971, 158–159, fig. 120a–e; Schauer 1988, 182, note 12, fig. 3; 189, note 65; Egg – Waurick 1990, 41, no. 7.7; Clausen 2001, 206–207, fig. 4.2; Clausen 2005, 34, 38; Bader 2008, 179, cat. no. 50.

In 1910, after being found during work in a vineyard in the north of Batina/Kiskőszeg, the helmet was bought by the collector J. Frey. As well as a number of other objects, he also mentions fragments of two further helmets but in poor condition, so does not purchase them.²¹³ The location of these possible helmet fragments is unknown. E. Foltiny provides a somewhat different description: the Römisch-Germanisches Zentralmuseum Mainz bought on May 27 in 1902 several bronzes from the merchant Fejér, Budapest, which originate from the former Komitat Bács-Bodrog and supposedly belonged together.²¹⁴ Besides several rings, a spiral, fibula, and 12 bronze sheet discs, the helmet was also mentioned. E. Foltiny concluded that the find spot Batina is uncertain and the objects were recovered from several different places in the former Komitat Bács-Bodrog and the Komitat Liptau.²¹⁵ He named seven museums keeping finds from Batina, comprising Vienna, Budapest, Berlin, Sombor, Subotica, Keszthely and Pécs, and suggests that there might have been more. Since the finds associated with the deposit from Batina in the Natural History Museum in Vienna range from the Neolithic to the Roman Period, a single associated deposit seems extremely unlikely.

Unfortunately, the helmet from Batina was damaged during the Second World War and had to be partly restored. As a consequence, the original weight of the helmet might have been higher. Inside the helmet, primarily close to the rim, marks from a tool with sharp edges are visible.

Cat. no. 37. Nagytétény, kom. Budapest, Hungary – river find (river Danube) – complete helmet. Measurements: height: 16.5cm (cap); 3.5cm (knob); diameter: 20.4 × 22.3cm (cap), 2.1cm (knob); thickness: 1–1.2mm (rim), 0.2mm (cap); weight: 402g – Magyar Nemzeti Múzeum, inv. no. 81/1952/1 (52.81.1) – Pl. 5.37. References: Mozsolics 1955, 36, fig. 2; Hencken 1971, 149, fig. 117a–b; Borchhardt 1972, 122, fig. 15; Mozsolics 1985, 25, 155, pl. 136.3; Schauer 1988, 189, note 66; Clausen 2001, 207, fig. 4.1; Clausen 2005, 34, 38.

The helmet was dredged with a ‘rapier Type E’ from the Danube in 1952.²¹⁶

Cat. no. 38. Brody/Ternopil, obl. Ternopil, Ukraine – single find (?) – complete helmet. Measurements: height: 14cm; knob: height: 3cm; diameter: 20 × 21.6cm – private collection – Pl. 5.38. References: unpublished.

The find circumstances, including the exact location, are unknown. It was said to have been found in the forest near to Brody/Ternopil, Ukraine, close to a river, at a depth of c. 80–100cm, as a single find. The person who found the helmet was ‘in a hurry’, and did not observe any other bronzes together with the helmet.²¹⁷ The helmet appeared on a Ukrainian internet forum at the end of 2013 and attempts were made to sell it in November 28, 2013, at Viology Auctions. However, the seller broke the auction guidelines, and the sale was closed. The current location of the helmet is unknown.

Cat. no. 39. Unprovenanced – complete helmet. Measurements: height: 16.8cm; diameter: 22 × 22.7cm; thickness 0.22–4mm; knob: height: 3.5cm, attached with rivets; diameter of the pomel of the knob: 2.24cm; diameter knob disc: 4.3 × 4.6cm; diameter lining disc: 3.2 × 3.5cm; weight: 530g – Römisch-Germanisches Zentralmuseum Mainz, inv. no. O.42514 – Pl. 5.39. References: Clausen 2001, 199–200, figs. 1–3; Clausen 2005, 34, 38.

²¹³ Mozsolics 1955, 35.

²¹⁴ Foltiny 1961, 178.

²¹⁵ Reinecke 1907; Foltiny 1961, 176.

²¹⁶ Kemenczei 1988, 42, no. 173.

²¹⁷ As reported by the finder after requesting more information about the helmet in April 2014.

The find circumstances and find location are unknown. The helmet was bought by the museum before 2001.

Cat. no. 40. Unprovenanced – complete helmet. Measurements: height: 18.7 or 17.3cm; diameter cap: 21.8 × 23.5cm; thickness: 2mm, on the rim 2.3 × 2.5cm; knob: height: c. 4.3cm; diameter: base: 3.6cm; shaft: 1.1cm; pommel: 2.4cm; weight: unknown – private collection – Pl. 5.40. References: Clausen 2005, 31–38, figs. 1–5.

The find circumstances and find location are unknown. The helmet was sold at an auction of the Jean-David Cahn AG in Basel before 2005 and again at another auction of the Jean-David Cahn AG in Basel on September 16, 2010, listed as no. 311, and noted as coming from ‘northern Europe’.

2.1.4 Helmets of Type Pişcolt

Helmets Type Pişcolt are rather large and, in proportion to their width, relatively high. Their height ranges from 18–27.5cm and the diameter at the rim from 19–23cm. The weight ranges from 1032–1478g, differing significantly from the much lighter helmets of Class I (see Fig. 2.2), and especially from helmets of Type Oranienburg, which never weigh more than 700g.²¹⁸ The higher weight is, apart from the size of this helmet type, also due to the thickness of the cap, which can be up to 5mm at the rim or up to 3mm at the top of the helmet’s cap. The helmets do not have any *Ausschnitt* (cut out or opening) as identified on the rim of helmets of Type Oranienburg.²¹⁹

The helmets have a row of rivet holes running parallel to the rim. Unlike helmets of Type Paks or helmets of Type Nagytétény, the number of rivet holes on these helmets is only between c. 6–14, which is significantly lower. Given the size and diameter of the helmets and the presence of rivet holes, it is clear that there would have been an organic inlay or an organic cap would have been worn underneath the helmet. This organic inlay or cap was placed inside and the edge of the opening bent outwards and fixed with rivets to the outside of the bronze helmet, as indicated by different colour corrosion products on the outside of the helmets, usually reaching from the rim to a few millimetres above the rivet holes, resulting in a much darker area of corrosion.²²⁰ These darker areas have been identified on the helmets from Mezőkövesd (cat. no. 45) and Hajdúböszörmény (cat. no. 44), as well as on three unprovenanced helmets (cat. nos. 50, 52 and 53).²²¹

The knob on the unprovenanced helmet cat. no. 53 has a vertical hole, which was closed with a cast-on on the inside of the helmet. Inside the hole, some organic filling might have been preserved, as might possibly be the case in the knob of the unprovenanced helmet cat. no. 52.²²²

The caps of the helmets of Type Pişcolt are plain and undecorated. Only the central knob is decorated, about the shaft, with either several horizontal lines (such as those from Sehlsdorf, Škocjan, Mezőkövesd, Şoarş (cat. no. 47), and the unprovenanced helmet cat. no. 51) or with additional herringbone ornamentation (those from Pişcolt, Slúžin, and five unprovenanced helmets (cat. nos. 50, 52–55). The only exceptions are the helmet from Endrőd (cat. no. 46), where the shaft of the knob is additionally decorated with chevrons infilled with hatching, and the helmet from Monte Altino, where the knob is undecorated. All of the knobs have a tubular hole, which passes through its entire length.

Two similar knobs from Škocjan (cat. nos. 57 and 58), where the helmet caps have not survived, can be related to those found on the helmets of Type Pişcolt, based on their profile, shape and decoration, wherein the cast-on, solid knobs have a stepped base and a plain shank. The

²¹⁸ Mödler 2013a; Mödler 2013b.

²¹⁹ Mödler 2013a.

²²⁰ Mödler 2014a, fig. 7.

²²¹ Schauer 1988, 447; Born – Hansen 2001, 72, pl. XVI; Clausen 2005, 35, fig. 6.

²²² Clausen 2005, 36.

head of one of the knobs has broken off and the whole fragment has been distorted by heat. The lack of a tubular hole, however, makes this knob different from all other knobs related to or actually belonging to helmets of Type Pişcolt. The other knob from Škocjan has the central, tubular hole found on the knobs from the helmets of Type Pişcolt. C. Iaia associated the knobs from Škocjan with Italian cap helmets,²²³ most likely based on a fragment from the rim of a helmet, possibly of this type of helmet, which they associated together with the two knobs.

Due to their size and weight, as well as the lack of any decoration on the solid cap, helmets of Type Pişcolt are clearly distinguishable from the much smaller, thinner, and lighter helmets of Types Paks, Oranienburg, and Nagytétény, as well as the more recent decorated Italian helmets with solid knobs. In comparison with these much lighter and smaller helmets, the larger size and compactness of the helmets of Type Pişcolt, which also permitted the application of a thicker, higher protective organic inlay, must surely represent an improvement in the level of protection for the person wearing it. The fact that helmets of Type Pişcolt were used in combat is indicated by traces of weapon damage, such as that on the helmet from Hajdúböszörmény.

A number of the helmets also show traces of repair, as well as evidence of use-wear. The helmet from Pişcolt (cat. no. 48) had applied in the centre of the cap a small decorated bronze sheet, which was riveted on. On the inside of the helmet, it is supported with a further rectangular, undecorated bronze sheet.²²⁴ These likely cover a hole or crack, which was hidden by means of the small decorated bronze sheet. Several such cracks are present on the cap of the helmet from Endrőd. One of these cracks was repaired during the Bronze Age with a rectangular plate of bronze attached to the inside the helmet by means of a large, flat-headed rivet.²²⁵

2.1.4.1 Research History

G. v. Merhart was the first to describe helmets of Type Pişcolt as *Glockenhelme*, *Knaufhelme* and *ungarische Helme*.²²⁶ Amongst these he included the helmets of Type Oranienburg from Oranienburg, Biecz, and Lúčky, as well as the Italian helmets from Tarquinia (though noted that these helmets were to be addressed separately). Soon after, Mozsolics described helmets of Type Pişcolt as *glockenförmige Helme* or *Typ Hajdúböszörmény*.²²⁷ Hencken discussed them as 'rounded bell helmets', and Clausen as *Helme mit glockenförmiger Kalotte und durchlochten Scheitelknauf*.²²⁸ Both Hencken and Clausen included Italian cap helmets as well as the helmets from Tarquinia, an Italian helmet now kept at the museum in Karlsruhe, Germany, and the helmet from Populonia, Italy, amongst their group of helmets.

Unlike these Italian helmets, the Carpathian helmets of Type Pişcolt, as well as the helmets of Type Pişcolt from Monte Altino (cat. no. 49) and the unprovenanced helmet cat. no. 50, are all undecorated and have a particularly large, high cap. The central knob is usually decorated with horizontal lines on the shaft. Those Italian helmets previously associated with the helmets of Type Pişcolt are rather thin and delicate, are decorated, have a hemispherical cap and a more flattened knobs. Consequently, these helmets are not associated with the group of helmets of Type Pişcolt in the following, and are discussed as a separate, distinct group.²²⁹

At present, thirteen complete or almost complete helmets of Type Pişcolt, two knobs and one further potential fragment of a helmet of Type Pişcolt, are known.²³⁰ Two further knobs, those from Škocjan, are also related to this type of helmet (Tab. 2.5).

²²³ Iaia 2005, 49–50, fig. 5.3.

²²⁴ Mödler 2014a, fig. 6.

²²⁵ Mödler 2014a, fig. 4.left.

²²⁶ v. Merhart 1941.

²²⁷ Mozsolics 1955, 38.

²²⁸ Hencken 1971; Clausen 2001.

²²⁹ See Chapter 2.1.6, p. 83.

²³⁰ Hencken 1971, 43; Mozsolics 2000, pl. 40.14; Mödler 2014a. See cat. no. 56.

Cat. No.	Find Circumstances	Find Site	State	Condition	High Cap (cm)	High Knob (cm)	Dm (cm)/ Fragments	Thickness Cap/Rim (mm)	Weight (g)
41	bog	Sehlsdorf	DE	complete	18.4	6.8	22.2 × 23.2	– / 2.5–2.7	1455
42	associated deposit	Služín	CZ	knob	–	6.2	–	–	–
43	votive deposit	Škocjan	SLO	knob	–	6.4	–	–	–
44	associated deposit	Hajdúböszörmény	HU	complete	25.5	5.8	20.5 × 23.5	<1 / 3	1338
45	associated deposit	Mezőkövesd	HU	not complete	23.5	6.2	22.5	– / 2	1340
46	river	Endrőd	HU	complete	26.1	6.2	19 × 23.2	<1 / 5	1032
47	associated deposit	Șoarș	RO	not complete	25	6.1	–	<1 / 4–5	524
48	associated deposit	Pișcolt	RO	not complete	18	6.5	22	<1 / 4	1094
49	unknown	Monte Altino (?)	IT (?)	complete	–	–	23.5 × 21	–	–
50	unknown	unprovenanced	–	complete	20.5	6.1	22.7 × 23.5	0.8 / 4	1478
51	unknown	unprovenanced	–	not complete	17	6.1	20.5 × 24.9	0.5–1 / 2–3	912
52	unknown	unprovenanced	–	complete	21.5	4.5	19.5 × 21.3	1.2 / 3.5	1150
53	unknown	unprovenanced	–	complete	total height: c. 24		c. 21	– / 2.5	–
54	unknown	unprovenanced	–	complete	total height: c. 25		–	–	–
55	unknown	unprovenanced	–	complete	19.1	6.4	23.5 × 25	– / 2	c. 1400
56	associated deposit	Bonyhád	HU	fragment cap	–	–	–	–	–
57	votive deposit	Škocjan	SI	knob	–	4.7	–	–	–
58	votive deposit	Škocjan	SI	knob	–	2.3	–	–	–

Tab. 2.5 Helmets of Type Pișcolt.

Recently, an alleged helmet of Type Pișcolt was sold at auction at Hermann Historica in Munich on 15 October 2012 and again on 21 April 2016.²³¹ The origin of the helmet is sadly unknown, though it previously belonged to a ‘private collection in Vienna from the 1960s’. Elsewhere, we have discussed in some detail the likelihood that it is in fact a forgery²³² that is unless we are willing to accept the possibility, however unlikely, that an original helmet cap underwent a significant degree of later modification. Therefore, the helmet will not be considered in the following. Another complete helmet of Type Pișcolt is also currently on sale (cat. no. 55).

Almost all helmets of Type Pișcolt with known find circumstances derive from associated deposits, the exception being the helmets from Škocjan (votive deposit) and Sehlsdorf (single find), which was found in a bog. The presence of sand inside the knob of one unprovenanced helmet (cat. no. 52) might also indicate that it had been deposited in water. As will be discussed below, we can clearly distinguish helmets of Type Pișcolt from the older helmets of Type Oranienburg and helmets of Type Paks, in terms of their typo-chronological basis, and in

²³¹ Hermann Historica 2012; Hermann Historica 2016.

²³² Mödlinger 2014a.

respect of their manufacture and chemical composition. We can, therefore, postulate a separate development of this helmet type in the Carpathian Basin.

2.1.4.2 Distribution and Deposition

Helmets Type Pişcolt are mainly found in the Carpathian Basin. From the 16 helmets known (including the fragment from Bonyhád, cat. no. 56), the find location of seven of the helmets is either unknown (cat. nos. 50–55) or is unsecure (cat. no. 49). Due to the corrosion of the unprovenanced helmet cat. no. 50, a wet context was assumed for it in 1892,²³³ which was copied since then. It has to be pointed out that the corrosion does not show any specific features supporting this claim. In the case of the remaining nine helmets, six derive from the Carpathian Basin (Hajdúböszörmény, Mezőkövesd, Endrőd, Şoarş, Pişcolt, Bonyhád), or can be connected to this region on the basis of following the Danube and Morava upstream (Služín; cat. no. 42). One helmet is known from Sehlsdorf, Germany, and the knob of a further example was found in the votive deposit from Škocjan, Slovenia. Two further knobs likely to be from helmets of Type Pişcolt were found together in the same votive deposit. Helmets Type Pişcolt therefore have a distribution ranging from Sehlsdorf in the northwest to Monte Altino in the south (Fig. 2.11). The helmets from Škocjan, Sehlsdorf, and those from Monte Altino and the unprovenanced helmet cat. no. 50, are most likely imports from the Carpathian Basin.²³⁴ The helmet from Sehlsdorf, when taken alongside the situlae of Type Hajdúböszörmény (such as those from Siem/Aalborg and Granzin/Lübz) and the bronze cups of Type Jenišovice, attest to the exchange networks between the Carpathian Basin and northern Germany, and more generally the area west of the Baltic Sea, which is also evident in the sharing of various traditions, including depositional practices.²³⁵



Fig. 2.11 Archaeological distribution of helmets of Type Pişcolt: **41.** Sehlsdorf; **42.** Služín; **43.** Škocjan; **44.** Hajdúböszörmény; **45.** Mezőkövesd; **46.** Endrőd; **47.** Şoarş; **48.** Pişcolt; **49.** Monte Altino (?); **50–55.** Unprovenanced; **56.** Bonyhád; **57–58.** Škocjan. Numbers correspond to the catalogue numbers.

²³³ Pertusi 1892, 3, no. 26.

²³⁴ Mozsolics 1972, 373, 393.

²³⁵ Born – Hansen 1992, 354.

The helmet from Endrőd represents a single find from a wet context, as might the unprovenanced helmets cat. nos. 50 and 52. The helmet from Sehlisdorf, which was found in a bog, can also be connected to this depositional group. The large copper carbonates in the cracks on the unprovenanced helmet cat. no. 51, however, might instead indicate its deposition in soil.²³⁶ Seven of the helmets of Type Pişcolt with known find circumstances derive from associated deposits or votive deposits.²³⁷ Those from associated deposits include the helmets from Služín, Bonyhád, Mezőkövesd, Hajdúböszörmény Pişcolt, and Şoarş. The composition of these associated deposits varies widely. The associated deposit from Služín consists of 22 complete, destroyed or fragmentary bronze objects (12 sickles, seven socketed axes, the knob of a helmet of Type Pişcolt, a tube/socket, and fragment of a sword blade) placed in a ceramic vessel. The lack of ornaments in this associated deposit is unusual for deposits of the Lausitzer group of the Urn-field culture but common in the Carpathian Basin.²³⁸ The associated deposit from Bonyhád is also largely comprised of fragmented bronzes. As well as the helmet of Type Pişcolt fragment, it consisted of more than 200 objects, including fragmented spearheads, knife, daggers, chisel, sickles, rings, arm rings, belt buckles, pins, fragments of a bronze cup, spirals, several bronze sheet fragments, perhaps from vessels, as well as winged and socketed axes.²³⁹ At Mezőkövesd, the bronzes were instead deposited complete, with the bronze objects placed inside a ceramic vessel. The bronzes had also been placed inside one another, with two arm spirals with twisted ends having been placed inside the helmet, which in turn had been placed inside a bronze situla of Type Hajdúböszörmény. The ceramic vessel also contained fragments of two bronze Type B1 vessels placed as a cover over the situla. The associated deposit from Hajdúböszörmény instead contains both fragments and complete objects.²⁴⁰ In addition to the helmet, the associated deposit consists of a situla of Type Hajdúböszörmény, the handles of two other situlae, a cup of Type Jenišovice-Kirkendrup, two bronze buckets with cruciform handles,²⁴¹ 20–30 swords (five of Sprockhoff Type IIa, two of Sprockhoff Type IIc, four metal hilted swords with flat pommel, two metal hilted swords with oval knob, six Type Schalenknauf swords, and three blade fragments which are now lost). The rather small associated deposit from Pişcolt consists of the helmet and a bronze cup, which can be dated only broadly to Ha A.²⁴² The limited contents might be due to the find circumstances, as the associated deposit was found during the construction of a road in 1969, and under such conditions it is not unlikely that not all bronzes were recovered. Amongst these associated deposits, the most problematic composition is for that from Şoarş. Since its discovery, the composition of the associated deposit varies significantly from author to author (see Tab. 2.6).²⁴³

The composition, sales history and find circumstances of the Şoarş associated deposit was first documented by G. F. Weber,²⁴⁴ who noted that only part of the deposit was sold to the Ackner collection.²⁴⁵ Weber himself donated four socketed axes to the Brukenthal Museum in 1836. According to J. Neugebauer, however, the contents of the associated deposit is somewhat different, being comprised of three spearheads, a helmet and a fibula (probably roman).²⁴⁶ According to C. Gooss, most of the objects from the associated deposit were sold to a private collection in Hannover (the second helmet, over 30 socketed axes, and the fibula, repeating the mistake of

²³⁶ Born – Hansen 1992, 340.

²³⁷ Škocjan; most recently, see Turk 2012; Teržan et al. 2015.

²³⁸ Salaš – Šmíd 1999, 33.

²³⁹ Mozsolics 2000, 102–104.

²⁴⁰ Mozsolics 1984; Patay 1990, 22; Mozsolics 2000, 46.

²⁴¹ Type B1 according to Patay 1990, 21–22.

²⁴² Born – Hansen 1992, 348.

²⁴³ Ackner 1834, 222–285; Neugebauer 1851, 275; Gooss 1876, 50; Mozsolics 1955, 39; Petrescu-Dîmbovița 1978, 144; Luca – Georgescu 2008, 27–33. For an overview, see Mödler 2014a.

²⁴⁴ Luca – Georgescu 2008, 27.

²⁴⁵ Ackner 1834, 274, pl. I.1.

²⁴⁶ Neugebauer 1851, 275.

Author	Axes	Helmets	Spearheads	Sickles	Varia
Luca – Georgescu 2008, citing Weber (who bought the hoard)	> 30	2	2	2	
Ackner 1834: Weber sold to Ackner collection	1	1 st helmet	1	1	
Luca – Georgescu 2008, citing Weber: donation 1836 to Brukenthal Museum	4				
Neigebaur 1851		1	3		fibula (?)
Gooss 1876: finds sold to private collection in Hannover	> 30	2 nd helmet			fibula (?)
Mozsolics 1955	30	2	2	few	mace head
Petrescu-Dîmbovița 1978	21 and > 9 (min. 3 Hannover)	2 (1 Hannover)	2	2	
Schauer 1988	21	2	2	few	mace head

Tab. 2.6 Composition of the associated deposit of Șoarș according to different authors.

Neigebaur).²⁴⁷ To increase confusion, Hampel noted another associated deposit from Șoarș, similarly found by Roma and also containing a helmet.²⁴⁸ Reputedly, this associated deposit was also sold to a private collector in Hannover. Mozsolics stated that 30 axes were found inside the now missing helmet. Leaving aside the issue of whether or not 30 such axes could fit inside a Bronze Age helmet, Mozsolics notes that the contents of the first associated deposit, comprising two spearheads, a mace head and a few sickles, were also deposited inside the helmet.²⁴⁹ This is also the first time that the mace head is noted as being associated with the associated deposit, which likely stems from it having been depicted on the same plate as the Șoarș associated deposit in the publication of Ackner.²⁵⁰ Petrescu-Dîmbovița, however, depicts a spearhead, a sickle, five axes, the helmet, as well as a part of a second helmet, as belonging to just one associated deposit, and briefly mentions that over 30 axes, two sickles and two spearheads were found inside the two helmets.²⁵¹ According to Petrescu-Dîmbovița, 21 axes were deposited inside the helmet, and despite the problems that would be involved in achieving such a circumstance, it is further repeated by Schauer.²⁵² One helmet and three axes are reported as held by a private collection in Hannover according to Petrescu-Dîmbovița.²⁵³ The only bronzes which now survive from the associated deposit (associated deposits) of Șoarș are one helmet, one spearhead with flat, rhombic blade, a sickle of Type Uioara 9, a socketed axe with herringbone decoration, two socketed axes of Type Wanzek 2.b.7, one socketed axe of Type Wanzek 2.b.6.a or Boroffka-Ridiche 2.b.6.a.3–0/3, and an axe with concave mouth.²⁵⁴ Since the second helmet from Șoarș was never depicted,²⁵⁵ we cannot be sure if it is represented amongst the already known helmets of Type Pișcolt (or other helmet types!) from private collections. Hencken favoured the unprovenanced helmet from the Lipperheide collection (cat. no. 54), a view which was rejected by Schauer.²⁵⁶ Alternatively, one of the unprovenanced helmets cat. nos. 52 and 53 might be the lost second helmet from Șoarș. We cannot, however, be certain that the helmet survives, or for that matter fully trust the veracity of the claims that it existed in the first place. We

²⁴⁷ Gooss 1876, 50.

²⁴⁸ Hampel 1886b, 96.

²⁴⁹ Mozsolics 1955, 39.

²⁵⁰ Ackner 1834, pl. 1.

²⁵¹ Petrescu-Dîmbovița 1978, 144.

²⁵² Schauer 1988.

²⁵³ Petrescu-Dîmbovița 1978, 144.

²⁵⁴ Luca – Georgescu 2008, 54.

²⁵⁵ The second helmet depicted by Hampel (1876, pl. XII) next to the helmet from Hajdúböszörmény is the helmet from Endrőd. See Hampel 1877, opposite pl. XIII.

²⁵⁶ Hencken 1971, 50; Schauer 1988.

can therefore note only that a possible second helmet, potentially associated with the known helmet from Șoarș, was sold to a private collection in Hannover in the mid-19th century.²⁵⁷ There are also speculations about a second helmet from the Hajdúböszörmény associated deposit, but which no longer survives.²⁵⁸ Consequently, we must also consider the possibility that one of the helmets of Type Pișcolt with uncertain provenience might originally be from Hajdúböszörmény.

2.1.4.3 Chronology

G. v. Merhart argued that helmets of Type Pișcolt are more recent than the helmets of Type Oranienburg.²⁵⁹ Schauer, however, suggests that the knobs of helmets of Type Pișcolt attest to helmets of Type Pișcolt being partly contemporary with helmets of Type Oranienburg, a view repeated by Born and Hansen.²⁶⁰ It is now clear that helmets of Type Oranienburg, dating to the 15th–13th century BC, are significantly older than helmets of Type Pișcolt, and that the helmets of Type Oranienburg found in the later Ha B1 associated deposits from Lúčky and Sâg are relics or antiques associated with much later objects.²⁶¹ Prototypes for such large, heavy Bronze Age helmets are so far unknown, though we might consider the older helmets of Type Nagytétény with solid knob, given their similarities in profile and shape, as possible ancestors. Only Hencken argued, on the basis of broad similarities in shape, for a direct connection with Greek boar tusk helmets and their role as potential prototypes.²⁶² Apart their chronological distance, and also according to the recovery area, their local development in the Carpathian Basin seems more likely.

Of the 15 secure helmets of Type Pișcolt, as well as the potential fragment from Bonyhád, only the associated deposits from Služín, Hajdúböszörmény, Mezökövesd, Șoarș, and Pișcolt, can be considered useful in determining a chronological classification for helmets of Type Pișcolt. The votive deposit from Škocjan has a rather wide chronological time frame, stretching from the 12th to 8th century BC,²⁶³ and provides little basis for narrowing the chronological range for the helmets of Type Pișcolt, though most parts of the deposit seem to belong to Ha B. The remaining associated deposits with helmets of Type Pișcolt, however, are more uniformly attributable to Ha B1. The associated deposit from Služín is dated, on the basis of the socketed axes, to the Rohod period, and according to the associated ceramic vessels more specifically to Ha A2/Ha B1, though tending more to the beginning of Ha B1 and depositional Křenůvky horizon. More recently, M. Salaš has agreed upon a more general attribution to Ha B1.²⁶⁴ The associated deposit from Hajdúböszörmény provides the basis for the Hajdúböszörmény horizon,²⁶⁵ which is associated with Ha B1.²⁶⁶ Given its similarity to the associated deposit from Hajdúböszörmény, the associated deposit from Mezökövesd is also dated to Ha B1.²⁶⁷ The associated deposit from Șoarș is associated with Transylvanian Bronze Age IV.²⁶⁸ S. A. Luca and A. Georgescu dated the associated deposit to the Moigrad–Tăuteu period, relative with Ha B1, as does Rusu.²⁶⁹ The associated deposit from Pișcolt is dated accordingly to Ha B,²⁷⁰ or more specifically to Ha B1.²⁷¹

²⁵⁷ Gooss 1876, 50.

²⁵⁸ Mozsolics 2000, 45.

²⁵⁹ v. Merhart 1941, 4, note 3.

²⁶⁰ Schauer 1988, 191; Born – Hansen 1992, 348.

²⁶¹ Mödler 2013a.

²⁶² Hencken 1971, 8.

²⁶³ Turk 2012, 137.

²⁶⁴ Salaš – Šmíd 1999, 33; Salaš 2005, 158.

²⁶⁵ Mozsolics 1955, 37.

²⁶⁶ Mozsolics 1955, 37; Hajdúböszörmény horizon, B Via; Müller-Karpe 1959, 114, 139, 167, 204; Gimbutas 1965, 151–153; Patay 1969, 200.

²⁶⁷ Patay 1969, 200.

²⁶⁸ Mozsolics 1955, 48.

²⁶⁹ Rusu 1990, 70; Luca – Georgescu 2008, 33, 54.

²⁷⁰ Némethi 1972, 120.

²⁷¹ Rusu 1990, 77.

The clear association of helmets of Type Pişcolt with Ha B1 provides a reasonable basis for attributing unprovenanced helmets of Type Pişcolt, as well as those single finds, such as the helmets from Endröd and Sehlsdorf, to the same phase. The helmet of Type Pişcolt from Monte Altino might also represent a further potentially later deposition (and not necessarily later production), as in Italy the persistence of the shape of helmets of Type Pişcolt up to the beginning Iron Age and adaption of it by pottery cap helmets might indicate.²⁷²

Catalogue

Cat. no. 41. Sehlsdorf, Lkr. Parchim, Mecklenburg-Vorpommern, Germany – single find (?) – complete helmet. Measurements: height: 25.2cm; 6.8cm (knob); diameter: 22.2–23.2cm; thickness: 2.5–2.7mm (rim); weight: 1455g – Landesamt für Kultur und Denkmalpflege Mecklenburg-Vorpommern, inv. no. 315 (?) – Pl. 6.41. References: Beltz 1910, 253; Sprockhoff 1930, 44; v. Merhart 1941, 11; Sprockhoff 1956, 85; Drescher 1958, 52; Hencken 1971, 43, fig. 21g–h; Borchhardt 1972, 129, cat. no. 29.5; Keiling 1987, 96, fig. 50; Schauer 1988, 188; Albrecht 1991, 13–16; Calzecchi-Onesti 1991, 77, no. 8; Born – Hansen 1992, 344; Hundt 1997, no. 132, pl. 39.2; Götter und Helden 1999, 257, no. 154; Born – Hansen 2001, 79; Clausen 2001, 219; Hänsel 2003; Schmidt 2004, 87–95, 195, cat. no. 50, fig. page 92; Clausen 2005, 36; Mörtz 2011a, 367; Mödinger 2014a, figs. 2, 12, cat. no. 1.

The helmet is supposedly a single find recovered during peat cutting in 1836.

Cat. no. 42. Služín, Okr. Prostějov, Czech Republic – associated deposit – knob. Measurements: height: 6.5cm; diameter base: 6.2cm – Muzeum Prostějov, inv. no. 143.668 – Pl. 6.42. References: Salaš – Šmíd 1999, 19, 31, figs. 7.2; 10.21; Clausen 2001, 219; Clausen 2005, 36–37; Salaš 2005, 502–514, pl. 424.21; Mödinger 2014a, figs. 3, 12, cat. no. 2.

In summer 1997 in the south of Služín, at Zábrusky, 13 storage pits attributed to the Lausitzer group of the Urnfield culture were found. In the northern half of one of these storage pits, just 30cm below the ground, a ceramic vessel, covered with the base of another ceramic vessel with a hole, was uncovered. The vessel contained 22 complete, destroyed and fragmented bronze objects, comprising the knob of a helmet, seven socketed axes with the blades all pointing north or northwest, 12 sickles with the decorated side upside, a cast tube or socket, and a fragment of a sword blade.²⁷³

Cat. no. 43. Škocjan, Obalno-kraška, Slovenia – votive deposit – knob. Measurements: height: 6.4cm; weight: 248g – Naturhistorisches Museum, Vienna, inv. no. 47.626 – Pl. 6.43. References: Szombathy 1913, 149, fig. 94; v. Merhart 1941, 12, fig. 2.10 left; Hencken 1971, 48, fig. 26a–c; Borgna 1999, 158, fig. 5; Clausen 2001, 219; Clausen 2005, 36; Mödinger 2014a, figs. 3, 10, 12, cat. no. 3.

The votive deposit from Škocjan contains over 600 metal objects and fragments (mainly fragmented and deliberately destroyed arms and armour). First objects were discovered in 1909, which led to first excavations by the *Prähistorische Kommission, k. u. k. Naturhistorisches Hofmuseum* (today the Natural History Museum Vienna).

Cat. no. 44. Hajdúböszörmény, Hajdú-Bihar megye, Hungary – associated deposit – complete helmet. Measurements: height: 25.5cm (cap), 5.8cm (knob); diameter: 20.5 × 23.5cm; thickness: 3mm (rim); weight: 1338g (not 2335g or 2355g!) – Magyar Nemzeti Múzeum, inv. no. 33/1858/3 – Pl. 6.44. References: Graffenried 1860, 372–374, figs. 66–72; Hampel 1876, pl. XII; Hampel 1886b, 74, pl. XXXIII.2; Hampel 1892, 49–58; v. Merhart 1941, 11, fig. 2.12; v. Merhart 1952, 5; Kossack 1954, 27, no. 1; Mozsolics 1955, 37, 48, fig. 4; Müller-Karpe 1959, 114, 139,

²⁷² See Chapter 2.1.6, p. 83.

²⁷³ Salaš – Šmíd 1999, 33.

167, 204; Gimbutas 1965, 151–153; Patay 1969, 200; Hencken 1971, 44, fig. 21d–f; Borchhardt 1972, 129, cat. no. 29.2; Mozsolics 1984, 81–93; Kemenczei 1988, 57; Patay 1990, 21, no. 7; Calzecchi-Onesti 1991, 77, no. 10; Kovács 1992, 45, fig. 29; Soroşeanu 1995, 65; Mozsolics 2000, 45, no. 5, pl. 30.5; Clausen 2001, 120; Clausen 2005, 36; Vachta 2008, 123, list V.1.5. no. 1; Mörtz 2011a, 367; Mödler 2014a, figs. 1, 7, 12, cat. no. 5.

The associated deposit was found close to Csege hill in 1858, and some of its contents reached the Magyar Nemzeti Múzeum, with further objects from the associated deposit only coming to the museum later, whilst some appear to have been melted down immediately after it was discovered. Some finds from the deposit are housed at the Reformed College at Debrecen. For detailed description of the associated deposit and its history, see Mozsolics.²⁷⁴

Cat. no. 45. Mezőkövesd, Borsod-Abaúj-Zemplén megye, Hungary – associated deposit – complete helmet. Measurements: height: 23.5cm (cap); 6.2cm (knob); diameter: 22.5cm; thickness: 2–3mm (rim); weight: 1340g – Magyar Nemzeti Múzeum, inv. no. 60.2.2 – Pl. 6.45. References: Patay 1969, 173, 190, figs. 1–8, pls. 41–45; Hencken 1971, 44–45, fig. 21a–c; Kemenczei 1984, 149, no. 19; Schauer 1988, 188; Patay 1990, 23, nos. 19–20; Calzecchi-Onesti 1991, 77, no. 11; Mozsolics 2000, 55, no. 5, pl. 52.3; Clausen 2001, 219; Clausen 2005, 36; Soroşeanu 2005, 408; Vachta 2008, 123, list V.1.5. no. 8; Mörtz 2011a, 367; Mödler 2014a, figs. 1, 7, 12, cat. no. 6.

The associated deposit was found during levelling work in 1959 at a depth of 60–65cm.²⁷⁵ A ceramic vessel contained a situla of Type Hajdúböszörmény, in which the helmet had been placed, with the knob pointing downwards. Due to pressure from above, the knob perforated the base of the situla. Inside the helmet, two arm spirals were found. The situla itself was covered with two bronze vessels of Type B1.²⁷⁶

Cat. no. 46. Endrőd (Gyomaendrőd), Békés megye, Hungary – single river find (river Körös) – complete helmet. Measurements: height: 26.1cm (cap), 6.2cm (knob); diameter: 19 × 23.2cm; thickness: up to 5mm (rim) – Erkel Ferenc Múzeum Gyula, inv. no. 60.113.1 – Pl. 6.46. References: Hampel 1886a, pl. XXXIII.1–2; Sprockhoff 1930, 46; v. Merhart 1941, 11, fig. 2.11; Mozsolics 1955, 38, fig. 5.1; Hencken 1971, 45, fig. 2; Borchhardt 1972, 129, cat. no. 129.1; Schauer 1988, 188; Makkay 1989, 181, pl. 28; Calzecchi-Onesti 1991, 77, no. 99; Clausen 2001, 120; Clausen 2005, 36; Mödler 2014a, fig. 1.4, cat. no. 7.

The helmet was found in the bed of the river Körösök in or before 1874.

Cat. no. 47. Şoarş (Sáros/Scharosch), jud. Braşov, Romania – associated deposit – half preserved. Measurements: height: 25cm (cap), 6.1cm (knob); diameter: approximately 23cm; weight: 524g – Muzeul Naţional Brukenthal, Sibiu, inv. no. 11.992 = A 4685 – Pl. 6.47. References: Ackner 1834, 274, pl. I.1; Neigebaur 1851, 275; v. Arneth 1851, 289; Gooss 1876, 50; v. Merhart 1941, 11, fig. 2.7; Mozsolics 1955, 39, fig. 5.2; Hencken 1971, 50–51, fig. 27c–e; Némethi 1972, 115; Petrescu-Dîmboviţa 1977, 135, pl. 324.8; Petrescu-Dîmboviţa 1978, 144, pl. 243.B9; Wollmann 1982; Bader 1983, 122, no. 421; Mozsolics 1985, 25, note 119; Schauer 1988, 188; Rusu 1990, 69, pl. V.1; Calzecchi-Onesti 1991, 77, no. 16; Born – Hansen 1992, 346–348, fig. I; Clausen 2001, 219; Hansen 2001, 80; Clausen 2005, 36; Ciugudean et al. 2006, 27–33, 51, 54, pls. XI–XIII; Vachta 2008, 123, list V.1.5, no. 13; Mödler 2014a, fig. 3.1, cat. no. 8.

The find circumstances of the associated deposit, most likely discovered in the vicinity of Şoarş, are unknown. The associated deposit was purchased from Sinti or Romanies by F. Weber, the evangelic priest from Şoarş, before 1834.²⁷⁷

²⁷⁴ Mozsolics 1985, 102–104; Mozsolics 2000, 43–47.

²⁷⁵ Patay 1969, fig. 1.

²⁷⁶ Patay 1969; Patay 1990, 23.

²⁷⁷ For composition of the associated deposit, see Tab. 2.6 and Chapter 2.1.4.2.

Cat. no. 48. Pișcolt, jud. Satu Mare, Romania – associated deposit – complete helmet. Measurements: height: 18cm; knob: height: 6.5cm; diameter: 22cm; weight: 1094g – Muzeul Municipal Carei (Nagykárolyi Városi Múzeum), inv. no. 2290 – Pl. 7.48. References: Némethi 1972, 113–117, figs. 1–2, pls. 26.1–2; 27.1–4; Schauer 1988, 188, fig. 7; Rusu 1990, 77, pl. V.6; Calzecchi-Onesti 1991, 80, no. 17; Born – Hansen 1992, 384; Clausen 2001, 219; Clausen 2005, 36; Soroceanu 2008, 47, no. 10; Vachta 2008, 123, list V.1.5, no. 11; Némethi 2009, 65–67; Mödler 2014a, fig. 3.2, cat. no. 9.

The helmet was found in 1969 at via Veche ‘Livada’ Öregszölő, when several trees were removed during the preparation for the construction of a road. The helmet was most likely found together with a bronze cup of Type Fuchsstadt.²⁷⁸

Cat. no. 49. Monte Altino, prov. Campobasso, Italy – find circumstances unknown – complete helmet. Measurements: height: 27.5cm; diameter: 23.5 × 21cm – Museo Provinciale Sanitico, Campobasso, inv. no. 1250 – Pl. 7.49. References: Sogliano 1889; Calzecchi-Onesti 1991, 68, 80, no. 18, figs. 1–2; Clausen 2001, 219; Clausen 2005, 36; Iaia 2005, 45–46, cat. no. 1, fig. 4.1; Mödler 2014a, fig. 14, cat. no. 14.

The find circumstances and find date of the helmet are unknown. The helmet was already noted in the inventory of the museum in 1889.

Cat. no. 50. Unprovenanced (formerly known as ‘Mantova’, prov. Mantua, Lombardia, Italy) – complete helmet. Measurements: height: 26.6cm; 6.1cm (knob); diameter: 22.7 × 23.5cm; base of the knob: diameter 6.2cm; thickness cap: 0.8–4mm; weight: 1478g (1280g according to Pertusi 1892) – Antikenmuseum Berlin (Lipperheide collection), inv. no. L 68 – Pl. 7.50. References: Pertusi 1892, 3, no. 26; v. Wieser 1894, pl. 7.43; v. Lipperheide 1896, 128, no. 230b; Schröder 1912, 24, fig. 15; Szombathy 1913, 149, fig. 93; v. Merhart 1941, 12, no. 18, note 15; Hencken 1971, 50, fig. 28; Borchhardt 1972, 129, no. 29.11; Mozsolics 1972, 373–374, 393–394; Schauer 1988, 182, 188, 447, fig. K 54a–c; Pflug 1989, 65, no. 35; Egg – Waurick 1990, 41, no. 7.5, fig. 8.2; Calzecchi-Onesti 1991, 80, no. 19; Born – Hansen 1992, 345; Born – Hansen 2001, 79, 251, fig. 200; Clausen 2001, 219, fig. 28; Clausen 2005, 36; Iaia 2005, 46, fig. 4.2; Mödler 2014a, figs. 3, 12, cat. no. 4.

The helmet was purchased from the Amilcare Ancona collection in Milan, with the note that according to its colour, it might have derived from water.²⁷⁹ It is unknown from whom the Amilcare Ancona collection bought the helmet and where it might have come from. As v. Merhart pointed out,²⁸⁰ the find spot ‘Mantova’ was added only later,²⁸¹ probably according to a misunderstanding.

Cat. no. 51. Unprovenanced – complete helmet. Measurements: height: 23.1cm; 6.1cm (knob); diameter: 20.5 × 24.9cm – Museum Berlin (formerly: Museum für Völkerkunde, Leipzig; Grosenhain, Saxony), Zschille Collection; inv. no. 13.167 – Pl. 7.51. References: Forrer 1894, no. 12; v. Merhart 1941, 12, fig. 2.7; Mozsolics 1955, 38, fig. 5.3; Hoffmann 1961, 98; Patay 1969, 191; Hencken 1971, 50, 54, fig. 29a–c; Schauer 1988, 188; Albrecht 1991, 13; Calzecchi-Onesti 1991, 80, no. 20; Born – Hansen 1992, 339–356; Born – Hansen 2001, 251, fig. 201; Clausen 2001, 220; Clausen 2005, 36–37; Mödler 2014a, figs. 3, 12, cat. no. 10.

The actual find spot remains unknown. The collection was purchased in New York before 1896 by R. Zschille. The helmet had been repaired several times, riveting different brass plates to the inside of the rim of the helmet, covering also the rivet holes.²⁸²

²⁷⁸ Martin 2009, 168.

²⁷⁹ Pertusi 1892, 3, no. 26.

²⁸⁰ v. Merhart 1941, 12, note 18.

²⁸¹ Szombathy 1913.

²⁸² Born – Hansen 1992, 340.

Cat. no. 52. Unprovenanced – complete helmet. Measurements: height: 21.5cm (cap); diameter: 21.3 × 19.5cm; thickness of the edge: 1.2–3.5mm; knob: height: 4.5cm; base diameter: 3.9cm; opening: 7mm deep; weight: 1150g – present repository unknown; Guttman collection, inv. no. AG 1000 – Pl. 7.52. References: Born – Hansen 2001, 72, 175, 245–250, 270, figs. 195, 199, 202–203, pl. XVI; Clausen 2001, 219; Clausen 2005, 36–37; Hermann Historica 2005b; Eisenberg – Price 2006, 37, no. 73; Mödler 2014a, figs. 2, 12, cat. no. 11; Alexander Ancient Art 2017.

The helmet was part of the Guttman collection and was put up for auction (Lot 9, not sold) at Christie's in London on 28 April 2004. It was sold on 19 October 2005 at Hermann Historica²⁸³ and again in 2007 at Royal-Athena Galleries.²⁸⁴ Its current location is unknown. On the basis of traces of sand/chips inside the helmet, it has been suggested that it was recovered from a water context.²⁸⁵ Further details are unknown.

Cat. no. 53. Unprovenanced – complete helmet. Measurements: height: 24cm; diameter: approx. 21cm; thickness: 2.5mm (rim) – sold at an auction of 'Gorny und Mosch' in Munich December 13, 2003; no. 12 – Pl. 8.53. References: Clausen 2005, 36–38, fig. 6; Mödler 2014a, cat. no. 12.

The origin of the helmet is unknown, as is the current location.

Cat. no. 54. Unprovenanced – complete helmet. Measurements: approximately 25cm (total height) – Königliche Museen Berlin, lost during World War II – Pl. 8.54. References: v. Merhart 1941, 12; Hencken 1971, 50, fig. 28; Mödler 2014a, fig. 2, cat. no. 13.

The helmet belonged to the Lipperheide collection and was lent to the Königliche Museen zu Berlin in 1905 but after the World War II it went missing.²⁸⁶ A surviving picture published by Hencken shows that the helmet belongs to the group of helmets of Type Pişcolt.

Cat. no. 55. Unprovenanced – complete helmet. Measurements: total height: 25.5cm (total height); knob: height: 6.4cm; diameter pommel: 3.4 × 3.5cm; diameter base knob: 5.8 5.8cm; weight: c. 1400g – Pl. 8.55. References: Phoenix Ancient Art 2012, 32–33, no. 8.

The helmet presumably derives from an ex-European private collection from the 1990s. It was put up for auction (Lot 210, not sold) at Christie's, New York on June 10, 2010 and is currently (June 2017) on sale at Phoenix Ancient Art in Geneva. The helmet has 14 rivet holes, which were most likely cast, and during the manufacturing processes were enlarged by being punched through. The helmet does not have a significantly thicker rim than that of the cap, as noted on other helmets of Type Pişcolt.

Cat. no. 56. Bonyhád, Tolna megye, Hungary – associated deposit – fragment. Measurements: ca. 15 × 18cm. Magyar Nemzeti Múzeum, inv. no. 107/1889/167 – Pl. 8.56. References: Hampel 1892, pl. CLIII.7, 10; Wosinsky 1896, 381–392; Hencken 1971, 43; Mozsolics 1985, 102–104, no. 75, pl. 40.14.

The exact find spot of the associated deposit is unknown. It consists of more than 200 objects, including fragmented spearheads, daggers, knife, sickles, chisel, arm rings, rings, pins, belt buckles, spirals, fragments of a bronze cup, several bronze sheet fragments (vessels?), as well as socketed and winged axes.²⁸⁷

The bronze sheet was folded over twice. On one side, rivet holes are visible as well as differing corrosion products parallel to the slightly stripped edge, which is common on bronze helmets. Usually, helmets of Type Pişcolt are much larger about the rim or edge than that of the

²⁸³ Hermann Historica 2005b.

²⁸⁴ Eisenberg – Price 2006, 37, no. 73.

²⁸⁵ Born – Hansen 1992, 245.

²⁸⁶ Hencken 1971, 50.

²⁸⁷ Mozsolics 2000, 102–104.

fragment from Bonyhád, and therefore its attribution to the group of helmets of Type Pişcolt is not entirely certain.

Related Helmets

Cat. no. 57. Škocjan, Obalno-kraška, Slovenia – votive deposit – knob. Measurements: height: 4.7cm. Museo Civico, Trieste, inv. no. 47.627 – Pl. 8.57. References: Szombathy 1913, 149; v. Merhart 1941, 12, fig. 2.10 right; Hencken 1971, 157, fig. 126a–c; Borgna 1999, 158, fig. 5; Clausen 2001, 219; Clausen 2005, 36; Teržan et al. 2015.

The cast-on, solid knob has a stepped base and a plain shank.

Cat. no. 58. Škocjan, Obalno-kraška, Slovenia – votive deposit – knob. Measurements: height: c. 2.3cm. Museo Civico, Trieste, inv. no. 47.628 – Pl. 8.58. References: Szombathy 1913, 149; Hencken 1971, 157, fig. 126d–e; Clausen 2001, 219.

The cast-on, solid knob has a stepped base and a plain shank. The head of the knob has broken off and the whole fragment has been distorted by heat. The lack of a tubular hole makes this knob different from all other knobs related to or found attached to helmets of Type Pişcolt.

2.1.5 Single Helmet Types, Cheek Plates, Knobs and Possible Fragments

Two complete bronze helmets, as well as a unique helmet from Malpensa, potential helmet knobs, and several cheek plates and fragment, potentially related to helmets, will be discussed in the following. An overview on the finds discussed is provided in Tab. 2.7, and their recovery mapped in Fig. 2.12.²⁸⁸

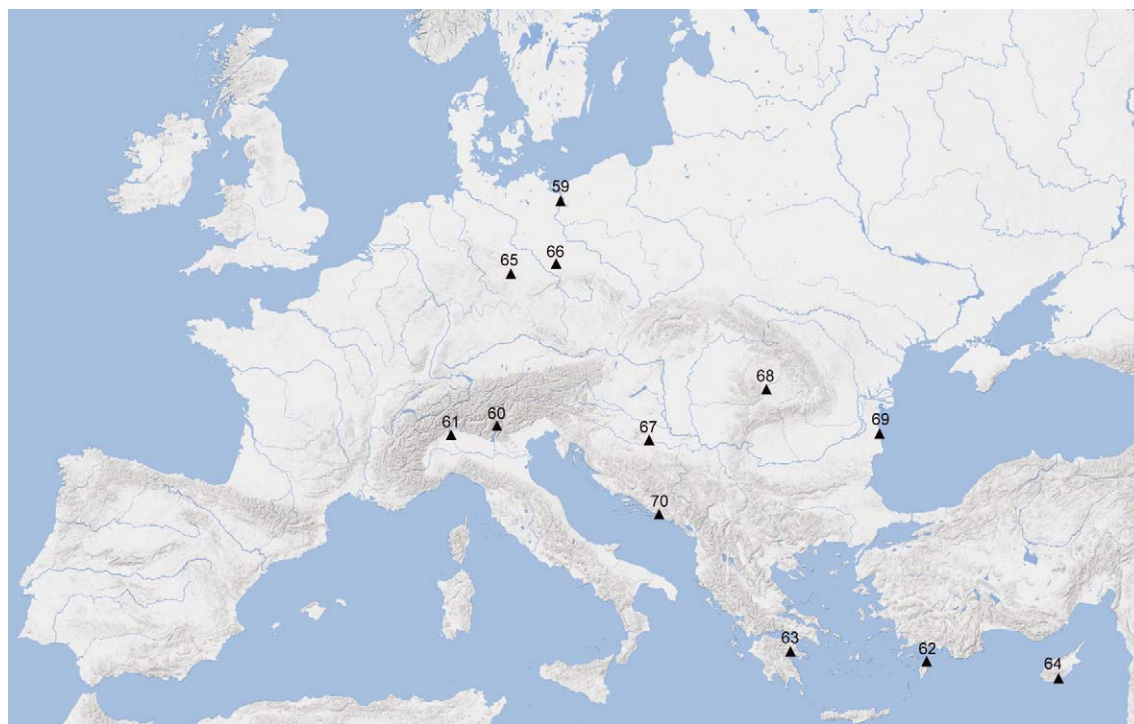


Fig. 2.12 Archaeological distribution of single cap helmet types, cheek plates and sockets/knobs: **59.** Szczecin-Zdroje; **60.** Fiave; **61.** Malpensa; **62.** Ialysos; **63.** Dendra; **64.** Kourion; **65.** Schmiedehausen; **66.** Weißig; **67.** Podcrkavlje; **68.** Špálnaca; **69.** Techirghiol; **70.** Grepce. Numbers correspond to the catalogue numbers.

²⁸⁸ For the Viksø helmets, see Chapter 2.3.

Cat No.	Type	Find Circumstances	Find Site	State	Condition	High Cap (cm)	High Knob (cm)	Dm (cm)/ Fragments	Thickness Cap/Rim (mm)	Weight (g)
59	helmet	river	Szczecin-Zdroje	PL	complete	13.5	4	19.5 × 21.3	1 / 1.2	649
60	helmet (?)	settlement	Fiave	IT	almost complete	21	–	26	–	–
61	helmet	associated deposit	Malpensa	IT	almost complete	c. 15	–	–	0.5	–
62	cheek plate	grave	Ialiso	GR	not complete	–	–	17.5 × 12.5	– / 2	75
63	cheek plate	grave	Dendra	GR	complete	–	–	15.5 × 10.5	–	–
64	cheek plate	grave	Kourion-Kaloriziki	CY	fragmented	–	–	17.2 × 8	–	–
65	cheek plate	associated deposit	Weißig	DE	complete	–	–	13.3 × 7–8.8	– / 2	210
66	cheek plate	associated deposit /grave (?)	Schmiedehausen	DE	complete	–	–	13.3 × 7	– / 1	67
67	cheek plate	associated deposit	Podcrkavlje	HR	not complete	–	–	10.2 × 4.4	– / 0.5	–
68	knob	associated deposit	Špálnaca	RO	not complete	–	5.4	–	–	–
69	knob	associated deposit	Techirghiol	RO	not complete	–	5	–	–	–
70	knob	grave (?)	Grepci	BA	complete	–	4.4	–	–	72

Tab. 2.7 Single types of cap helmets, cheek plates and knobs.

2.1.5.1 *Single Helmet Types*

Only three complete helmets are described in the group of single helmet types, represented by the bronze helmet from Szczecin-Zdroje (cat. no. 59), the helmet from Malpensa (cat. no. 61) and the organic cap or helmet from Fiavé-Carera (cat. no. 60). The helmet from Szczecin-Zdroje, the single example of its Type Szczecin-Zdroje, with unique decoration of ribs and bosses, still lacks adequate classification. The cast socket is fixed on the calotte with four rivets. Around the socket, the helmet is decorated with three parallel, concentric rows of punched dots. Above the row of rivet holes, totalling eighteen with just one rivet surviving in place, two ribs and one row of punched dots was applied. The central zone of the helmet is decorated with double circles of pellet decoration with a central boss.²⁸⁹ Clausen most recently included it amongst his group of ‘cap helmets with ribs and bosses’, together with the Italian finds from Fermo, three helmets from Tarquinia, and an unprovenanced helmet from the museum in Karlsruhe.²⁹⁰ Hencken associated the helmet with his group of ‘cap helmets and others with plain socket’, which includes not only the above mentioned helmets from Tarquinia and Fermo but also fragments from Straßengel, Škocjan, Guşteriţa, Şpălnaca and Techirghiol.²⁹¹ G. v. Merhart regarded the unique helmet as an import but did not specify from where.²⁹² According to finds with similar decoration (see below), a local production or at least a production in the (north)eastern zone of the Urnfield culture seems most likely.

Since the helmet from Szczecin-Zdroje is a single find from the river Oder, we have no relative information, such as associated finds, upon which to establish its chronological classification. Hencken notes that the decorative elements are common between the Elbe and Vistula during Ha B3 and the beginning of the Iron Age, relative with period V-VI of the Nordic Bronze Age, indicating a date in the 8th century BC or perhaps later.²⁹³ However, similar decorative elements are already present during the Late Bronze Age. The horizontal ribs can be found on helmets of Type Paks,²⁹⁴ though not on the Italian helmets with which the helmet from Szczecin-Zdroje was associated.²⁹⁵ The pellets are of uniform size (apart the central bosses in the circles), which is also uncommon on Early Iron Age Italian armour. The double circles made out of pellets with the large central boss can however be found on the complete cuirass from the Danube (cat. no. 134), on one of the cuirasses from Jura (cat. no. 138), on the helmets from Tiryns (cat. no. 120) and Pass Lueg, as well as on bronze sheets from Salaş Noćajski, Serbia,²⁹⁶ Guşteriţa, Romania,²⁹⁷ Pila del Brancon, Italy,²⁹⁸ Dresden-Dobritz, Germany,²⁹⁹ and from an Iron Age devotion from Sicily.³⁰⁰ Similar decoration is also known on sheet fragments from Techirghiol.³⁰¹ Sadly, the fragments are too small to reconstruct the object they were once part of. The riveted-on socket from the helmet from Szczecin-Zdroje does not point to a later date, despite its apparent similarity to those helmets with riveted on socket from Grepci (cat. no. 70), Tarquinia and Fermo, since earlier riveted-on knobs are also known, as demonstrated by the helmet of Type Oranienburg from Knossos (cat. no. 2). A date relative to Bz D–Ha A for the helmet from Szczecin-Zdroje seems, therefore, to be most reasonable.

²⁸⁹ Albrecht 1991.

²⁹⁰ Clausen 2001, 217.

²⁹¹ Hencken 1971, 155–162.

²⁹² v. Merhart 1941, 11.

²⁹³ Hencken 1971, 159.

²⁹⁴ See Chapter 2.1.2.

²⁹⁵ Clausen 2001, 217.

²⁹⁶ Vasić 1994, pl. 38.13.

²⁹⁷ Bronze sheet fragment: Rusu 1990, 73, pl. V.5.

²⁹⁸ Bronze sheet fragment: Salzani 1998, fig. 2.138.

²⁹⁹ Bronze cup: Martin 2009, pl. 30.119.

³⁰⁰ Egg 1983, fig. 2.4–5.

³⁰¹ Petrescu-Dîmboviţa 1978, pl. 215.17–19.

The helmet from Malpensa (cat. no. 61) is a unique and at present the single example of Type Malpensa. It derives from the same associated deposit as the greaves (cat. nos. 160–161, 179). The deposit is dated accordingly to the greaves to Ha A1 and contained furthermore ingots and ingot fragments, three spearheads and a fragment of further spearhead, two axes and a further axe fragment, two sickles and further fragment, and fragments of bronze sheet recently confirmed as a helmet.³⁰²

It consists of a very thin bronze sheet with eight strips, reaching from the upper third of the cap to the base, similar to the medieval *Spangenhelme*. The strips are bent inwards at the base. Inside the helmet, much thicker bronze sheets were fixed, their edge fitting beneath the inward bent strips, in this way protecting the whole head with bronze. Impressions upon the bronze and broken off sheet fragments on the top of the helmet indicate the former presence of a cast-on knob, which was not recovered. Chemical and microstructural analyses were carried out by the author in summer 2015. Two detailed publications on the associated deposit and the helmet in particular were recently published.³⁰³

The development and improvement of arms would have had a mutually dependant relationship with contemporary improvements in defensive armour, irrespective of the material either were made of. Before the appearance of metal armour, and certainly following its appearance, we can rightly assume considerable diversity of form in organic armour, as is demonstrated by its depiction on various media in the Near East and on Sardinian bronze figurines.³⁰⁴ Compared with Europe, the Aegean and the Near East provide a much richer source for the reconstruction of organic helmets. Whilst no complete helmets are preserved, we can reconstruct them from their depictions, and from those non-perishable components used in their construction, such as in the case of boar tusks. The work of Borchhardt represents an early discussion concerning the details of the types, distribution and chronology of Aegean organic helmets, including boar tusk helmets and zonal helmets, of which many depictions and miniatures are known.³⁰⁵

The only surviving organic European Bronze Age helmet is from Fiavé-Carera, Trentino-Alto Adige, Italy.³⁰⁶ The frame of the helmet was made of spliced branches of spruce. Small branches of viburnum were wrapped in spirals around them and additionally secured with reed, and therein providing a higher protective ‘buffer’ than that of leather helmets alone. This helmet may then also have been furnished with a leather covering. In Mariupol, Ukraine, the use of boar tusks on organic caps as head protection might already have been developed during the Neolithic.³⁰⁷ Rectangular boar tusk plates were found upon the skull, breast and knees of skeletons. The plates were arranged horizontally rather than vertically, as on the later Aegean boar tusk helmets. Contemporary boar tusk blades are also known from graves from the Cortaillod culture in Chamblandes, Switzerland.³⁰⁸

Bronze sheet fragments from Lakkithra (Grave Δ), which resemble the ones from Kallithea, were, as were the fragments from Tiryns, interpreted as parts of bronze or organic cuirasses.³⁰⁹ However, we now know, thanks to the benefit of more recent finds that the fragments from Kallithea and Lakkithra most likely belong to tiara-like helmets or headgear (also known as ‘feather crown’, or ‘feather-headgear’). A good example of such a helmet is that from the tholos-grave at Praisos-Foutoula, which is dated to c. 1200 BC.³¹⁰ The cylindrical helmet is bucket-shaped and decorated with alternating single, horizontal ribs of rows and ornamental rivets. Another, 16cm high, similar head gear is known from a grave in Portes-Kephalovryson (1200–

³⁰² de Marinis et al. (2009, 148) originally noted that these fragments might potentially belong to a helmet.

³⁰³ de Marinis 2016; Gambari et al. 2017.

³⁰⁴ Lilliu 1966; Borchhardt 1972.

³⁰⁵ Borchhardt 1972.

³⁰⁶ Perini 1987, 190.

³⁰⁷ Makarenko 1934, 135–153, figs. 11, 15.

³⁰⁸ Twelve plates in three rows with holes on each end, found under the skull, see Borchhardt 1972, 29.

³⁰⁹ Paulik 1968, 54, fig. 8.1; Schauer 1982d, 126–127. See also Chapter 3.6.

³¹⁰ Deger-Jalkotzy 2006, 714.

1100 BC).³¹¹ The head gear has a cylindrical shape with an oval section and straight sides. It is decorated with bronze strips with horizontal ribs alternating with horizontal lines of ornamental rivets. Both ends of the helmet bear wider bronze bands with relief ridges at the edges.³¹² The 16 strips and the rivets were fixed to an internal head gear made of tightly knitted straw.³¹³ Depictions of such headgear are e.g. known from captured sea people (mainly Peleset) and fighting sea people from both the land and sea battles from the Medinet Habu frieses. An organic cap was worn under the bucket-shaped bronze sheet band. On the top of the helmet, all along the bronze sheet band, different organic materials could be applied, such as feathers, or reed.

Catalogue

Cat. no. 59. Szczecin-Zdroje (Finkenwalde or Stettin), woj. Zachodniopomorskie, Poland – single river find (river Oder) – complete – height: 13.5cm (cap), 4cm (socket); diameter: 19.5 × 21.3cm; thickness: 1–1.2mm (rim); 0.2–0.3cm (calotte); weight: 646–649g. Museum für Vor- und Frühgeschichte Berlin, inv. no. Ic 3669 – Pl. 9.59. References: Schuchhardt 1912/1913; Sprockhoff 1926, 292; Sprockhoff 1930, 44; v. Merhart 1941, 23, fig. 8.4; Hencken 1971, 157–158, fig. 127; Schauer 1988, 193, fig. 9; Albrecht 1991; Born – Hoffmann 1992; Born – Hansen 2001, 74, fig. 59; Clausen 2001, 217; Menghin – Hänsel 1997, 132 (with fig.).

The helmet was found in the river Oder in 1909 and brought to the museum in Berlin in 1910. Further finds include a bronze sword and a spearhead with ‘silver or copper inlays’, but they might not be associated with the helmet.³¹⁴

Cat. no. 60. Fiavé-Carera, Trentino-Alto Adige, Italy – settlement find – complete. Measurements: 21cm; diameter: 21.5cm; outer diameter: 26cm; diameter spruce: 15 × 8mm; diameter snowball bush: 12 × 2mm; diameter reed cord: average 4mm. Museo delle Palafitte del Lago di Ledro, inv. no. FpC 75.454 – Pl. 9.60. References: Bill 1979, 98, fig. 1; Perini 1987, 190, 360–361, figs. 76–78, 178, pl. XXXIII; Perini 1990, 253–265; Born – Hansen 2001, 60, fig. 54.

The organic helmet or head protection was recovered from the Early to Middle Bronze Age settlement of Fiavé-Carera, Italy.

Cat. no. 61. Malpensa, reg. Lombardia, Italy – associated deposit (?) – fragments of a helmet. Measurements: 9 × 4.6cm (inv. no. 21.885); 10.2 × 8.6cm (inv. no. 25.820); 10.5 × 7 (inv. no. 25.821); 6.4 × 3.3cm (inv. no. 25.823); thickness: 0.1 cm; weight: 240g. Museo Civico Archeologico di Varese, inv. nos. 21.885, 25.820, 25.821, 25.823. References: de Marinis 1979, 511–514; Mira-Bonomi 1979, 125; Mozsolics 1985; de Marinis 1988, 161–163; Peroni 1989, 88, 278; Hansen 1994, 14; Clausen 2002, 155; de Marinis 2009, 148–154; de Marinis 2016, figs. 13–17; Gambari et al. 2017, figs. 2–17.

The associated deposit contained three greaves (cat. nos. 160–161, 179), ingots and ingot fragments, three spearheads and a fragment of further spearhead, two axes and a further axe fragment, two sickles and further fragment, and fragments of bronze sheet recently confirmed as a helmet.

2.1.5.2 Cheek Plates

Hencken was the first to discuss Bronze Age cheek plates.³¹⁵ He distinguished two basic shapes amongst the Minoan-Mycenaean sphere, which differ from the U-shaped cheek plates known

³¹¹ Moschos 2009, figs. 1–2.

³¹² Cf. Mödinger 2014b, 28.

³¹³ Papadopoulos 1999, pl. LIXb; Kolonas 2001, 260.

³¹⁴ Riemer 1997, 132.

³¹⁵ Hencken 1971, 179–182.

from the Near East (e.g. Boghazköy). Hencken's Type 1, which has its origin amongst the Minoan-Mycenaean world, is triangular in shape with more or less curved sides and a small projection. This type of cheek plate can be connected with the boar tusk helmets. Several depictions on helmets of apparently different materials, are known from the middle and late Mycenaean period.³¹⁶ The finds from the Carpathian Basin, as well as from Middle Europe, were related by Hencken to this type and dated to Bz D–Ha A2 (Weißig, Schmiedehausen). Hencken's Type 2 has a similar shape as Type 1 but incorporates an additional projection to protect the cheekbone and jaw. Type 2 is known from LM II or the 15th century BC onwards, mainly in combination with boar tusk helmets and 'conical bell helmets', as known from Aegean graves and depictions.³¹⁷ Their use may have lasted until the 11th century BC, as the cheek plate from grave 28 in Tiryns suggests. Borchhardt divided Bronze Age cheek plates into four different groups, represented by his Type I–IV.³¹⁸ Type I has a projection to protect the cheekbone (Knossos, Dendra, Tiryns, Hagia Triada and Wöllersdorf), Type II is decorated (A: Pass Lueg, Agros; B: Boğazköy), Type III has pointed ends and a parallel step to the edge (Ialysos, Weißig, Schmiedehausen; Katsamba, Isopata, Mykenai), and Type IV has a rounded edge (Altin Tepe).

More recently, K. Peschel distinguished three different types of cheek plates,³¹⁹ with Type A having a double bowed front edge (depictions: Pylos, Hagia Triada;³²⁰ finds: Knossos, Dendra, (Mycenae), Tiryns), Type B a single bowed front edge (depictions: Keos,³²¹ Katsamba, Isopata,³²² Mycenae; finds: Ialysos, Lueg, Podcrakavlje-Slavonski Brod, Weißig, Schmiedehausen), and Type C having a single bowed front edge and raised middle part (finds: Wöllersdorf, Uioara de Sus). Schauer mentions a cheek plate and further fragments of helmets from the deposit of Brodski Varoš.³²³ However, the rectangular edges of these bronze sheets, as well as their decoration, does not resemble any of the other known cheek plates.

The very few surviving bronze cheek plates compared to the relatively high number of preserved bronze helmets might suggest a greater use of organic cheek plates,³²⁴ perhaps attached not to the helmet but to the organic inlay of the helmets. The conspicuous absence of bronze cheek plates might also suggest that they were purposefully separated before deposition. Some helmets, however, clearly did not incorporate cheek plates at all, such as those of Type Biebesheim, which appear to have used only a chin strap. Presently, six helmets with cheek plates are known, comprising a helmet of Type Lueg from Pass Lueg (cat. no. 83), the helmets of Type Paks from Žiar nad Hronom (cat. no. 16), and one unprovenanced helmet (cat. no. 21). The boar tusk helmet from Dendra, the helmet from Knossos, and the helmet from Tiryns, also have bronze cheek plates. Clearly, bronze cheek plates are not exclusively associated with helmets only produced in bronze, and were compatible with both bronze and organic helmets. On all the above named helmets both cheek plates were preserved. The 'bronze collar' from Kourion-Kaloriziki was recently identified during a new evaluation of the bronze sheets as comprising two cheek plates (cat. no. 64).³²⁵ However, the interpretation of the bronze bands found in the same grave as coming from a helmet, to which the cheek plates belonged,³²⁶ can be questioned, since holes for attaching these bands to the organic cap of the helmet would certainly have to be more numerous than they are and positioned closer to the inner rim. The grave is the

³¹⁶ Katsamba, Crete: LH II/1450–1400 BC (Hencken 1971, fig. 3d); Megaron-frieze at Mycenae (Hencken 1971, fig. 9a).

³¹⁷ Hencken 1971, 18, 179.

³¹⁸ Borchhardt 1972, 72, fig. 6.

³¹⁹ Peschel 1984, 71, fig. 7.

³²⁰ Hencken 1971, fig. 7c.

³²¹ Caskey 1966, 375, pl. 90b.

³²² LH II/1450–1400 BC.

³²³ Schauer 1982b, 135; Schauer 2003, fig. 4.4.

³²⁴ Bartík 2009, 44.

³²⁵ Matthäus – Schumacher-Matthäus 2014.

³²⁶ Matthäus – Schumacher-Matthäus 2014, 69–70, figs. 21–22.

oldest from the Kaloriziki cemetery, and is dated on the basis of the associated pottery to the beginning of the 11th century BC and LC III.³²⁷

As well as those associated with helmets, several individual examples of cheek plates are also known. Unlike those from the Mediterranean area, most of the cheek plates from central and northern Europe have come from associated deposits, the only exception being if the associated deposit from Schmiedehausen is in fact a grave (cat. no. 65). Many of these cannot be associated with specific helmet types, but the relative date of the associated deposits and their associations can provide important clues as to their likely attribution. However, no cheek plates are known from western Europe. It is reasonable to assume that the decoration on the cheek plates is connected with the decoration on the helmet, as is suggested by the decoration on the five preserved helmets with cheek plates. Moreover, on the basis of similar shape, as well as the decoration, we can associate some of the single cheek plates with specific helmet types.

As indicated by both the chronological proximity and close morphological similarity between the cheek plates on the unprovenanced helmet (cat. no. 20) and the helmet from Žiar nad Hronom, the cheek plates from Wöllersdorf, Hočko Pohorje, Uioara de Sus, Újszöny/Komárom and Mezőnyárád, can be associated with helmets of Type Paks.³²⁸

A close relationship between the cheek plate from the Bz D–Ha A2 associated deposit from Podcrkavlje-Slavonski Brod (cat. no. 67)³²⁹ with the only decorated crested helmet, the unprovenanced helmet cat. no. 100, which is related to the western European helmets of Type Biebesheim, seems reasonable, since both have wheel decoration of similar size. Except for the Bz D–Ha A1 greaves Type Lengyeltóti, armour with wheel decoration is unknown. Interestingly, the rim of the cheek plate is folded outwards.

The deposit (or possible grave) from Schmiedehausen was dated by C. Eckhart to around 1100 BC, as does Borchhardt.³³⁰ The fragment of cheek plate has two holes at one end to attach it to the helmet. On the other end at least one hole for the chin strap is visible. The two lines of pellets parallel to the rim suggest its production during Bz D–Ha A1,³³¹ and is most likely of local manufacture.³³² Assuming similar decoration for both cheek plates and helmet, the only helmets with pellet decoration are those helmets similar to that from Szczecin-Zdroje. Other helmets with pellet decoration, such as those of Type Lueg, are significantly older, and in the case of the helmet from Tiryns, have a different form of cheek plate. An association with helmets of Type Biebesheim seems less likely since they are without decoration and appear to have been used with chin straps rather than cheek plates.

Dated variously to Bz D–Ha A1/late period III, the cheek plate from Weißig (cat. no. 66) was associated with helmets of Type Lueg³³³ and the cheek plate from Ialysos³³⁴ (cat. no. 62). The cheek plate from Weißig has two holes at the tip, perhaps used to secure the cord that attaches it to the helmet and also under the chin, or to be able to hang up the helmet. The two rivet holes for attaching the cheek plate to the helmet are spaced c. 6cm apart. Apart from those from the Aegean,³³⁵ similar cheek plates are unknown. Establishing a relationship between the use of cheek plates with those helmets with more localised distributions, such as Type Biebesheim, or western European helmets in general, does not seem likely. All helmets of this type have a maximum of three rivet (?) holes positioned very close to one another on both sides of the helmet, immediately above the edge, which served more likely for the attachment of a chin strap (the only exception being the two unprovenanced helmets of Type Montbellet (cat. nos. 77 and 78),

³²⁷ Matthäus – Schumacher-Matthäus 2014, 54.

³²⁸ Mödlinger 2013b.

³²⁹ Vinski-Gasparini 1973, 217.

³³⁰ Eckhart 1962/1963, 301; Borchhardt 1972, 136.

³³¹ Jockenhövel 1974, 39.

³³² Peschel 1984, 72.

³³³ Kleemann 1941/1942.

³³⁴ Hood – de Jong 1952, 260.

³³⁵ Such as the cheek plate from Ialysos (LH IIIA) and in the depictions from Katsamba and Isopata (Borchhardt 1972, 72).

the Type Mantes helmet from Mainz, and another unprovenanced helmet (cat. no. 100), related to Type Biebesheim). Helmets Type Paks also have a completely different type of cheek plate. It therefore seems more likely that the Weißig cheek plate belongs to an as yet unknown form of bronze or organic helmet.

Even though the chronological classification, the application of organic inlay and the method of attachment to the helmet is different from Aegean cheek plates, the similarities in shape and profile are obvious, and therefore point to influences from or development in the Aegean region.

Catalogue

Cheek Plates of Helmets Type Paks

See Section 2.1.2.

Aegean Cheek Plates / Associated Ones

Cat. no. 62. Ialysos, Greece – grave – fragment. Measurements: 17.5 × 12.5cm; weight: 75g – British Museum, inv. no. 36.1872.6–20.50 – Pl. 9.62. References: Walters 1899, 211, pl. XIII.I; Kukahn 1936, 2, 6; Lorimer 1950, 211, pl. 13.1; Hood – de Jong 1952, 258, note 70; Yalouris 1960, 55; Müller-Karpe 1962a, 271; Wace – Stubbings 1962, 515; Verdelis 1967, 43; Hencken 1971, 11, 26, fig. 9b; Müller-Karpe 1980, 774, no. 114.

The cheek plate was recovered from a group of Mycenaean tombs in 1872 by the British consul in Rhodes. It is heavily fragmented and severely corroded, and no pure metal survives. The cheek plate has small holes running parallel to the edges used to fix the organic inlay with twine, some of which is still preserved (Chapter 2.4, Fig. 2.50).

Cat. no. 63. Dendra, Peloponnese, Greece – grave 12 – complete. Measurements: 15.5 × 10.5cm – Archaeological Museum of Nafplion, inv. no. unknown – Pl. 9.63. References: Verdelis 1967, 42–44, suppl. 20.1–2; Borchhardt 1972, pl. 6; Mödinger 2013a.

For further details on the find circumstances and the alleged grave associations, see cat. no. 123. The cheek plates have a similar shape as the one from Knossos but are a little broader and shorter. The left cheek plate consists of various fragments and repairs. The right cheek plate is missing almost the whole front area, but the rest is in somewhat better condition and not as corroded as the left cheek plate. Both cheek plates have small holes running parallel to the edge, which served to fix the organic inlay with twine, some of which is still preserved on the left cheek plate.³³⁶

Cat. no. 64. Kourion-Kaloriziki, Limassol, Cyprus – grave 40 – two fragmented cheek plates. Measurements: c. 17.2 × 8cm – Kourion Museum, Episkopi inv. no. unknown – Pl. 9.64. References: Mc Fadden 1954, 140, no. 35, pl. 26.35; Catling 1964, 143, no. e, pl. 17e; Benson 1973, 49–50; Bouzek 1988; Kytlicová 1988a; Bouzek 1997, 92, fig. 75; Matthäus – Schumacher-Matthäus 2014, figs. 19–20.

The grave, dated to LC III, was discovered by robbers in 1903. Some of the finds were illegally sold but the police were able to rescue some, such as the golden sceptre. In 1953, McFadden undertook further excavations and discovered the shaft grave, which had been covered by a bench of sandstone, which is where the robbers had stopped, allowing for the recovery of further finds. On this bench were several ceramic vessels, a fragmented bronze cup, a bronze amphora covered with a sieve and fragments of a bronze wand or stick. The amphora contained the cremated remains of what was likely a female, along with a bronze ring, an amber bead, a golden pin, twelve small bow fibulae, and a small grind stone. In between this bench and the western wall of the shaft grave a ceramic oinochoe, an iron dagger, and several bronze fragments were documented. The robbed part of the grave also contained a further bronze spear-

³³⁶ Verdelis 1967, 43.

head. Another robbed bronze amphora allegedly covered with a sieve and containing a cremation, twelve gold sheets with rosette-motif, and more ceramic, is now lost. The preserved golden sceptre was found below (or perhaps inside?) the amphora. A small and a large bronze tripod were also stolen by the robbers but were rescued by the police.³³⁷

The grave is the oldest from the Kaloriziki cemetery, and demonstrates significant Aegean influence, as indicated by the double burial, the rite of cremation, the associated weapons, and the presence of older luxury objects. It can be connected with other tombs that show Aegean influence, such as grave 201–202 from the North Cemetery in Knossos, grave XXVIII in Tiryns, and the burials in the so-called Heroon at Lefkandi.³³⁸

The cheek plates had previously been misinterpreted as being a bronze collar,³³⁹ perhaps a consequence of all the fragments not being fully published until 2014.³⁴⁰

The holes along the rim of the cheek plates indicate the attachment of an organic lining to the inside face. Both cheek plates are similarly decorated with three rosettes with six leaves surrounded by a circle along the backside, and three smaller, similar ones on the front side, with each positioned relative to the chin, cheek bone and eye brow. The motifs are produced with pellet decoration. Larger pellets are randomly distributed in between the rosettes.

No similar cheek plates are known but from the region of the eastern Mediterranean, the largely contemporary helmet from Tiryns (cat. no. 120) provides a useful parallel. The cheek plates are the only reference to helmets from the transitional period from the Late Bronze Age to the Early Iron Age on Cyprus.

Cat. no. 65. Weißig, Lkr. Meißen, Saxony, Germany – associated deposit – complete. Measurements: 13.3 × 7–8.8cm; thickness: ca. 2mm; weight: 210,1g – Staatliches Museum für Archäologie Chemnitz, inv. no. S113/43 – Pl. 9.65. References: Kleemann 1941/1942, 74, 134, fig. 13; Hood – de Jong 1952, 260; Hencken 1971, 180, fig. 147b; Borchhardt 1972, 136, pl. 44.1–2; Peschel 1984; v. Brunn 1968, 74, 344, pl. 178.6.³⁴¹

The associated deposit was found in 1853 during ploughing between Weißig and Leckwitz. The bronzes were found in a ceramic vessel, which is now lost. The associated deposit consists of ten fragments of sword blade(s), five spearheads, one cheek plate of a helmet, 13 complete and fragmented palstaves, 16 complete and broken winged axes, nine further fragments of axe, two small chisels, two fragments of twisted bronze, fragments of knives, a fragment of razor, more than 140 fragments of sickles, fragments of bronze cups, fragments of pins, fragments of foot rings, several different bronze sheet fragments, fragments from eight almost complete arm rings and bands, fragments of wire, fragments of one torque (?), fragments of ingot and sprue/waster. In other collections, there are further fragments reputedly from the same associated deposit.³⁴² In Bautzen there are eight sickles and associated fragments, in Berlin a fragment of pin, a winged axe and five further fragments, and sickles, in Freiberg a winged axe, a spearhead fragment, and sickles, in Görlitz and Leipzig there are sickles, in the British Museum a complete sickle and several fragments, in Zittau there is a fragment of a pin, and in a private collection a further pin.

The cheek plate from the right side of the helmet is slightly curved and the edges are bent over to hold the now missing organic inlay. On the upper part there are two holes to attach it to the helmet. Two further holes served to fix the chin strap.

³³⁷ Matthäus – Schumacher-Matthäus 2014.

³³⁸ Matthäus – Schumacher-Matthäus 2014.

³³⁹ Bouzek 1988; Kytlicová 1988a; Bouzek 1997, 92, fig. 75.

³⁴⁰ McFadden 1954, pl. 26.35; Catling 1964, pl. 17c; Matthäus – Schumacher-Matthäus 2014, figs. 19–20.

³⁴¹ Older literature, mainly from the 19th century, which discuss the associated deposit in general are noted by v. Brunn 1968, 345.

³⁴² v. Brunn 1968, 345.

Single Types of Cheek Plates

Cat. no. 66. Schmiedehausen, Lkr. Weimarer Land, Thüringen, Germany – associated deposit or grave – right cheek plate. Measurements: 13.3 × 7cm; thickness: 1mm; weight: 67g – Vorgeschichtliches Museum der Friedrich-Schiller-Universität Jena, inv. no. III 55.255 – Pl. 9.66. References: Eichorn 1904, 132; Eckhart 1962/1963, 301, no. 6, pl. 30; Hencken 1971, 179, fig. 147a; Borchhardt 1972, 72, 136, fig. 6, pl. 44.3–4; Peschel 1984, 67–72, 83–85, fig. 5.1; v. Brunn 1959, 7.

H. Eichorn describes in 1904 a circle of elevated stones buried within a layer of ash, wherein the bronzes and a human jaw, now lost, were found sometime before 1897.³⁴³ The associated deposit presently consists of the cheek place, three bracelets and two neck rings. It was originally held by a private collection.

Cat. no. 67. Podcrkavlje-Slavonski Brod, Brodsko-posavska županija, Croatia – associated deposit – fragment of a cheek plate. Measurements: 10.2 × 4.4cm – Zemaljski Muzej Bosne e Hercegovina, inv. no. 3734 and 3730 – Pl. 9.67. References: Holste 1951, 6, pl. 8.27; Peroni 1956, 75, 88, 90; Vinski-Gasparini 1973, 217, pl. 66.37; Müller-Karpe 1980, 805, no. 314; Bouzek 1981, 25, note 19, fig. 4.3; Hansen 1994, 569, JU 220; Clausen 2002, 183, fig. 24.3; Kudelić 2007, 22; Karavanić 2009, 100, no. 37; 116–118.

The associated deposits from Podcrkavlje, found in 1862 at ‘Dvorišta’, and Slavonski Brod (‘Biliš’), were brought to the museum in 1868, and were probably mixed. This ‘associated deposit’ comprised 277 objects, including arm rings, buttons, discs, pins, fibulae, bronze sheets, pendants, wire, fragments of swords of Type Brodski Varoš, spearheads, daggers, socketed axes, knives, razors, saws, sickles and raw bronze.³⁴⁴

2.1.5.3 Sockets of Other Helmet Types

The sockets from Špálnaca (cat. no. 67) and Techirghiol (cat. no. 68) are entirely undecorated. On the basis of their shape they most likely came from helmets of Type Paks, though the lack of decoration might suggest their origin amongst another, as yet unknown type or variant of bronze helmet, or even organic head protection.

The top of the socket from Špálnaca is missing. The hole passes through the centre, and the shank is undecorated. The current location of the socket is unknown, for it is not in Bucharest,³⁴⁵ Gothenburg, Aiud or Budapest.³⁴⁶ A fragment of the socket of a helmet, as well as other possible fragments of another (?) helmet, are known from the Ha A1 associated deposit from Techirghiol.³⁴⁷ The decoration on the three sheet fragments look similar to that found on the helmet of Szczecin-Zdroje.³⁴⁸ The socket is undecorated, and can be dated to Ha A1,³⁴⁹ only based on the associated deposit associations.

At Grepci in Bosnia-Herzegovina, an Early Iron Age deposit was recovered (cat. no. 70). Together with a bronze flange hilted sword, an iron spearhead, bronze ferrule, a bronze ring, a grindstone and an iron fragment, and the bronze knob of a helmet. The knob is riveted onto the cap with three flat headed rivets. On the inside, the rivets are additionally fixed with lining discs. The tubular shaft ends in an oval knob which is decorated with vertical lines of herring-bone ornament. Only the parts of the cap attached to the knob are preserved. No human bone or cremation was found but the combination of objects reflects more the inventory of an Early Iron

³⁴³ Eichorn 1904, 132.

³⁴⁴ Vinski-Gasparini 1973, 217, pls. 66–68.

³⁴⁵ Petrescu-Dîmbovița (1978, 128–129) and pers. comm. G. Trohani.

³⁴⁶ Gothenburg: pers. comm. E.-B. Filipsson; Aiud: pers. comm. P. Scrobotă; Budapest: pers. comm. I. Szathmári.

³⁴⁷ Aricescu 1965, 25, fig. 5, 12–14.

³⁴⁸ Petrescu-Dîmbovița 1978, pl. 215.17–19.

³⁴⁹ Hencken 1971, 160, fig. 130.5.

Age grave than it does an associated non-sepulchral deposit, and it is therefore possible that the human remains were overlooked during the building of the new church and its cemetery.

Catalogue

Cat. no. 68. Șpălnaca, jud. Alba, Romania – associated deposit – fragment of a possible socket – height: 5.4cm; diameter: 1.8cm (shaft). Muzeul de Istorie Aiud, inv. no. 312.314 – Pl. 9.68. References: Dumitrescu 1938, 221, fig. 15.4; Hencken 1971, 160, fig. 129; Petrescu-Dîmbovița 1978, 127, no. 177, pl. 157.614; Bader 1983, 33, nos. 16–17; Bader 1991, 123, nos. 315–316; Hansen 1994, 593, RO 425; Clausen 2001, 214; Soroceanu 2008, 37, no. 2.

The associated deposit was found by Matei Nandru during fieldwork in the area of ‘Dudău’ in August 1887.³⁵⁰ The bronzes were buried approximately 60cm deep in the soil, in a pit some 110cm in diameter, and there may have been an ash layer at the base of the pit. The total weight was perhaps 1–1.2 tons. The associated deposit was bought by the museum for 1.400 Lei in 1888. Already it was noted that a large part of the associated deposit had disappeared.³⁵¹ The associated deposit was formerly kept at the Muzeul National de Istorie Romaniei. Today, it is stored in a number of different museums, in Aiud, Bucharest, Cluj, Deva and Budapest. At the museum in Bucharest, it was recored under the inventory numbers 98–107, and listed more than 530 objects. Most of these objects could no longer be located as early as the 1930s.³⁵² In 1958, just 501 objects of the 1058 originally listed were found to still be present in Budapest.³⁵³

Cat. no. 69. Techirghiol, jud. Constanța, Romania – associated deposit – fragments of a possible socket. Measurements: c. 5 × 2.7cm. Muzeul de Arheologie Constanța, inv. no. 533–537 – Pl. 9.69. References: Rusu 1963, 187; Aricescu 1965, 24, fig. 5.15; Aricescu 1970, 32; Hencken 1971, 160, fig. 130; Petrescu-Dîmbovița 1978, 136, no. 192, pl. 215.A16–A19; Rusu 1990, 76, pl. II.4, 10; Bader 1991, 83, no. 135.

The associated deposit was found on the side of a little hill close to a lake in 1959. It was recovered at a depth of approximately 70cm. The associated deposit had a total weight of about 2.4kg and consisted of 28 objects, including ten sickles, three socketed axes, sword fragments, four casting cakes fragments, sheet fragments, the possible socket of a helmet.

Cat. no. 70. Grepici, Bosnia-Herzegovina – associated deposit/grave (?) – knob – diameter base: 6cm; diameter top: 1.8cm; diameter shaft: 0.7cm; height: 4.4cm; weight: 72g – Franjevački muzej i galerija Livno, no inv. no. – Pl. 9.70. References: Marijan 1995, 54, no. 4, pls. 1.4; 2.4; Clausen 2001, 207, fig. 5.

The associated deposit or grave find from Grepici consists of bronzes and an iron spearhead. The helmet might represent a relic or antique of the Bronze Age.

2.1.5.4 Possible Fragments of Helmets

The Bz D–Ha A1 associated deposit from Bizovac, Croatia, was discovered in 1895. The 333 bronzes were placed inside a ceramic vessel, including the potential helmet fragment, fragments from a situla of Type Kurd, decorated discs, sword fragments, daggers, spearheads, saws, socketed axes, bracelets, sickles, casting cakes, and more.³⁵⁴ Clausen rejects the fragment as being from a helmet, apparently following Mozsolics who suggested it was more likely a fragment of

³⁵⁰ Kossack 1954, 17; Rusu 1963, 184; Berciu 1966, 43.

³⁵¹ Dumitrescu 1938, 195

³⁵² Dumitrescu 1938, 195.

³⁵³ Petrescu-Dîmbovița 1978, 129.

³⁵⁴ Hansen 1994, 560, JU 19; Karavanić 2009, 95, no. 5; Mörtz 2011a, 368.

a cuirass.³⁵⁵ The c. 12 × 12cm fragment has a rim with a parallel row of holes, positioned roughly 1cm away from each other.³⁵⁶ The fragmentary decoration, and two ribs with cord-like impressions parallel to rim, is unknown on other helmets.³⁵⁷

A small bronze fragment from the Bz D–Ha A1 associated deposit of Poljanci IV, Croatia, might also derive from a helmet (Brodsko Posavlje Muzej Slavonski Brod, inv. no. A–4032). The 6.5 × 3.3cm fragment has one rivet and clear traces of hammering on both sides.³⁵⁸ On the outside, a black band of corrosion is visible, as known from other helmets, such as the helmet of Type Pişcolt from Mezökövesd, indicating the original presence of organic material positioned against the bronze.

The small number of associated finds in graves from the cemetery of Volders is attributable to a several reasons, including the generally reduced number of grave goods used during this period, the use of the ‘ustrina’ funeral process (‘ustrina’ indicates the site of a historical funeral pyre, which is not identical with the position of the grave), as well as the nature of the excavation itself (with most of the graves having been opened from the side, rather than from above, and only the core of the grave, such as the urn and content of the stone lining, being documented). We also have to consider the possibility that the remains of later burials were interned in earlier graves.³⁵⁹ Grave 322 contains only objects, which had been included in the cremation process, such as a metal hilted sword of Type Wörschach, a fragment of a double-edged razor, an astragalus and five sherds of three bowls. The fragments most likely belonging to defensive armour are the three small, deformed and partially molten bronze sheets, having a bent edge and decorated with several small bosses and one large big boss measuring 28mm in diameter. Whilst the greaves from Canosa (cat. nos. 193–194), have similar but smaller bosses, and the helmets of Type Biebesheim, such as those from Blainville, Paris, Montmacq A and Chalon-sur-Saône, have the same large single boss decoration, there are no more exact parallels.

A further potential helmet fragment is known from an early Ha B1 grave from Acholshausen, Germany.³⁶⁰ The fragment, which was burnt during the funeral, consists of a large bronze cone with a slightly rectangular shaped shaft base, which was most likely cast on a metal sheet. However, similar sockets are unknown, though the vertical ribs on the whole shaft suggest a possible relationship with the sockets on the helmets of Type Pişcolt. If the object is indeed a socket, it is of an as yet unknown helmet type.

The associated deposit of Pila del Brancon, Italy, was found in 1993 during agricultural work 1.5km to the south of the Middle Bronze Age cemetery of Olmo, on the bank of the river Tartaro.³⁶¹ It is very possible that the deposit was not completely recovered. Presently, it consists of 51 spearheads and fragments, ten swords and fragments, including Type Allerona, Type Cetona and Type Arco, two daggers of Type Santa Agata and Pertosa, 28 spearheads, one fragment of a winged axe, 73 bronze sheet fragments, and nails. The associated deposit is dated to c. 1200 BC.³⁶² All objects appear to have been intentionally destroyed, bent or broken and exposed to fire. K. Jankovits interprets most of the bronze sheet fragments as the remnants of defensive armour, including helmet, cuirass and greaves, as does Bietti Sestieri and colleagues.³⁶³ The potential helmet of Type Pişcolt fragment (VR 26.605) has six holes running parallel to the rim.³⁶⁴ The rivet holes were punched through using a ring die, which is rather unlikely for helmets of Type Pişcolt. The fragment has a smooth, natural edge or rim on the left side, clearly indicating that it could not have come from a helmet (the cap of helmets of Type

³⁵⁵ Mozsolics 1985, 26; Clausing 2001, 208.

³⁵⁶ Vinski-Gasparini 1973, 212, pl. 35.13.

³⁵⁷ Schauer 2003, 197, fig. 4.2.

³⁵⁸ Miklik–Lozúk 2004, 32, pl. 8.5; Miklik–Lozúk 2009, 47, 109, cat. no. 263.

³⁵⁹ Sperber 2011, 7.

³⁶⁰ Schauer 1982a, 341; Wilbertz 1982, pls. 54–61; Sperber 2011, 25–26, fig. 9.1; Bietti Sestieri et al. 2013.

³⁶¹ Salzani 1994; Salzani 1998.

³⁶² Bietti Sestieri et al. 2013.

³⁶³ Jankovits 1999/2000, 189; Bietti Sestieri et al. 2013.

³⁶⁴ Jankovits 1999/2000, fig. 1.1.

Pișcolt is made out of one single bronze sheet). One of the sheet fragments has decorative elements (consisting of two circles made out of pellet decoration with central boss) similar to other body armour, such as the helmets from Tyrins, Pass Lueg and Szczecin-Zdroje, as well as the cuirasses from the Danube (cat. no. 134) and Jura (cat. no. 138). Other bronze sheets with the same motif derive from Salaš Noćajski, Serbia,³⁶⁵ Gușterița, Romania,³⁶⁶ Dresden-Dobritz, Germany,³⁶⁷ and from an Iron Age devotion from Sicily.³⁶⁸ The fragment from Pila del Brancon does not have any original rim or edge surviving, making it almost impossible to reconstruct or discern its relation to any original form.

The associated deposit from Suseni (Gyergyóújfalu), Romania, was found in 1924. The bronzes have been placed inside a ceramic vessel. The associated deposit consists of ten axes, 15 sickles and a further 11 fragments, four knives, one bronze vessel, seven fragments of sword blade(s), eight fragments of spearhead, 32 arm rings and related fragments, a fragment of a pin, seven Posamenterie-fibulae and associated fragments, a button, eleven fragments of a bronze belt, one socket (?), one bronze object with two nails (?), three fragments of raw bronze, a gold wire measuring 15cm, and one gold pearl (?) which was sold.³⁶⁹ The possible fragment of a helmet (stored at the Muzeul de Arheologie – Istorie in Târgu Mureș; inv. nos. 53 and 73) is a bronze sheet with three ribs parallel to the edge, similar to the fragments from Uioara de Sus but without any rivet holes running parallel to the edge.³⁷⁰ It remains uncertain if the bronze sheet was without doubt part of a helmet.

The associated deposit from Uioara de Sus (Felső-Marosujvár), Romania, was found in 1909 during excavations after an axe had appeared during ploughing. The associated deposit weighs approximately 1.1 tons, and consists of some 5812 objects, which had been buried in a 1.2m deep pit with a diameter of 1.5m. After the excavation, further pieces of rough bronze, as well as a piece of pure tin, were found.³⁷¹ The associated deposit was bought by the Muzeul de istorie, Cluj. Some objects from the same associated deposit are today in the museum in Gothenburg. Petrescu-Dîmbovița mentions nine fragments of helmet and seven fragments of cuirass.³⁷² Rusu notes that one of the fragments is similar to the helmets from Škocjan and Tarquinia.³⁷³ He also suggests that several other bronze sheet fragments are from helmets.³⁷⁴ However, based on the nature of the decoration, as well as the narrow distance between the rivet (?) holes, this seems very unlikely.

2.1.5.5 Bronze Objects Formerly Interpreted as Fragments or Sockets of Helmets

Bronze sheet fragments with parallel ribs and parallel rows of large bosses have often been interpreted as coming from helmets. This includes fragments from Brodski Varoš, Croatia,³⁷⁵ Debeli Vrh, Slovenia,³⁷⁶ Mačkovac-Crišnjevi, Croatia,³⁷⁷ Vrsac-Majdan, Serbia,³⁷⁸

³⁶⁵ Vasić 1994, pl. 38.13.

³⁶⁶ Bronze sheet fragment: Rusu 1990, 73, pl. V.5.

³⁶⁷ Bronze cup: Martin 2009, pl. 30.119.

³⁶⁸ Egg 1983, fig. 2.4–5.

³⁶⁹ Petrescu-Dîmbovița 1977, 107.

³⁷⁰ Rusu 1963, 184, 208; Rusu 1990, 76, pls. I.1; IV.2.

³⁷¹ Petrescu-Dîmbovița 1978, 132.

³⁷² Petrescu-Dîmbovița 1978, pl. 198.1023–1030 (potential helmet fragments), pl. 198.1031–1033 (potential cuirass fragments).

³⁷³ Rusu 1990, 76.

³⁷⁴ Rusu 1990, pl. II.11–15, 17–23 = inv. no. III 6025; III 7526; III 5795; III 5997; III 7413; III 7448. Rusu notes furthermore three sockets (?): one cylindrical, one tubular and one with a ribbed cross section (inv. no. III 6158, III 6154 and III 6178) from the same deposit (Rusu 1990, 76, pl. II.2–3). However, these sockets do not resemble those found on any helmet, which are much smaller.

³⁷⁵ Vinski-Gasparini 1973, 95, 212, pl. 57.2; Schauer 2003, fig. 3.9–13.

³⁷⁶ Čerče – Šinkovec 1995b, 159, 168, pls. 66.79; 152.18; Karavanić 2009, 117.

³⁷⁷ Karavanić 2006, fig. 6; Karavanić 2009, 118.

³⁷⁸ Rusu 1990, 77, note 26, pl. IV.5.

Keszőhidegkút, Hungary,³⁷⁹ Bonyhad, Hungary, and Rinyaszentkirály, Hungary.³⁸⁰ Compared with the similar bronze sheets from Nadap, Hungary,³⁸¹ it is clear that these actually belong to belt plates.

Further objects interpreted as parts of (organic) helmets are cast, hollow sockets. They usually have an oval, hollow base, which can also be stepped and ridged along its length, from the smaller end from the base to the socket, and a round, thin and long socket on top. Some of them still contain wires with a quadratic cross-section, which are usually bent inside. An unequivocal interpretation of their use, however, is still lacking. They might have served as parts of chariots or as metal end of organic helmets, as Paulík suggests,³⁸² though the latter still lacks important associational evidence. Examples are known from Služín, Czech Republic,³⁸³ Polešovice, Czech Republic,³⁸⁴ Kisterenye, Hungary (Magyar Nemzeti Múzeum), Mušov 2, Czech Republic,³⁸⁵ Přestavlky, Czech Republic,³⁸⁶ Poljanci I, Croatia,³⁸⁷ and Mačkovac–Crišnjevi, Croatia.³⁸⁸

Mozsolics notes that three plane, >1–2mm thick fragments from the associated deposit from Szentgálóskér (Kurd horizon BVb/Ha A1), might belong to a helmet or vessel.³⁸⁹ Instead, they seem to be the unfinished work in the manufacture of bronze sheets for the production of a much larger bronze sheet object. The associated deposit is stored at the Magyar Nemzeti Múzeum, Hungary (inv. nos. 4/1886/100–101, 103).

The associated deposit from Jászkarajenő was found in a field in a ceramic pot. From the 227 pieces recovered just 162 are listed in the inventory of the Magyar Nemzeti Múzeum, meaning that some one third of the associated deposit is now lost. The associated deposit, which is associated with the Gyermely horizon BVc/Ha A1,³⁹⁰ contains fragments of a vessel and no helmet (inv. no. 16/1933/149–150).³⁹¹

The associated deposit from Dolné Janíky, Slovakia, was found in 1963 at a depth of 50cm in a ceramic vessel during ploughing.³⁹² It is possible that the associated deposit was not recovered completely. Currently, the associated deposit comprises a saw, an anvil, two belt buckles, a possible socket from a leather (?) helmet, several fragments of tools and jewellery, two possible gravers for making arm rings, and a melted fragment of bronze. Paulík compares the possible socket (height: 3.2cm; diameter 1–3cm) with the one from Straßengel as well as other tube-applications from the Velatice culture.³⁹³ However, it bears no similarity to confirmed helmet sockets. The object is stored at the Archeologický ústav SAV in Nitra, Slovakia (unknown inv. no.).

M. Rind and Schauer published the fragments from Abensberg as potential helmet fragments.³⁹⁴ However, the rim is surrounded by a kind of metal fastener and fixed with a flat-headed rivet. Further fragments have an inwards bent rim, shaped as if to surround a wire (the latter missing?). Due to the fact that the find is not consistent with the form of other helmets, and its provenance uncertain, having been recovered illegally by a metal detectorist, it cannot be securely dated to the Bronze Age.

³⁷⁹ Mozsolics 1985, 24–25, pl. 35.39.

³⁸⁰ Hampel 1896, pl. CCXV.13–14.

³⁸¹ Makkay 2006, pls. VI–VIII.

³⁸² Paulík 1972, 10, 13, 16–18, figs. 4, 8.5.

³⁸³ Salaš – Šmíd 1999, 32, fig. 10.22.

³⁸⁴ Salaš 1997.

³⁸⁵ Salaš 2002, fig. 5.14.

³⁸⁶ Mačala 1985, pl. VII.3–11; Salaš 2002, 269.

³⁸⁷ Miklik-Lozúk 2009, 72–73.

³⁸⁸ Karavanić – Mihaljević 2001, pl. 6.4.

³⁸⁹ Mozsolics 1985, 194, no. 62, pl. 115.4.

³⁹⁰ Mozsolics 1985, 130.

³⁹¹ Mozsolics 1985, 129; Patay 1990, pl. 70.164.

³⁹² Paulík 1972.

³⁹³ Paulík 1972, 15, 31.

³⁹⁴ Rind – Schauer 1997, 112, 118, fig. 64.25; Weiss 1998, fig. 5.1.

The potential socket of a helmet from the Bz D–Ha A associated deposit from Mixnitz, Austria,³⁹⁵ held at the Universalmuseum Joanneum (inv. no. 22.593 (1158)), might in fact be part of a chariot, a similar example of which is known from Staudach.³⁹⁶ The fragment from Mixnitz has a rather short socket, a wide hole and is formed from sheet metal rather than cast, as other sockets and knobs are.

A potential fragment of a helmet from an associated deposit from the Rabenwand bei Bad Aussee, Austria, more closely resembles the head of a pin than the socket or knob of a helmet.³⁹⁷ The fragment is stored at the Kammerhofmuseum Bad Aussee, Austria (unknown inv. no.).

S. A. Luca and A. Georgescu mention a possible fragment of a helmet found in Ciceu-Corabia, Romania.³⁹⁸ The associated deposit was found in 1968 in a Ha B settlement. The contents of the associated deposit had been placed in a ceramic vessel. Earlier, G. Marinescu had suggested that the fragments were from a helmet and a cuirass.³⁹⁹ However, none of the fragments resemble any known cuirass or helmet.

Rusu notes a possible fragment of a helmet in the associated deposit from Băleni, Romania, but provides neither photograph nor drawing of the relevant fragment.⁴⁰⁰ Petrescu-Dîmbovița has described the deposit but here no bronze fragment, which might be part of a helmet, can be identified, though a socket-like object is depicted, as is a bronze sheet with narrow holes parallel to the edge, and a double (finger?) ring.⁴⁰¹ None of these objects has any similarity with other known helmets. It appears unlikely that the associated deposit contains a fragment of a helmet. The associated deposit is stored at the Muzeul de Istorie Galați, Romania (inv. no. 7.393–427).

The associated deposit from Cincu, Romania, was discovered in 1888 in a field.⁴⁰² The fragment interpreted by Rusu as a part of a helmet⁴⁰³ seems more likely to be part of a belt. The ribs and dots arranged in a single row in the middle of the ‘helmet’, as well as the single pellet and roundel, does not have any parallels amongst known helmets. The fragment is stored at the Muzeul National Brukenthal in Sibiu, Romania (inv. no. A 4750 = 12.066).

The associated deposit from Dipșa, Romania, was found close to ‘La Buturugi’ in the south-east of the village in 1911, and contained around 406 objects.⁴⁰⁴ According to that listed by H. Ciugudean and colleagues⁴⁰⁵ the associated deposit contains 138 sickles, 46 axes (39 of them socketed axes), six socketed hammers and anvils, nine fragmented knives, 16 saw blades, four chisels, eight fragments of swords of types Uriu/Aranyos and Reutlingen, ten daggers, seven spearheads, a disc-butted axe, 23 bracelets of different types, three fibula fragments, four neck rings, six pendants, an ornamented belt, two buttons, 36 fragments of bronze sheet from vessels, including at least two cups, cauldrons or situlae, seven bronze bars, and 262 ingots. The total weight of the associated deposit is about 72.8kg of bronze. The alloy composition of 49 of the objects were studied by XRF by T. Kienlin and E. Pernicka.⁴⁰⁶ Petrescu-Dîmbovița depicts a conical, funnel-like bronze object from the associated deposit, which was interpreted by Rusu as the possible knob of a helmet⁴⁰⁷ but which seems more likely to be a casting sprue or waster. Petrescu-Dîmbovița does not depict the other fragments from the associated deposit, which were interpreted by Rusu as parts of a helmet.⁴⁰⁸ These fragments are also not mentioned by

³⁹⁵ Müller-Karpe 1959, 276, pl. 124.D22; Hencken 1971, 183, fig. 149b; Gleirscher 2007, 48–53, fig. 4.1.

³⁹⁶ Clausing 2003, 124, fig. 38.1.

³⁹⁷ Windholz-Konrad 2004, 303, fig. 20, pl. 3.35; Gleirscher 2007, 48–53, fig. 4.3.

³⁹⁸ Marinescu 1979, 52, no. 24, pl. II.11; Luca – Georgescu 2008, 32.

³⁹⁹ Marinescu 1979, pl. II.4, 11.

⁴⁰⁰ Rusu 1990, 77.

⁴⁰¹ Petrescu-Dîmbovița 1977, 73, pl. 74.6, 9, 10.

⁴⁰² Petrescu-Dîmbovița 1977, 88.

⁴⁰³ Rusu 1990, 76, pl. III.1.

⁴⁰⁴ Petrescu-Dîmbovița 1977, 92.

⁴⁰⁵ Ciugudean et al. 2006.

⁴⁰⁶ Kienlin – Pernicka 2006.

⁴⁰⁷ Petrescu-Dîmbovița 1977, pl. 140.24; Rusu 1990, pl. I.2.

⁴⁰⁸ Rusu 1990, pl. III.5.

Ciugudean and colleagues.⁴⁰⁹ The reconstruction of the possible helmet by Rusu can be doubted based on the lack of any scale and in having no equivalents amongst known helmets.⁴¹⁰ The fragments concerned are stored at the Muzeul National Brukenthal in Sibiu, Romania (inv. no. A 5718–19).

The Ha A associated deposit from Slatioara-Sacoți, Romania, was found at a depth of 50cm in August 1959.⁴¹¹ A ceramic vessel was found to hold five axes and axe fragments, two spearheads, five sickles and associated fragments, two neck rings, two fragments of knives, 21 bracelets, a bar (?), two spirals, casting cake, a fibula, an unidentified bronze object, and a decorated bronze sheet interpreted as a spiral arm guard by I. Nania and S. Holtei.⁴¹² Both ends of this 6.4 × 3.1cm bronze sheet fragment are bent around a wire, and instead was interpreted by Rusu as a helmet.⁴¹³ However, the decoration on the fragment has no equivalent amongst known helmets. It seems more likely that the fragment is from a belt. The fragment is stored at the Muzeul Județean Argeș, Romania (inv. no. 1298; 1323).

With the exception of helmets, discs or cups, other sheet bronze objects decorated with a star motif are extremely rare, being represented only by a fragment from Sacoți, Romania. The fragment is flat, and not bent as suggested by the sketch of Rusu, and therefore unlikely to be from a helmet.

The second deposit from Vilcele, Romania, was found sometime before 1982. The associated deposit consists of 51 bronze objects and has a total weight of 2.4kg. The associated deposit was stored in a ceramic vessel and consists of a fragment of a fibula, six arm rings and related fragments, one or two spirals, an ingot, a spearhead and socket fragment, five axes and axe fragments, a blade fragment, 18 sickles and related fragments, a fragment of a knife, a fragment of twisted wire, a loop, a bronze bar, a possible fragment of a neck ring, a possible fragment of an arm ring, a fragment of a pin, three casting cakes, and a decorated bronze sheet.⁴¹⁴ Rusu interprets one sheet fragment (Muzeul de Istorie Cluj, Romania, inv. no. 67.799; ANr. 48) as coming from a helmet, which he compares with the helmet from Fermo, Italy.⁴¹⁵ However, the fragment is flat and the decoration is unlike that on any known helmet, and seems more likely to derive from a belt plate.⁴¹⁶

2.1.6 Outlook to the Iron Age: Italian Cap Helmets

Italian Bronze Age metal helmets are rare, currently comprised of just the five helmets from Iseo, Oggiono-Ello, Brancere, ‘Mantua’ and ‘Monte Altino’. The remaining bronze helmets from Italy all date to the Iron Age or *prima età del ferro* (Tab. 2.8). The details of the latter will be briefly discussed. Eight bronze helmets with decorated cap and cast-on or riveted on knob, as well as five decorated cap helmets without knob, derive mainly from the central Italian necropolis of Tarquinia, Populonia, Fermo and Veii.

Two cap helmets with knob are unprovenanced, and are lacking information concerning find spot and context. One of these, which is presently held in Karlsruhe, might derive from Tarquinia. The second was recently sold at Hermann Historica on 6 November 2013 and again, having been restored, on 5 November 2014. On 30 October 2015 it was put up for auction once again, but not sold (Fig. 2.13.8).⁴¹⁷ The find location was not listed at either sale. Fragments belonging to potential decorated Italian cap helmets are also known from Škocjan (Fig. 2.14).

⁴⁰⁹ Ciugudean et al. 2006.

⁴¹⁰ See also S. Hansen (1994, 23) for general criticism concerning Rusu’s interpretation of helmets.

⁴¹¹ Petrescu-Dîmbovița 1977, 120.

⁴¹² Nania – Holtei 1972, 177.

⁴¹³ Rusu 1990, 77, pl. III.3.

⁴¹⁴ Soroceanu 1981.

⁴¹⁵ Rusu 1990, 76, pl. IV.1.

⁴¹⁶ Soroceanu 1981, 250, fig. 1.4.

⁴¹⁷ Hermann Historica 2013; Hermann Historica 2014; Hermann Historica 2015b.

No.	Type	Find Circumstances	Find Site	State	Inv. No.	High Cap (cm)	High Knob (cm)	Dm (cm)/Fragments	Thickness Cap/Rim (mm)
1	Italian cap helmet with knob	grave	Veii	IT	33.901	19	4	26	–
2		grave	Tarquinia (RC 232/150)	IT	RC 232 (150)	21.2	5.9	22.7 × 23.3	– / 2–3
3		grave	Tarquinia (RC 254/260)	IT	RC 254 (260)	14.7	6.6	23.2 × 25.3	2 / 4.5–6
4		grave	Tarquinia (RC 291)	IT	RC 291	19.8	6	22.7 × 23.2	1.1 / 3
5	Italian cap helmet without knob	unknown	unprovenanced (today: Karlsruhe)	IT (?)	–	19.5	–	22.5 × 23.4	– / 4
6		grave	Fermo	IT	16.427	18.9	6.5	21.4 × 23.5	0.5 / 1.5
7		grave	Populonia (Poggio del Molino o del Telegrafo)	IT	10.355	20.6	5.7	22 × 23.2	1 / 5
8		unknown	unprovenanced (Hermann Historica auction)	IT (?)	–	17	–	21.5	–
9	Italian cap helmet without knob	grave	Tarquinia (Impiccato grave II) A	IT	83.380	15.6	–	27 × 28.6	0.5 / 1.5–1.8
10		grave	Tarquinia (Impiccato grave II) B	IT	83.380	14	–	23.6 × 27.5	0.5 / 2–2.5
11		grave	Tarquinia (23.3.1883 (M8))	IT	4416	15.7	–	23.8 × 24.3	– / 1.5–2
12		grave	Populonia (Poggio del Molino o del Telegrafo)	IT	10.356	14.5	–	23.5 × 24.7	0.5 / 1.5
13	Italian cap helmet without knob	unknown	unprovenanced (today: Louvre)	IT (?)	1109	–	–	23 × 24.5	–
14	unkn.	votive deposit	Škocjan	SI	47.748; 47.745; 47.643	–	–	–	–

Tab. 2.8 Italian cap helmets from the *bronzo finale/prima età del ferro*. The helmets are kept today in the following museums: **1.** Museo di Villa Giulia, Rome; **2–4, 11.** Museo Nazionale, Tarquinia; **7, 9–10, 12.** Museo Archeologico, Florence; **5.** Badisches Landesmuseum, Karlsruhe; **6.** Museo Nazionale delle Marche, Ancona; **13.** Louvre, Paris; **14.** Museo Civico, Trieste. The current repository of no. 8 is unknown.

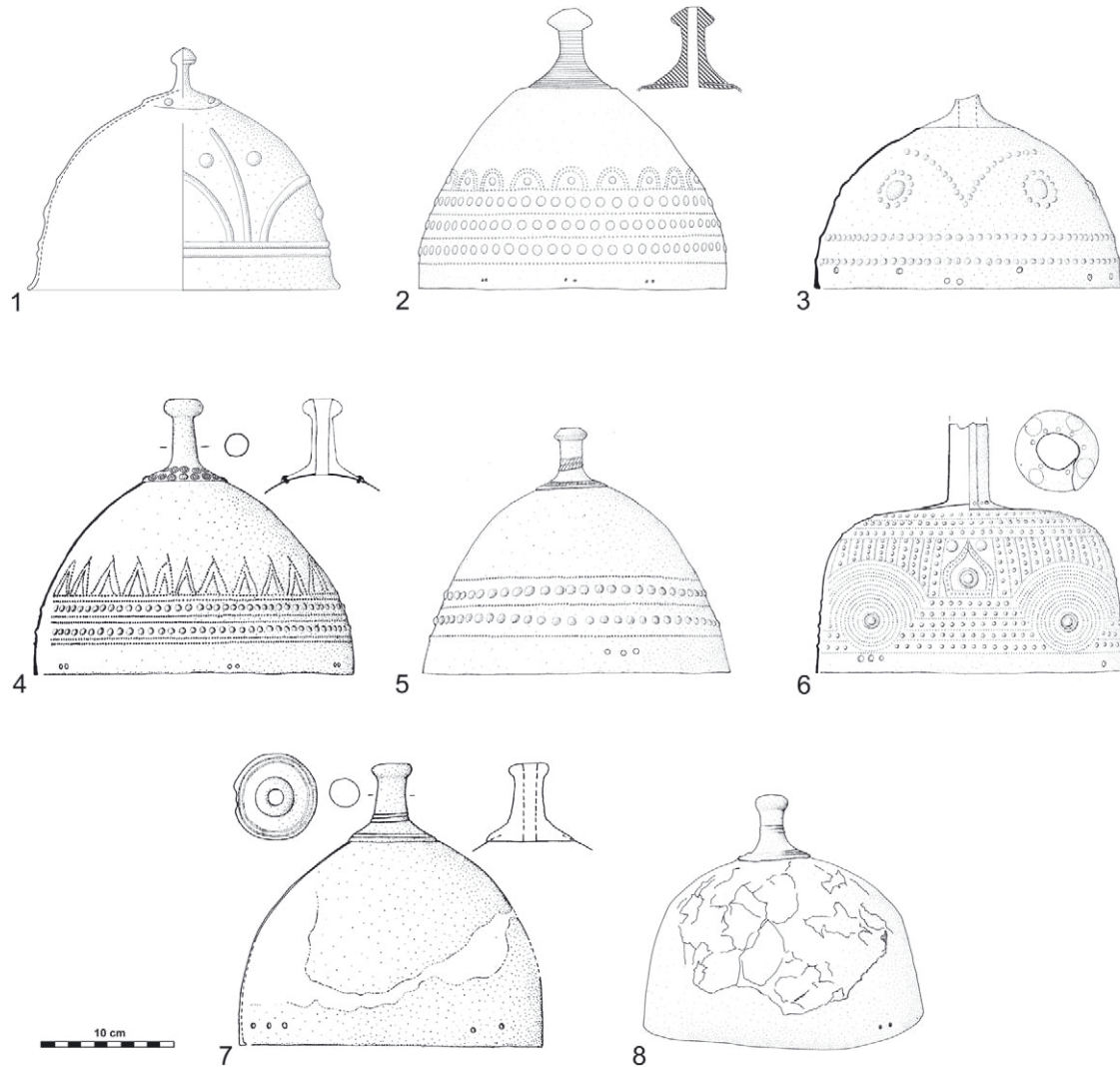


Fig. 2.13 Italian cap helmets with knob or socket: 1. Veii (grave 431) (after Clausen 2001, 203, fig. 4.3); 2. Tarquinia RC 232 (150) (after Hencken 1971, fig. 23); 3. Tarquinia RC 254; 4. Tarquinia RC 291; 5. Unprovenanced (today kept in Karlsruhe); 6. Fermo; 7. Poggio-Populonia; 8. Unprovenanced (before restoration, Hermann Historica 2013; drawing by the author). Numbers relate to those in Table 2.8 (drawings after Iaia 2005, if not indicated otherwise).

These helmets were probably produced during the end of *bronzo finale* and the initial phase of the *prima età del ferro*, with their deposition most likely occurring during the *prima età del ferro* I.

The continuity and development of metal helmets from *bronzo finale* to *prima età del ferro* can also be seen in the production of pottery replicas of the metal armour. From *bronzo finale*, helmet-like covers for urns are known from the Italian protovillanovian Tolfa-Allumiere group.⁴¹⁸ These urn lids have a squeezed, flat hemispherical shape, with their representation of actual helmets being distorted by symbolic imitation or artistic freedom. The oldest pottery replica of a bronze helmet appears to be that from the tomb of Montorgano 2, Sasso di Furbara,⁴¹⁹ and already more closely resembles the metal helmets of *prima età del ferro* than it does those of the preceding Bronze Age. These pottery replicas become common across southern Etruria and Campania, and were deposited in graves from the 10th–9th century BC. Though the decoration of pottery replicas differs significantly from that on contemporary bronze helmets, being

⁴¹⁸ Iaia 2005, 107, fig. 40a–c; Iaia 2013a.

⁴¹⁹ Iaia 2005, 109, fig. 40d.

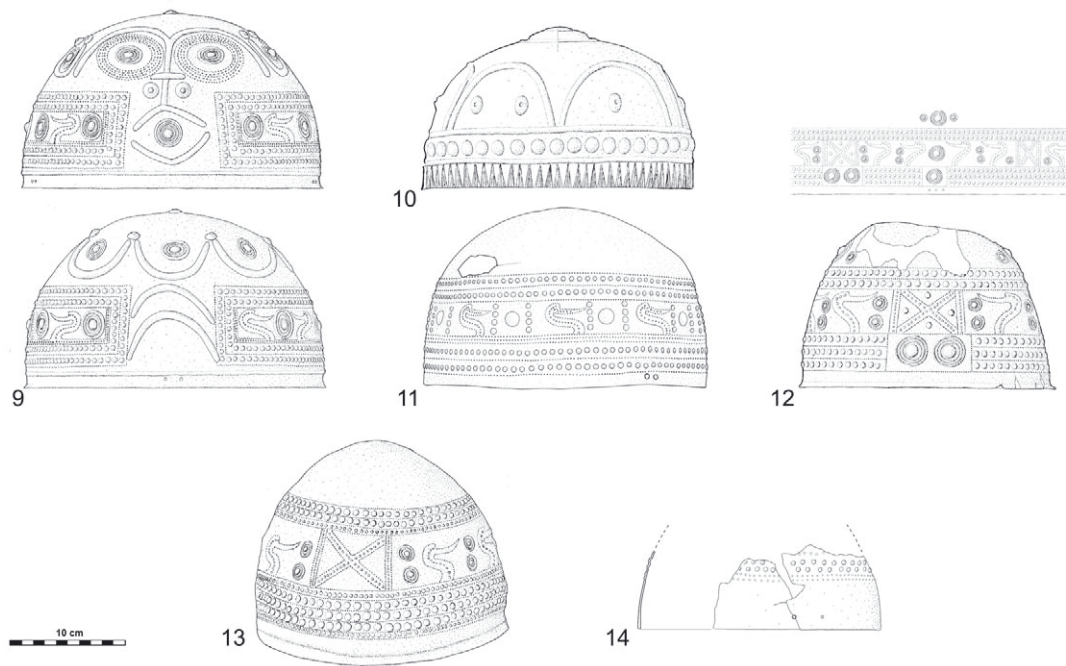


Fig. 2.14 Italian cap helmets without knob or socket: **9–10.** Tarquinia (grave II); **11.** Tarquinia 23.3.1883 (M8) (after Hencken 1971, fig. 109); **12.** Populonia (Poggio del Molino o del Telegrafo); **13.** Unprovenanced (today at the Louvre); **14.** Škocjan. Numbers relate to those in Table 2.8 (drawings after Iaia 2005, if not indicated otherwise).

more geometric in design, their affinity based on form and shape is obvious, with even the holes along the rim having been imitated. The most realistic of these pottery replicas derive from Tarquinia. The replica helmet from Monte San Angelo/Veii, dated to the beginning of *prima età del ferro* IA, even has a knob with a stepped shaft, similar to that of Ha B1 helmets of Type Pişcolt, while other replicas resemble the older helmets of Type Pişcolt in the shape of the cap.⁴²⁰ With 35 pottery replica helmets having been documented from the cemetery of Pontecagnano, it provides an important site for reconstructing the development of pottery replica of bronze cap helmets.⁴²¹ During site phase IA, the replica helmets closely resemble helmets of Type Pişcolt, indicating a possible knowledge of this type of helmet from the Carpathian Basin, despite the fact that no helmets of Type Pişcolt are so far known from Campania. The closest find is the helmet of Type Pişcolt from Monte Altino, Campobasso (cat. no. 49). In site phase IB instead, the cap of the pottery replica helmets becomes more conical and the knob demonstrates a considerable variation in form and shape, including human and animal figures, roofs, etc.⁴²² No metal helmets are known from Pontecagnano.

Italian decorated cap helmets were never classified as a single regional group until the work of Iaia,⁴²³ and were instead usually associated with broader types and groups of helmets.⁴²⁴ For example, v. Merhart and Hencken both associated the two helmets from Tarquinia (RC 232/150), and the unprovenanced helmet from Karlsruhe (probably also from Tarquinia) with helmets of Type Pişcolt.⁴²⁵ The helmets from Cuneo and Veii were associated with the helmets of Nagytétény and Batina within the group of ‘cap helmets with cast knob’,⁴²⁶ and the helmets from Fermo and Tarquinia (RC 260) with the group of ‘cap helmets and others with plain

⁴²⁰ E.g. one helmet from Pontecagnano, see Iaia 2005, fig. 41b.

⁴²¹ Gastaldi 1998.

⁴²² Iaia 2005, 111.

⁴²³ Iaia 2005.

⁴²⁴ E.g. v. Merhart 1941; Hencken 1971; Clausen 2001.

⁴²⁵ v. Merhart 1941; Hencken 1971, 45–48.

⁴²⁶ Hencken 1971, 149–151.

socket'.⁴²⁷ The helmet from Cuneo, Italy, a single find recovered from the bed of the river Gesso between 1855 and 1870, is usually discussed together with other Bronze Age (Italian) helmets, despite the fact that it is dated significantly later. F. M. Gambari dates the helmet to the early 5th century BC, as does Clausen,⁴²⁸ whilst Hencken dates the helmet based on the saw-tooth edge of the disc to Ha C/D.⁴²⁹ Given this dating it will not be discussed in detail in the following. The three cap helmets without knob from Tarquinia were discussed by Hencken alongside the Bronze Age group of helmets of Type Montballet.⁴³⁰ Clausen assigned most of Italian cap helmets without knob to his group of 'cap helmets without knob', which includes both Bronze Age and Iron Age helmets. Most of the Italian decorated cap helmets with knob or socket were included in his group of 'cap helmets with rib and boss decoration'.⁴³¹ He included in this group the helmet from Tarquinia (RC 232, RC 254, RC 291), the unprovenanced helmet from Karlsruhe, and the helmets from Fermo and Szczecin-Zdroje. The fragments from Škocjan and the helmet from Populonia might also be related to this group. Due to its chronological association with the beginning of the Late Bronze Age and the stylistically different decoration, we have excluded the helmet of Szczecin-Zdroje from the list of Italian cap helmets. Clausen also included the only plain, undecorated Italian cap helmet with knob (chamber tomb 1, inv. no. 10.355), from Populonia, with the helmets of Type Pişcolt.⁴³² Due to the distribution of rivet holes, shape, thickness of the metal sheet, and decoration of the knob, we cannot agree with his classification for this helmet, and have instead assigned this helmet to the group of Italian cap helmets with knob or socket.

More recently, Italian cap helmets were discussed by Iaia.⁴³³ He characterised less a specific type but instead a broad group ('gruppo San Canziano-Tarquinia') of diverse Italian helmets, unified by the shape of their cap and the cast-on or riveted on knob. To his group A belong the two knobs from Škocjan, which are related here instead to helmets of Type Pişcolt,⁴³⁴ while group B (with variants) includes the helmets from Tarquinia (RC 232), an unprovenanced helmet (no. 5 in Tab. 2.08), and Populonia (chamber tomb 1, inv. no. 10.355). The helmet from Tarquinia (RC 291) with riveted on knob is related to group B, as are two potentially related fragments from Škocjan.⁴³⁵ Iaia considers the third helmet from Tarquinia (RC 254), and that from Veii with solid knob, as unique pieces, since their knobs were riveted and not cast-on.⁴³⁶ The helmets with knob in fact demonstrate three different types of knob application, with most having cast-on knobs, one of the helmets from Tarquinia (RC 291) has a knob that is riveted on, whilst the knob on the helmet from Veii is also riveted on and solid.

Two undecorated rim fragments from Škocjan, each having two rivet holes and a rather high cap profile,⁴³⁷ probably derive from double crested helmets of Type Novilara, and were most likely one of the last objects deposited in the cave in which they were found.⁴³⁸

2.1.6.1 Italian Cap Helmets with Knob or Socket

The cap helmet from Veii (Grotta Gramiccia, grave 431) has a large, cast knob, which is attached onto the cap with rivets. The rim is bent outwards, and above the rim are two raised

⁴²⁷ Hencken 1971, 155–157.

⁴²⁸ Ridella 1994; Gambari 2000, 207; Clausen 2001, 204.

⁴²⁹ Hencken 1971, 151.

⁴³⁰ Hencken 1971, 130–138.

⁴³¹ Clausen 2001, 216–217, 220.

⁴³² Clausen 2001, 219.

⁴³³ Iaia 2005, 47–63.

⁴³⁴ See Chapter 2.1.4, p. 57.

⁴³⁵ Hencken 1971, 51, fig. 26e; Iaia 2005, 53, fig. 7.9–10.

⁴³⁶ Iaia 2005, 49.

⁴³⁷ Naturhistorisches Museum, Vienna, inv. no. 45.635; Hencken 1971, 48–50, fig. 26d.

⁴³⁸ See Hencken (1971, fig. 133) and Teržan (1990, 61, fig. 8.1) for another fragment of a helmet of Type Novilara from Škocjan.

mouldings. Above these, there is a series of arches with one boss in the centre of each. The knob of the helmet is attached by means of three rivets, which are no longer visible on the inside of the helmet due to the nature of the restoration and installation of supplementary material. Hencken dates the grave and the helmet to the 8th or late 9th century BC.⁴³⁹ Schauer associates it with site phase IIA or IIB at Veii, as does A. Berardinetti and L. Drago (Veio IIA).⁴⁴⁰ Iaia recently dated the helmet ‘a campana svasata, con apice pieno e inchiodato’ to Veii IIA, relative to Tarquinia IIA1.⁴⁴¹

The helmet from Tarquinia (RC 232/150) served as the lid for an urn, which contained a cremation and two bronze horse-bits. The helmet is slightly dented on the top and decorated with four rows of small bosses and three rows of larger bosses between them. Above, there is a double arch of small bosses, surrounding one larger boss. Small rivet holes are positioned in pairs parallel to the rim. The shank of the cast-on knob is decorated with horizontal lines. The knob of the socket is flattened. Iaia considers the helmet from Tarquinia (RC 232/150) as the oldest of his group ‘San Canziano-Tarquinia’, variant B and dates it to a transitional horizon between the end of *bronzo finale* and the beginning of *prima età del ferro*, on the basis of its decoration, which resembles that on Kirkendrup-Jenišovice bronzes.⁴⁴² According to Hencken, the helmet dates to the late 10th to 8th century BC, and which Schauer attributes to the late Villanova period.⁴⁴³

The knob of a further helmet from Tarquinia (RC 254/260), now broken, had been cast-on. Around the rim, there is an irregular row of holes, and above them a row of bosses. On the front, the bosses appear to be arranged so as to resemble eyes and eyebrows. The helmet is dated to the beginning of *prima età del ferro*.⁴⁴⁴

The cast knob of a further helmet from Tarquinia (RC 291) is attached to the cap by four rivets. The knob is decorated with stamped rings and dot ornamentation. Parallel to the rim, there are pairs of small holes. When the helmet was found, fragments of organic lining, possibly leather and wood, were also discovered as well.⁴⁴⁵ The cap is decorated with rows of small and large bosses and dots, some in the form of triangles. Helbig also notes eleven fragments of bronze sheet with embossed decoration, and on the rim attached hooks for securing a bronze ring, from which the pendant rings hang. These were found directly beneath the helmet. The helmet is dated no later than the initial phase of *prima età del ferro*.

An unprovenanced helmet (no. 5 in Tab. 2.08), was bought from a dealer, and little is known concerning its history, though Tarquinia or its surrounding vicinity are suspected as being its area of origin. An urn might have been found together with the helmet. This urn shows similar corrosion as that on the helmet and is decorated with classic bird and boat motif (*Vogelsonnenbarke*).⁴⁴⁶ On back and front of the helmet two rivet holes are present, with three rivet holes having been applied to each side. Above the rivet holes, the cap is decorated with three rows of small bosses and two rows of large bosses. The knob is cast-on. Hencken notes a possible bronze attachment for the helmet in the shape of a trident with three human figurines on top.⁴⁴⁷ There are no contemporary examples for such attachments, with the closest being the Celtic helmet from Filottrano, Italy. The authenticity of the attachment for the Italian cap helmet is not secure. The helmet is dated to the 9th or early 8th century BC based on the decoration on the knob, which is similar to that on the helmet from Populonia, and on the cap, also seen on one of the helmets from Tarquinia (RC 232), as well as the associated vessel.⁴⁴⁸

⁴³⁹ Hencken 1971, 151.

⁴⁴⁰ Schauer 1988, 188; Berardinetti – Drago 1997, 48, fig. 17.

⁴⁴¹ Iaia 2005, 56–57.

⁴⁴² Iaia 2005, 49.

⁴⁴³ Hencken 1971, 47; Schauer 1988, 188.

⁴⁴⁴ Iaia 2005, 55.

⁴⁴⁵ Helbig 1882, 20.

⁴⁴⁶ Iaia 2005, fig. 56, no. 1.

⁴⁴⁷ Hencken 1971, fig. 24b–c.

⁴⁴⁸ Jurgeit 1999, 234, no. 380, pl. II.

On the front and back of the helmet from Fermo, a central hole was applied immediately above the rim, whilst on the sides there are three holes above the rim. Unlike on other helmets, the cap is complete and does not have a central hole under the riveted-on socket. This socket was made out of a bronze sheet bent into a tube. The lower ends are bent outwards and fixed to the cap with four rivets. Seven further holes in the cap surround the tube at its base. The helmet is decorated with both small and large bosses, arranged in horizontal and vertical rows, as well as in circles. Between these circles, crested Villanovan helmets are depicted, as known from the Villanovan helmet from Bisenzio (Villanovan IIB). Iaia dates the helmet to the central phase of *prima età del ferro* I.⁴⁴⁹

In Poggio del Molino o del Telegrafo, Populonia, two cremation burials and two inhumation burials were found in a single grave. Recovered from the same grave, which was clearly reused over a considerable period, was a decorated cap helmet without knob.⁴⁵⁰ The grave appears to have been first used in the 9th century BC and was possibly still in use as late as the 8th century BC. As well as the helmet(s), a bronze axe, two ferrules, a fibula, and amber and glass jewellery were found.

The other Italian cap helmet with cast-on knob, which was put up for auction at Hermann Historica four times⁴⁵¹ allegedly derives from the Italian antiquities market where it was bought in the 1980s. The undecorated cap of the helmet is severely corroded and almost completely destroyed, with the surviving fragments having been joined together with wax. Only the lower part of the cap remains intact, along with the knob. The shaft of the knob is decorated with three central horizontal lines and two further lines on the base of the knob, and is similar to that found on the helmets from Populonia and Karlsruhe. On both sides of the helmet, immediately above the rim, there are two rivet holes, positioned close to one another.

Possible helmet fragments from Škocjan may also belong to the group of Italian cap helmets.⁴⁵²

2.1.6.2 Italian Cap Helmets Without Knob or Socket

The cap helmet without knob from Populonia, Poggio del Molino o del Telegrafo, which derives from the same grave as a decorated cap helmet with knob, is dated to site phase 1B1. The three cap helmets without knob from Tarquinia are all dated to Tarquinia IIA1.⁴⁵³

The helmet from Populonia and an unprovenanced helmet (no. 13 in Tab. 2.08) have almost the same decoration. Horizontal lines of pellets and bosses on the base and top of the cap encompass a central band of water bird heads motif with concentric ring and dot decoration in front of them, as well as alternating zones of geometric decoration, including a cross formed of pellet and boss decoration, within vertical pellet and boss lines.

From the Impiccato grave II, Tarquinia, a cap helmet, which was covering the urn, was recovered, as well as another bronze object⁴⁵⁴ interpreted as a helmet or ceremonial basin.⁴⁵⁵ The decoration of the front of the cap helmet suggests a human face.⁴⁵⁶ The sides and the back are instead covered with upside down arches and inside are bosses in concentric circles. Toward the rim, the cap is decorated with three lines of small dots and in between two lines of bosses, arranged in a rectangular shape so as to surround four bird heads, and in between them bosses or 'sun-discs' consisting of several concentric circles. The second helmet is flattened and distorted, and is without rivet holes. It is decorated with a line of chevrons and above of it are two

⁴⁴⁹ Iaia 2005, 57, no. 13, fig. 9.

⁴⁵⁰ Iaia 2005, 59, no. 14, fig. 10.

⁴⁵¹ Hermann Historica 2013; Hermann Historica 2014; Hermann Historica 2015b; Hermann Historica 2017.

⁴⁵² Iaia 2005, 49–50, fig. 5.3.

⁴⁵³ Iaia 2005, 58–61.

⁴⁵⁴ Hencken 1971, 135, fig. 108; Clausen 2001, 221; Iaia 2005, 63, no. 18, fig. 12, pl. Xc.

⁴⁵⁵ Delpino 2005, 343–358.

⁴⁵⁶ Iaia 2005, 62, no. 17, fig. 12, pl. Xa–b.

horizontal ribs, which enclose a line of bosses. Further ribs form large arches and fill the central part of the cap. Inside the arches, one or two bosses with a central impression were applied.

From another grave from Tarquinia, found the 23.3.1883 (M8), one more helmet is known.⁴⁵⁷ It is stored in the Museo Archeologico Nazionale, Tarquinia (inv. no. 4416). The helmet has four pairs of holes along the lower edge. It is decorated with two concentric bands of three smaller bosses, and in between them two rows of larger bosses. In the middle, there is a decorated band of birds heads, separated by vertical lines of larger bosses.⁴⁵⁸

2.2 Western European Helmets

Western European helmets comprise all helmets of Class II and helmets of Type Montbellet (Fig. 2.2). In western Europe and the eastern Alpine region, the helmet cap is usually made of two bronze sheets, joined together by folding, which form a central crest. The only exception are helmets of Type Montbellet and some of the helmets of Type Mantes, the latter bearing only a basic ridge. The date of almost all western European helmets is a matter of discussion, since they usually occur only as single finds or derive from helmet-only deposits. So far, we can distinguish four main types of crested helmets (in chronological order): Type Mantes with a basic ridge, Type Lueg with a three-pointed crest, Type Biebesheim with a conical, rounded crest and Type Bernières d'Ailly with a triangular, pointed crest. The recovery area of types Mantes, Biebesheim and Bernières d'Ailly overlap, as it partly does also with helmets of Type Montbellet (Fig. 2.15). Therefore, and as pointed out later (Chapter 2.2.1), they are discussed together with the other western European helmets.



Fig. 2.15 Archaeological distribution of western European Bronze Age helmets: ● Helmets of Type Montbellet. ◇ Helmets of Type Mantes. △ (grey) Helmets of Type Lueg. ▲ Helmets of Type Biebesheim. △ Helmets of Type Bernières d'Ailly. Helmets with unknown or unsecure find location are not mapped.

⁴⁵⁷ Hencken 1968, 194; Hencken 1971, 135, fig. 109; Schauer 1982c, 705; Clausen 2001, 221.

⁴⁵⁸ Iaia 2005, no. 16, fig. 11.

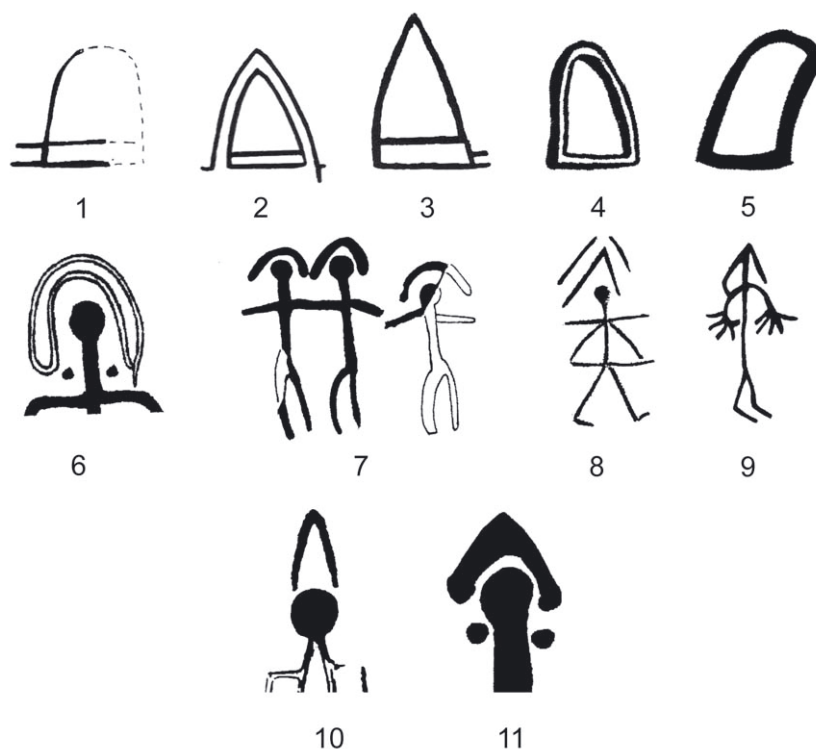


Fig. 2.16 Helmets and headgear depicted on Iberian stelae (after Harrison 2004, fig. 7.12 and Ripoll Perelló 1963) (not to scale). Crested helmets with rivets (1–3) and other helmets or headgear (4–12): **1.** Valencia de Alcántara III; **2.** Santa Ana de Trujillo; **3.** Zarza de Montánchez; **4.** Solana de Cabañas; **5.** Cabeza del Buey III; **6.** Cabeza del Buey I; **7.** Zarza Capilla III; **8.** Setefilla; **9.** Almargen; **10.** Las Herencias I; **11.** Ategua; **12.** Barranc de la Gasulla.

The known corpus of crested helmets, comprising some 40 examples, and helmets of Type Montbellet were found mainly in northern and central France, western Germany, western Austria, and northwestern Switzerland. Fragments and depictions of European crested helmets are also known from Portugal and Spain. Helmets of Type Bernières d'Ailly and Type Biebesheim show an overlapping distribution between the Seine and Oise and the middle part of the Rhine. Helmets of Type Mantes instead range from northern Italy to Mantes in the northwest and Mainz in the northeast, overlapping with Type Biebesheim. The recovery area of Type Lueg in the western Austrian Alps does not overlap with any other helmet type.

Depictions of crested helmets are restricted to the southwestern area of the Iberian Peninsula.⁴⁵⁹ None of the northern stelae depicts helmets.⁴⁶⁰ The distribution area of actual finds of crested helmets and these depictions do not overlap. The oldest stelae with helmets show pointed helmets with convex profile, while the more recent stelae show horned helmets⁴⁶¹ and helmets with a straight-sided profile (Fig. 2.16).⁴⁶² The crest is never clearly indicated, but we can recognise the typical decorative rivets of crested helmets. The profile of the depicted helmets resembles those of Type Bernières d'Ailly, as indicated by the long conical rivets and the double horizontal line of the base. The interpretation of the depicted helmets as Type Bernières d'Ailly instead of Type Biebesheim is also more consistent with the distribution of the actual helmets. So far, around ten depictions of crested helmets are either known as separate motifs or worn by

⁴⁵⁹ The Iberian stelae with the central depiction of (mainly Type Herzprung) shields date to the end of the Atlantic Bronze Age (Bronze Final I–II) (e.g. Uckelmann 2012, 128) but also thought to be of more recent origin in the 9th/8th century BC (Celestino Pérez – López-Ruiz 2006). For the chronological discussion and overview: see Burgess 1991, 39; Harrison 2004, 84, fig. 6.1; Brandherm 2008; Brandherm 2011; Mederos Martín 2012.

⁴⁶⁰ Stary 1994, 39.

⁴⁶¹ See Chapter 2.3, p. 137.

⁴⁶² Celestino Pérez – López-Ruiz 2006, 91, fig. 3.

a warrior.⁴⁶³ Most of the helmets worn by human figures have either a thick, round shape or a thinner, pointed 'V'-shaped form.⁴⁶⁴ The stele from Santa Ana de Trujillo,⁴⁶⁵ Subtype II B after Almagro-Gorbea,⁴⁶⁶ might actually depict two helmets inside one another, which is rather unusual, since normally only one helmet per stela is depicted. Since only the outer helmet has recognisable rivets, we might alternatively interpret the inner one as the organic inlay of a crested helmet. This may also be the case for the helmet depictions made of double lines on the stelae from Serefilla and Cabeza del Buey I.⁴⁶⁷ Similarly the round head protection around the head of the human figure from the stele at Cabeza del Buey I might also be a depiction of organic head protection.

The origin of European crested helmets as well as their chronology is still a matter of discussion. Most recently, Brandherm⁴⁶⁸ related the development of the shape and profile of the cap of Western European crested helmets to that of eastern Mediterranean cap helmets, with the former developing from the latter. However, the Alpine crested helmets of Type Lueg are considered older than the western European crested helmets, and are not connected to any eastern Mediterranean cap development. Hencken, Borchhardt and Schauer also emphasised an origin in the Near East.⁴⁶⁹ R. v. Laur-Belart suggests helmets of Type Mantes as potential ancestors of crested helmets,⁴⁷⁰ but Brandherm argues that their simple shape alone does not necessarily indicate an older type.⁴⁷¹ A. Lippert sees the origin of crested helmets not in the Near East but as a local development out of previous organic bi-valve helmets.⁴⁷² Egg and Tomedi date the helmets of Type Lueg already to Bz C, interpreting them as one of the oldest metal helmets and consequently reject any potential origin in the Aegean or the Near East.⁴⁷³ This is criticised by Schauer due to the wide chronological variation seen in the votive deposit from the Piller Sattel (Bz C2–Ha A/B1) and the unsecure association of the finds from the Pass Lueg deposit.⁴⁷⁴ Lippert recently suggested a slightly diverse approach for the development of crested helmets, placing Type Bernières d'Ailly at the beginning, in the 13th/12th century BC.⁴⁷⁵ Accordingly, Type Bernières d'Ailly would be followed by Type Biebesheim (12th/11th century BC), which he connects with two ceramic helmets from Veii (graves nos. 4–5, necropolis Quattro Fontanili) and Populonia. Connecting the helmet from Tiryns with the ones of Type Lueg, he dates the latter to the 11th century as well, noting that Type Lueg and the earliest Italian helmets overlap chronologically.⁴⁷⁶ The Italian crested helmets made of ceramic and bronze then dominate his following period IIIB.

Seeing in helmets of Type Mantes the origin of both central and western European helmets would finally put an end to the discussion of whether or not the crested helmets derive from Near Eastern or Aegean crested archetypes. Despite this, there is still the impression that an eastern origin is sought by some authors, based on two depictions and a crested Anatolian (?) helmet without any known find context or date as the basis for its argument:⁴⁷⁷ the depiction of a boar tusk helmet from a 16th century silver vase from Mycenae, grave round A, grave IV⁴⁷⁸ and the warrior stele from Hattuša-Bogazköy, Anatolia (14th/13th century BC). It is usually over-

⁴⁶³ Harrison 2004, C17.

⁴⁶⁴ Harrison 2004, fig. 7.12, row B and C.

⁴⁶⁵ Mederos Martín 2012, 417–454, fig. 2.2.1; Uckelmann 2012, fig. 16.2.

⁴⁶⁶ Almagro-Gorbea 1977.

⁴⁶⁷ Harrison 2004, fig. 7.12.C.32, C71.

⁴⁶⁸ Brandherm 2011.

⁴⁶⁹ Hencken 1971; Borchhardt 1972; Schauer 1980; Schauer 1983.

⁴⁷⁰ v. Laur-Belart 1950, 205.

⁴⁷¹ Brandherm 2011, 43.

⁴⁷² Lippert 2011, 42–43.

⁴⁷³ Egg – Tomedi 2002, 556.

⁴⁷⁴ Schauer 2003, 201.

⁴⁷⁵ Lippert 2011, 40–45.

⁴⁷⁶ Lippert 2011, 45.

⁴⁷⁷ Schauer 1980, 521, 533–540, figs. 16–17; contra Brandherm 2011.

⁴⁷⁸ Hencken 1971, 9, fig. 6; Egg – Tomedi 2002, fig. 13.

looked that this boar tusk helmet from Mycenae shows an organic crest (as indicated by the parallel lines), as also found on many other depictions,⁴⁷⁹ which clearly indicate organic crests. The Hattuša-Bogazköy helmet also shows what is obviously an organic crest (tail?), which starts on the forehead and reaches the middle of the back of the person wearing the helmet (there does not seem to be a separation between crest and tail), as known from the relief of Suppiluliuma II at Hattuša. The oldest known crested helmet of eastern Mediterranean origin unfortunately lacks any information concerning find circumstances or location.⁴⁸⁰ Its cap has a conical profile and not, as older depicted helmets, a convex profile. Brandherm interprets these helmets as more recent than the western European crested helmets and sees a possible influence on this helmet from the western European crested helmets.⁴⁸¹ There are no known depictions similar to this helmet and its date remains unclear. Schauer argues that based on this helmet, a development from crested helmets made out of one piece of bronze to later ones made of two halves joined together at the crest must have taken place.⁴⁸²

We cannot ignore the fact that knowledge of Mediterranean helmets may indeed have influenced the production or development of Late Bronze Age European helmets – but not in the form of direct prototypes. Such knowledge is demonstrated by the presence of a fragment from a Mediterranean pointed helmet in the deposit from the Río Huelva.⁴⁸³ Schauer identified it as part of an Urartian/Syrian helmet.⁴⁸⁴

Due to the small number of crested metal helmets from the Aegean and Near East (the late 11th century BC helmet from Tiryns, one of the Ur-helmets and the most likely more recent ‘Anatolian’ helmet),⁴⁸⁵ which are both typologically and chronological diverse, the argument for the local development of European crested helmets gains more weight. This process might have occurred with the imitation of organic helmets or, more likely, with the development of crests on cap helmets.⁴⁸⁶ The development of crests out of cap helmets is supported by three massive cap helmets – found in Mantes, Oggiono-Ello and Mainz – with a central ridge or little crest and one massive helmet with a little crest, and already made out of two bronze sheets (Weil). All helmets belong to helmets of Type Mantes. These helmets might be the crucial point for the development of crested helmets. Here, the relationship of Type Mantes and Type Biebesheim and between types Mantes and Type Lueg is of particularly interest.

Besides stylistic approaches, the development from a simple hemispherical cap to a shape which leaves more space above the head and increases also the buffer zone during weapon impact (as we evidenced on Type Biebesheim), thus supporting a ‘gliding’ of the blade along the helmet’s side rather than allowing to ‘hack’ right into it (i.e. so that the angle of impact is not 90° but higher), improves the protective aspects of the helmet – a surely convincing argument for the person using the helmet as head protection. Further similarities between cap helmets of Type Mantes and Type Biebesheim are the growing crest, the rising cap, the (initial?) flat-headed rivets on some helmets of Type Biebesheim and the partly straight rim (Le Theil). Between Type Mantes and Type Lueg, the hemispherical shape of the cap, the flat rivets and the inwards bent rim without a wire indicate a close connection.⁴⁸⁷ According to these similarities, we identify helmets of Type Mantes not only as the precursor of Type Biebesheim, but also of Type Lueg. Besides the shared characteristics, this is also supported by the compactness and thickness of the bronze sheet and the lack of any fine decoration on the helmets of Type Mantes,

⁴⁷⁹ Borchhardt 1972, suppl. E.

⁴⁸⁰ Schauer 1980, 533, figs. 16–17.

⁴⁸¹ Brandherm 2011, 47, fig. 4.

⁴⁸² Schauer 2003, 201.

⁴⁸³ Brandherm 2011, 43.

⁴⁸⁴ Schauer 1983, 185, fig. 5a–b.

⁴⁸⁵ Stary 1994, 41, fig. 2.

⁴⁸⁶ Brandherm 2011, 43.

⁴⁸⁷ Despite the Pass Lueg helmet being in between western and eastern European helmets, influence from the east concerning the shape of the cap cannot be excluded if we do not want to regard the origin of the cap’s profile amongst the western, but rather massive helmets of Type Montbellet.

which is far from the delicate structure and decoration of the later helmets of Type Lueg and Type Biebesheim and which would make development in the opposite direction rather unlikely.

2.2.1 Helmets of Type Montbellet

Helmets of Type Montbellet are undecorated, plain cap helmets with a hemispherical cap, which were made from a single bronze sheet. The rim at the top of the cap is thicker than the sides,⁴⁸⁸ because of the use of an open die for the production of the helmet.⁴⁸⁹ The rim of the helmet from Iseo is bent inwards, possibly to fix an organic lining or to make the cap more resistant. This is also noted on the helmet of Type Mantes from Oggiono-Ello and those of Type Lueg. Just at the fold on the helmet from Iseo, holes were applied: in front and back were placed two holes, and to the sides, with three holes on each side (diameter 3–4mm). On the front and back of the helmet from Brancere, one single hole is visible, whilst each side has seven, most likely to attach cheek plates than a chin strap; most of these holes are torn. The helmet from Montbellet has instead just one hole each on each side, while the helmets from Szikszó and Wonsheim have two on each side. The helmet from Thonberg has an additionally two holes on both the front and back. The quality of the photographs of the today lost, unprovenanced helmets cat. nos. 77–78 do not permit any detailed description. It is only possible to note that both bear a high number of rivet holes; interestingly, the same weight is published for both helmets (Tab. 2.9). However, their different form and shape indicates two different helmets and not the same find known under two names.

Cat. No.	Find Circumstances	Find Site	State	Condition	High Total (cm)	Dm (cm)	Thickness Cap/Rim (mm)	Weight (g)
71	river	Montbellet	FR	not complete	14.5	22 × 18.5	0.6–1 / –	–
72	associated deposit (?)	Thonberg	DE	complete	13.7	17.5 × 21.6	2–3 / 5	678
73	associated deposit (?)	Wonsheim	DE	complete	12	18.6 × 22	1.5	563
74	associated deposit	Szikszó	HU	complete	14.4	18 × 21.7	– / 3	638
75	river	Brancere	IT	complete	14	17 × 21.5	–	370
76	bog	Iseo	IT	complete	11	16.5 × 19	–	–
77	unknown	unprovenanced	–	lost	–	–	–	1140
78	unknown	unprovenanced	–	lost	14	23 × 21.5	–	1140

Tab. 2.9 Helmets of Type Montbellet.

2.2.1.1 Research History

G. v. Merhart subdivided helmets made of one piece of bronze into group A, the *Kappenhelme*, and group B, the *Glockenhelme*, which have a more conical or bell shape.⁴⁹⁰ Hencken used the terminology of v. Merhart and divided cap helmets into several different groups: conical bell helmets; rounded bell helmets; cap helmets with stars; cap helmets with cast knobs; cap helmets and others with plain sockets; cap helmets without knobs or sockets. He included in the latter group also helmets of Type Mantes and the Iron Age helmets from Tarquinia, Cuevas de Vinromá, Býčí skála, as well as a potential helmet from Cumae and the more recent helmet from Schoonaarde (see below).⁴⁹¹ Thus, only the six helmets from Montbellet, Thonberg, Wonsheim,

⁴⁸⁸ E.g. Schauer 1982c, fig. 10.

⁴⁸⁹ For the production method, see Mödler 2014a.

⁴⁹⁰ v. Merhart 1941.

⁴⁹¹ Hencken 1971, 124–137.

Szikszó, Brancere and Iseo are associated with the helmets of Type Montbellet. G. v. Merhart notes another helmet, presumably from Rome (cat. no. 77),⁴⁹² which was part of the collection of Amilcare Ancona, Milan, but not the later Zschille collection, as a comparison of the photographs of the two helmets indicate.⁴⁹³ The helmet from the Zschille collection (cat. no. 78) was destroyed during the Second World War, as noted by Hencken;⁴⁹⁴ the location of the helmet from 'Rome' remains unknown. As well as these six helmets, Schauer included in his group of undecorated cap helmets also those of Type Mantes from Oggiono-Ello and Mainz, as well as the unfinished, potential helmets or vessels from Ehingen.⁴⁹⁵ In addition, he associated the helmet from Brancere with decorated cap helmets. Most likely, the so-called helmets from Ehingen, Baden Württemberg, Germany,⁴⁹⁶ are not helmets at all, since they are too small and there are no rivet holes to attach a chin strap or cheek plates. Moreover, their shape, with wide-open edge, is not found on any other helmet so far. If they are unfinished helmets or vessels though, according to Hencken,⁴⁹⁷ they already are so thin that it seems impossible to thin them even more to achieve the shape of a functional helmet. In any case, the probable type of helmet (or vessel?) cannot be detected. The associated deposit is dated to the beginning of Ha B1.⁴⁹⁸

The helmet from Schoonaarde is usually associated together with other helmets of Type Montbellet⁴⁹⁹ or considered as potentially Celtic in origin.⁵⁰⁰ It is the only plain cap helmet, which was not found within the area of the Urnfield culture; the exact find circumstances – allegedly a single find from the river Scheldt – are unknown. As on the helmets from Iseo and Brancere, the rim of the helmet is bent inwards, maybe to fix an organic lining or to make the cap more resistant. On the sides of the helmet from Schoonaarde are two small gaps where we can see a wire which passes through the inwards bent rim. It seems as if the wire here formed tiny loops, maybe to attach a chin strap. The helmet is also the only plain cap helmet with decoration: three lines parallel to the rim are engraved on the outside. Considering the unique decoration, the inwards folded rim with wire and the loops it forms, we might indeed interpret it as a more recent helmet, which is not necessarily connected with helmets of Type Montbellet.

Both v. Merhart and Hencken did not find a satisfactory explanation for the origin of helmets of Type Montbellet.⁵⁰¹ Schauer connects the European cap helmets with depictions on Assyrian and Egyptian reliefs (Luxor, Abydos, Abu Simbel and Medinet Habu), referring to the depicted Shardana helmets, indicating they might also represent metal helmets and not only organic head protection, as suggested by Borchhardt.⁵⁰² Schauer locates the precursors of the European plain cap helmets between Egypt and the Caspian Sea.⁵⁰³ However, his connection between European cap helmets with Persian helmets with gold and silver applications from the 13th–12th century BC seems somewhat farfetched.⁵⁰⁴

The more narrowly defined types of cap helmets used here, as opposed to that previously described,⁵⁰⁵ based on that of undecorated, plain cap helmets (Type Montbellet) and those cap helmets with central ridge or basic crest (Type Mantes) and others⁵⁰⁶ allows the clearer visualisation of the development of these two types. It seems rather unlikely that cap helmets with

⁴⁹² v. Merhart 1941, 5, 10, fig. 1.6.

⁴⁹³ Pertusi 1892, 3, no. 21, pl. VIII.6; Forrer 1894, 2, pl. IV.27.

⁴⁹⁴ Hencken 1971, 144.

⁴⁹⁵ Schauer 1982c, 704–705.

⁴⁹⁶ Hencken 1971, 183, fig. 151; Schauer 1980, 525; Schauer 1982c, fig. 12.

⁴⁹⁷ Hencken 1971, 185.

⁴⁹⁸ Schauer 1980, 525; Schauer 1982c, 719.

⁴⁹⁹ E.g. Hencken 1971, 126; Warmenbol 1992, 101–103; Moore – Armada 2011, 305.

⁵⁰⁰ Schauer 1982c, 704.

⁵⁰¹ v. Merhart 1941; Hencken 1971.

⁵⁰² Borchhardt 1972, 109; Schauer 1982c, 721.

⁵⁰³ Schauer 1982c, 724.

⁵⁰⁴ Schauer 1980, 530, fig. 9–11.

⁵⁰⁵ v. Merhart 1941; Hencken 1971; Schauer 1982c.

⁵⁰⁶ See Chapter 2.1, p. 30.

ridge or basic crest are older than basic cap helmets; consequently, we interpret the latter as older than helmets of Type Mantes but having a longer life span.

We also have to consider them a local invention, developing out of organic head protection, which had been in use at least since the Early/Middle Bronze Age (see e.g. the conical head protection from Fiavé-Carera, Italy (cat. no. 60)).⁵⁰⁷ Helmets Type Montbellet are without doubt the most basic metal helmets and show the closest form to the human head. Assuming the first helmets of Type Montbellet are older than Type Mantes, would make them also the precursor of the later western European crested helmets, from Type Mantes with basic crest, to types Lueg, Biebesheim and Bernières d'Ailly with elaborated crest, and finally the Italian crested helmets. Moreover, we have to take into account that the find spots of helmets of Type Montbellet, despite the single find at Szikszó (most likely an import), only overlaps with the find area of western European crested helmets.

Most of the helmets of Type Bernières d'Ailly, all those of Type Lueg, as well as helmets of Type Montbellet, the helmets from Iseo and those of Type Mantes (helmets from Mantes and Oggiono-Ello), have an inwardly bent rim, usually enclosing a wire. Such is never observed on eastern European helmets, apart the unprovenanced crested helmet (cat. no. 100). While the shape of the cap changed with the development of the crest in western Europe, its basic shape remained with the crested helmets of Type Lueg – though the latter is a much thinner, more delicate version of the rather massive helmets of Type Montbellet. Thus, it is in the form of the cap helmet, rather than in the development of the crested helmet, that we find connections with Eastern European prototypes, which, as helmets of Type Oranienburg demonstrate, themselves surely had Aegean precursors. Due to the basic, easy to produce shape of plain cap helmets such as helmets of Type Montbellet, we might reasonably assume that such helmets continued to exist even after the development of more elaborate types; though their number is rather small, we suggest that they were a long-lived phenomenon.

A similar development from plain, undecorated cap helmets to crested helmets can also be noted in Mesopotamia: the oldest metal helmets are, without doubt, plain, undecorated Sumerian cap helmets found in Ur (2nd half of the 3rd millennium BC).⁵⁰⁸ Interestingly, one of the three helmets also bears a basic ridge as found on our helmets of Type Mantes. More elaborated, organic crested helmets appear only shortly after (see the helmet on the tropaion from Mari).

2.2.1.2 Distribution and Deposition

All helmets of Type Montbellet were found within the area of the Urnfield culture, and only one of them in its eastern zone (Fig. 2.17). Find spot and find circumstances of the unprovenanced helmet (cat. no. 77) remain unclear. Helmets Type Montbellet were recovered from the Po basin in the south to the Jura Mountains in the west and to the Main and Rhine in the north. Their recovery area overlaps widely with helmets of Type Mantes. The helmets from Brancere and Montbellet were found in rivers, the one from Iseo in a bog, while the two German finds from Thonberg and Wonsheim probably derive from associated deposits. The exact composition of these associated deposits, their find circumstances and their exact associations remain unclear. The helmet from Szikszó, the only one found in eastern Europe, also derives from an associated deposit. This helmet, most likely an import, provides the most secure information on the chronology of these helmets.

⁵⁰⁷ Perini 1987, 190; Born – Hansen 2001, 60, fig. 54.

⁵⁰⁸ Wolley 1934, 63, nos. 18, 45–50, pls. 148–149, 218; Borchhardt 1972, 94, pl. 19.2–3; Gilibert 2004/2005, 98, fig. 14.

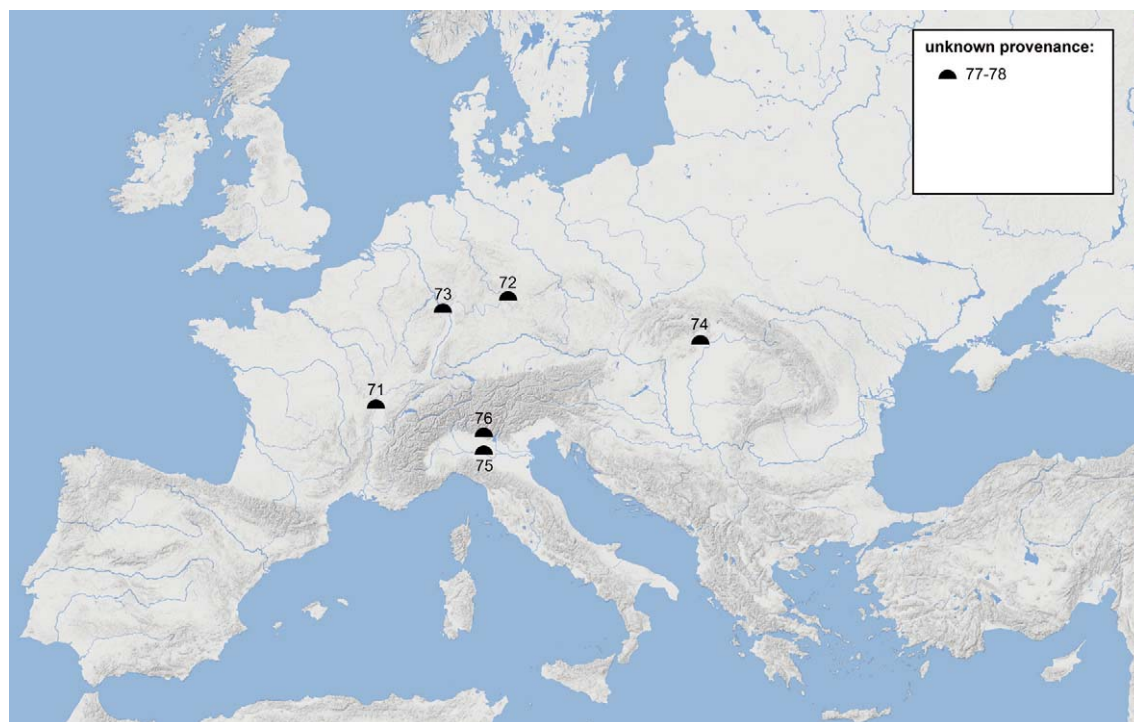


Fig. 2.17 Archaeological distribution of helmets of Type Montbellet: **71.** Montbellet; **72.** Thonberg; **73.** Wonsheim; **74.** Szikszó; **75.** Brancere; **76.** Iseo; **77–78.** Unprovenanced. Numbers correspond to the catalogue numbers.

2.2.1.3 Chronology

The helmets from Montbellet, Brancere and Iseo are of little use in any consideration of the chronological classification of this helmet type. Up to now, the helmet from Montbellet has been associated with both the Iron Age and the Late Bronze Age.⁵⁰⁹ The helmet from Wonsheim was associated with Ha B(1) based on the cups in the same associated deposit.⁵¹⁰ However, according to Martin, the cups of Type Ehingen-Wonsheim date to Ha B3.⁵¹¹ The potentially associated finds of the helmet from Thonberg remain unclear yet. Thus, the only chronologically valuable associated deposit is that from Szikszó, containing three small sickles (Bz D) and three large ones (Ha B) (two *Knopfsicheln*, four *Zungensicheln*), as well as a median winged axe of Type Kleedorf.⁵¹² According to Hansen and Mozsolics, the associated deposit may have been deposited in Ha B1, or, according to Hencken, at the transition from Ha A to Ha B or at the beginning of Ha B, while Kemenczei associates the associated deposit with Ha A2.⁵¹³ Thus, we are left with a wide chronological time frame for helmets of Type Montbellet, which ranges from Bz D–Ha B. This necessitates then the reconstruction of tentative chronology based on the temporal development of these helmets using typological characteristics instead, based upon the sequence outlined above: helmets of Type Montbellet are the most basic helmet shape, developing from local organic precursors, and therefore older than helmets of Type Mantes (Bz D), which develop from them. As helmets of Type Montbellet are the simplest metal helmet to be produced, we consider them to have been an especially long-lived phenomenon, which, despite their small number, may have lasted even until the end of the Urnfield culture.

⁵⁰⁹ Bonnamour 1990, 47.

⁵¹⁰ Reinecke 1906; Holste 1937; v. Merhart 1941; Schauer 1982c, 719.

⁵¹¹ Martin 2009, 75.

⁵¹² Hencken 1971, fig. 101; Schauer 1982c, 720.

⁵¹³ Hencken 1971, 130; Kemenczei 1984, 51; Hansen 1994, 19; Mozsolics 2000, 80.

Catalogue

Cat. no. 71. Montbellet, 'Pont de Fleurville', Dép. Saône-et-Loire, France – river find (river Saône) – complete helmet. Measurements: height: 14.5cm; diameter: 22 × 18.5cm; thickness: 0.6–1mm – Musée de Tournus, inv. no. 88.4.20 (collection Musée Greuze) – Pl. 10.71. References: Bonnamour 1985, fig. 3; Bonnamour 1990, 74, no. 60, fig. 35; Feugère 1994, 47; Gras 2002, figs. 1–2, pl. IV; Feugère 2005, 85–92.

The helmet was considered by M. Feugère as Type Mannheim/Coolus, but later revised.⁵¹⁴

Cat. no. 72. Thonberg, Bayern, Germany – associated deposit (?) – complete helmet. Measurements: height: 13.7cm; diameter: 17.5 × 21.6cm; thickness: 5mm (rim), 2–3mm (cap); weight: 678g – Germanisches Nationalmuseum Nürnberg, inv. no. V 1962 – Pl. 10.72. References: Hock 1911, 8; Hock 1914, 249, pl. I.18; Holste 1937, 16; v. Merhart 1941, 5, fig. 1.8; v. Henning 1970, 83, no. 46, pl. 81; Hencken 1971, 128, fig. 99; Schauer 1980, 521–543; Schauer 1982c, 704, no. 5, figs. 8–11; Schauer 1984, 209–235; Clausning 2001, 221; Abels 2002, 46; Grahl 2004.

This helmet and 'other stuff' was found allegedly in a sand pit at Sandpfeife near Thonberg in 1906, appeared on the market in 1911 and was bought by the Germanisches Nationalmuseum from a dealer from Nuremberg. The impression on the cap might be recent damaged, as children reputedly played with the helmet before it was sold.

Cat. no. 73. Wonsheim, Rheinland-Pfalz, Germany – associated deposit (?) – complete helmet. Measurements: height: 12cm; diameter: 18.6 × 22cm; thickness: 1.5mm (edge); weight: 563g – Landesmuseum Mainz, inv. no. 2222 – Pl. 10.73. References: Reinecke 1900, 343; Reinecke 1906; Holste 1937, 16; v. Merhart 1941, 5, fig. 1.1; Hencken 1971, 130, fig. 100a; Schauer 1980, 525; Schauer 1982c, 704, no. 4, figs. 6–7; Clausning 2001, 221; Lippert 2011, 31.

The helmet was found allegedly together with nine bronze cups, of which six are still preserved, in 1858. Two very similar looking cups might belong to the same associated deposit and were bought by the museum in 1860, 'deriving from the vicinity of Wonsheim', from the Nationalmuseet in Copenhagen (inv. no. 19.253–OAV.11.C48; 19.254–OAV.11.C49).

Cat. no. 74. Szikszó, kom. Borsod-Abaúj-Zemplén, Hungary – associated deposit ('find I') – almost complete helmet. Measurements: height: 14.4cm; diameter: 18 × 21.7cm; thickness: 3mm (rim); weight: 638g – Herman Ottó Múzeum in Miskolc, inv. no. 66.14.1 – Pl. 10.74. References: Kemenczei 1966, 101, pl. XV; Hencken 1971, 130, fig. 101a; Schauer 1980, 525; Schauer 1982c, 705, no. 8, fig. 5.2; Kemenczei 1984, 50–55, 151, no. 29, pl. CXVII.4; Hansen 1994, 19, 554, H 677; Mozsolics 2000, 80, no. 6, pl. 99.7; Clausning 2001, 221.

The helmet was found together with three small sickles (*Zungensicheln*) (Bz D) and three large sickles (*Knopfsicheln*) (Ha B), as well as a median winged axe of Type Kleedorf⁵¹⁵ in 1965.

Cat. no. 75. Brancere, Lombardia, Italy – river find (river Po) – complete helmet. Measurements: height: 14cm; diameter: 17 × 21.5cm; weight: 370g – Museo Civico Ala Ponzone di Cremona (Inventory Vol. S, oggetti di scavo, 93, no. 3) – Pl. 10.75. References: Patroni 1909, 276, fig. 2; v. Merhart 1941, 5, fig. 1.4; Hencken 1971, 130, fig. 102; Pontiroli 1974, 212–213, no. 221; Schauer 1982c, 705, no. 12, fig. 13; Clausning 2001, 221; Martinelli 2004, 30.

The helmet was found in 1896 at Brancere in the sands of the river Po and bought by the museum in 1906.

Cat. no. 76. Iseo, prov. Brescia, Lombardia, Italy – single find (bog) – complete helmet. Measurements: height: 11cm; diameter: 16.5 × 19cm – Museo Preistorico Luigi Pigorini, Rome, inv. no. 66.152 – Pl. 10.76. References: Castelfranco 1887, 145–147, pl. V.5; Ruffoni 1888, 36;

⁵¹⁴ Feugère 1994, 47; Feugère 2005, 61–67.

⁵¹⁵ Hencken 1971, fig. 101; Schauer 1982c, 720.

Ruffoni 1891, 76, 85, pl. VIII.8; Montelius 1895, pl. 33.5; v. Merhart 1941, 5, fig. 1.5; Hencken 1971, 133, fig. 104; Schauer 1982c, 704, no. 2, fig. 2; Clausen 2001, 221.

The helmet was found before 1887 at a depth of 3m in the bog while cutting peat close to the Lago d'Iseo. It was said a now lost (?) bronze sickle was found together with the helmet.

Cat. no. 77. Unprovenanced (known as 'Rome', Italy) – complete helmet. Measurements unknown; weight: 1140g – repository unknown – Pl. 10.77. References: Ruffoni 1891, pl. VIII.8; Pertusi 1892, 3, no. 21, pl. VIII.6; v. Merhart 1941, 5, 10, fig. 1.6; Hencken 1971, 144; Clausen 2001, 221.

The find spot and find circumstances of this helmet are unknown. It was part of the collection of Amilcare Ancona, Milan. The current location of the helmet is unknown.

Cat. no. 78. Unprovenanced – complete helmet, but destroyed during WW2. Measurements: height: 14cm; diameter: 23 × 21.5cm; weight: 1140g – Pl. 10.78. References: Forrer 1894, 2, pl. IV.27; Hencken 1971, 144, fig. 113.

The helmet from the Zschille collection was not the one from 'Rome', which belonged to the Amilcare Ancona collection from Milan, as a comparison of the two photographs of both helmets demonstrates;⁵¹⁶ both helmets though are indicated with the same weight.

2.2.2 Helmets of Type Mantes

Helmets of Type Mantes – named for the French find from the Seine at Mantes, Dép. Seine-et-Oise – are rather heavy, massive cap helmets with a slight, central ridge running from the front to the back (Tab. 2.10). These helmets, manufactured from either one or two bronze sheets, are, strictly speaking, a transitional form between helmets of Class I and Class II. Whilst some were still formed from a single bronze sheet, as is characteristic of Class I helmets, the form of their crest and their distribution also relate them to Class II helmets. Given this mixed heritage, they are clearly the local precursor of crested helmets of Types Biebesheim, Bernières d'Ailly and Lueg. The crest of helmets of Type Mantes is either solid (Oggiono-Ello, Mainz-Kostheim) or hollow (Mantes). The rim of the helmet is straight and significantly thicker than the cap (Mantes, Mainz-Kostheim) or folded inwards (Oggiono-Ello), as on helmets of Type Lueg. Both the helmet from Oggiono-Ello and those of Type Lueg are not bent around a wire, as known on crested helmets of Type Biebesheim and Bernières d'Ailly or the helmet from 'Hungary'. At the rim of the helmet from Oggiono-Ello are two rivet holes in the front and the back of the helmet as well as three on each side, though not exactly opposite one another. The helmet also has a distinct cut-out on the back. On the helmet from Mainz-Kostheim, some of the small and flat headed rivets survive, mainly due to the use of internal lining discs. The now conserved copy of the helmet from Mantes does not show any rivet holes. While the Italian and the German helmets are without any decoration – and here we exclude the massive, inwards bending rib parallel to the rim of the helmet from Oggiono-Ello as 'decoration' – the helmet from Mantes is decorated with three negative lines parallel to the edge.

Cat. No.	Find Circumstances	Find Site	State	Condition	High Total (cm)	Dm (cm)	Thickness Cap/Rim (mm)	Weight (g)
79	river	Mantes	FR	complete	24	21 × 17	–	–
80	river (?)	Mainz	DE	complete	16.7	22.3 × 21.7	2–3 / –	1208
81	associated deposit	Oggiono-Ello	IT	complete	13.6	20.3 × 18.7	–	750
82	river	Weil am Rhein	DE	complete	19.6	22.7 × 17.4	–	804

Tab. 2.10 Helmets of Type Mantes.

⁵¹⁶ Pertusi 1892, 3, no. 21, pl. VIII.6; Hencken 1971, fig. 113.



Fig. 2.18 Helmet of Type Mantes from Weil am Rhein, Germany (© Archäologische Bodenforschung Basel-Stadt, photograph: P. Saurbeck).

Around the rim of the helmet from Mainz a blackish band is visible. This is due to the turned-out edge of the inner organic lining, which then reacted on the outside with the bronze and led to the formation of different corrosion products.

Even though the helmet from Weil is, technologically speaking, closer to the classical crested helmets, with its cap made from two different bronze sheets joined together in the centre, this helmet still more closely resembles the helmets from Oggiono-Ello, Mainz-Kostheim and Mantes (Fig. 2.18). The lack of decoration and the shape of the massive cap, which is more round than conic, indicate a close relation to helmets of Type Mantes. The use of two flat-headed rivets on both the front and back demonstrates the connection to crested helmets of Type Lueg. We can interpret this helmet as a transitional form from Type Mantes, as the prototype of crested helmets, to the highly developed crested helmets of Type Lueg or Type Biebesheim.⁵¹⁷

2.2.2.1 Research History

As noted at the beginning of Chapter 2.2, helmets of Type Mantes were considered also as potential ancestors of crested helmets,⁵¹⁸ even though their simple shape alone does not necessarily indicate an older type.⁵¹⁹ Sperber interprets the helmet from Mantes as the one-part version of the two-part Type Biebesheim helmets, but not as an ancestor of the latter, while Schau-

⁵¹⁷ E.g. v. Laur-Belart 1950, 202–208.

⁵¹⁸ v. Laur-Belart 1950, 205.

⁵¹⁹ Brandherm 2011, 43.

er already classified it as a crested helmet.⁵²⁰ Lippert classifies the helmets from Mantes and Weil as Art Biebesheim.⁵²¹ Type Mantes were also interpreted as a product of the combination of contemporary cap helmets and bi-valve crested helmets,⁵²² though their date of Bz D (if not earlier; according to the associated finds in the deposit from Oggiono-Ello) suggests otherwise.

2.2.2.2 Distribution and Deposition

The find spots of the four helmets are quite widely spread: from Mantes in the northwest to Mainz in the northeast and southwards to Oggiono-Ello, Lombardia (Fig. 2.19). The helmet from Mantes was found in the Seine in 1860. It was part of the collection of Dr. Bonneau at Mantes, the actual find location being unknown. A reproduction is displayed in the Musée des Antiquités Nationales in Saint-Germain-en-Laye. From a private collection, another helmet, said to be found in the Main/Rhine (estuary of both rivers?) close to Mainz before 1940, is known. The helmet from Weil was found on a river bank of the Rhine in 1910. Today, the fluvial terrace of the river Rhine next to the village of Weil, Germany, in the north of Kleinhüningen, Switzerland, seems to be the most likely find spot. The helmet was bought by the Historisches Museum Basel and kept there for several decades before it moved to the Museum der Kulturen. The helmet from Oggiono-Ello was found as a part of a deposit in a quarry. G. v. Merhart notes loose fragments of a bronze sheet probably found together with the helmet, which might have been attached to it, since also on the inside of the helmet a bronze sheet was attached by rivets (Fig. 2.20).⁵²³



Fig. 2.19 Archaeological distribution of helmets of Type Mantes: **79.** Mantes; **80.** Mainz; **81.** Oggiono-Ello; **82.** Weil am Rhein. Numbers correspond to the catalogue numbers.

⁵²⁰ Schauer 1982c, 704; Sperber 2011, 23.

⁵²¹ Lippert 2011, 42.

⁵²² Brandherm 2011, 44.

⁵²³ v. Merhart 1941, 6–9.



Fig. 2.20 Bronze bands found under the helmet of Type Mantes from Oggiono Ello, Italy (after Ghislanzoni 1929, fig. 12) (no scale).

2.2.2.3 Chronology

Since three of the four helmets are single finds from rivers, the only helmet useful for dating is the one from Oggiono-Ello. The associated deposit contains two swords of Type Oggiono,⁵²⁴ two Griffplatten daggers, four Bz D spearheads and two axes (Type Möhlin/variant B) as well as several unidentified fragments of bronze sheet bands with rivet (?) holes on the sides.⁵²⁵ According to Hansen and Hencken the associated deposit dates to Bz D.⁵²⁶ Though, some of the bronzes, such as the two axes, might already date to Bz B/C according to Schauer.⁵²⁷ V. Bianco-Peroni dates the associated deposit to the Middle Bronze Age, and M. Egg – G. Waurick to ‘most likely’ 12th/13th century BC.⁵²⁸ A chronological range for helmets of Type Mantes of late Bz C to Bz D therefore seems to be most likely.

Catalogue

Cat. no. 79. Mantes, Dép. Seine-et-Oise, France – single river find (river Seine) – complete helmet. Measurements: height: 24cm; diameter: 21 × 17cm – Musée des Antiquités Nationales Saint-Germain-en-Laye, inv. no. 4778 (copy; the depository of the original is unknown) – Pl. 11.79. References: Déchelette 1910, 231; Coutil 1912, 693–695, fig. 1; Coutil 1927, 362–366; v. Merhart 1941, 6, note 7, fig. 9.2; Hencken 1971, 126, 128, fig. 97; Mohen 1977, 122–124, fig. on p. 149; Schauer 1982c, 704; Clausen 2001, 221; Lippert 2011, 75.

The helmet was found in the Seine in 1860. It was part of the collection of Dr. Bonneau at Mantes, the actual find location being unknown. A reproduction of the helmet can be found at the Musée des Antiquités Nationales in Saint-Germain-en-Laye.

⁵²⁴ Bianco-Peroni 1970, 19–22; Schauer 2003, 193.

⁵²⁵ Ghislanzoni 1929, 7, no. 12, fig. 12.

⁵²⁶ Hencken 1971, 135; Hansen 1994, 19, note 41.

⁵²⁷ Schauer 2003, 193.

⁵²⁸ Bianco-Peroni 1970, 18; Egg – Waurick 1990, 14.

Cat. no. 80. Mainz, Hessen, Germany – single river find (?) (probably in the estuary of the rivers Main and Rhine) – complete helmet. Measurements: height: 16.7cm; diameter: 22.3 × 21.7cm; thickness: 2–3mm; weight: 1208g – Landesmuseum Mainz, inv. no. 17.124 – Pl. 11.80. References: v. Merhart 1941, 5; Hencken 1971, 128, fig. 98; Schauer 1980, figs. 4–8; Schauer 1982c, figs. 3–5; Egg – Waurick 1990, 15, fig. 8.1; Lippert 2011, 64, pl. 1.5.

The helmet comes from a private collection and was said to be found in the river Main close to Mainz. It was bought by the museum in 1917.

Cat. no. 81. Oggiono-Ello, prov. Lecco, Lombardia, Italy – associated deposit – complete helmet. Measurements: height: 13.6cm; diameter: 20.3 × 18.7cm; weight: 750g – Museo Civico, Como, inv. no. X-927 – Pl. 11.81. References: Ghislanzoni 1929, 7, nos. 11, 13–14, fig. 11; v. Merhart 1941, 5, fig. 1.7; Bianco-Peroni 1970, 18, pl. 74.B; Hencken 1971, 133, fig. 105; Bouzek 1981, 24, fig. 3.1; Schauer 1982c, 701–704, no. 1, fig. 1; Egg – Waurick 1990, 14; Hansen 1994, 19, 221; Clausen 2001, 221; Schauer 2003, fig. 1.11.

The helmet was presumably found together with two swords (Type Oggiono), two Griffplatten daggers, four Bz D spearheads and two axes (Type Möhlin/variant B) as well as several fragments of bronze sheets in a quarry in a cleft in the rock with view to Lake Annone, some 300m above sea level. As E. Ghislanzoni pointed out, the objects were not found all together at once but over a period of several months.⁵²⁹

Cat. no. 82. Weil am Rhein, Baden-Württemberg, Germany (former Kleinhüningen, Basel, Switzerland) – single river find (river Rhine) – complete helmet. Measurements: height: 19.6cm; diameter: 22.7 × 17.4cm; weight: 804g – Museum der Kulturen, Basel, inv. no. I.21690 – Pl. 11.82. References: v. Laur-Belart 1950, 202–208; Hencken 1971, 62, fig. 36; Heman 1983, 15; Blanchet 1984; Jud 1985, 62–66; Benz 2008, 346, fig. on p. 90; Lippert 2011, 65, pl. 4.1; Sperber 2011, 23.

The helmet was found on a river bank of the Rhine in 1910. Today, the fluvial terrace of the river Rhine next to the village of Weil am Rhein, Germany, in the north of Kleinhüningen, Switzerland, seems to be the most likely find spot. The helmet was bought by the Historisches Museum Basel and kept there for several decades (old inv. no. 1910.181) before it was moved to the Museum der Kulturen.

2.2.3 Helmets of Type Lueg

All three helmets of Type Lueg have a bi-valve, round cap bearing a three pointed crest. Most likely, the helmets from Anlaufstal and the Piller Sattel also had cheek plates as found on the helmet from Pass Lueg, as suggested by the presence of two rivet holes on each side. The crested cap consists of two bronze sheets, fixed together at the crest with overlapping ends and with rivets on the front and back. The helmet from Pass Lueg is the only complete helmet of this type, which includes preserved cheek plates.

All three helmets (Tab. 2.11) have as decoration a massive, broad rib parallel to the rim, a dotted line parallel over it and two dotted lines following the edge of the crest. In the centre of the cap, three dotted circular lines as well as a central boss complete the similarities in the decoration. Additionally, the Pass Lueg helmet has two smaller circles of the same kind left and right of the central one; the helmet from the Anlaufstal has one boss to the side of the big circle close to the front side of the helmet. Similar decoration is also known on the helmets from Szczecin-Zdroje and Tiryns, the cuirass from Jura B and a complete bronze cuirass from the Danube as well as one of the bronze cups from the associated deposit from Dresden-Dobritz.⁵³⁰ Further fragments with the same kind of decoration are known from the Late Bronze Age associat-

⁵²⁹ Ghislanzoni 1929, 15.

⁵³⁰ Martin 2009, pl. 30.119; Mödinger 2014b.

ed deposits from Salaş Noćajski,⁵³¹ Guşteriţa, Romania,⁵³² Techirghiol, Romania,⁵³³ and Pila del Brancon,⁵³⁴ as well as an Iron Age deposit from Sicily.⁵³⁵

Cat. No.	Find Circumstances	Find Site	State	Condition	Fragments (cm)	High Total (cm)	Dm (cm)	Thickness Cap/Rim (mm)	Weight (g)
83	associated deposit	Pass Lueg	AT	complete	–	27.5 (15 cap)	18.3 × 21.3	–	998 (cap)
84	votive deposit	Piller Sattel	AT	fragment	19.6 × 16.2	c. 34	19.6 × 16.2	0.9 / 1.3	500
85	river	Anlaufstal	AT	fragment	18.9 × 19.3	–	–	–	279

Tab. 2.11 Helmets of Type Lueg.

The decoration of the crest on Type Lueg is completed by a vertical, broad rib, which also serves as stabilisation. Unfortunately, the upper part of the crest of the helmet from the Anlaufstal is missing. Additionally, the helmet from Pass Lueg has on each side four bosses on the crest; one in the middle of each small point of the crest, and two left and right of the vertical rib. The helmet from the Piller Sattel does not bear any bosses at all on the crest. The helmet from Anlaufstal bears one boss preserved on the smaller point of the crest. Moreover, the helmet from Pass Lueg shows three parallel, vertical, dotted lines reaching from the end of the crest to the horizontal line of pellets on one side of the helmet – the one closest to the holes for the cheek plates. The helmet from the Anlaufstal has the same kind of decoration but with just two lines of pellets and on the side opposite to the holes with which to attach the cheek plates. The helmet from the Piller Sattel bears no such decoration on the preserved part.

The helmet from Pass Lueg has on what is assumed to be the front three parallel lines of pellets which reach from the horizontal line of pellets to the beginning of the crest, where the three lines meet. On the back or ‘neck’ side of the helmet, no such decoration is visible. In addition, we find bosses next to the vertical rib, as well as one on each side of the crest on the tip of the front and back point. The cheek plates are decorated with three parallel, horizontal lines of pellets, parallel to the upper edge of the cheek plates, which are followed by three circles of pellets (diameter approx. 2.5cm) with one central boss inside. Below the circles, there are again three parallel, horizontal lines of pellets with three circles of pellets and a central boss. Beneath the three circles, there are once more three parallel, horizontal lines of pellets. Under these, we find two circles of pellets with a central boss. Both circles are surrounded by one line of pellets.

Approximately 2cm above the rim, the helmet from the Piller Sattel has a broader, plastic rib. A vertical rib similar to the horizontal one is found on the central part of the crest. Parallel to the horizontal rib, a line of pellets is visible. On the sides of the helmet, three circles of pellets with a central boss were applied. Two lines of pellets follow the whole edge of the crest. No part of the opposite half of the helmet survive (not even any overlapping parts to join the two parts together on the crest).

The helmet from the Anlaufstal shows approximately 1.6cm above the rim a 3mm broad convex rib, parallel to the edge. Parallel to the horizontal rib and approx. 1.4cm above it, a line of dots is visible. A double line with small dots is following the edge of the crest; the dotted line on the outside is irregular. Both lines were punched before the two parts of the helmet cap and crest were joined together; one joint is overlapping the dotted lines. On the front of the helmet, right under the ending of the crest, two vertical dotted lines are visible. In the middle of the preserved half of the helmet, three circles of dotted lines (diameter 5.9–6.9cm) and a central boss (diameter 1.5cm) were applied. The size of the central boss corresponds with the ones from the

⁵³¹ Vasić 1994, pl. 38.13.

⁵³² Bronze sheet fragment: Rusu 1990, 73, pl. V.5.

⁵³³ Bronze sheet fragment: Petrescu-Dîmboviţa 1978, pl. 215.17–19.

⁵³⁴ Salzani 1998, no. 139.

⁵³⁵ Egg 1983, fig. 2.4–5.

preserved part of the crest; the slightly deformed single boss on the right side of the one surrounded by the three dotted circles is slightly bigger (diameter 1.6–1.8mm). This single boss might be interpreted as ‘eyes’, such as is known from helmets of Type Biebesheim (Paris, Montmacq A, Blainville) or as a reduction of the motif found on the Pass Lueg helmet. In any case, the boss itself is too well preserved and in a too much similar position to conclude, that it resulted from depositional damage from being in the river, such as a stone bending the metal sheet as suggested by M. Mehofer.⁵³⁶

2.2.3.1 Research History

Helmets of Type Lueg remain the basis for lively discussion, especially concerning the chronological classification of this very special helmet type. Until 2001, the helmet from Pass Lueg, which was found in 1838, was the only example of its kind. The association with other finds from a potential deposit, to which the helmet might also belong, remains unclear, thus resulting in a range of different chronological assignments.

The new helmet finds from the Piller (a votive deposit with over 350 bronzes, ranging – according to different authors – from Bz A/B to Ha A1,⁵³⁷ or even Ha B1⁵³⁸) and the single find from the Anlaufthal in 2006, have resulted in further diverse discussions about the dating of these helmets, but at least rendered the interpretation of the form as a local Alpine variant of Early Iron Age Italian crested helmets⁵³⁹ as obsolete. These chronological discussions also influenced the general discussion about the origin of crested helmets in general; dating the helmets of Type Lueg to Bz C as Egg and Tomedi have, would make them one of the oldest metal helmets, making an origin for crested helmets in the Aegean or the Near East impossible.⁵⁴⁰ This view, however, was criticised by Schauer due to the wide chronological range of the votive deposit from the Piller Sattel and the unsecure nature of the associated finds from Pass Lueg.⁵⁴¹

2.2.3.2 Distribution and Deposition

All helmets of Type Lueg were found at passes or close to them in the west of the eastern Alps, not far from the copper mining areas in Tyrol and Salzburg (Fig. 2.21), to which they are moreover connected through their alloy composition patterns and lead isotope characterisation. Both point to their production from local copper ores. The helmets have been connected with specific events or situations, such as votive deposits to mark good passage along long distance trading routes, local copper mining and its control, the presence of elites or the exchange of smiths and/or their products.

The votive deposit at the Piller Sattel/Moosbruckschrofen is around 2km from the Bronze- and Iron Age cremation sanctuary at the Piller Sattel, the pass from the Pitz to the Inn valley. All bronzes were found together in a large ceramic pot. The helmet from Pass Lueg was found in 1838 during work on the street over the pass. The pass Lueg might not be a very high pass but nevertheless marks the entrance or end of a dangerous gorge through which the river Salzach runs. According to the finder, the helmet was found together with other bronze objects close to a cliff 10m above the old street. The helmet from the Anlaufthal seems to be a single find from the creek Anlauf. Following the Anlauf creek, we reach the Korntauernscharte (2460m above sea level), from where it is easy to reach the upper Möll Valley and then the Drau Valley, an important route to the south.

⁵³⁶ Mehofer 2011, 121.

⁵³⁷ Egg – Tomedi 2002; Tomedi 2002; Schauer 2003; Tomedi 2004; Tomedi 2007; Lippert 2010; Lippert 2011.

⁵³⁸ Lippert 2011, fig. 24.

⁵³⁹ So v. Merhart 1969, 137.

⁵⁴⁰ Egg – Tomedi 2002, 556.

⁵⁴¹ Schauer 2003, 201.

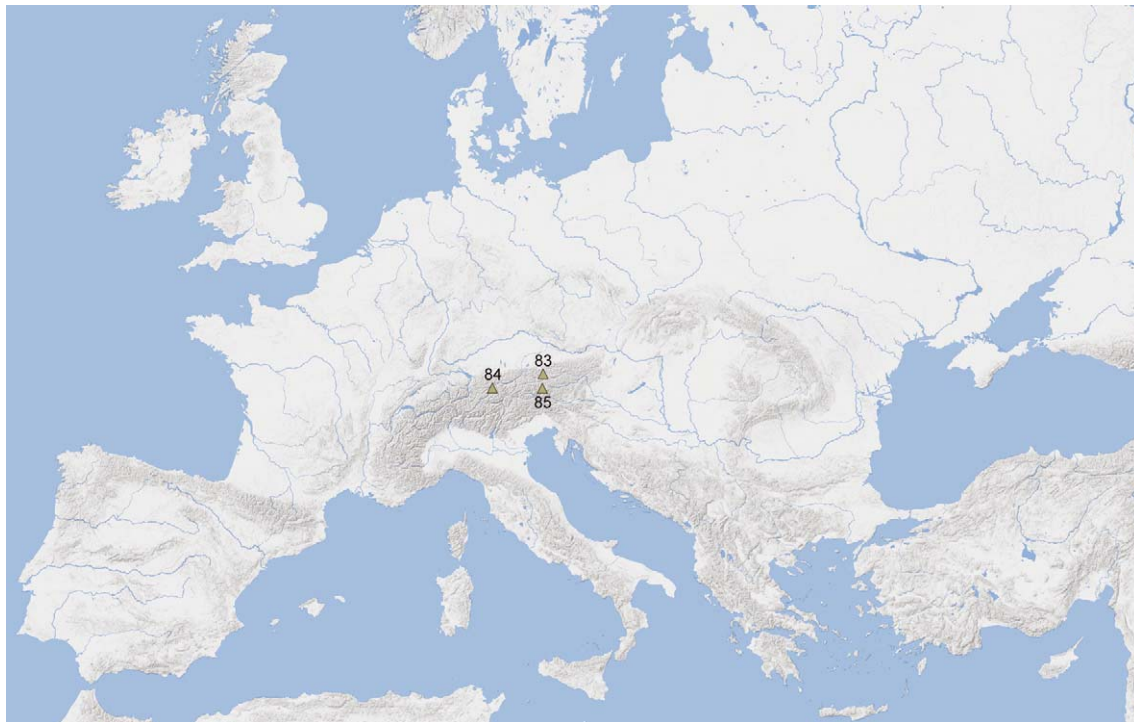


Fig. 2.21 Archaeological distribution of helmets of Type Lueg: **83.** Pass Lueg; **84.** Piller Sattel; **85.** Anlaufstal. Numbers correspond to the catalogue numbers.

2.2.3.3 Chronology

The dating of helmets of Type Lueg is still a matter of discussion, and opinions differ widely. Older publications could take into account only the helmet from Pass Lueg; the helmets from the Piller Sattel (votive deposit) and Anlaufstal (single find) having been found only in 2001 and 2006 respectively. Today, the theory of v. Merhart, who assumed that the helmet from Pass Lueg was a local Alpine variant of Early Iron Age Italian crested helmets,⁵⁴² is now redundant. R. Pittioni dated the helmet of Pass Lueg to the late Urnfield period, whilst Müller-Karpe dated it to the early Urnfield period, a date that J. Bouzek and Hencken also adopted.⁵⁴³

Considering that the potential associated finds of the Pass Lueg helmet are such, a date of Bz C/D seems reasonable. The axe associated with the helmet from Pass Lueg might be of Type Gmunden, which was widely distributed during Bz C1, but is also known from Bz D.⁵⁴⁴ The picks of Type Mitterberg do not allow any detailed dating,⁵⁴⁵ though some of them were also found in the deposit from Sipbachzell, Upper Austria, which contains bronzes ranging from the Middle Bronze Age to the early Urnfield period.⁵⁴⁶

The votive deposit from the Piller Sattel is dated to Bz C–Ha A but there is still debate concerning this.⁵⁴⁷ According to the associated finds of the helmet, Egg and Tomedi date the helmet to Bz C/D;⁵⁴⁸ the oldest object can be dated to the transition of Bz A/B – a *Flügelnadel* (winged pin), whose basic shape is already known in the Early Bronze Age – and the most recent to Bz C2/D (median-winged axes). According to Egg and Tomedi, there is no object typical for the Late Bronze Age, which is questioned by Schauer, who mentions that due to the longer life span

⁵⁴² v. Merhart 1969, 137.

⁵⁴³ Pittioni 1954, 514; Müller-Karpe 1959, 10, 113; Müller-Karpe 1962a, 273; Hencken 1971, 58; Bouzek 1981, 24.

⁵⁴⁴ Mayer 1977, 130.

⁵⁴⁵ Egg – Tomedi 2002, 553.

⁵⁴⁶ Höglinger 1996, 87.

⁵⁴⁷ Most recent, the overview in Mörtz 2013.

⁵⁴⁸ Egg 2002; Egg – Tomedi 2002, 545; Tomedi 2004; Tomedi 2007.

of some of the finds in the deposit – one sickle (*Zungensichel*), one axe and the fragment of a *Griffzungenschwert* – the helmet from the Piller Sattel might date also to Bz D–Ha A.⁵⁴⁹ As C. Jahn recently pointed out,⁵⁵⁰ the sickle might also indicate a date in the Middle Bronze Age, and cannot therefore be considered a firm basis for a Late Bronze Age date. Conversely, the sickles of Type Uioara (which occur in Bz C2 but are most common during Bz D–Ha A1) do not seem to be used much after casting. P. Schauer was also criticised by Tomedi, who included a discussion on circular-arguments of axe/sickle-dating and the dating of associated deposits in general in his publication.⁵⁵¹ A completely different chronological approach has been taken by Lippert, based on his correspondence analyses. He suggested that the helmet was deposited at the end of Ha A2/B1,⁵⁵² which is definitely too late if we consider the associated finds of the deposit.

However, we have to take into account that some associated finds from the Piller Sattel deposit, such as the sickles of Type Přestavlky (Bz D2) and the median-winged axes of Type Freudenberg (mainly Bz D), do point to a slightly different chronological approach than that presented by Egg and Tomedi. The helmet was unlikely to have been produced in Bz C (an argument perhaps predicated more on wishing to have the oldest European metal helmets), and was much more likely produced in Bz D. Also, similar axes were found in the grave of Čaka and in the deposit of Ducové,⁵⁵³ and the manufacturing technique, mainly the production of two halves to mount the cap, cannot be too far removed chronologically from Type Mantes, the archaic ancestor of European crested helmets. Another argument is the production of the earliest central European bronze defensive armour in the Carpathian Basin from Bz D onwards, which has close connections to the slightly older armour from Greece (e.g. the cuirass from Dendra and helmets of Type Oranienburg; the helmet from Biecz, dated to Bz C/D, is most likely an import from the Aegean).⁵⁵⁴ The appearance of the first European metal helmets, a crested, bi-valve and highly elaborated helmet in the Alpine region of central Europe, does not seem very likely; as already pointed out before (Type Mantes, Chapter 2.2.2), it seems more likely that helmets of Type Mantes represent the base of development for European crested helmets, thus also being the ancestors of helmets of Type Lueg.

Therefore, it seems most reasonable that helmets of Type Lueg were deposited in Bz D2, or potentially even Ha A1, after a short period of use. A dating to Bz D–Ha A1 is supported by the construction technique using two bronze sheets joined together on the crest and the applied decoration, i.e. the three circles of pellet lines with a central boss. This element of decoration is rare and is found mainly on Late Bronze Age armour, and is unknown for the Middle Bronze Age: on the helmet from Tiryns, one of the cuirasses from Jura (cat. no. 138) and a complete bronze cuirass from the Danube as on other bronze sheet objects from Salaš Noćajski, Serbia,⁵⁵⁵ Gușterița, Romania,⁵⁵⁶ Techirghiol, Romania,⁵⁵⁷ Pila del Brancon, Italy,⁵⁵⁸ Dresden-Dobritz, Germany,⁵⁵⁹ and from an Iron Age deposit from Sicily.⁵⁶⁰

Catalogue

Cat. no. 83. Pass Lueg, Salzburg, Austria – associated deposit – complete helmet. Measurements: height: 15cm (cap), 27.5cm (with crest); diameter: 18.3 × 21.3cm; weight: 1134g (total);

⁵⁴⁹ Egg – Tomedi 2002, 545 with notes; Schauer 2003, 193.

⁵⁵⁰ Jahn 2013, 235.

⁵⁵¹ Tomedi 2007.

⁵⁵² Lippert 2011, fig. 24.

⁵⁵³ Sperber 2011, 17.

⁵⁵⁴ See Chapter 2.1.1, cat. no. 3.

⁵⁵⁵ Vasić 1994, pl. 38.13.

⁵⁵⁶ Bronze sheet fragment: Rusu 1990, 73, pl. V.5.

⁵⁵⁷ Bronze sheet fragment: Petrescu-Dîmbovița 1978, pl. 215.17–19.

⁵⁵⁸ Bronze sheet fragment: Salzani 1998, fig. 2.138.

⁵⁵⁹ Bronze cup: Martin 2009, pl. 30.119.

⁵⁶⁰ Egg 1983, fig. 2.4–5.

998g (without cheek plates); 'right' cheek plate: 14.8 × 9.3cm (for more detailed measurements see Mehofer 2011, 121); weight: 57.5g; thickness: 0.8–1.3mm; 'left' cheek plate: 15.5 × 9.7cm; weight: 78.5g – Salzburg Museum, inv. no. ARCH 122 – Pl. 12.83. References: Seethaler 1839; v. Süß 1844, 16; v. Arneth 1851; Much 1883; Kyrle 1918, 80, figs. 1–4, 12–16; Moosleitner 1982; Urbanek 1991, 61; Moosleitner 1993; Tomedi 2007; Lippert 2010; Lippert 2011; Lutz 2011; Marx 2011; Mehofer 2011.

The helmet was found in 1838 during work on the street over the pass. According to the finder, the helmet was found together with other bronze objects close to a loose precipice 10m above the old street. Years later, the finder also mentions 'other bronzes' from the same find spot which he threw away.⁵⁶¹ The recorded composition of the deposit differs over time, comprising either:

1. helmet, one axe, two pickaxes, two pieces of molten ore⁵⁶²
2. helmet, one axe, a pickaxe, three antique bronzes⁵⁶³
3. helmet, one axe, two pickaxes, two pieces of metal⁵⁶⁴
4. helmet, a winged axe, two pickaxes and another one in the Natural History Museum Vienna (maybe from another find spot), two pieces of casting cake.⁵⁶⁵

However, today it seems that two pickaxes and a winged axe (Salzburg Museum inv. no. 123–125, and maybe also another pickaxe from the Natural History Museum Vienna, inv. no. 18.000) as well as three bronze bars and two pieces of casting cake (also in the Salzburg Museum) were indeed part of the deposit. After the helmet was found, it was boiled in oil to receive the specific patina as it has it now. Lippert and Mehofer note different weights of the helmet in the same publication.⁵⁶⁶

Cat. no. 84. Piller Sattel, Tirol, Austria – votive deposit – fragment (half of the helmet). Measurements: fragment: 19.6 × 16.2cm; height: approx. 34cm; thickness: 0.9–1.3mm; diameter approx. 20–22cm (for more detailed measurements see Mehofer 2011, 124); weight: 500g – Archäologisches Museum Fließ, no inv. no. – Pl. 12.84. References: Tomedi et al. 2001; Egg 2002; Egg – Tomedi 2002; Nowak 2002; Tomedi 2002; Schauer 2003; Tomedi 2004; Tomedi 2007; Lippert 2010; Lippert 2011; Lutz 2011; Marx 2011; Mehofer 2011; Tomedi 2012.

In 2001 F. Neururer located with the aid of a metal detector a votive deposit of more than 350 bronzes in a crevice at the Moosbruckschrofen am Piller. The deposit is around 2km from the Bronze- and Iron Age cremation sanctuary at the Piller Sattel, the pass from the Pitz- to the Inn valley, and was excavated by the Institut für Ur- und Frühgeschichte from the Innsbruck University only three days after its discovery. All the bronzes were found in one big ceramic pot. The deposit contained amongst other things the helmet, one *Achtkantschwert* Type Hausmoning, one sword of Type Spatzenhausen, one flange hilted sword, spearheads (including also residues of the shaft, identified as ash), daggers, shaver, median-winged axes, sickles, needles/pins, pieces of a bronze belt, pendants (*Brillenanhänger*), discs (*Stachelscheiben*), spiral rolls still containing leather, etc. Almost all objects show traces of intentional destruction, including indications of burning.

Cat. no. 85. Anlaufstal, Salzburg, Austria – single find – fragment (half of the helmet). Measurements: 18.9 × 19.3cm; approx. height of the cap: 14cm (for more detailed measurements see Mehofer 2011, 120); weight: 279g – Montanmuseum Altböckstein, Bad Gastein; no inv. no. – Pl. 13.85. References: Lippert 2010; Lippert 2011; Lutz 2011; Marx 2011; Mehofer 2011; Weber 2011.

⁵⁶¹ Egg – Tomedi 2002, 551.

⁵⁶² Seethaler 1839.

⁵⁶³ v. Süß 1844; v. Arneth 1851; both note a pickaxe instead of spearheads.

⁵⁶⁴ Much 1883.

⁵⁶⁵ Kyrle 1918.

⁵⁶⁶ Lippert 2011, 20; Mehofer 2011, 121, 123.

Following the Anlauf creek, we reach the Korntauernscharte (2460m above sea level), from where it is easy to reach the upper Möll Valley and then the Drau Valley. In August 2006, on the left side of the Anlauf creek, E. Tschitschko found the fragmented half of the helmet with a metal detector. The alleged find spot is around 1200m above sea level and was confirmed by pollen analyses of residues inside the crest of the helmet and the surrounding of the presumable find spot.⁵⁶⁷ The fragment was found in the humus, sandy earth 6m from the river. The partly exposed bronze surface of the fragment (according to the finder) might be the result of continuous abrasion of the surface (but then no traces of manufacture would have been left) or the result of the oxygen poor surrounding in the bed of the creek. However, the edges are patinated, so the fragment was deposited as such.

Only one half of the helmet, the 'left' side (the same as the Piller Sattel helmet), is preserved. The front and the back were broken off as well. On one of the smaller points of the crest, the folds are still preserved (two on the lower side, one on the upper side). The central part of the helmet is partly damaged due to its deposition in the river; it is folded and partly broken through. The overlapping parts of the two halves of the helmet as well as the rivet holding them together are missing. On the outside of the helmet, the patina is partly chipped off. The colour is dark green to dark brown.

2.2.4 Helmets of Type Biebesheim

Today, 13 complete and one fragmented helmet, the latter from Otterstadt, Germany, are known (Tab. 2.12). The crest of helmets of Type Biebesheim is generally narrow, and cap as well as crest are pointed or rounded (Ebing, Montmacq A and B, Seurre, Paris) at the top. Unfortunately, the upper part of the helmet from Le Theil is missing. The edge of the crest of one of the

Cat. No.	Find Circumstances	Find Site	State	Condition	Fragments (cm)	High Total (cm)	Dm (cm)	Thickness Cap/Rim (mm)	Weight (g)
86	river	Biebesheim (A)	DE	complete	–	27.9	22 × 17.6	0.75–1 / –	–
87	river	Biebesheim (B)	DE	complete	–	26.1	19.2 × 19.6	–	770
88	river	Bremen	DE	almost complete	–	29.5	23.5 × 17.5	–	794
89	river	Ebing	DE	complete	–	29	21.5 × 16.2	–	829
90	river	Pockinger Heide	DE	almost complete	–	22.6	20 × 18.9	–	804
91	river	Otterstadt	DE	fragment	18 × 27.6	–	–	–	–
92	river	Auxonne	FR	complete	–	25.5	20.7 × 18.3	–	690
93	associated deposit	Le Theil	FR	not complete	–	24	20.7 × 18.6	–	–
94	river	Blainville-sur-l'Eau	FR	complete	–	32.5	27.1 × 17.8	–	1020
95	river	Chalon-sur-Saône	FR	complete	–	31	21.4 × 18.5	–	491
96	river	Montmacq (A)	FR	complete	–	26	22 × 17	–	650
97	river	Montmacq (B)	FR	complete	–	25	23 × 17	–	725
98	river	Paris	FR	complete	–	26	23 × 18	–	760
99	river	Seurre	FR	complete	–	23	22.5 × 18.8	–	689
100	unknown	unprovenanced	–	complete	–	24.5	19 × 17	0.5 / 4	465

Tab. 2.12 Helmets of Type Biebesheim and related helmet (cat. no. 100).

⁵⁶⁷ Weber 2011.



Fig. 2.22 Front-view of the helmet of Type Biebesheim from Seurre, France (© Musée Denon, photo: Antoine Maillier)

halves overlaps the crest of the other half. Both the front and back of the rectangular sheets of both halves overlap and were fixed together with two, sometimes three, rivets. On Type Biebesheim these are either flat rivets (Auxonne, Biebesheim B, Otterstadt, Seurre) (Fig. 2.22) or conical rivets (Biebesheim A, Bremen, Pockinger Heide, Ebing, Blainville, Chalon, Montmacq A, Paris). The helmet from Montmacq B even has decorative fluted, flat headed rivets. Since the helmets from Biebesheim and Montmacq were deposited together, there does not seem to be a yet identifiable local or chronological preference for rivet design.

The rim is straight (Le Theil) or bent outwards around a wire. On the sides, the helmets usually have two holes close to each other to attach cheek plates or, due to the short distance between the holes, more likely a chin strap. The rivet holes on the helmet from Paris were punched from the inside to the outside after the rim of the helmet was bent outwards.⁵⁶⁸ The helmet from Chalon-sur-Saône even shows separately attached bronze sheets, each with three holes to attach cheek plates or chin strap. The helmets from Montmacq A, Chalon-sur-Saône and Paris show so-called 'eyes' (large bosses) on the sides, while the helmet from Blainville shows large bosses close to one another on each side of the helmet. Above the rim, the helmet from Paris bears a parallel circumferential rib. The helmet of Montmacq B has two ribs parallel to the rim right above it, while the helmet from Montmacq A bears a line of 63 small bosses

⁵⁶⁸ Mohen 1977, fig. on p. 122.

immediately above the rim. The helmet of Chalon-sur-Saône instead shows a line of large bosses along the rim.

2.2.4.1 Research History

In discussing the broader context of western European crested helmets, v. Merhart grouped helmets of Type Biebesheim amongst his group CI.⁵⁶⁹ 30 years later, Hencken called them ‘crested helmets with conical cap’, and Schauer discussed them as helmets *Art Biebesheim*.⁵⁷⁰ Shortly later, V. Pingel identified further potential helmets of Type Biebesheim on some Iberian stelae.⁵⁷¹ It is only in recent years, however, that western European crested helmets have once more begun to be discussed in their wider context.

Schauer suggests that the undecorated helmets of Type Biebesheim belong in Ha A, while the helmets with ‘eyes’ are more recent and closely related to the western European cuirasses.⁵⁷² Moreover, he sees in the helmet from Bremen, with its higher crest, a close connection to the Italian helmets. Lippert sees Type Biebesheim (which he dates to the 12th/11th century BC) as the predecessor of helmets of Type Bernières d’Ailly and connects those of Type Biebesheim with the ceramic helmets from Veii (grave nos. 4–5, necropolis Quattro Fontanili) and Populonia.⁵⁷³ Type Biebesheim are identical to Sperber’s *Art Billy*, which he distinguishes into two variants, which are both mainly current in Ha B1. He interprets the helmets from Otterstadt, Seurre and Auxonne, based on their low crest, lack of conical rivets and evenly curved profile, as slightly older examples (‘variant Auxonne’) of his *Art Billy*, dating them to his late Sb Iib (Ha A2), while all other helmets of *Art Billy* are dated to his Sb Iic (early Ha B1).⁵⁷⁴ The unprovenanced helmet assigned here to Type Biebesheim (cat. no. 100) is suggested by Sperber as a potential transitional form between the eastern European helmets and the western European crested helmets.⁵⁷⁵ In his recent discussion of the origin of European crested helmets, Brandherm dates helmets of Type Biebesheim to no later than Ha A.⁵⁷⁶ Müller-Karpe narrows the chronological frame down to the early phase of the late Urnfield period, with their first appearance in Bz D,⁵⁷⁷ while A. Coffyn assigns the helmets to the very end of *Bronze final* I or the beginning of *Bronze final* II (Ha A1).⁵⁷⁸

2.2.4.2 Distribution and Deposition

Helmets of Type Biebesheim have been found only in southeast France and western Germany, from Bremen in the north to Ebing in the south, with the helmet from the Pockinger Heide as the most eastern example, and that from Paris as the most western example (Fig. 2.23). The main distribution area is from Bavaria in the east to almost Clermont-Ferrand in the west, but with a noticeable absence finds in Switzerland. Except for the helmet from Le Theil, a dryland deposit (though unlikely a grave), all examples are from wet contexts, mainly from rivers and old river beds. The helmet from Otterstadt was intentionally bent and destroyed before it was deposited in the river Rhine. All other helmets are complete or suffered just slight damage during recovery.

⁵⁶⁹ v. Merhart 1941, 16.

⁵⁷⁰ Hencken 1971, 58–65; Schauer 1980, 532–540.

⁵⁷¹ Pingel 1974, 1–19; Pingel 1993, 209–231.

⁵⁷² Schauer 1980, 533.

⁵⁷³ Lippert 2011, 40–45.

⁵⁷⁴ Sperber 2011, 23.

⁵⁷⁵ Sperber 2011, 21–23.

⁵⁷⁶ Brandherm 2011, 43.

⁵⁷⁷ Müller-Karpe 1959, 113.

⁵⁷⁸ Coffyn 1985, 171.



Fig. 2.23 Archaeological distribution of helmets of Type Biebesheim: **86–87**. Biebesheim; **88**. Bremen; **89**. Ebing; **90**. Pockinger Heide; **91**. Otterstadt; **92**. Auxonne; **93**. Le Theil; **94**. Blainville-sur-l'Eau; **95**. Chalon-sur-Saône; **96–97**. Montmacq; **98**. Paris; **99**. Seurre; **100**. Unprovenanced, related to helmets of Type Biebesheim. Numbers correspond to the catalogue numbers.

2.2.4.3 Chronology

Since almost all helmets of Type Biebesheim are single river finds, the chronological classification is based on one potential association (Chalon-sur-Saône) and the deposit from Le Theil, as well as what we perceive to be the general typological development of crested helmets. Schauer considers helmets of Type Biebesheim, due to the decorative 'eyes' which some have, to be closely related to western European cuirasses, and accordingly dates the helmets to Ha B1,⁵⁷⁹ with the undecorated helmets being older and belonging to Ha A.⁵⁸⁰ On the other hand, he considers the helmet from Bremen, with its higher crest, as closely connected to the Italian crested helmets. G. v. Merhart and H. Müller-Karpe assign the deposit of Le Theil to Ha A; Müller-Karpe narrows the chronological frame down to the early phase of the late Urnfield period, with the first appearance of these helmets in Bz D.⁵⁸¹ According to G. Cordier, the deposit or grave from Le Theil dates to *Bronze final* I/Ha A2, as note Kossack and Sperber (Ha A2/B1).⁵⁸²

Assuming the helmet from Chalon-sur-Saône was indeed an associated deposit (possibly including two swords of Type Forel, a sword of Type Hemigkofen, a sickle and a bracelet), Sperber suggests a depositional date in Ha B1. He also notes that helmets of Type Biebesheim and its variant Auxonne (not considered as a variant here) are mainly found in Ha B1. According to him, helmets without conical headed rivets and with a lower crest (Auxonne) might also be dated to Ha A2.⁵⁸³ A. Coffyn suggests a date at the very end of *Bronze final* I or at the beginning of

⁵⁷⁹ For discussion of the chronology of the western European cuirasses, see Chapter 3.4.

⁵⁸⁰ Schauer 1980, 533.

⁵⁸¹ v. Merhart 1941, 24, 38; Müller-Karpe 1959, 113.

⁵⁸² Kossack 1954, 30; Cordier 1997, 87; Sperber 2011, 20.

⁵⁸³ Sperber 2011, 20, 24.

Bronze final II (Ha A).⁵⁸⁴ The helmet from Chalon-sur-Saône is also dated by L. Bonnamour to *Bronze final* IIIa (Ha B1)⁵⁸⁵ even though it might be contemporary with the sword of Type Hemigkofen, thus dating to Ha A. D. Brandherm recently associated the deposit from Le Theil and helmets of Type Biebesheim in general not later than Ha A.⁵⁸⁶ The associated median-winged axe ('hache à ailerons médians') is an early form and occurs first in associated deposits of the Rosnoën phase (Bz D2–Ha A1).⁵⁸⁷ The deposit is just outside the immediate zone of origin, which is France to the west of the border with Switzerland.⁵⁸⁸

F. Audouze characterised the girdle as an early type of one of his *ceintures articulées en bronze, groupe II*, which he broadly dates to *Bronze final* IIIb, but admits an earlier date due to constructional aspects for the Le Theil helmet.⁵⁸⁹ The alleged casting mould for winged axes and (on the opposite side of the mould) a further unknown type of object, as well as the gold foil, which lacks any parallels, do not contribute significantly to the dating of the deposit. Ultimately, a date in Bz D2–Ha A(1) for helmets of Type Biebesheim seems to be most likely.

2.2.4.4 Associated, Unprovenanced Helmet

The find spot and find circumstances of the crested helmet reputedly to be from 'Hungary' are unknown (cat. no. 100). The helmet resembles, with its convex cap, a very low crest and flat-headed rivets below the crest, most closely the shape of helmets of Type Biebesheim. One of the two halves of the helmet was folded over the other at the crest to join the two parts. The rim was bent inwards around a bronze or copper wire, which resulted in several cracks on the metal sheet. Parallel to the rim 13 (partly rectangular) rivet holes were punched through the metal sheet from the outside to the inside with a distance of 4–5.5cm each. Also on the top of the crest one round hole was applied, most likely to fix a plume or a rivet, reinforcing the join of the two halves of the helmet. Bands or strips on the corroded surface might be the result of imprints of a former organic wrapping, or otherwise from an organic mat which the 'grave'⁵⁹⁰ had been furnished with.

Unlike other helmets of Type Biebesheim, this unprovenanced helmet has an inwards bent rim and is richly decorated. The cap is decorated along the rim and the crest on both sides with alternating lines of pellets and bosses, as is found on other classes of body armour, e.g. greaves of Type Kuřim,⁵⁹¹ and western European cuirasses.⁵⁹² In the blank areas left and right of the lines of pellets and bosses in the centre, a wheel motif with pellet lines, bearing a central boss, was applied. The wheel motif is only known on armour from Bz D–Ha A1, including greaves⁵⁹³ and a cheek plate from the Bz D–Ha A1 associated deposit from Podcrkavlje-Slavonski Brod (cat. no. 67), which might be contemporary with this regional variant of Type Biebesheim.

Assuming the helmet is original,⁵⁹⁴ it is certainly influenced by western European helmets of Type Biebesheim, to which local elements of decoration were applied. We might therefore interpret it as having been locally produced in the Carpathian Basin, than as an imported helmet of Type Biebesheim which was then decorated to suit local tastes, as is indicated by the inwards bent rim. According to its close affinities with helmets of Type Biebesheim, the presence of the

⁵⁸⁴ Coffyn 1985, 171.

⁵⁸⁵ Bonnamour 2000, 80.

⁵⁸⁶ Brandherm 2011, 43.

⁵⁸⁷ Type A after Millotte et al. 1968, 12–16, fig. 1.

⁵⁸⁸ Millotte et al. 1968, fig. 2, no. 7.

⁵⁸⁹ Audouze 1976, 77, 81–83, 87, 132, no. 164.

⁵⁹⁰ Born – Hansen 2001, 241.

⁵⁹¹ See Chapter 4.1.3, p. 233.

⁵⁹² See Chapter 3.5, p. 188.

⁵⁹³ See Chapter 4.1.2, p. 227.

⁵⁹⁴ As indicated by the AAS analyses: see Born – Hansen 2001, 270. However, we still have to take into account the possibility that other Bronze Age metal finds were molten and used to produce the helmet recently. No metallographic analyses have been carried out in order to eliminate any doubts on the originality of the helmet.

wheel motif and the combination of pellet and boss decoration, the helmet might be dated slightly later than the more western examples of Type Biebesheim.⁵⁹⁵

Catalogue

Cat. no. 86. Biebesheim A, Kr. Groß-Gerau, Hessen, Germany – single river find of two helmets (river Rhine) – complete helmet. Measurements: height: 27.9cm; diameter: 22 × 17.6cm; diameter inside: 20.7 × 16.7cm; rivets: length: 3.25cm – Landesmuseum Darmstadt, inv. no. unknown – Pl. 13.86. References: Jorns 1964, 183–184; Jorns 1972, 76–85; Müller-Karpe 1980, pl. 439.B1–2, cat. no. 572; Lippert 2011, 64, pl. 2.1.

The two helmets were found no more than 6m away from one another in an old river bed of the Rhine in 1963, some 8–9m depth below the ground water level, during work in a gravel pit. They were found with almost no corrosion on the surface.

Cat. no. 87. Biebesheim B, Kr. Groß-Gerau, Hessen, Germany – single river find of two helmets (river Rhine) – complete helmet. Measurements: height: 26.1cm; diameter: 19.2 × 19.6cm; diameter inside: 18.7 × 19.4cm; diameter rivets: 1.6cm; weight: 770g – Heimatmuseum Biebesheim, inv. no. unknown – Pl. 13.87. References: Jorns 1964, 183–184; Jorns 1972, 76–85; Müller-Karpe 1980, pl. 439.B1–2, cat. no. 572; Lippert 2011, 64, pl. 2.3.

The two helmets were found no more than 6m away from one another in an old river bed of the Rhine in 1963, some 8–9m depth below the ground water level, during work in a gravel pit. They were found with almost no corrosion on the surface.

Cat. no. 88. Bremen, Kreis Bremen-Blumenthal, Bremen, Germany – single river find (river Lesum) – complete helmet. Measurements: height: 29.5cm; diameter: 23.5 × 17.5cm; weight: 794g – Focke Museum Bremen, inv. no. 8058 – Pl. 14.88. References: Grohne 1939, 22; v. Merhart 1941, 16; Jacob-Friesen – Jacob-Friesen 1963, 324, fig. 296; Hencken 1971, 64, fig. 37; Lippert 2011, 64, pl. 7.1.

The helmet was found during dredging works in November 1938 in the river Lesum close to the city of the same name. The crest is higher than on other helmets of the same type. It shows on the front and back a pair of conical headed rivets, as well as a further pair of rivet holes on each side. The helmet was found without any corrosion. Due to the find circumstances, the helmet was severely deformed and the two halves almost torn apart. A copper smith restored the helmet, which included the use of hard solder for brazing.

Cat. no. 89. Ebing, Kreis Staffelheim, Bayern, Germany – single river find (old bed of the river Main) – complete helmet. Measurements: height: 29.5cm; diameter: 21.5 × 16.2cm; thickness: 0.5mm; weight: 829g – Landschaftsmuseum Ebing, inv. no. unknown (Prähistorische Staatssammlung, Munich, inv. no. 1967, 1279) – Pl. 14.89. References: Pescheck 1967, 264, 271, fig. 14; Pescheck 1968, 34–35; Henning 1970, 90, pls. 82–85; Jakob 1972; Abels et al. 1996, 94; Lippert 2011, 65, pl. 3.2.

The helmet was found in September 1964 in the gravel pit of the Porzner und Söhne company, 700m to the east of Ebing, in 3–5m depth, in one of the old river beds of the river Main.

Cat. no. 90. Pockinger Heide, Oberindling, Gem. Pocking, Kr. Griesbach, Bayern, Germany – single river find (riparian forest of the river Inn) – complete helmet. Measurements: height: 22.6cm; diameter: 20 × 18.9cm; length rivets: 1.7–1.9cm; height crest: 1.9–2.5cm; weight: 804g – Bayerisches Nationalmuseum, Munich, inv. no. IV 567 – Pl. 14.90. References: Lindenschmit 1881, pl. III.1–3; Hager – Mayer 1892, 95, no. 567; Coutil 1911, 7; Coutil 1912; Coutil 1926; v.

⁵⁹⁵ See also Born – Hansen 2001, 75; Sperber 2011, 21.

Merhart 1941; Hencken 1971, 64, fig. 38; Müller-Karpe 1980, IV, pl. 412; Lippert 2011, 65, pl. 2.2.

The helmet is a single find from before 1851 in the riparian forests of the river Inn, close to Indling.

Cat. no. 91. Otterstadt, Rheinland-Pfalz, Germany – single river find (old Rhine) – fragment. Measurements: c. 18 × 27.6cm (pressed flat); weight unknown – Private ownership, no inv. no. – Pl. 14.91. References: Sperber 2011, 38, pl. 3.2; Sperber 2017, cat. no. 578.

The helmet was found in the old Rhine's riverbed around 2000; the current owner bought the helmet from the finder around 2005.

Cat. no. 92. Auxonne, Dép. Côte-d'Or, France – single river find (river Saône) – complete helmet. Measurements: height: 25.5cm; diameter: 20.7 × 18.3cm; weight (after B. Mille): 690g – Musée des Antiquités Nationales at Saint-Germain-en-Laye, inv. no. 1237 – Pl. 14.92. References: Coutil 1911, 7; v. Merhart 1941, 161, fig. 3.6; Hencken 1971, 58, fig. 32a–b; Lippert 2011, 64, pl. 5.2.

The helmet was found before 1911 in the Saône at Auxonne.

Cat. no. 93. Le Theil/Billy, Dép. Allier, France – associated deposit – almost complete helmet. Measurements: height: 24cm; diameter: 20.7 × 18.6cm – Musée des Antiquités Nationales at Saint-Germain-en-Laye, inv. no. 22.239 – Pl. 15.93. References: Bourgeois 1875; Chantre 1875; Coutil 1911, 7; Déchelette 1924, 332–337; Hencken 1971, 59, fig. 33a; Audouze 1976, 132; Cordier 1997, 79, fig. 9; Lippert 2011, 65, pl. 3.1; Sperber 2011, 20.

The helmet was found in 1875 as a part of an associated deposit, together with an early median-winged axe (*hache à ailerons médians*), a chisel, a girdle with lancet-shaped pendants (*articulées en bronze/groupe II*),⁵⁹⁶ two punched gold sheets, eleven glass beads, three amber beads, one spindle whorl; some sherds of pottery and a casting mould made of stone for axes and an undetermined object. There were no traces of ashes or bones. The helmet is rather fragmentary and was restored with plaster.

Cat. no. 94. Blainville-sur-l'Eau, Dép. Meurthe-et-Moselle, France – single river find (banks of the river Meurthe) – complete helmet. Measurements: height: 32.5cm; diameter: 27.1 × 17.8cm; weight (after B. Mille): 1020g – former collection A. France-Lanard, now private collection of A. France-Lanord, Nancy; a copy is at the Musée des Antiquités Nationales at Saint-Germain-en-Laye, inv. no. 86.196 – Pl. 15.94. References: Hencken 1971, 58, fig. 32c–d; Périn 2004, 49, fig. 46; Lippert 2011, 64, pl. 5.1; Huth 2012, fig. 7.

The helmet was found on the banks of the river Meurthe in 1971.

Cat. no. 95. Chalon-sur-Saône, Dép. Saône-et-Loire, France – river find (river Saône) – complete helmet. Measurements: height: 31cm; diameter: 21.4 × 18.5cm; weight: 491g (not 1780g!) – Musée Chalon-sur-Saône, inv. no. 74.21.4 – Pl. 15.95. References: Bonnamour 1975, 16–21, fig. 5; Bonnamour et al. 1976, 614, fig. 7.1; Bonnamour 1989, 214, fig. 121.1; Bonnamour 1990/1991, 47, no. 61, figs. 36–37; Bonnamour 2000, 134, cat. no. 367, fig. on p. 80; Born – Hansen 2001, 75–76; Lippert 2011, 64–65; Sperber 2011, 20.

The helmet was found together with a sword of Type Hemigkofen, two swords of Type Forel, a bracelet and a sickle in the river Saône in the North of Chalon, at Port Ferrier, before 1974.

Cat. no. 96. Montmacq A, Dép. Oise, France – single river find of two helmets (river Oise) – complete helmet. Measurements: height: 26cm; diameter: 22 × 17cm (21.7 × 16.1cm according to Hémery 1929, 423); weight: 650g – Musée Vivenel, Compiègne, inv. no. H 898 – Pl. 16.96.

⁵⁹⁶ After Audouze 1976, 77.

References: Hémery 1929, 423–424; v. Merhart 1941, 16; Hencken 1971, 62, fig. 34a–b; Blanchet – Lambot 1975, 44–46, no. 34; Lippert 2011, 65, pl. 5.3; Lehoërff 2013, 84, fig. 112.

In 1921, two helmets were found close to each other in the river bed of the Oise.

Cat. no. 97. Montmacq B, Dép. Oise, France – single river find of two helmets (river Oise) – complete helmet. Measurements: height: 25cm; diameter: 23 × 17cm (21.8 × 17.8cm according to Hémery 1929, 423); weight: 725g – Musée Vivenel, Compiègne, inv. no. H 897 – Pl. 16.97. References: Hémery 1929, 423–424; v. Merhart 1941, 16; Hencken 1971, 62, fig. 34c–d; Blanchet – Lambot 1975, 44–46, no. 33; Lippert 2011, 65, pl. 5.4; Lehoërff 2013, 84, fig. 112.

In 1921, two helmets were found close to each other in the river bed of the Oise.

Cat. no. 98. Paris, France – single river find (river Seine) – complete helmet. Measurements: height: 26cm; measurements: diameter: 23 × 18cm; weight (after B. Mille): 760g – Musée des Antiquités Nationales at Saint-Germain-en-Laye, inv. no. 358 – Pl. 16.98. References: Coutil 1911, 7; v. Merhart 1941, fig. 3.7; Hencken 1971, 62, fig. 35; Mohen 1977, 122, figs. on pages 122, 123, 148; Lippert 2011, 65, pl. 5.5; Lehoërff 2013, fig. 83.

The helmet was found in the river Seine before 1911.

Cat. no. 99. Seurre, Dép. Côte-d'Or, France – single river find (old ford of the river Saône) – complete helmet. Measurements: height: 23cm; diameter: 22.5 × 18.8cm, weight: 689g – Musée Vivant Denon, Chalon-sur-Saône, inv. no. 98.19.1 – Pl. 17.90. References: Bonnamour 2000, 122, no. 59, fig. on page 28; Bonnamour 2009, 65; Lippert 2011, 65.

The helmet was found close to the Île aux Bœufs at an old ford of the Saône in 1977 and bought by the museum in July 1998. It formerly belonged to D. Chaffote.

Cat. no. 100. Unprovenanced (Hungary?) – complete helmet. Measurements: height: 24.5cm; diameter: 19 × 17cm; thickness: 0.5–0.8mm, on the edge 3.5–4mm; weight: 464–466g – private ownership; Guttmann collection, inv. no. AG 1125 – Pl. 17.100. References: Born – Hansen 2001, 59, 175, 241, figs. 192–194, pls. XIII, XIV; Clausen 2002, 183; Hermann Historica 2005a; Eisenberg – Price 2006, 37, no. 74; Lippert 2011, 65, pl. 6.1; Sperber 2011, 21.

Find spot and find circumstances are unknown. The helmet was part of the Guttmann collection. It was put up for auction (Lot 16, not sold) at Christie's in London on 28 April 2004 and sold on 19 October 2005 at Hermann Historica in Munich.⁵⁹⁷ It was sold again at the Royal-Athena Galleries in 2007.⁵⁹⁸ The wheel motif of the helmet might connect it with the cheek plate from Podcrkavlje, Croatia (cat. no. 67), which bears similar decoration.

2.2.5 Helmets of Type Bernières d'Ailly

Currently, ten complete helmets of Type Bernières d'Ailly are known, as well as fragments of at least eight further examples (Tab. 2.13). Typical for helmets of Type Bernières d'Ailly is the pointed crest and the strongly curved to almost triangular profile, with a sometimes slightly bulging cap. The profile changes from an almost triangular shape in northwestern France to a strongly curved profile found in the east and in Germany. This might point to a development from west to east (taking into account also the Iberian depictions of crested helmets on stelae (Fig. 2.16). A vertical ridge on the sides of the cap, which runs to the top of the crest, improves the stability of the cap and would have provided additional protection during use. Rivet holes on both sides on the helmet, for attaching cheek plates or a chin strap, are common or, as seen on the helmets from Bernières d'Ailly, to fix bronze bands. Only the helmets from Bernières d'Ailly have holes on the front and/or back accompanying those found on the sides, which were

⁵⁹⁷ Hermann Historica 2005a.

⁵⁹⁸ Eisenberg – Price 2006, 37, no. 74.

Cat. No.	Find Circumstances	Find Site	State	Condition	Fragments (cm)	High Total (cm)	Dm (cm)	Thickness Cap/Rim (mm)	Weight (g)
101	associated deposit	Bernières-d'Ailly (A)	FR	complete	–	28	21.5 × 17	–	–
102	associated deposit	Bernières-d'Ailly (B)	FR	complete	–	25	22 × 17.3	–	687
103	associated deposit	Bernières-d'Ailly (C)	FR	complete	–	26.3	21 × 17.8	–	560
104	associated deposit	Bernières-d'Ailly (D)	FR	complete	–	24.6	21.7 × 16.7	–	720
105	associated deposit	Bernières-d'Ailly (E)	FR	not complete	–	29	max. 21	–	460
106	associated deposit	Bernières-d'Ailly (F)	FR	complete	–	27.5	22	–	660
107	associated deposit	Bernières-d'Ailly (G)	FR	not complete	–	>25.5	21.9	–	360
108	associated deposit	Bernières-d'Ailly (H)	FR	complete	–	26.2	23.5 × 17.6	–	800
109	associated deposit	Bernières-d'Ailly (I)	FR	not complete	–	19.5	19.5	–	220
110	associated deposit	Bernières-d'Ailly (J)	FR	not complete	–	>13.5	27.3	–	–
111	river	Armancourt	FR	complete	–	26.5	22.1 × 16	–	520
112	unknown	unprovenanced ('Normandy')	FR (?)	complete	–	22.3	22.5 × 17.2	–	–
113	river	Nemours	FR	complete	–	26	–	–	462
114	river	Mainz-Kostheim	DE	complete	–	25	21.5 × 16.8	–	–
115	river	Roxheim	DE	fragment	17 × 10	–	–	–	–
116	associated deposit	Larnaud	FR	rivet	2.7	–	–	–	–
117	river	Huelva	ES	fragment	21.5 × 16.8	–	–	–	150
118	river	Huelva	ES	fragment	8 × ?	–	–	–	12
119	associated deposit	Monte do Crasto	PT	fragments	7.8 × 3.4 13.5 × 9.6 11.2 × 10.7	–	–	0.3–1 / –	20/40/45

Tab. 2.13 Helmets of Type Bernières d'Ailly.

in order to fix small horizontal bronze bands inside the helmet.⁵⁹⁹ The bands in the front additionally held together both parts of the cap. These bands might also have served as clamps to improve the fitting of the organic cap under the metal helmet. Five of the helmets from Bernières d'Ailly (helmets A, B, E, F, H) have a hollow attachment made of bronze sheet on the sides. These were held by four rivets and were most likely used to fix organic or bronze ornamentation.⁶⁰⁰ The attachments on the helmet from Armancourt are no longer survive, only the rivet holes for fixing them remain. The rim of helmets of Type Bernières d'Ailly is bent inwards around a copper or bronze wire; it is mostly hammered flat, so it might not have been used to secure the perishable material from lining. So far, only the helmet from 'Normandy' has an outward bent rim.

On the crest, the edges of one sheet were folded over the other sheet. Sometimes, the crest was fixed with an additional rivet (Bernières d'Ailly, helmets G and F, Mainz-Kostheim). The two halves of the helmets are usually attached in the front and back with three long, conical rivets, which have a slightly curved, concave cross-section. Only the helmet from Mainz-Kostheim has on each side one flat-headed rivet only. Of the helmet Huelva B, only the upper part of the crest survives; right under the tip of the crest, a rivet hole is visible. The bronze sheets forming the crest of the heavily fragmented helmet G from Bernières d'Ailly are not only attached by folding one over the other on the crest but also by at least four flat-headed rivets on the very top of the crest.

The helmet from 'Normandy' bears on the front- and backside a V-shaped, but not completely preserved, bronze sheet, probably covering the today lost rivet joining the two halves. The sheet is attached with one conical headed rivet each on the upper end on the two halves. The V-shaped sheet is decorated with small embossed dots. Above the rim a row of larger bosses is visible. A lot of them are broken through, caused by the corrosion process and the thinness of the metal sheet. The crest of the helmet has at the base an embossed rib parallel to the upper end of the cap.

All other helmets have one or two decorative, plastic ribs parallel to the edge; in every case they are below the beginning of the crest. The crest of the helmets is usually decorated with fine, parallel lines. Some helmets, such as that from Armancourt and Mainz-Kostheim, are without any decoration on the crest.

The profile of the helmets changes according to the geographic location: while most north-western helmets (Bernières d'Ailly, 'Normandy') have a straighter cap profile and crest, the more southeasterly helmets, such as that from Nemours, already begin to show instead a slightly curved or concave crest. The helmets from Armancourt and Mainz-Kostheim, as the most eastern helmets of this type, have a clearly curved profile of both cap and crest. This indicates a development from simple rounded cap helmets to helmets with a raised, rounded or slightly pointed cap (Type Biebesheim) to highly pointed caps with a straight, almost triangular profile (Bernières d'Ailly).

2.2.5.1 Research History

Most of the helmets of this type derive from the associated deposit of Bernières d'Ailly, whilst the rest have either unclear find circumstances or derive from rivers, and consequently lack associated finds. The focus for discussion from the very beginning, therefore, has very much concerned their chronological classification. The oldest helmet finds of this type, being the eponymous find of Bernières d'Ailly, were first classified as Celtic and connected with the Gauls.⁶⁰¹ Found in 1832, these helmets were widely regarded amongst the art scene of a wide

⁵⁹⁹ Hencken 1971, 66.

⁶⁰⁰ E.g. feathers, hair or bronze sheets in the shape of horns, as on the Iron Age helmet from Ortona, Apulia, as suggested by Brandherm 2011, 47.

⁶⁰¹ As noted by Couetil 1902, 71–82.

entry in 19th century France.⁶⁰² It was Coutil, at the beginning of the 20th century, however, that classified them as helmets as belonging to the Bronze Age.⁶⁰³ G. v. Merhart grouped helmets of Type Bernières d'Ailly amongst his group CII.⁶⁰⁴ In contrast to other scholars, such as Hencken ('crested helmets with pointed caps'), Egg and Waurick (*Kammhelm mit spitzer, konischer Kalotte*), Milcent (Type 'Bernières d'Ailly'), Sperber (Type 'Armancourt') and others, which date the helmets to the very end of the Bronze Age, Lippert places his helmets of Type 'Mainz-Kostheim' at the beginning of the Late Bronze Age.⁶⁰⁵ The first study concerned with the construction of these helmets was undertaken by Hencken.⁶⁰⁶ But it is only recently that the manufacture and chemical composition of helmets of Type Bernières d'Ailly have been studied.⁶⁰⁷ Currently, the helmets are undergoing restoration at the Musée de Normandie in Caen, France.

2.2.5.2 Distribution and Deposition

In 1832, a deposit of ten helmets was found in Bernières d'Ailly, in the south of Caen, France. The helmets were allegedly found one upon another with the crest pointing upwards. They were deposited in three groups, with third and final group placed atop the other two,⁶⁰⁸ and not arranged in the form of a triangle as some authors have suggested.⁶⁰⁹ L. Coutil mentioned asso-



Fig. 2.24 Archaeological distribution of helmets of Type Bernières-d'Ailly: **101–110.** Bernières-d'Ailly; **111.** Armancourt; **112.** Unprovenanced; **113.** Nemours; **114.** Mainz-Kostheim; **115.** Roxheim; **116.** Larnaud; **117–118.** Huelva; **119.** Monte do Crasto. The numbers correspond to the catalogue numbers.

⁶⁰² E.g., F. A. Bartholdi 1864, Vercingétorix statue in Clermont Ferrand; F.-É. Ehrmann 1869: *Vercingétorix appelant les Gaulois à la défense d'Alésia*, Musée d'Art Roger-Quilliot, Clermont Ferrand; H.-P. Motte 1886: *Vercingétorix se rendant au camp de César*, Musée Crozatier, Le Puy-en-Velay; L.-N. Royer 1899, *Vercingétorix jette ses armes aux pieds de César*, Musée Crozatier, Le Puy-en-Velay.

⁶⁰³ Coutil 1902, 71–82.

⁶⁰⁴ v. Merhart 1941, 16.

⁶⁰⁵ Hencken 1971, 66–77; Egg – Waurick 1990, 14; Lippert 2011, 32, fig. 22; Sperber 2011; Milcent 2012, 131, 213.

⁶⁰⁶ Hencken 1971.

⁶⁰⁷ The publication is currently in preparation by Brun and colleagues.

⁶⁰⁸ de Linas 1869; Coutil 1902, pls. 9–10; de Beauregard 1909.

⁶⁰⁹ Hencken 1971, 66. See Warmenbol 2010, 564–565.

ciated finds consisting of a winged axe, two spearheads and two bracelets, which are now lost.⁶¹⁰ Other complete helmets are known from Nemours, ‘Normandy’ and from Armancourt in the north of Paris, thus placing the main distribution area in northern France. Another complete helmet is known from Mainz-Kostheim. All four helmets are single finds from river. Before deposition, the helmet from Roxheim was bent, broken and partially burnt – the latter perhaps indicating its participation in a cremation rite. Fragments of two helmets derive from the Huelva associated deposit from the estuary of the rivers Odiel and Tinto. Other fragments are known from the associated deposit of Monte do Crasto. Also, the associated deposits from Grañón⁶¹¹ and Castro de Avelãs⁶¹² contain likely fragments of helmets of this type (Fig. 2.24).

The Iberian helmets are the only ones with datable contexts, while the German and French helmets are all single finds from wet contexts or, as in the case of the deposit from Bernières d’Ailly, the exact nature of the supposed associations are unknown. Unlike the complete French and German helmets, the Spanish helmets are severely fragmented, might have been deposited as *pars pro toto*, and may thus derive from several different helmets (e.g. the Huelva helmet fragments). The associated deposit from Larnaud, France, also contains what appears to be a rivet from a crested helmet of Type Bernières d’Ailly.⁶¹³ Most of the French find spots (Bernières d’Ailly, Armancourt, Nemours) are in the vicinity of the river Seine, while Larnaud is close to the source of the river Seine. Following the Seine upstream, the profile of the helmets changes from a straight crest and cap to a more concave, central drawn-in profile, which is also observed on the helmets found more to the east.

2.2.5.3 Chronology

Due to their find context, it is difficult to accurately date helmets of Type Bernières d’Ailly: French and German finds are either single finds from rivers, have unknown find circumstances or, where possibly associated, the finds are today lost. The fragmented helmet from Roxheim is also a single river find. The large number of ‘Atlantic’ type bronzes recovered from the same area of deposition and dated to SB IIc–IIIb (Ha B) by Sperber,⁶¹⁴ however, might be contemporaneous with the helmet.

The helmets from Bernières d’Ailly were part of an associated deposit, of which other alleged finds – a winged axe, two spearheads and two bracelets – are not preserved and no depictions exist.⁶¹⁵ Schauer dated the deposit to the late Urnfield period (Ha B),⁶¹⁶ while Hencken assigned it to the 8th century BC.⁶¹⁷ Egg and Waurick suggest that the oldest crested helmets have a rounded crest and helmets with pointed, conical crest are later and belong most likely to the 9th/8th century BC.⁶¹⁸ P.-Y. Milcent dates the deposit to late (or *récent*) *Bronze final* II or early (*ancien*) *Bronze final* III.⁶¹⁹ Lippert assumes, on the basis of his correspondence analyses, that helmets of Type Bernières d’Ailly are actually the oldest European crested helmets, and dates them to the 13th–12th century BC.⁶²⁰ Unfortunately, the rivet of a helmet of Type Bernières d’Ailly from the associated deposit from Larnaud, France, is not of much chronological help: the contents of the associated deposit varies from Bz D (e.g. butt of a Rixheim sword) to Ha B1 (the ‘thraco-cimmerian’ finds; e.g. a belt of Type Bénévent-en-Champsaur).⁶²¹

⁶¹⁰ Coutil 1907, 960.

⁶¹¹ Alonso Fernández – Jiménez Echevarría 2009, 34.

⁶¹² Kalb 1980, 29, 43, figs. 7, 37.1–6; Jorge 1988, 97–98.

⁶¹³ Hencken 1971, 75, fig. 49a; Mohen 1977, 122; Sperber 2011, 20.

⁶¹⁴ Sperber 2006b, 359.

⁶¹⁵ Coutil 1910, 580.

⁶¹⁶ Schauer 1975, supp. 49.4.

⁶¹⁷ Schüle 1969, 65–72, 76; Jacob-Friesen 1968, 271; Hencken 1971, 74, with references to Arribas 1964, 50.

⁶¹⁸ Egg – Waurick 1990, 14.

⁶¹⁹ Milcent 2012, 131, 213.

⁶²⁰ Lippert 2011, 32, fig. 22.

⁶²¹ Mohen 1977, 122; Sperber 2011, 20.

There are both helmet fragments and depictions from the Iberian Peninsula, which contribute to the chronology of the Iberian helmets of Type Bernières d'Ailly. The deposition of Huelva (if it happened at once), is dated to Ha B1; a few finds though already date to Bz D,⁶²² while the deposit from Grañón (which also contains potentially a fragment of a crested helmet) is dated to 1200–1100 BC/Grañón horizon, based on the association of swords of Type Vilar Maior, which are also found outside Iberia in southwest France, and a sword of Type Fontanguillere, which is mainly distributed in southwest France.⁶²³ The deposit from Vila Cova de Perrinho/Monte do Crasto, Portugal, contained alongside the helmet fragments two daggers of Type Porto de Mós and a torque, and resembles in its composition the Huelva find. It is dated accordingly to the Blackmoor/Braud/Huelva phase.⁶²⁴

Thus we can conclude that helmets of Type Bernières d'Ailly were deposited in the Iberian Peninsula from the 12th century BC onwards, after a rather short period of use, considering the most likely French origin. Some helmets though might have been used somewhat longer, as suggested by the stele from Zarza de Montánchez. If the identification of the depicted sword as being of Type Cordeiro is correct,⁶²⁵ the stele might be dated to late Ha B1. Thus widening the time frame for helmets of Type Bernières d'Ailly, at least in the Iberian Peninsula, from the end of Ha A1 to late Ha B1, with a peak in deposition during Ha A. The chronological classification of the French helmets of Type Bernières d'Ailly is, according to the deposit of Larnaud, ranging from Bz D–Ha B1, similarly broad. Based on their physiognomy, it is clear that helmets of Type Bernières d'Ailly are later than those of Type Biebesheim, with earliest helmets of Type Bernières d'Ailly probably appearing in Ha A1 and spreading rapidly. They might have been in use then until late Ha B1.

Catalogue

Cat. nos. 101–110. Bernières-d'Ailly, Dép. Calvados, France – associated deposit – ten helmets, most of them complete. Measurements: see Tab. 2.13 – museums and inv. no. see below – Plates 17–20. References: Lambert 1837; Fallue 1866; de Linas 1869; Mériel 1890; Coutil 1901, 71–82, pls. IX–X; Coutil 1907, 960; de Beauregard 1909; Coutil 1910, 579–588; de Beauregard 1910, 5, pl. 1, fig. C1; Déchelette 1910, 229–232, 235, 237; Coutil 1911; Coutil 1927, 362–366; Doranlo 1952/1954, 94–116; Hencken 1971, 66, 37, figs. 40–46; Verron 1971, 75, no. 77, fig. on page 74; Pflug 1989, 95, cat. no. 88; Egg – Tomedi 2002, fig. 12; Brun et al. 2007, 41; Warmenbol 2010, 564–565; Lehoërff 2011, fig. 2; Lippert 2011, 64; Berthelot 2014.

The ten helmets were found in 1832 in Falaise.⁶²⁶ The helmets were allegedly found one atop the other, divided between three groups, with the crest pointing upwards, the third group positioned atop the other two groups.⁶²⁷ The piles of helmets were not placed in the form of a triangle, as stated by some authors.⁶²⁸ Coutil mentions associated finds, consisting of a winged axe, two spearheads and two bracelets.⁶²⁹ According to de Linas, nothing else was found with the helmets.⁶³⁰

⁶²² Brandherm 2007.

⁶²³ Brandherm 2007, 42; Alonso Fernández – Jiménez Echevarría 2009; Roberts et al. 2013, 35, fig. 2.5; Matthews 2017.

⁶²⁴ Brandherm 2007, 14, 81.

⁶²⁵ Brandherm 2007, 140, class F, cat. no. D15.

⁶²⁶ The find location is described as 'à deux lieues de Falaise, près des racines du mont d'Eraines' (Fallue 1866, 260–263), 'à mille trois cent mètres d'Ailly et à six cent mètres environ de Sainte-Anne d'Entremont' (Mériel 1890, 259–260), or 'au pied du mont d'Eraines et près du hameau de Sainte-Anne d'Entremont [...] à dix mètres du fossé du château' (Coutil 1902, 71–72). Cf. Berthelot 2014.

⁶²⁷ de Linas 1869; Coutil 1902, pls. 9–10; de Beauregard 1909.

⁶²⁸ Hencken 1971, 66. See Warmenbol 2010, 564–565.

⁶²⁹ Coutil 1910, 580.

⁶³⁰ de Linas 1869, 4–5.

During the two or three decades after they were found, the helmets were donated or sold to different museums and private collections. Today, the helmets are kept in several different museums: the helmet formerly owned by Ernest d'Acy and Costa de Beauregard is today at the University Museum of Philadelphia (cat. no. 101; inv. no. 70.4.1; purchased from J. J. Klejman in 1970), and the helmet formerly owned by the Comte Ladislav Odescalchi (bought 1902 from L. de Glanville) was transferred to the Palazzo Barbérini, Rome, in 1903 (cat. no. 102; inv. no. 1022.1727) and then on to the Museo Nazionale del Palazzo di Venezia, Rome in 1959.⁶³¹ Another helmet is kept by the Musée des Antiquités de Rouen (cat. no. 103; inv. no. 227.78.A; formerly 970.227; it was owned by Mrs. Davois du Mesnil-Sous-Lillebonne, who sold it 1840 to the museum). After extensive damage to the museum at Falaise in 1944, the other helmets were stored in the library of the city. Since 2006, these helmets have been kept at the Musée de Normandie, Caen (cat. nos. 104–110; inv. nos. D.2006.6.1–D.2006.6.7). The numbering of the helmets in Tab. 2.13 and in the following follows that used by de Beauregard and Hencken.⁶³²

Cat. no. 111. Armancourt, Dép. Oise, France – single river find (river Oise) – complete helmet. Measurements: height: 26.5cm; diameter: 22.1 × 16cm; weight: 520g – Musée Vivenel, Compiègne, inv. no. H899 – Pl. 21.111. References: Hémery 1926, 195–200; Coutil 1927, 362–366; Hémery 1927, 136–141; v. Merhart 1941, fig. 4.2; Hencken 1971, 66, fig. 39; Blanchet – Lambot 1975, 45–46, no. 35; Lippert 2011, 63, pl. 1.4.

The helmet was found in 1913 or 1914 in the river Oise.

Cat. no. 112. Unprovenanced (known as 'Normandy', France) – complete helmet. Measurements: height: 22.3cm; diameter: 22.5 × 17.2cm – private collection in Switzerland – Catalogue de la Biennale des Antiquaires 1984, 662–663 – Pl. 21.112. References: Pflug 1989, 95, cat. no. 88; Egg – Tomedi 2002, fig. 12.19; Lippert 2011, 64.

The helmet was sold in France by the Galerie des Pyramides to Switzerland. Find spot and find circumstances of the helmet are unknown. It was first presented in an official archaeological context during the *Schutz und Zier* exhibition in Basel, Switzerland.

Cat. no. 113. Nemours, Dép. Seine-et-Marne, France – find circumstances unknown – complete helmet. Measurements: height: 26cm; weight: 462g – Musée de Préhistoire d'Île-de-France, inv. no. 80.20.1 – Pl. 21.113. References: Roy 1983; Bonnamour – Mordant 1988, 363–372.

The find circumstances of the helmet are unknown.

Cat. no. 114. Mainz-Kostheim, Hessen, Germany – single river find (estuary of the river Main into the Rhine) – complete helmet. Measurements: height: 25cm; diameter: 21.5 × 16.8cm – Römisch-Germanisches Zentralmuseum, inv. no. 2219 – Pl. 22.114. References: v. Merhart 1941, fig. 4.1; Hencken 1971, 72, fig. 47; Egg – Waurick 1990, 15, fig. 8.3; Lippert 2011, 64, pl. 1.5.

The helmet was found before 1940 in the estuary of the river Main as it flows into the Rhine.

Cat. no. 115. Roxheim, Lkr. Ludwigshafen, Rheinland-Pfalz, Germany – single river find (old Rhine) – fragment. Measurements: c. 10 × 17cm – Historischen Museum der Pfalz, inv. no. HMP 2000/0004–60 – Pl. 22.115. References: Sperber 2006a, 207, fig. 7.14; Sperber 2006b, 362, fig. 2.9; Sperber 2011, 38, fig. 12.1; Sperber 2017, cat. no. 236.

The fragmented helmet was found in the Silbersee ('silver lake') at Bobenheim-Roxheim, a quarry pond in a bend of the former riverbed of the Rhine. In the Silbersee, a large number of other Late Bronze Age finds were also recovered, some c. 60% being of 'Atlantic' types.⁶³³

⁶³¹ Lehoërff 2011.

⁶³² de Beauregard 1910; Hencken 1971, 66–73.

⁶³³ Sperber 2006a; Sperber 2006b.

Cat. no. 116. 40 Larnaud, Dép. Jura, France – associated deposit – one rivet. Measurements: length: 2.7cm – Musée des Antiquités Nationales at Saint-Germain-en-Laye, inv. no. 21.695 – Pl. 22.116. References: Hencken 1971, 75, fig. 49a; Mohen 1977, 122; Sperber 2011, 20.

The associated deposit from Larnaud, France, which contains a rivet from a crested helmet of Type Bernières d'Ailly, has a rather wide chronological span. The contents of the associated deposit varies in age from Bz D (e.g. the butt of a Rixheim sword) to Sperber's SB IIIa1 (1020–960 BC), equivalent to late Ha B1 or early B2 (e.g. 'thraco-cimmerian' finds; such as a belt of Type Bénévent-en-Champsaur).⁶³⁴

Cat. nos. 117–118. Huelva A & B, Andalusia, Spain – assemblage in river (estuary of the rivers Odial and Tinto) – fragments of two helmets. Measurements: fragment A: height: 25cm; diameter: 21.5 × 16.8cm; weight: 150g; fragment B: length: 8cm; weight: 12g – Museo Arqueológico Nacional, Madrid inv. no. 229 (helmet A) and 318 (helmet B) (old inv. no.: 32.606; 32.525) – Pl. 22.117–118. References: Almagro Basch 1958, Fas. 4, E.1.39, nos. 269–272; Hencken 1971, 72, 74, fig. 48; Schauer 1983, 185; Stary 1994, 95, suppl. 3A.1, map 1; Ruiz-Gálvez Priego 1995; Harrison 2004, 15; Brandherm 2007, 29–30; Lippert 2011, 64, pl. 1.1–2.

The bronze objects were dredged from the estuary of the river Odiel between February and March (April?) 1923, at a depth of 9–9.5m, at the confluence of the rivers Odiel and Tinto. The mechanical dredger, with buckets on a continuous chain, brought the sediment to the surface, where the workmen picked out the bronzes they saw. During later dredging further objects were discovered, but they cannot be clearly associated with this assemblage. The assemblage contains, based on the description of Brandherm, swords of Type Rixheim, Type Cordeiro, a transitional type, 93 swords and fragments belonging to at least 51 swords of Type Huelva, two carps-tongue swords, 28 daggers, 92 spearheads and fragments (belonging to at least 81 spearheads), 61 regatones and further fragments of those, 56 rivets, 17 arrow heads, 12 tutuli, 11 rings, five fragments of at least two bronze helmets, four elbow fibulae and other fibulae forms, four fragments of at least three torques, two buckles, five bronze sheets, nine objects of undetermined type, a pin, a chisel, and some iron fragments.⁶³⁵

Cat. no. 119. Vila Cova de Perrinho (Rossio) / Monte do Crasto, prov. Beira Litoral, Portugal – associated deposit – three fragments. Measurements: fragment ARQ A: 7.8 × 3.4 × 0.3cm; 20g; fragment ARQ 34: 13.5 × 9.6 × 0.1cm; 40g; fragment ARQ 35: 11.2 × 10.7 × 0.1cm; 45g – Museu Municipal de Vale de Cambra, inv. no. ARQ033–35 – Pl. 22.119. References: Brandão 1963, 118, no. 9, pl. 1.9–11; Kalb 1980, 29, figs. 7, 41.8–10; Coffyn 1985, 390, pl. XL; Bottaini – Rodrigues 2011a, 109, figs. 2, 3.8–10; Bottaini – Rodrigues 2011b, 31–32, fig. 5, tab. 1; Brandherm 2011, 40.

The associated deposit⁶³⁶ was found in 1959 or 1960 in Rossio, Vila Cova de Perrinho. It consists of a ceramic vessel, three beads, three axes, three chisels, two daggers of Type Porto de Mos, two fragments of bracelets, and three bronze sheet fragments of a crested helmet. The beads and the ceramic pot are now lost.

2.2.6 Helmet from Tiryns

The helmet from Tiryns is the only crested helmet not assignable to any of the previously defined forms represented by types Mantes, Lueg, Biebesheim or Bernières d'Ailly. The helmet from Tiryns is only partially preserved. It was made out of six elements: two halves of a cap, two bands in between and two cheek plates, which is similar to the helmet indicated on the Linear B tablets from Pylos (around 1200 BC), where the helmet (*ko-ru-to*) is described as com-

⁶³⁴ Mohen 1977, 122; Sperber 2011, 20.

⁶³⁵ Brandherm 2007, 29.

⁶³⁶ Interpreted as a grave by Brandão 1963, 114.

posed by four elements (*o-pa-wo-ta*) and two cheek plates (*pa-ra-wa-jo*). The cheek plates of the Tiryns helmet show a row of small holes (diameter c. 1mm) parallel to the edge to fix the organic inlay, with a distance between each of them of 5mm. During the excavation, residues of linen were still present between the rivet holes but were not preserved during restoration work. The bands have three holes in both ends, probably used to fix a wooden crest holder.

On the two halves of the cap of the Tiryns helmet, a dotted line with pendant and another line parallel to it, below the chevrons, follows the rim of the cap. From the Aegean-Cypriot world we know openwork triangles found on several Cyprian tripods and stands from the 12th century BC onwards,⁶³⁷ though these might not have been cut-out but by bending a rod. The decoration of open elements is documented also from the Nordic Bronze Age in period II.⁶³⁸ Mozsolics sees the origin of the openwork triangles in Southern Russia, the Caucasus and the Koban during the 13th century BC, which then appears in Transylvania and Hungary shortly afterwards.⁶³⁹

In the centre of each side of the Tiryns helmet, as well as in the centre of the cheek plate, two circles of pellets with a large central boss were applied. This central element is known from other European defensive armour, as on the helmets from Pass Lueg and from Szczecin-Zdroje, on the cuirass from Jura (cat. no. 138), and the complete example from the Danube.⁶⁴⁰ Other bronze sheet with the same motif derive from Salaš Noćajski, Serbia,⁶⁴¹ Gușterița, Romania,⁶⁴² Techirghiol, Romania,⁶⁴³ Pila del Brancon, Italy,⁶⁴⁴ Dresden-Dobritz, Germany,⁶⁴⁵ and from an Iron Age deposit from Sicily.⁶⁴⁶ Borchhardt instead sees in the central decoration a close connection to the older *Zonenhelme*, which bear both zig-zag bands and additional round metal discs.⁶⁴⁷

The grave dates to the early 11th century BC or LH IIIC (late).⁶⁴⁸ N. M. Verdelis assumes the helmet was produced in a local workshop, using yet unknown Cretan-Mycenaean archetypes,⁶⁴⁹ which is strengthened by the similarity of the form of the cheek plate with the ones from Knossos and Dendra. The influence of the Urnfield culture is evident in the central decoration of both helmet and cheek plates. Thus, we might regard the helmet from Tiryns as a hybrid between Aegean and Urnfield culture types.

Cat. no. 120. Tiryns, Argolis, Greece – grave 28 – almost complete helmet. Measurements: height: 17cm; diameter: 22.5cm; thickness: 0.1cm; measurements cheek plates: 16 × 9cm; measurements bands: 30.5/29/10.5.5 × 3cm – Archaeological Museum of Nafplion, inv. no. unknown. – Pl. 22.120. References: Daux 1958; Verdelis 1963, 17, fig. 5.9, suppl. 6–7; Desborough 1964, 64, 80, 84; Hencken 1971, 23–26, fig. 8; Borchhardt 1972, 43–44, pl. 8.4–5; Borchhardt 1977, E68, fig. 9.E, pl. E.IVa; Schauer 1982a, 343; Lippert 2011, 75–76, pl. 8.5–6.

The geometric graves, located some 150m to the south of the acropolis, were excavated in 1957. Grave 28 contained two burials; one earlier, without any associated finds, and a later grave, containing the helmet itself, one bronze spearhead, two iron daggers, one 79cm long broken bronze sheet band, one bronze phalera or shield buckle, two bronze finger rings and one *Bügelkanne*. Schauer argues that the position of the helmet was relocated to the area of the chest

⁶³⁷ Catling 1964, 190–223.

⁶³⁸ Hencken 1971, 23.

⁶³⁹ Mozsolics 1955.

⁶⁴⁰ Mödlinger 2014b; cat. no. 132.

⁶⁴¹ Vasić 1994, pl. 38.13.

⁶⁴² Bronze sheet fragment: Rusu 1990, 73, pl. V.5.

⁶⁴³ Bronze sheet fragment: Petrescu-Dîmbovița 1978, pl. 215.17–19.

⁶⁴⁴ Bronze sheet fragment: Salzani 1998, fig. 2.138.

⁶⁴⁵ Bronze cup: Martin 2009, pl. 30.119.

⁶⁴⁶ Egg 1983, fig. 2.4–5.

⁶⁴⁷ Borchhardt 1972, 44.r

⁶⁴⁸ Desborough 1964, 241.

⁶⁴⁹ Verdelis 1963, 23.

during the decomposition process, dislocating the bronze phalera, which was positioned so as to provide protection for the heart, and was not, as Verdelis suggests, a shield buckle.⁶⁵⁰ Schauer also suggests that the bronze disc may also have been used as a cover for the helmet.

2.2.7 Single Helmet types and Potential Helmet Finds

The only western European helmet, which could perhaps have been dated more precisely, was that found in Picquigny, Dép. Somme, France, in peat at a depth of 3m, together with an antenna sword, next to one of many skeletons.⁶⁵¹ The helmet was sold to a copper smith, however, and melted down. No drawings were made, which was already regretted in early writings of A. Mongez.⁶⁵²

Coutil and L. Hémerly both cite a helmet from Posen,⁶⁵³ similar to the one from Mainz, which according to A. Demmin: 'On a trouvé un exemplaire tout pareil [as the helmets from Bernières d'Ailly] à Posen et un autre en Bavière dans la rivière de l'Inn'.⁶⁵⁴ The latter is very likely the helmet from the Pockinger Heide. It is not clear to which helmet Demmin refers. In 1869, only the crested helmets from Bernières d'Ailly, Pockinger Heide and Pass Lueg were known.

Some 13 conical-headed rivets, potentially belonging to crested helmets, were found at Flag Fen, Peterborough, United Kingdom.⁶⁵⁵ The rivets from the Nottingham Hill associated deposit, Gloucestershire, which was deposited inside a hillfort,⁶⁵⁶ are more likely from a bronze vessel than a crested helmet (Fig. 2.25).

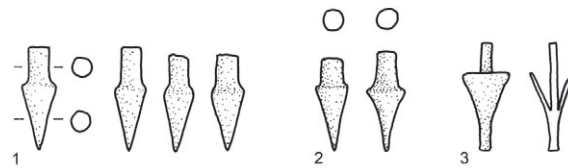


Fig. 2.25 Potential rivets of helmets of Type Biebesheim or Type Bernières-d'Ailly: 1. Nottingham; 2. Flag Fen; 3. Saint-Brieuc-des-Iffs.

The associated deposit from Vénat, France, is dated to the transition from Ha B to early Ha C.⁶⁵⁷ It is thought to contain a single potential rivet from a crested helmet of Type Bernières d'Ailly.⁶⁵⁸ The cross-section of the rivet, however, is rather unique – the angle between shaft and head is not 90° but 45°, and is different in form from those rivets found on known helmets.

The rivets from the *Bronze final* II associated deposit from Saint Briec-des-Iffs, France, interpreted as transitional between early or *Bronze final* II *ancien* (i.e. Ha A2) and late or *Bronze final* II *récent* (i.e. Ha B2),⁶⁵⁹ are assumed to come from a crested helmet of Type Biebesheim.⁶⁶⁰ However, the rivets do not have a solid, conical head but are instead hollow, a form, which is currently unknown on helmets of Type Biebesheim. More likely, they derive from another type of object.

⁶⁵⁰ Schauer 1982a, 343; Verdelis 1963.

⁶⁵¹ Athenas 1828, 280; Breuil 1900, 520; Coutil 1911, 7, no. 8.

⁶⁵² Mongez 1803/1804, 499–501.

⁶⁵³ Coutil 1926, 303; Hémerly 1926, 198.

⁶⁵⁴ Demmin 1869, 149.

⁶⁵⁵ Coombs 1992, 509.

⁶⁵⁶ Gingell 1974, fig. 4.10–13.

⁶⁵⁷ Hencken 1971, 75.

⁶⁵⁸ Müller-Karpe 1959, 216; Jacob-Friesen 1968, 272; Hencken 1971, 75, fig. 49b; Mohen 1977, 122.

⁶⁵⁹ Milcent 2012, 216.

⁶⁶⁰ Mohen 1977, 122.

Sperber describes burnt fragments of bronze sheet, decorated with small bosses and having a folded rim, from Volders, grave 322, Tyrol, as being fragments from Type Biebesheim.⁶⁶¹ However, according to their decoration, they appear instead to come from either bronze vessels, greaves of Type Kuřim,⁶⁶² or possibly from helmets related to the Italian crested series.

The associated deposit of Grañón was ‘discovered’ in 2007 (or at least brought to the attention of the Dirección General de Patrimonio del Gobierno de La Rioja, at that time). The associated deposit was originally much larger, weighing over 50kg, but most of the associated deposit was sold to a junkyard. Today, just 18 objects survive, consisting mainly of swords, spears and ferrules, with just three of the objects being complete. It is said that the associated deposit originally contained shields (which would have made them the first actual bronze shields found in the Iberian Peninsula), helmets, fibulae and belts. No fragments of these from the associated deposit have so far been recovered, and no further information on them is available.⁶⁶³

2.2.8 Outlook to the Iron Age: Italian Crested Helmets

The peak in the development of prehistoric crested helmets is surely to be found in central Italy. Far less practical than earlier such helmets but richly decorated, some 55 crested helmets with

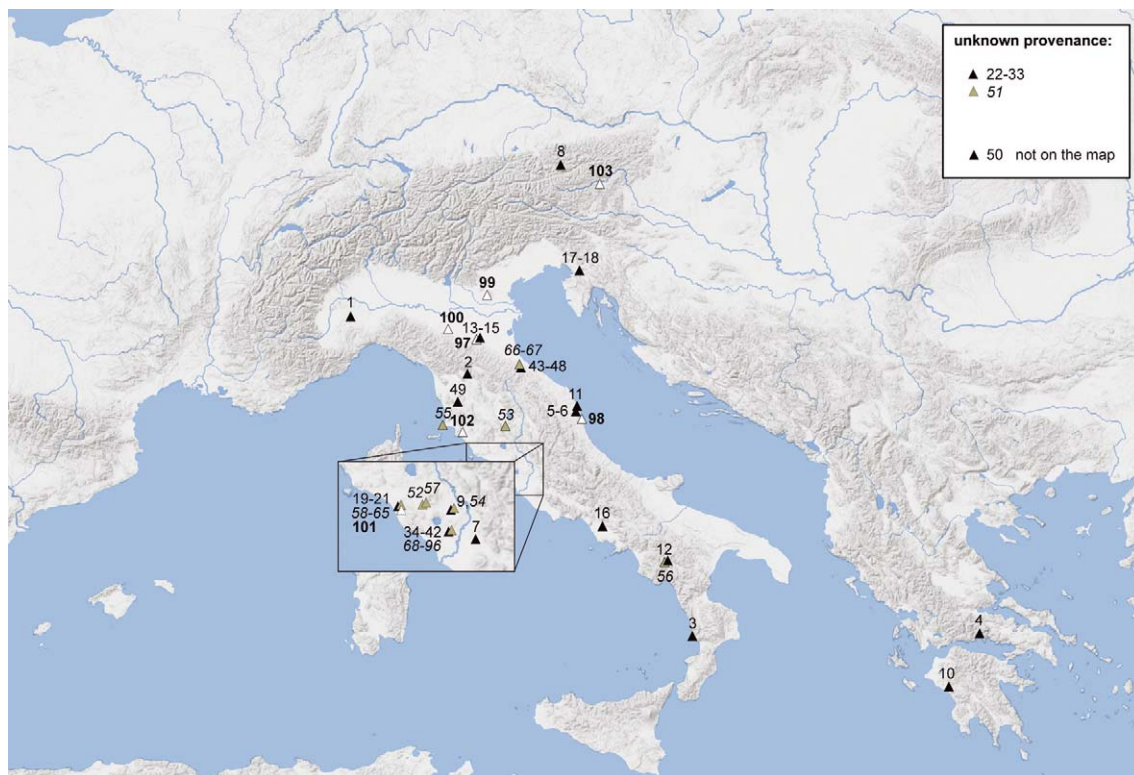


Fig. 2.26 Archaeological distribution of Italian crested helmets: ▲ Metal crested helmets: 1. Asti; 2. Bisenzio; 3. Campora San Giovanni; 4. Delphi; 5–6. Fermo; 7. Gabii; 8. Hallstatt; 9. Narce; 10. Olympia, Greece; 11. Porto S. Elpidio; 12. Sala Consilina; 13–15. San Francesco, Bologna; 16. Santa Maria di Capua Vetere; 17–18. Škocjan; 19–21. Tarquinia; 22–33. Unprovenanced; 34–42. Veii; 43–48. Verucchio; 49. Volterra; 50. Zavadinsy; 51. Unprovenanced. △ (grey) Ceramic replicas of metal crested helmets: 52. Chiusa Cima; 53. Città delle Pieve; 54. Falerii; 55. Populonia; 56. Sala Consilina, S. Antonio; 57. San Giuliano (Barbarano Romano, VT); 58–65. Tarquinia; 66–67. Verucchio; 68–96. Veii. △ Figurines with crested helmets: 97. Bologna; 98. Cupramarittima; 99. Luzzo Atestino; 100. Reggio Emilia; 101. Tarquinia; 102. Vetulonia; 103. Stettweg. Numbers relate to those in Tables 2.14 and 2.15.

⁶⁶¹ Sperber 2011, 10, fig. 3.

⁶⁶² See Chapter 4.1.3, p. 233.

⁶⁶³ Alonso Fernández – Jiménez Echevarría 2009, 8; Brandherm 2011, 40.

Helmets				Iaia 2005		Hencken 1971		v. Hase 1988	
No.	Find Spot	Museum	Inv. No.	Type	Cat. No.	Type	Fig.	Type	Cat. No.
1	Asti, Alveo del Tanaro (1875)	Museo di Antichità, Torino	1126	Asti B	31	pointed cap	52		8
2	Bisenzio (Capodimonte), Bucace, grave 1	Museo Archeologico Nazionale, Florence	85.531	Veii B	42	pointed cap	53		15
3	Campora San Giovanni	unknown	–	crested helmet (general)	45	–	–	–	
4	Delphi, Greece	Museo Delphi	–	Veii A1 (?)	38	–	–	–	17
5	Ferno, contrada Misericordia, grave 8	Museo Archeologico Nazionale, Ancona	16.473	Tarquinius A	19	pointed cap	55	type 1	3
6	Ferno (Ascoli Piceno), Misericordia, grave 74	Museo Archeologico Nazionale, Ancona	20.018	Veii A2	40	–	–	–	
7	Gabii, Osteria dell'Osa, grave 600	Soprintendenza Archeologica, Rome	–	Asti A	29	–	–	–	
8	Hallstatt, Austria	Landesmuseum Linz	–	San Canziano/Škocjan	35	–	–	–	19
9	Narce, Calcata, Mazzano Romano VT, grave 43	University Museum, Philadelphia	M. S. 850	Narce	56	round cap	68	–	
10	Olympia, Greece	Museum Olympia	10.301	Tarquinius or Veii	46	–	–	–	18
11	Porto S. Elpidio	Museo Archeologico Nazionale, Ancona	–	Verucchio A	49	–	–	–	
12	Sala Consilina	Antikenabteilung Staatliche Museen, Berlin	L 43	Tarquinius B	23	pointed cap	56		
13	San Francesco, Bologna	Museo Civico Archeologico, Bologna	65.771	Tarquinius (?)	27	–	–	–	
14	San Francesco, Bologna	Museo Civico Archeologico, Bologna	65.770	Tarquinius (?)	28	–	–	–	
15	San Francesco, Bologna	Museo Civico Archeologico, Bologna	65.749a–b	Verucchio (?)	54	–	–	–	
16	Santa Maria di Capua Vetere	Metropolitan Museum, New York	–	Tarquinius	26	pointed cap	57	type 1	4
17	Škocjan	Museo Civico, Trieste; Natural History Museum, Vienna	–	San Canziano/Škocjan	33	pointed cap	91		
18	Škocjan	Museo Civico, Trieste	47.635	San Canziano/Škocjan	34	pointed cap	92, b		
19	Tarquinius, Arcatelle, grave 20.3.1882	Museo Archeologico Nazionale, Tarquinius	RC 269	Veii A1	37	pointed cap	60, a–b	type 3	12
20	Tarquinius, Arcatelle, grave 24.2.1882	Museo Archeologico Nazionale, Tarquinius	RC 258	Tarquinius A	21	pointed cap	58	type 1	1
21	Tarquinius, poggio dell'Impiccato, grave 1	Museo Archeologico Nazionale, Florence	83.379/A	Tarquinius	22	pointed cap	59		5
22	unknown	National Museum of Wales, Cardiff	47.409 (?)	Tarquinius A	20	pointed cap	64	type 2	9
23	unknown	National Museum Copenhagen	–	Tarquinius B	25	pointed cap	65	type 2	11
24	unknown	Museum für Kunst und Gewerbe, Hamburg	1917.1228	Narce	57	round cap	74	–	
25	unknown	Musées Royaux d'Art et d'Histoire, Brussels	3606	–	–	–	–	type 2	10
26	unknown	Museum für Kunst und Gewerbe, Hamburg	1917.1230	–	–	round cap	75	–	
27	unknown	Civiche Raccolte d'Arte, Castello Sforzesco, Milan	3540	–	–	round cap	76–77	–	

Tab. 2.14 Early Iron Age Italian crested helmets.

Helmets										Hencken 1971		v. Hase 1988	
No.	Find Spot	Museum	Inv. No.	Type	Cat. No.	Type	Fig.	Type	Cat. No.				
28	unknown	Ashmolean Museum, Oxford	47.409 (?)		–	round cap	78-79	–					
29	unknown	prev. Seiffert collection, sold at Hermann Historica, October 2006	–		–	–		–					
30	unknown	prev. Guttman collection, sold at Hermann Historica, April 2009	–		–	–		–					
31	unknown (fake?)	sold at Hermann Historica, October 2005			–	–		–					
32	unknown, maybe Vulci	British Museum, London	1968.27.1	Veii A2	39	pointed cap	66-67		16				
33	unknown, maybe Vulci	Louvre, Paris	4399	Veii B (?)	43	–		–	14				
34	Veii, Grotta Gramiccia, grave 272	unknown	–	crested helmet (general)	44	–		–					
35	Veii, Casale del Fosso, grave 1036	Museo Archeologico Nazionale di Villa Giulia, Rome	–	Tarquinia B	24	pointed cap	61-62	type 2	6				
36	Veii, Casale del Fosso, grave 871	Soprintendenza per i Beni Arceologici dell'Etruria merid.	36.452	pointed cap, high crest	55	round cap	70	–					
37	Veii, Grotta Gramiccia, pozzo 648	Museo Archeologico Nazionale di Villa Giulia, Rome	35.231	–	–	round cap	69	–					
38	Veii, Quattro Fontanili, grave AA1	Museo Archeologico Nazionale, Civita Castellana	66.269	Veii B	41	pointed cap			13				
39	Veii, Quattro Fontanili, grave M9B	Museo Archeologico Nazionale, Civita Castellana	60.304	Asti B	32	pointed cap	63, a	type 1	2				
40	Veii, Quattro Fontanili, grave AA10B	Museo Archeologico Nazionale di Villa Giulia, Rome	65.213-16	–	–	round cap		–					
41	Veii, Quattro Fontanili, grave Z15A	unknown	–	–	–	round cap	72	–					
42	Veii, tomba a fossa con 2 loculi	lost (?)	–	Narce (?)	58	–							
43	Verucchio, le Pegge, grave 23	Museo Archeologico Nazionale, Verucchio	–	Verucchio B	51	–							
44	Verucchio, Moroni, grave 23	Museo Archeologico Nazionale, Verucchio	8539	Verucchio B	52	–							
45	Verucchio, Moroni, grave 32	Museo Archeologico Nazionale, Verucchio	8845	Verucchio	53	–							
46	Verucchio, Moroni, grave 35	Museo Archeologico Nazionale, Verucchio	72.745	Verucchio B	50	–							
47	Verucchio, necropoli Lippi, grave 57	Museo Archeologico Nazionale, Verucchio	160.587	Verucchio A	48	–							
48	Verucchio, necropoli Lippi, grave 89	Museo Archeologico Nazionale, Verucchio	28.537	Verucchio A	47	–							
49	Volterra, tomba di Poggio alle Croci (1996)	Soprintendenza per i Beni Archeologici della Toscana	SAT 21.50.80	Asti A	30	–							
50	Zavadinsky, Ukraine	Museo Masséna, Nice	–	San Canziano/Skocjan	36	pointed cap	93		20				

Tab. 2.14 continued

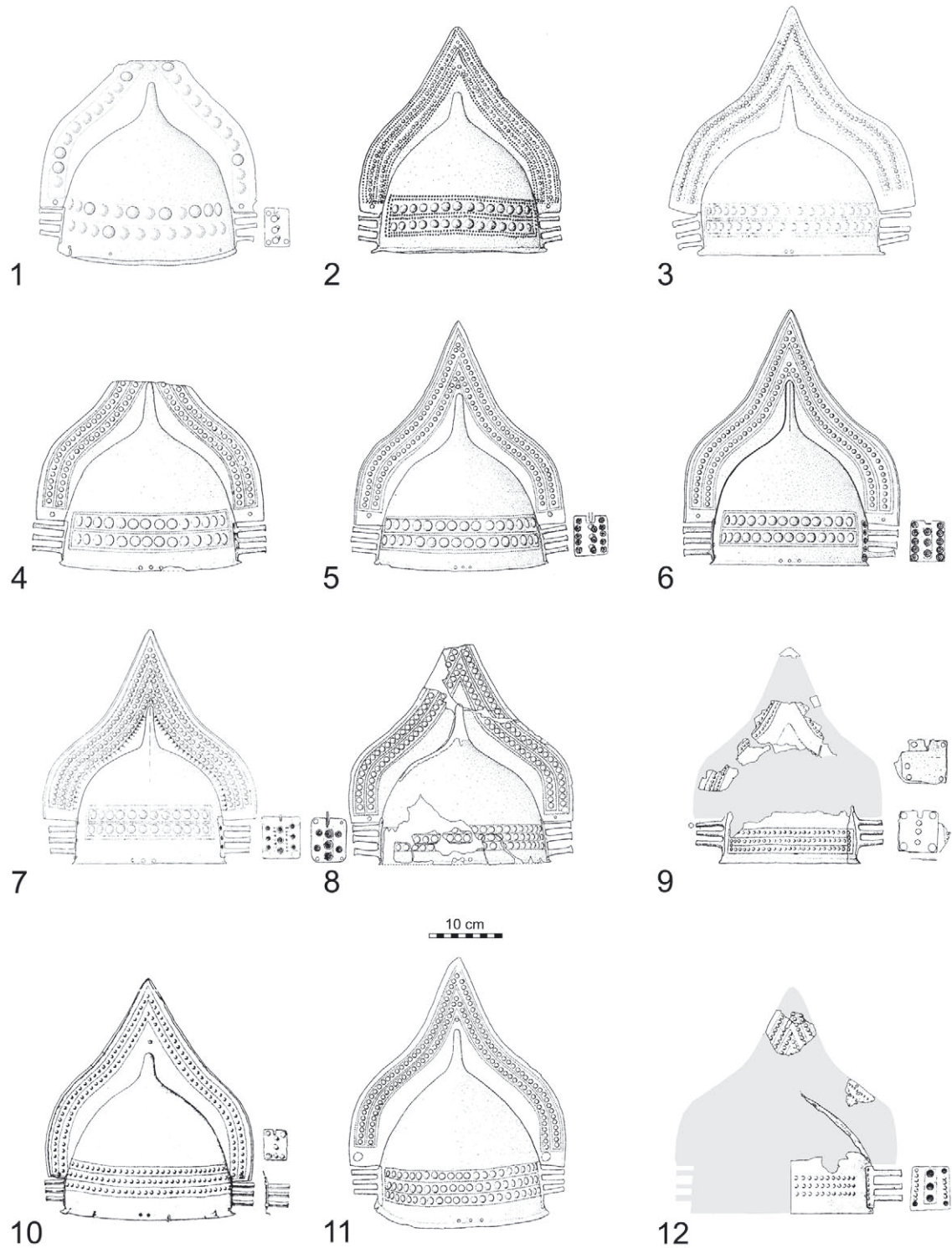


Fig. 2.27 Italian crested helmets: 1. Zavadintsy; 2. Santa Maria di Capua Vetere; 3. Unprovenanced ('Copenhagen'); 4. Tarquinia, poggio dell'Impiccato, grave 1; 5. Veio, casale del Fosso, grave 1036; 6. Sala Consilina; 7. Tarquinia, Arcatelle, grave 24.2.1882; 8. Fermo, contrada Misericordia, grave 8; 9. Veio, Quattro Fontanili, grave M9B; 10. Asti, Alveo del Tanaro (1875); 11. Unprovenanced ('Cardiff'); 12. Gabii, Osteria dell'Osa, grave 600 (drawings after Iaia 2005).

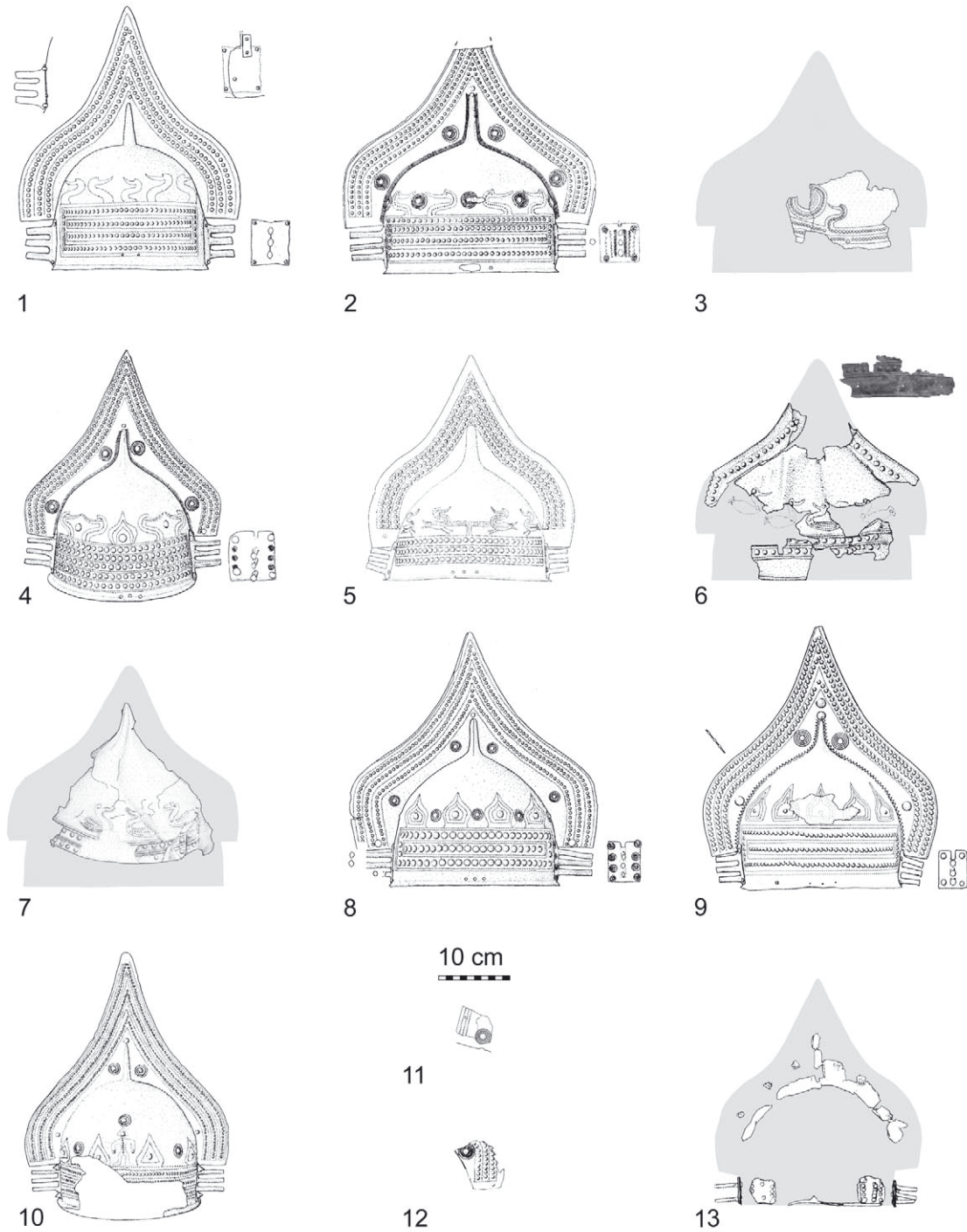


Fig. 2.28 Italian crested helmets: **1.** Fermo (Ascoli Piceno), Misericordia, grave 74; **2.** Tarquinia, Arcatelle, grave 20.3.1882; **3.** Škocjan (drawing: Mödlinger); **4.** Unprovenanced ('London'); **5.** Volterra, tomba di Poggio alle Croci (1996); **6.** Škocjan (drawing and photo: M. Mödlinger; photo © Prähistorische Abteilung NHM Wien, inv. no. 47.633); **7.** Škocjan (drawing: Mödlinger); **8.** Bisenzio (Capodimonte), Bucacce, grave 1; **9.** Veio Quattro Fontanili, grave AA1; **10.** Unprovenanced ('Louvre'); **11.** Bologna, San Francesco; **12.** Delphi; **13.** Veio, Grotta Gramiccia, grave 272 (drawings after Iaia 2005, if not indicated otherwise).

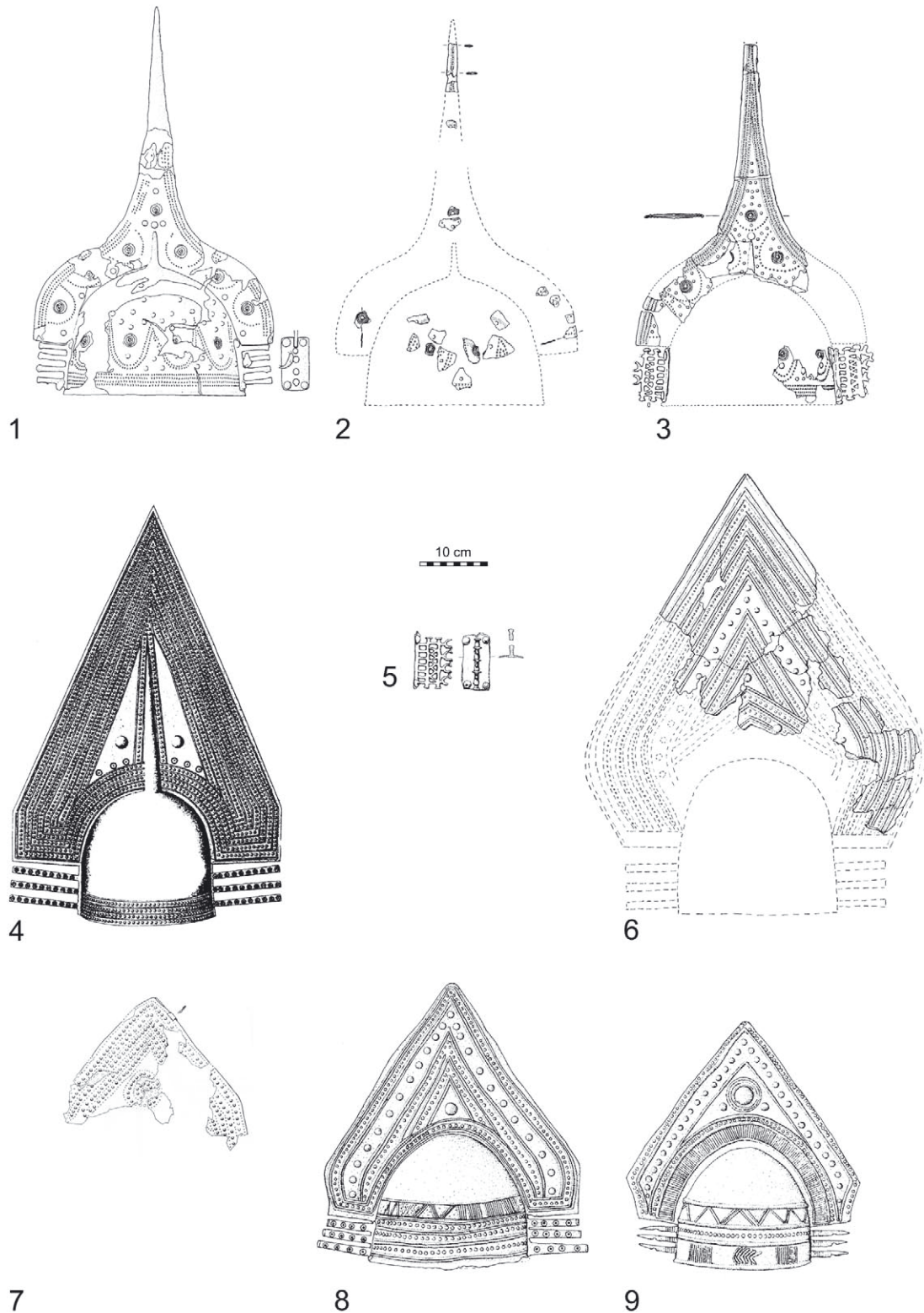


Fig. 2.29 Italian crested helmets: 1. Verucchio, necropoli Lippi, grave 89; 2. Verucchio, Moroni, grave 32; 3. Verucchio, Moroni, grave 35; 4. Veio, casale del Fosso, grave 871; 5. Verucchio, le Pegge, grave 23; 6. Veio, tomba a fossa con 2 loculi 1886; 7. Veio, Quattro Fontanili, grave Z15A (after Hencken 1971, fig. 72); 8. Narce, Calcata, Mazzano Romano VT, grave 43; 9. Unprovenanced ('Hamburg') (drawings after Iaia 2005, if not indicated otherwise).

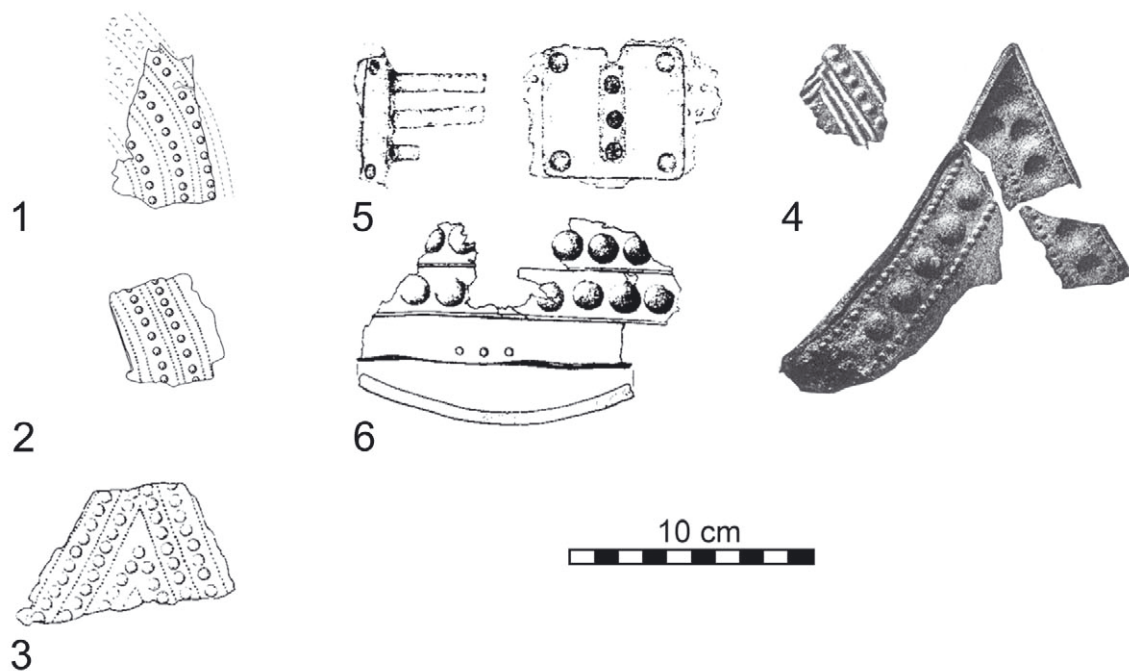


Fig. 2.30 Italian crested helmets: 1–2. Bologna, San Francesco; 3. Olympia; 4. Škocjan (after Hencken 1971, fig. 92); 5. Capora San Giovanni; 6. Hallstatt. (no scale for nos. 1–3) (drawings after Iaia 2005, if not indicated otherwise).

round or pointed cap are known from the early Iron Age Villanovan culture.⁶⁶⁴ For an overview of the main information available on these Italian crested helmets, as well as their typological classification according to various authors,⁶⁶⁵ see Tab. 2.14 and Figures 2.27–2.30).

The most comprehensive study of these Italian crested helmets was recently published by Iaia.⁶⁶⁶ Using morphological and decorative characteristics, established on the basis of the examination of different aspects of some 50 metal helmets (including classifying the decoration of the cap and crest into no less than seven types and six variants), he arranged the Italian helmets into five main groups: Tarquinia, Asti, San Canziano/Škocjan, Veii and Verucchio, encompassing several variants and subtypes.

F.-W. v. Hase distinguished the Italian crested helmets with pointed cap into three different, mostly contemporary, variants,⁶⁶⁷ based on the 20 or so examples then known to him. Variant I is characterised by a round, stocky cap with a horizontal based crest. These helmets appear already in Villanovan IB. Helmets associated with variant II are characterised by an elongated cap with a horizontal based crest. F. W. v. Hase dates variant II according to a ceramic helmet from Tarquinia, grave 39, which is assigned to the 9th century BC. The latest helmet is the one from Veii, grave 1036, which is dated to the second half of the 8th century BC.⁶⁶⁸ Variant III is defined by the cap, as in variant I or II, and has a slightly vertical based crest. The cap is deco-

⁶⁶⁴ Hencken 1971, 78–110; v. Hase 1988; Iaia 2005.

⁶⁶⁵ Hencken 1971; v. Hase 1988; Iaia 2005.

⁶⁶⁶ Iaia 2005, 65–114.

⁶⁶⁷ v. Hase 1988.

⁶⁶⁸ v. Hase 1988, 201.

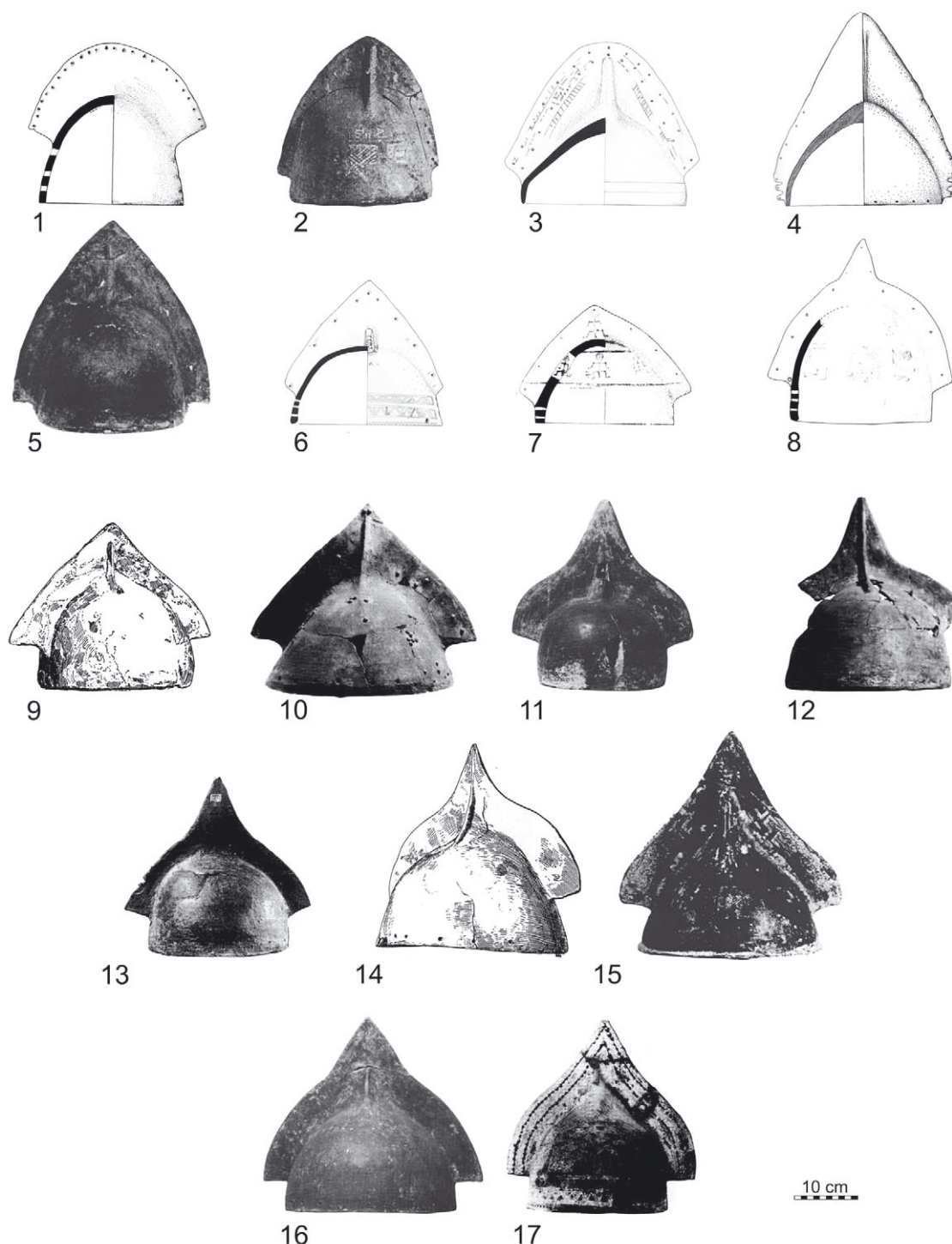


Fig. 2.31 Ceramic models of Italian crested helmets: **1.** Veio Quattro Fontanili, grave CC18–19B (after Alciati – Passarello 1963, fig. 44); **2.** Veio Quattro Fontanili, grave NO 4–5 (after v. Hase 1988, fig. 8.2); **3.** Veio Quattro Fontanili, grave AA8 (after Terrosi Zanco 1967, fig. 5.2); **4.** Veio Valle la Fata, grave 18 (after Lippert 2011 pl.11.1); **5.** Veio Valle la Fata, grave 28 (after v. Hase 1988, fig. 8.1); **6.** Veio Quattro Fontanili, grave AA7 (after Terrosi Zanco 1967, fig. 881.2); **7.** Veio Quattro Fontanili, grave DD19 (after Alciati – Passarello 1963, fig. 62b); **8.** Veio Quattro Fontanili, grave O6A (after Fabbriotti et al. 1972, fig. 65.2); **9.** Tarquinia Monterozzi (?) (after Hencken 1968, fig. 440); **10.** Tarquinia Impiccato, grave 65 (after Hencken 1968, fig. 47); **11.** Tarquinia Selciatello Sopra, grave 85 (after Hencken 1968, fig. 58c); **12.** Tarquinia Impiccato, grave 58 (after Hencken 1968 fig. 110d); **13.** Tarquinia Monterozzi (?), inv. no. RC 239 (after Hencken 1968, fig. 438); **14.** Tarquinia Monterozzi (?) (after Hencken 1968, fig. 439); **15.** Tarquinia Monterozzi, grave 66 (after v. Hase 1988, fig. 9.1); **16.** Tarquinia Impiccato, grave 80 (after Hencken 1968, fig. 144e); **17.** Tarquinia Impiccato, grave 39 (after Hencken 1968, fig. 214g).

rated with at least three rows of bosses, Ringbuckel and bird head depictions. The helmet from Tarquinia, as one of the oldest, marks the appearance of variant III (Villanovan IB according to Hencken).⁶⁶⁹ The most recent helmet is that from Bisenzio. Crested helmets with rounded cap occur as metal examples only in the late 8th century BC, but are already known from earlier contexts in the form of ceramic models.⁶⁷⁰ Only a few metal helmets are known (Tab. 2.14). The lack of crested metal helmets in Bologna and Este is most likely connected with different burial traditions, as generally no defensive armour is known from this area.⁶⁷¹ According to the densely narrow distribution area of both metal and ceramic helmets in southern Etruria, the local production of helmets of variant I–III in this area seem to be most likely. The helmets from Zavadintsy, Hallstatt and Asti, which also partly include other decorative elements, were surely produced by other workshops that were nonetheless extremely familiar or closely related to the Etrurian workshops. F. W. v. Hase locates these other workshops in northern Italy.⁶⁷²

Italian crested helmets unify characteristics of both western European and eastern European helmet types. While the cap testifies to a strong relationship with eastern European cap helmets (their profile resembles that of helmets of Type Pişcolt) and, though less significant, to helmets of Type Nagytétény, the crest certainly derives from western European helmets. The thin, pointed upper end of the cap was applied so as to increase the stability of the large crest, as already known on helmets of Type Lueg. We would also suggest that the vertical stabilisation rib on the central point of the crest of Type Lueg might be the precursor of the more massive midribs as found on the Italian crested helmets.

The connection between the Urnfield culture crested helmets and Italian crested helmets was suggested by v. Merhart.⁶⁷³ The relationship is even more evident, however, when including consideration of the ceramic helmets, skeuomorphs of unpreserved or unrecovered metal helmets. H. Born and L. D. Nebelsick assumed that the metal helmets depicted by Italian ceramic helmets might have had functional decorative rivets, as found on Type Biebesheim and Bernières d'Ailly, and might therefore be contemporary, if not precursors of the latter helmets.⁶⁷⁴ Moreover, both authors consider Italian crested helmets as older than the western European examples since both organic and metal crests are known in Italy, indicating a possible 'metallisation' of the older dated organic crested helmets. This view led them to conclude that the origin of this type of helmet lay in the Aegean and Anatolia, from where it spread to Italy and then north- and westwards.⁶⁷⁵ According to the chronology of helmets of both Type Biebesheim and Bernières d'Ailly, as well that of the Italian crested helmets (ceramic and metal), this is, as we will see, extremely unlikely.

Today, some 45 ceramic models of crested helmets are known (Tab. 2.15; Fig. 2.31). They were found, like the metal helmets, mainly in Tarquinia and Veii, with just one helmet known from Vulci and none from Bisenzio. From northern Etruria, there are just a few examples of urns covered with metal or ceramic helmets (e.g. Città della Pieve, Vetulonia) known to us. At the beginning of the Iron Age, some of the necropoli in Etruria and Campania demonstrate contemporaneity between the bronze cap helmets and ceramic imitations, of which the closest were found in Tarquinia. The ceramic helmet from Monte San Angelo/Veii (beginning of *prima età del ferro* IA) even shows a knob with a stepped shaft, pointing to the Ha B1 helmets of Type Pişcolt. Another further 35 or so ceramic cap helmets with knob are known from Pontecagnano.⁶⁷⁶ The helmets served as urn covers in the Villanova culture. Iaia suggests that the crested ceramic helmets from the transitional phase between late *prima età del ferro* I and initial phase

⁶⁶⁹ Hencken 1971, 78.

⁶⁷⁰ Hencken 1971, 97–110; v. Hase 1988, 202.

⁶⁷¹ Stary 1981.

⁶⁷² v. Hase 1988, 204.

⁶⁷³ v. Merhart 1941, 29, note 2.

⁶⁷⁴ Born – Nebelsick 1991, 32.

⁶⁷⁵ Born – Nebelsick 1991, 32–33.

⁶⁷⁶ Gastaldi 1998.

II, represent the continuation of the older ceramic helmet tradition.⁶⁷⁷ O. H. Frey distinguishes between the older ceramic imitations of crested helmets, with pointed cap, and more recent ones, with round cap;⁶⁷⁸ more likely, however, the helmets with rounded crest are older. According to R. Peroni and A. Vanzetti, the helmets can be generally dated to *prima età del ferro* IIA, despite the helmets from Tarquinia Impiccato, pozzo grave 65 (Fig. 2.31.10; dated to *prima età del ferro* IIA/B) and Tarquinia Selciatello Sopra, pozzo grave 85 (Fig. 2. 31.11; dated to *prima età del ferro* IB/IIA).⁶⁷⁹

No.	Find Site	No.	Find Site
51	'Italy' (private collection)	74	Veii, Quattro Fontanili, Pozzo grave CC 18–19B
52	Chiusa Cima	75	Veii, Quattro Fontanili, Pozzo grave CC10
53	Città delle Pieve	76	Veii, Quattro Fontanili, Pozzo grave DD 19
54	Falerii	77	Veii, Quattro Fontanili, Pozzo grave M 9D
55	Populonia	78	Veii, Quattro Fontanili, Pozzo grave NO 4–5
56	Sala Consilina, S. Antonio	79	Veii, Quattro Fontanili, Pozzo grave O6A
57	San Giuliano (Barbarano Romano, VT)	80	Veii, Quattro Fontanili, Pozzo grave P 16
58	Tarquinia Impiccato, Pozzo grave 39	81	Veii, Quattro Fontanili, Pozzo grave R 2–3
59	Tarquinia Impiccato, Pozzo grave 58	82	Veii, Quattro Fontanili, Pozzo grave T 5
60	Tarquinia Impiccato, Pozzo grave 65	83	Veii, Quattro Fontanili, Pozzo grave V 19
61	Tarquinia Impiccato, Pozzo grave 80	84	Veii, Quattro Fontanili, Pozzo grave V 3B
62	Tarquinia Monterozzi, Pozzo grave 66	85	Veii, Quattro Fontanili, Pozzo grave W 19
63	Tarquinia Selciatello Sopra, Pozzo grave 76	86	Veii, Quattro Fontanili, Pozzo grave X 4–5
64	Tarquinia Selciatello Sopra, Pozzo grave 85	87	Veii, Quattro Fontanili, Pozzo grave Y 11A
65	Tarquinia Selciatello Sopra, Pozzo grave 186	88	Veii, Quattro Fontanili, Pozzo grave Y 11A
66	Verucchio, Campo 'Lavataio', Pozzo grave 52	89	Veii, Quattro Fontanili, Pozzo grave Z 10
67	Verucchio, Ripa Lavatoio, grave 52	90	Veii, Quattro Fontanili, Pozzo grave Z 8
68	Veii, Quattro Fontanili, Pozzo grave AA13	91	Veii, Quattro Fontanili, Pozzo grave Z 9
69	Veii, Quattro Fontanili, Pozzo grave AA19	92	Veii, Valle la Fata, Pozzo grave 18
70	Veii, Quattro Fontanili, Pozzo grave AA19B	93	Veii, Valle la Fata, Pozzo grave 28
71	Veii, Quattro Fontanili, Pozzo grave AA7	94	Veii, Valle la Fata, Pozzo grave 5
72	Veii, Quattro Fontanili, Pozzo grave AA8	95	Veii, Valle la Fata, Pozzo grave 7
73	Veii, Quattro Fontanili, Pozzo grave BB16B	96	Veii, Valle la Fata, Pozzo grave 8

Tab. 2.15 Early Iron Age Italian ceramic imitations of crested metal helmets. The numbers are those used in Fig. 2.26.

Iaia suggests an earlier date for the helmets from Tarquinia Monterozzi, grave 66 and Tarquinia Impiccato, graves 37, 39 and 65 (*prima età del ferro* IB1).⁶⁸⁰ He associates the helmets from Tarquinia Selciatello Sopra, graves 85 and 186 and Tarquinia Impiccato, graves 58 and 80 with *prima età del ferro* 1B–2A1. The ceramic helmets from Veio are associated by J. Toms to phase IB (Valle la Fata, tomba 8), IC (Quattro Fontanili graves AA19A, AA19B, V3B), phase IC–IIA (Quattro Fontanili grave BB16B, Valle la Fata, tomba 5) and phase IIA (CC18–19B).⁶⁸¹ Some ceramic helmets from Veii, associated with Veii I, appear to resemble most closely the crested helmets of Type Biebesheim. The two most similar are the helmet from Valle la Fata,

⁶⁷⁷ Iaia 2013b, 83.

⁶⁷⁸ Frey 1990, 225.

⁶⁷⁹ Peroni – Vanzetti 2005.

⁶⁸⁰ Iaia 2005, 112.

⁶⁸¹ Toms 1986.

grave 28 (Fig. 2.31.5) and the one from Quattro Fontanili, grave no. 4–5 (Fig. 2.31.2).⁶⁸² However, they also already demonstrate, as a consequence of the centrally pointed cap and the high crest, a close relationship to the later Italian crested helmets. Also, the connection between crested helmets of Type Biebesheim and the ceramic models of crested helmets from Tarquinia and Veii, as described by v. Hase, can be questioned since the latter helmets were deposited, according to dendro-chronology, around 900–850 BC, and were most likely specifically manufactured for the burial.⁶⁸³ It is the same for the ceramic helmet from Tarquinia, Monterozzi, grave 66 (Fig. 2.31.15): the similarity with crested helmets of Type Bernières d'Ailly is striking but the high crest and the pointed cap show a closer relationship to the Italian helmets than to older western equivalents. Nevertheless, the close relationship to older forms suggests that there was knowledge of earlier Bronze Age helmets, and that their influence on the manufacture of Italian crested helmets made of bronze, especially in the adoption of their 'archaic' style and shape, must have been especially meaningful (see below).

A significant change in the construction of the different types of bronze crested helmets is marked by the form of the rivets. They generally grew in size and with increasing decorative purpose. But whilst they served a functional purpose on Bronze Age helmets, they are reduced to a purely decorative element on the Italian crested helmets, providing a clear typo-chronological order of development. On the Italian crested helmets, the earlier more conspicuous rivets, which functioned to hold together the two parts of the helmet, are replaced by flat-headed, inconspicuous rivets, in combination with an additional rectangular bronze sheet.⁶⁸⁴

The necropolis from Veii and Tarquinia contained the highest number of both bronze crested helmets and their ceramic models. Single metal helmets considered imports are known from Delphi, Olympia, Hallstatt, Škocjan and Podolia/Zavadintsy (Ukraine).⁶⁸⁵ A number of other unprovenanced helmets can also be connected to central Italian workshops, close to the two necropoli. The helmets found in Delphi and Olympia are interpreted as donations during the Greek colonisation of southern Italy in the 8th century BC.⁶⁸⁶ Find circumstances and find date of the helmet from Podolia/Zavadintsy are unknown. Coutil notes that the helmet was part of the Poulaski collection and cites a 'Congrès de Moscou T. II, 1892, 348'.⁶⁸⁷ Today, the helmet is stored at the Musée Masséna in Nice, France. The flat, hemispherical cap of the crested helmet, which belonged to the Guttman collection and was sold at Hermann Historica in 2005⁶⁸⁸ was made from a single metal sheet and has a separate crest, attached by means of rivets. The crest is decorated with large bosses, which are randomly distributed. The helmet lacks any counterpart in both construction and decoration, and its authenticity must be questioned.

Related finds of Italian crested helmets, occurring only as fragments, are also known from Škocjan.⁶⁸⁹ The fragments appear to belong to at least three helmets; two of them show complete bird depictions, without legs and with triangular tails, while the third helmet depicts bird heads with a central sun disc. It is unclear if a further fragment from the top of a crest belongs to the latter, third helmet or to a further fourth helmet.

Figurines with crested helmets have been dated to the 6th–7th century BC,⁶⁹⁰ suggesting the continued use, and possible manufacture, of crested helmets for both foot soldiers and horsemen.⁶⁹¹ The distribution of the small helmeted figurines is more to the north than that of the main distribution area of the actual metal helmets, and reaches as far as Styria, where we know horsemen with crested helmets from the Stettweger Kultwagen.

⁶⁸² Fabbriotti et al. 1972, 287 and v. Hase 1988, 208, and not the 11th century BC as in Lippert 2011, 43.

⁶⁸³ v. Hase 1988; Iaia 2005.

⁶⁸⁴ Hencken 1971, figs. 58c; 59b–c.

⁶⁸⁵ Anouchine 1893, 341, fig. 1; v. Hase 1988, 195.

⁶⁸⁶ Egg – Tomedi 2002, 556.

⁶⁸⁷ Coutil 1911, 7.

⁶⁸⁸ See p. 130.

⁶⁸⁹ Hencken 1971, figs. 91–92.

⁶⁹⁰ Hencken 1971, 111–119; v. Hase 1988, 205–206, fig. 7; Harrison 2004, 138–142.

⁶⁹¹ Foot soldiers: Hencken 1971, figs. 80, 82–84, 87–88. Horsemen: Hencken 1971, figs. 81, 85, 89–90.

2.3 Horned Helmets

Horned helmets do not form a geographically discreet group. They cannot be associated with the western European helmets with crest and bivalve cap, nor with the eastern European cap helmets, and therefore do represent a discreet typological group. So far, only two horned metal helmets are known (cat. no. 121). Depictions and figurines of Bronze Age warriors or deities with horned helmets are numerous, indicating both a wide distribution and common use of such helmets, ranging from Scandinavia to the Iberian Peninsula, and as far east as the eastern Mediterranean. This distribution includes a range of depictions upon different types of media, including upon exposed natural stone surfaces (Scandinavia), on stelae (Iberian Peninsula, Sippar or Hattuša), menhirs (Corsica; unfortunately with no horns preserved, Fig. 2.32), statuettes (Greensvænge, Fogdarp, Sardinia, Enkomi, Ugarit or Luristan), wall decoration (the sea people on the reliefs from Luxor, Abydos or Medinet Habu, faience from the Mycenaean shaft grave III, and the Mycenaean Warrior Vase, seal stone from Thebes), as well as in much later depictions of helmets with horns.⁶⁹² Such a broad spectrum over such a large area demonstrates that

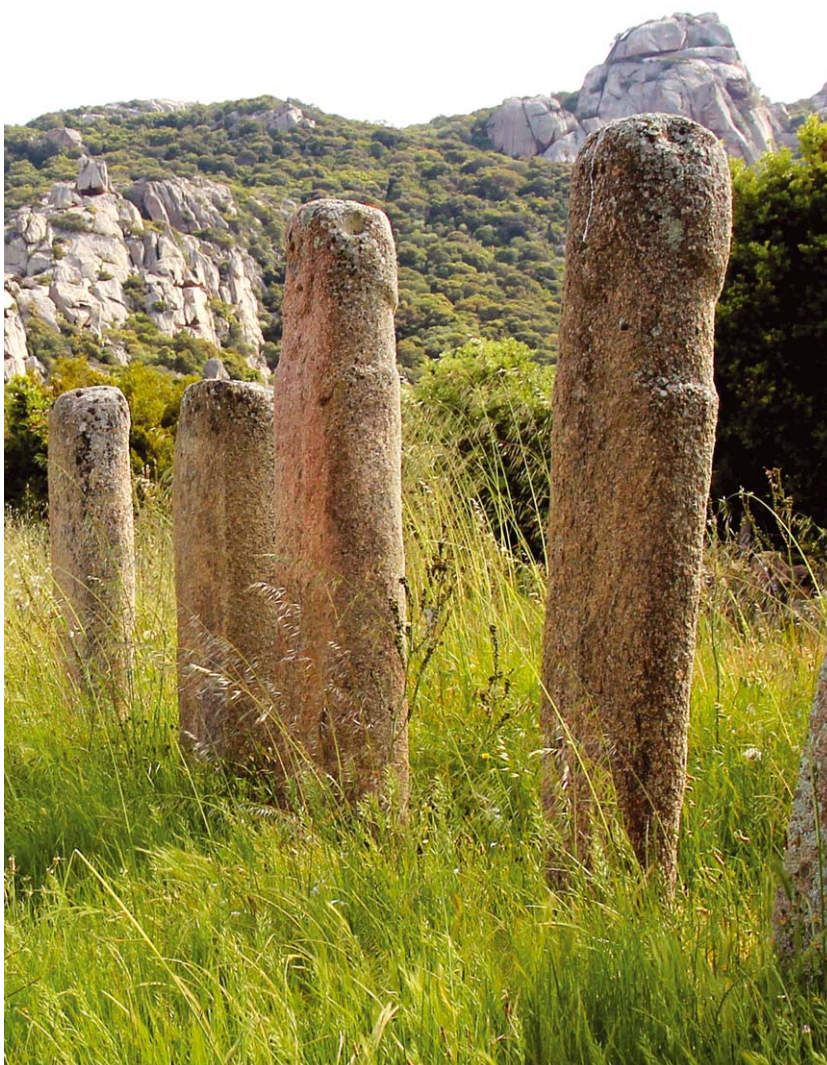


Fig. 2.32 Menhirs with unpreserved, presumably horned headgear from Cauria, Corsica (photo: H. and J. Mödlinger).

⁶⁹² E.g. Anatolia (?), see: Schauer 1983, 185.

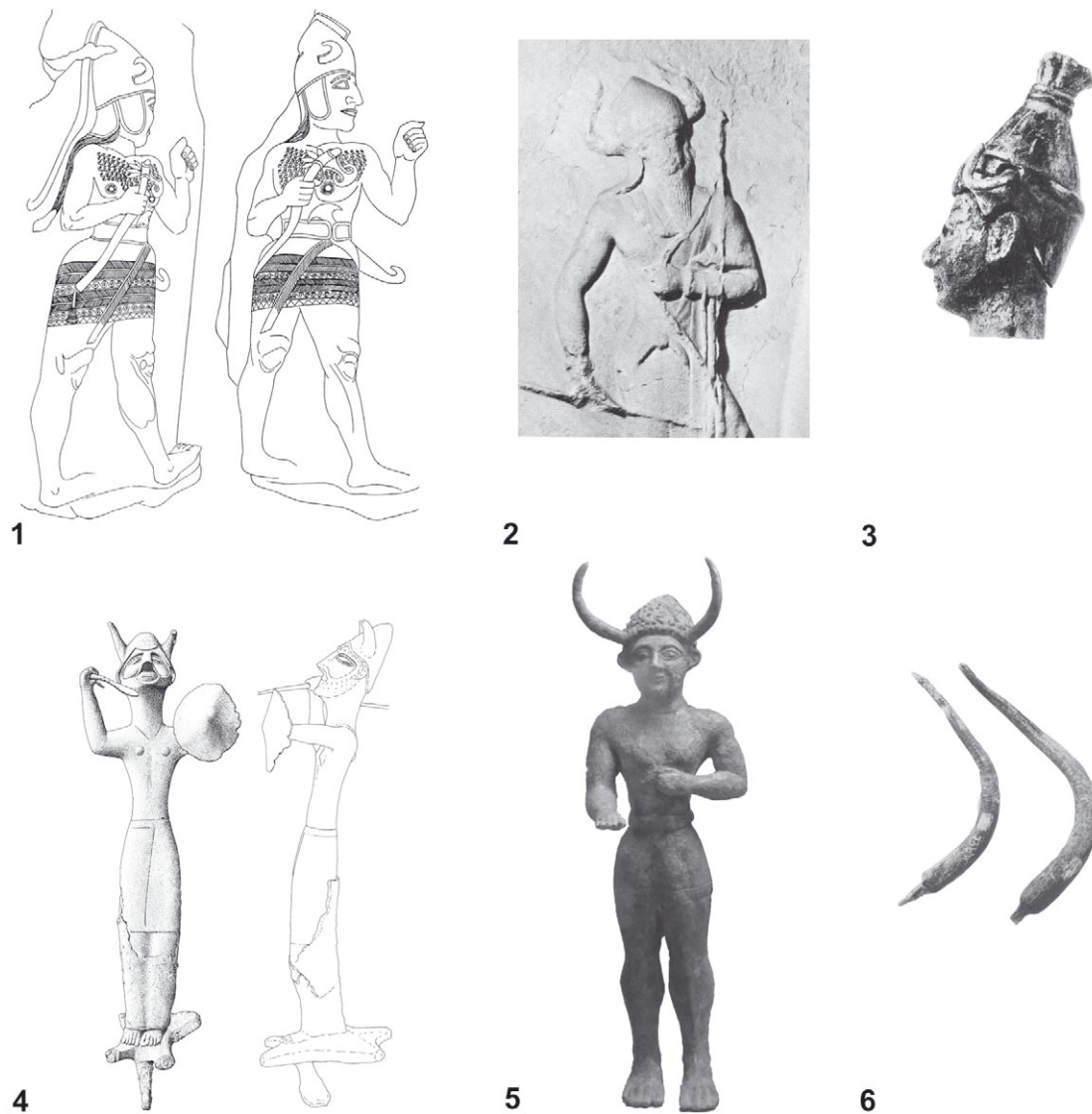


Fig. 2.33 Depictions, figurines and models of horned helmets from the Aegean and Near East: **1.** Hattuša/Boğazkale, Turkey. Relief (Egg – Tomedi 2002, fig. 14.2); **2.** Sippar/Tell Abū Habbah, Iraq. Stele of Naramsin (Borchhardt 1972, pl. 12.1); **3.** Ugarit/Ra's Schamra, Syria. Head of a Ba'al statuette (Borchhardt 1972, pl. 12.2); **4.** Enkomi, Greece (Seeden 1980, pl. 112); **5.** Enkomi, Greece (Càssola Guida 1973, pl. XXXVII.1); **6.** Dendra, Greece (tholos grave). The lead horns were found at the feet of the deceased under his weapons. The tholos grave is dated to LH IIIB (Borchhardt 1972, 40, pl. 15.3) (not to scale).

horned helmets were widely distributed during the Bronze Age and early Iron Age.⁶⁹³ The oldest depictions of horned helmets derive from the Near East (Fig. 2.33): Depictions are known from Sippar/Tell Abū Habbah, Iraq (stele of Naramsin; c. 2400–2300 BC), Ugarit/Ra's Schamra, Syria (head of a Ba'al figurine; 2000–1800 BC) Hattuša/Boğazköy, Turkey (relief; 14th century BC) and the Warrior Vase from Mycenae (12th century BC). Further figurines with horned headgear are known from Enkomi.⁶⁹⁴ From a Tholos grave at Dendra there are horns made of lead, which were deposited at the feet of the deceased.⁶⁹⁵ The horns might have been part of a headgear.

⁶⁹³ For references, see: Lilliu 1966; Borchhardt 1972; Harrison 2004; Kristiansen – Larsson 2005; Brandherm 2007; Brandherm 2008; Cesari – Leandri 2010; Brandherm 2011; Gonzalez 2012.

⁶⁹⁴ Càssola Guida 1973, pl. XXXVII.1; Seeden 1980, pl. 112.

⁶⁹⁵ Borchhardt 1972, 40, pl. 15.3.



Fig. 2.34 Horned helmets worn by the sea people on the temple reliefs of Medinet Habu, Egypt: 1. Attacking mercenaries of Ramses III (Borchhardt 1972, pl. 13.2); 2. Medinet Habu, Egypt. Temple relief: the guards of Ramses III (Borchhardt 1972, pl. 14.3); 3. Attacking sea people (Borchhardt 1972, pl. 13.1) (not to scale).

The actual function of horned helmets, or the meaning of the horns themselves, is unclear, and therefore it is necessary to consider individually the full range of types and their depiction. Despite religious or ritual associations, we have to assume their practical use as defensive armour. As depicted on the reliefs from Luxor, Abydos and Medinet Habu, the sea people clearly used their helmets in battle (Fig. 2.34 and 2.35). Sherden warriors, depicted on the Medinet Habu frieze, wear a yellow helmet, with clear red horizontal and vertical lines, perhaps indicating a base organic netting. The horns are light or pale blue, suggesting a different material than the helmet's cap.⁶⁹⁶ Horned helmets with a central 'knob' and without *Ausschnitt* of the cap or ear protection were used by Egyptian mercenaries. No further distinction can be made based on the helmets alone if the wearer was an Egyptian mercenary or an enemy.

In comparison to their large number, and the diverse range of sources used in the depiction of horned helmets, the number of actual preserved examples is extremely small: the two bronze helmets from Viksø are the only metal helmets with horns so far recovered (Tab. 2.7; Fig. 2.36.1).⁶⁹⁷ It is still not clear where the helmets were produced or assembled, since the helmets combine both Nordic and Urnfield features. The decoration is specifically drawn from Urnfield traditions, whereas most of the other characteristics belong to the Nordic Bronze Age tradition.⁶⁹⁸ Also, the craftsmen must have been familiar with the construction of two-piece western European crested helmets, though devising a different means for joining the two halves of the cap. Each helmet was made of two bronze sheets riveted together and additionally fixed by a massive, cast fitting on the top, forming a raised comb with a hooked beak, indicating a bird of prey. The lateral arms of the crest each cover a slit in the top of one of the two bronze sheets of

⁶⁹⁶ Photograph: e.g. D'Amato – Salimbeti 2015, 16.

⁶⁹⁷ Most recently Vandkilde 2013.

⁶⁹⁸ Vandkilde 2013, 171–173.

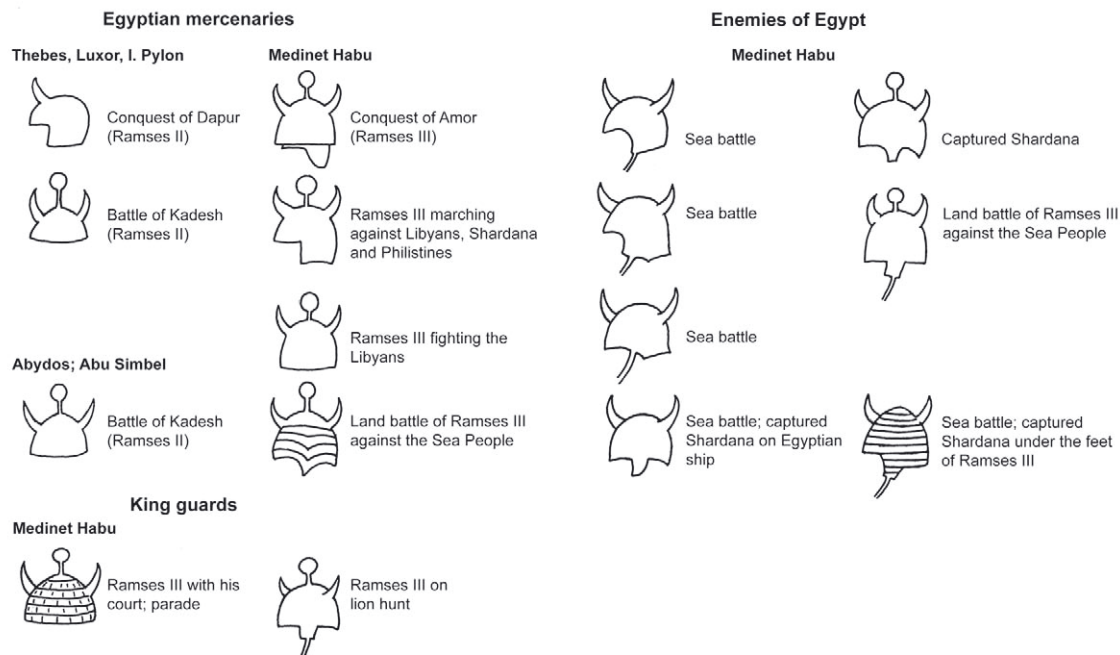


Fig. 2.35 Egyptian depictions of horned helmets of the Shardana (after Borchhardt 1972, 113–115) (not to scale).

the cap. Additionally, in the centre of the helmet the cast-on fitting consists of vertical bronze sheet ‘arms’, which touch the helmet. On each of these, one small cylindrical mounting was placed to enable the additional application of plumes, which were fixed with rivets passing through the holes of the cylindrical mounting. Feathers, hair or some other material used in the creation of these plumes could be fixed into the deep groove running along the middle of the crest. On both sides of the beak there are large bulging eyes with eyebrows, imitating a human face. Both eyebrows and eyes are detachable and fixed by means of loops on the inside of the helmet. Finally, the horns (resembling bronze lurs, which also occur in pairs), were riveted onto each helmet with fixed circular fittings. The horns are hollow cast, which were then riveted into cast bronze mountings which then were riveted onto the cap. There are two rivet holes on each side of the helmet near the rim where a chin strap or cheek plates could have been attached. The cap itself is decorated with bosses of different size. Parallel to the rim, a line of pellets is visible, ending in s-shaped figures of bird heads, confronting each other (*Vogelsonnenbarke*).

It remains unclear if the general purpose of the horns was to intimidate an opponent, for the identification of status or were perhaps functional, offering a greater degree of protection than those helmets without horns. Indeed, the function and use of the Viksø helmets is still a matter of debate; most recently, H. Vandkilde reviewed in detail previous theories and hypothesis, noting that an association with warfare has not yet gained the same degree of support as has ritual or religious interpretations of their function.⁶⁹⁹ Despite this, she proposes that the function of the helmets might be found both in the field of warfare and sea travel, as well as in the ritual practices of religious beliefs. The occurrence of the helmets in pairs might point to the so-called twin gods.⁷⁰⁰ Without any doubt, these so far unique helmets must certainly bear a rich cultural biography, irrespective of whether their function was a peaceful one or not.

The 32cm long bronze horn from Grevinge, Denmark, which parallels the horns of the Viksø helmets, might originally have been attached to a helmet (Fig. 2.36.4). The absence of further helmet finds might be attributed to the more common use of organic materials in their construction, not only for the horns but for the complete helmet. Unfortunately, due to the nature of the depictions, they rarely permit a clear identification of the material used in their

⁶⁹⁹ Vandkilde 2013.

⁷⁰⁰ Kristiansen 2006.



Fig. 2.36 Horned helmets from the Nordic Bronze Age: **1.** Viksø, Denmark (Borchhardt 1972, pl.15.1); **2.** Fogdarp, Sweden (after Vandkilde 2013, fig. 3); **3.** Grevensvænge, Denmark (Borchhardt 1972, pl. 14.14); **4.** Grevinge, Denmark (credits to the Nationalmuseet/The National Museum of Denmark) (to better compare the size and details of the horns, the drawings are not to scale).

construction. Other reasons for the scarce recovery of Nordic Bronze Age metal helmets with horns might be as a consequence of specific depositional practices or due to recycling strategies. Metal depictions of these horned helmets are further known from Grevensvænge, Denmark and Fogdarp, Sweden (Fig. 2.36.2–3) (see also below).

From Sardinia more than 1000 bronze figurines are known, of which some 70% have been published. We distinguish older ‘Uta-Abini’ figurines and such of the more recent ‘Mediterranean’ group.⁷⁰¹ The unpublished examples have been described by G. Lilliu as being of ‘no artistic and low archaeological value’⁷⁰² [sic]. From the more recent ‘Mediterranean’ group, no horned headgear is known.

More than half of the 200 anthropomorphic Bronze Age ‘Uta-Abini’ figurines depict warriors and archers, dated to the 11th–10th century BC.⁷⁰³ The warriors are usually equipped with sword and shield; only one carries a spear. The figurines were found in fortified stone-built domestic structures known as nuraghe, in sacred springs and in sanctuaries. The horns of the headgear worn by some warrior figurines can vary significantly in size. With the exception of the so-called ‘warrior-demons’ (figurines with four arms, four ‘eyes’, four to six swords, and two shields), the warrior figurines have proportions that are naturalistic, and therefore we might assume that it is the same for the related horned headgear (Fig. 2.37 and 2.38). Figurines of bulls with complete horns show the wide variety of different sized horns,⁷⁰⁴ which were most likely used for the composition of the horned headgear of the warriors. However, it is questionable if the oversized horns of the bull figurines are depicted in real scale compared to the size of the body of the bulls (Fig. 2.38.20, 25). We might exclude the possibility of their being depictions of aurochs, since these are not known from Sardinia.

Only 14 of the c. 50 ‘Uta-Abini’ figurines with horned headgear have large, long horns with pointed tips, of which just one is an archer. Many of the figures generally show broken off horns, so we cannot identify if they once had long, slightly curved or small and short, strongly forward curved horns. Only about one in every four of the archers has headgear without horns. The horns of their headgear is small, usually pointing forwards and placed on an organic cap with a small, two-pointed central crest. Only a few archers (Fig. 2.37.12) bear long, forward pointed curved horns on their headgear. One figure – of which only the head now survives – shows between the upwards bent, small horns, a disc or round object, similar to that worn by the Shardana as depicted in the relief of Medinet Habu (Fig. 2.37.17).

⁷⁰¹ Gonzales 2012.

⁷⁰² Lilliu 1966, 63.

⁷⁰³ Gonzales 2012, 86, 89, 100.

⁷⁰⁴ Lilliu 1966, 396–417.

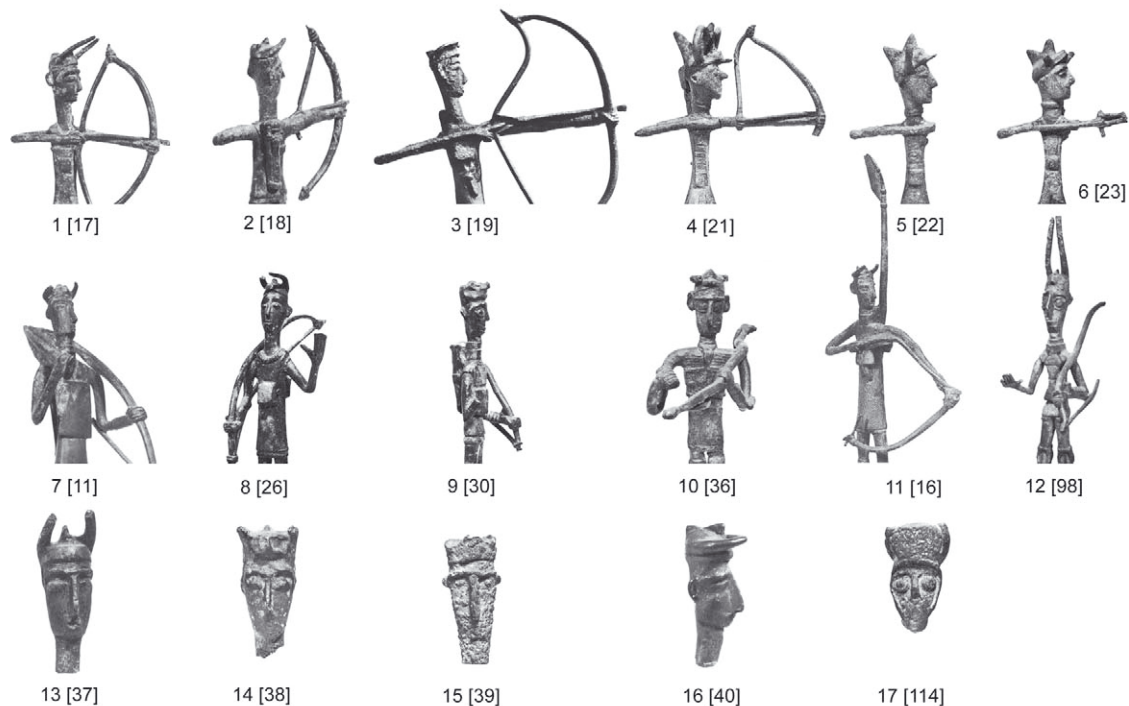


Fig. 2.37 Horned headgear of Sardinian bronze figurines: **1–12**. Archers; **13–17**. Single fragments of heads with horned headgear. Note the single cases of upwards bent short horns (no. 4) and long, slightly curved horns (no. 12) (after Lilliu 1966; his catalogue numbers are placed in [brackets]) (not to scale).

The warriors wearing horned headgear generally do not show different combinations of arms and armour than the ones with other form of head protection, with the only exception being the so-called warrior-demons or over-equipped warriors (Fig. 2.38.17, 21–24). The headgear with long, slightly curved horns of a warrior and a warrior-demon (Fig. 2.38.23–24) as well as two further warriors wearing a headgear with parallel horns touching each other (Fig. 2.38.18–19) are notable for resembling the horn from Grevinge, the helmets from Viksø, and the figurines from Grevensvænge, Denmark, and Fogdarp, Sweden (horned helmets of two men's heads on a horse collar), indicating a close connection (Fig. 2.39). All have cutaway tips which were substituted by a round ring, bowl or ball, sometimes with ribs immediately beneath it, symbolising the organic wrapping used to fix it.⁷⁰⁵ The Fogdarp heads are, at just 4×3.5 cm in size, particularly small. There are also figurines from Predio Canòpolo-Perfugas and Olmedo, Sardinia, of bulls with large horns, where the tips were cut off and substituted by a round object (Fig. 2.38.20, 25). These specific types of terminals are absent in the depiction of horns on Iberian stelae and in Nordic rock art. However, it is known on the Viksø helmets, the Grevinge horn, and the figurines from Grevensvænge and Fogdarp. The similarities in form and shape noted by Borchhardt with the stelae from Magacela (Fig. 2.40.9) cannot be confirmed.⁷⁰⁶ Also, the distribution area of horned headgear does not overlap with that of Type Herzsprung shields.⁷⁰⁷

Unlike the preserved Nordic Bronze Age horns and figurines, the horned headgear depicted in Scandinavian rock art are all small, and usually exhibit slightly curved horns or significantly curved ones with tips pointing towards each other (Fig. 2.39). The head is rarely recognisable, since the horns usually exit directly from the neck. Not highly surprising, Nordic rock art figures with horned headgear are male (ithyphallic; no indication of breasts) and are furnished with weapons, such as swords, axes and spears.

⁷⁰⁵ Larsson 1975, 176–178, figs. 5–7.

⁷⁰⁶ Borchhardt 1972, 139, fig. 14a; see Harrison 2004, no. C48.

⁷⁰⁷ For the difference between U-notched Herzsprung shields and related but later V-notched Mediterranean shields, see Uckelmann 2012, 63–68.

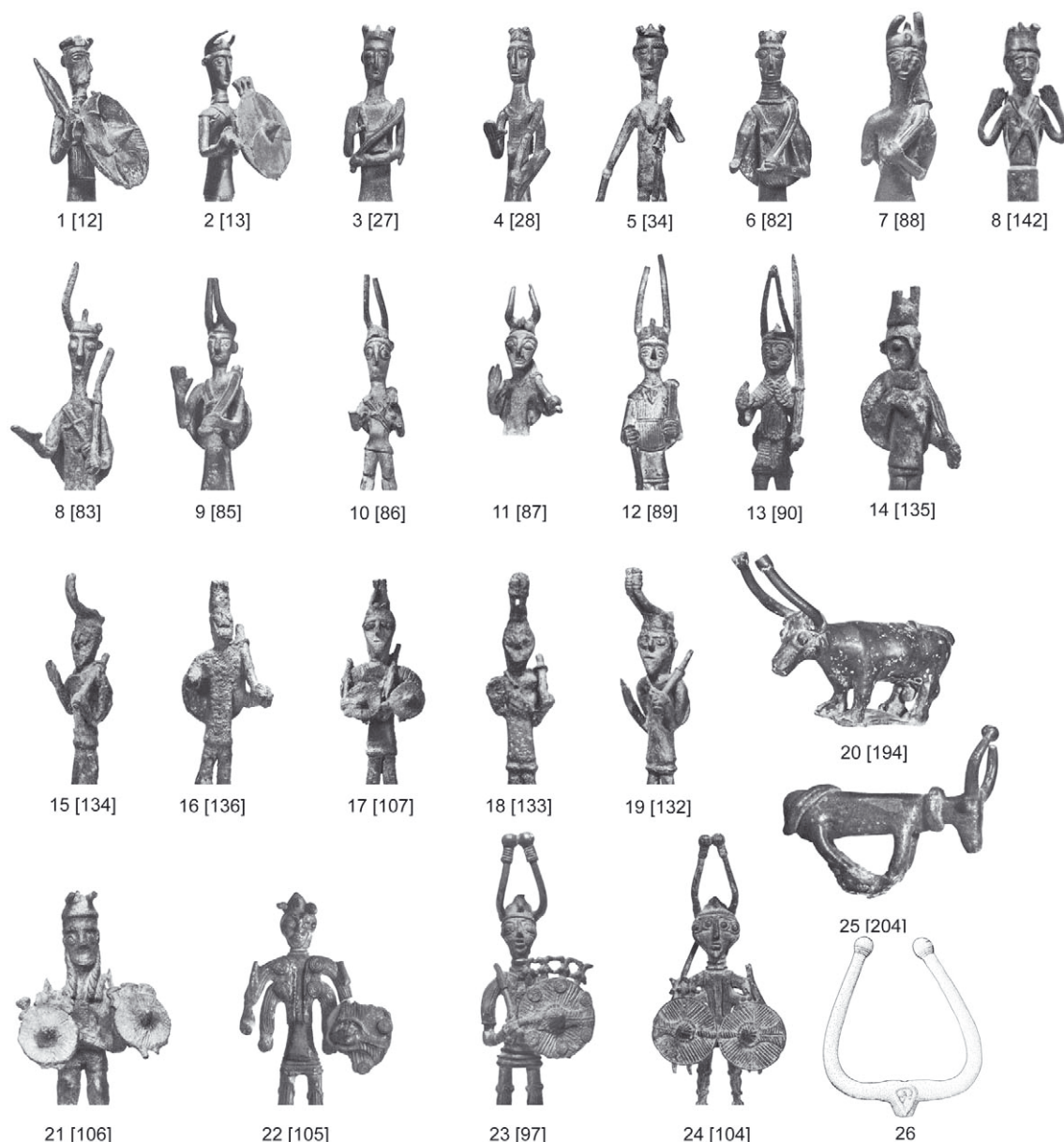


Fig. 2.38 Horned headgear of Sardinian bronze figurines: 1–8. Warriors with short, small and forward bent horns on the headgear; 9–14. Warriors with long, slightly curved horns on the headgear; 15–16, 18–19. Warriors with long, slightly curved horns touching each other along the whole length; 17, 21–24. Over-equipped warriors and so-called warrior demons with different sized horns on the headgear; 20, 25. Two bulls; 26. Separate horns from Terigu, loc. Santa Maria, collezione Vallero-Usai (original height c. 25cm). Note the wrapping of the horns at the tip and the ‘ball’ placed on it on both human figures and bulls (nos. 18–20; 23–26) (after Lilliu 1966; his catalogue numbers are placed in [brackets]) (not to scale).

Spears are usually held above the horned headgear in a clearly aggressive way. Swords are, despite one depiction (Fig. 2.39.7), always shown sheathed in their scabbard. Some of the figures seem to be walking (Fig. 2.39.1–2), while others appear to be ready to fight, with the left hand up or on the side and usually the right on the scabbard (Fig. 2.39.3–4; this motif can be found also on the Iberian stelae; see Fig. 2.40.1). Spears are often depicted as held in the left hand (Fig. 2.39.8–10). Since the sword hand usually is the right one, we might think of them not as depicted from the front but from the back or a ‘mirrored’ view, but if the figure is depicted from the back it might explain their larger size, being in the foreground, than that of the opponent, which

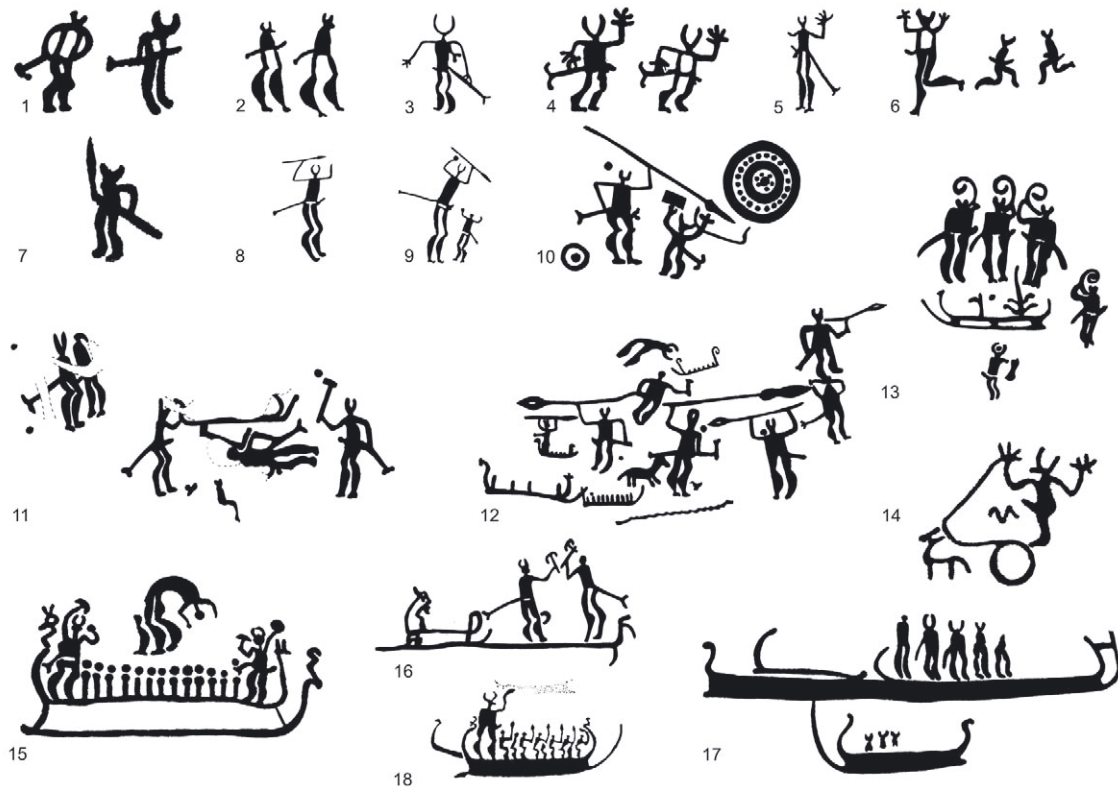


Fig. 2.39 Warriors with horned headgear on Scandinavian rock art: 1. Hede (Kville); 2. Borge (Ostfold); 3. Bottna (Bohuslän); 4. Slänge (Tanum); 5. Österöd (Kville); 6. Smörsten (Tanum); 7. Hede (Kville); 8. Karlsund (Kville); 9. Karlsund (Kville); 10. Hede (Kville); 11. Tuvene (Tanum); 12. Bro Utmark (Tanum); 13. Kalleby (Tanum); 14. Vitlycke (Tanum); 15. Sotetorp (Tanum); 16. Varp (Skee); 17. Kalleby (Tanum); 18. Lövåsen (Tanum).

might then be further away, in the background. On ships, the figures with horned headgear are either standing (Fig. 2.39.17), threatening (each other?) aggressively (Fig. 2.39.15), or fighting (Fig. 2.39.16, with axes). A *coup de grâce* seems to be shown, involving an axe, in front of a ship on a depiction from Tuvene, Tanum (Fig. 2.39.11). Men with horned headgear are also depicted dancing and running (Fig. 2.39.6), with lures (Fig. 2.39.13), or on a two-wheeled chariot with a tiny horse or goat in the front (Fig. 2.39.14). Between the chariot and the man's penis a snake is depicted. Nevertheless, the main motif of men with horned headgear is embedded within a fighting or war scene.

Horned headgear on Iberian stelae only occurs on the stelae of group IIc in the scheme of V. Pingel, which is characterised by the introduction of human figures (Fig. 2.40).⁷⁰⁸ The stelae of group IIc are considered the final stage in the development of these Iberian warrior stelae.⁷⁰⁹ The absolute chronology of the stelae is still a matter of debate.⁷¹⁰ Nevertheless, the depicted swords, fibulae and helmets give indications for their dating. The depicted Type Herzsprung shields cannot be used as an argument for the general dating of the stelae to the 9th–8th century BC, since radiocarbon dates from Irish shields and moulds for their manufacture point to a significantly older date.⁷¹¹ Most of the swords represented on stelae alongside figures with horned headgear have a slender parallel-sided blade and only in some cases do they have a leaf-shaped blade.⁷¹² The substitution of leaf-shaped swords with Type Huelva swords, which have parallel-

⁷⁰⁸ Pingel 1974; Pingel 1993.

⁷⁰⁹ Pingel 1974, 14; Almagro Gorbea 1977, 188; Brandherm 2008, 482.

⁷¹⁰ Burgess 1991, 39; Celestino Pérez 2001; Harrison 2004, 13–16; Brandherm 2008; Díaz-Guardamino 2012, 389–416; Mederos Martín 2012.

⁷¹¹ OxA–2429: 3470±70 BP; OxA–3228: 3150±90 BP; see Uckelmann 2012.

⁷¹² Brandherm 2008, 482.

sided blades, by the end of the second millennium BC⁷¹³ indicates that the horned headgear depicted on the stelae appeared no later than the end of the 11th century BC. Elbow fibulae can be regularly associated with the depiction of figures with horned headgear.⁷¹⁴ The first elbow fibulae appeared around the late 11th/early 10th century BC.⁷¹⁵ Crested helmets with rounder cap are depicted on several stelae from group IIc and some earlier stelae,⁷¹⁶ while helmets with a more pointed cap (Type Bernières d'Ailly)⁷¹⁷ are depicted only on stelae belonging to group IIc.⁷¹⁸ According to the iconographic development of the Iberian stelae, crested helmets were substituted by horned helmets or headgear at the end of the 11th century BC.⁷¹⁹ The horned headgear then might have been in use until the 8th century BC.⁷²⁰

Taking a closer look at the depicted human figures with horned headgear on the Iberian stelae,⁷²¹ we note that in six cases horns (partly with a second twist) exit horizontally/with a c. 90° angle, directly from the head – which occurs alongside an increasingly geometric depiction of the figure as a whole (Fig. 2.40.11–16) – and in another eight or nine cases almost horizontally, showing also a second twist on the tip (Fig. 2.40.7–10; two figures on the stelae from Cobeza del Buey IV and from Orellana;⁷²² potentially also the stelae from Castuera I). These characteristics are also known from the aurochs or ancient Iberian cattle races as the Cachena, Sayaguesa or Maronesa, potentially indicating the depiction of horns of local origin. Five figures have smaller, slightly curved horns (Fig. 2.40.1, 5, 6) while three figures have short, straight horns (Fig. 2.40.2–4). No helmet cap is visible, if we do not want to assume that it was not protruding from the tiny head. Two stelae from Olivenza and El Viso I (Fig. 2.40.3, 5) show oval ‘ears’ below the horns. Both figures show the largest number of associated objects depicted with the human figure (including wagon, bow, shield, fibula, earrings, sword, spear, and comb). Another stela, from El Viso IV (Fig. 2.40.15), might indicate the use of horns still attached to part of the bull’s cranium, since the base of the horns as found on the bull’s head is visible. Generally, the horns depicted on Iberian stelae do not closely resemble the Sardinian ones, which are usually much smaller (potentially referencing something other than bovine horns!) and, also if longer (see below), are just slightly curved, never pointing sideways or show a second twist. The different groups of headgear are not associated with any specific combination of other equipment. We can only note that the two figures with horned headgear and ‘ears’ show the highest number of objects around them.

We might identify two main types of horned headgear in Sardinia and the Nordic Bronze Age: a higher number of small horns on organic head protection, probably used in a more profane way (in Scandinavia, as depicted on rock surfaces; in Sardinia, as mainly worn by archers), and a smaller number of headgear with massive, long and slightly curved horns with cut-off ends and with ball- or bowl-reinforced tips, for a purpose other than profane use, as indicated by the Sardinian warrior-demons which wear the latter, and as seen in the Nordic bronze helmets and figurines (Fig. 2.36) with horned head gear. The structure exhibited by the two main groups of horned headgear found in Sardinia and the Nordic Bronze Age, is completely lacking amongst the Iberian stelae; at least four different types of headgear are depicted, being associated with neither a specific location, a way of depiction or in combination with other equipment. Also, the representation of the warrior differs significantly between northern and southern Europe: while the depicted warriors in Scandinavian rock art are part of a story and seem to be caught in ‘action’, the warrior stelae in Iberia and the Sardinian figurines are static, singular and

⁷¹³ Brandherm 2007, 16.

⁷¹⁴ Celestino Pérez 2001, nos. 35, 53, 65, 76, 85; Harrison 2004, 161–163.

⁷¹⁵ Brandherm 2008, 483.

⁷¹⁶ See also Celestino Pérez 2001, nos. 12, 17, 21, 22, 25.

⁷¹⁷ See Chapter 2.2.5, p. 116.

⁷¹⁸ Celestino Pérez 2001, nos. 71, 80, 84.

⁷¹⁹ Celestino Pérez – López-Ruiz 2006, 91, fig. 3; Brandherm 2008, 484.

⁷²⁰ Murillo Redondo et al. 2005; García Sanjuán et al. 2006.

⁷²¹ Harrison 2004, 143, fig. 7.13; García Sanjuán et al. 2006.

⁷²² Gonzáles Ledesma 2007.

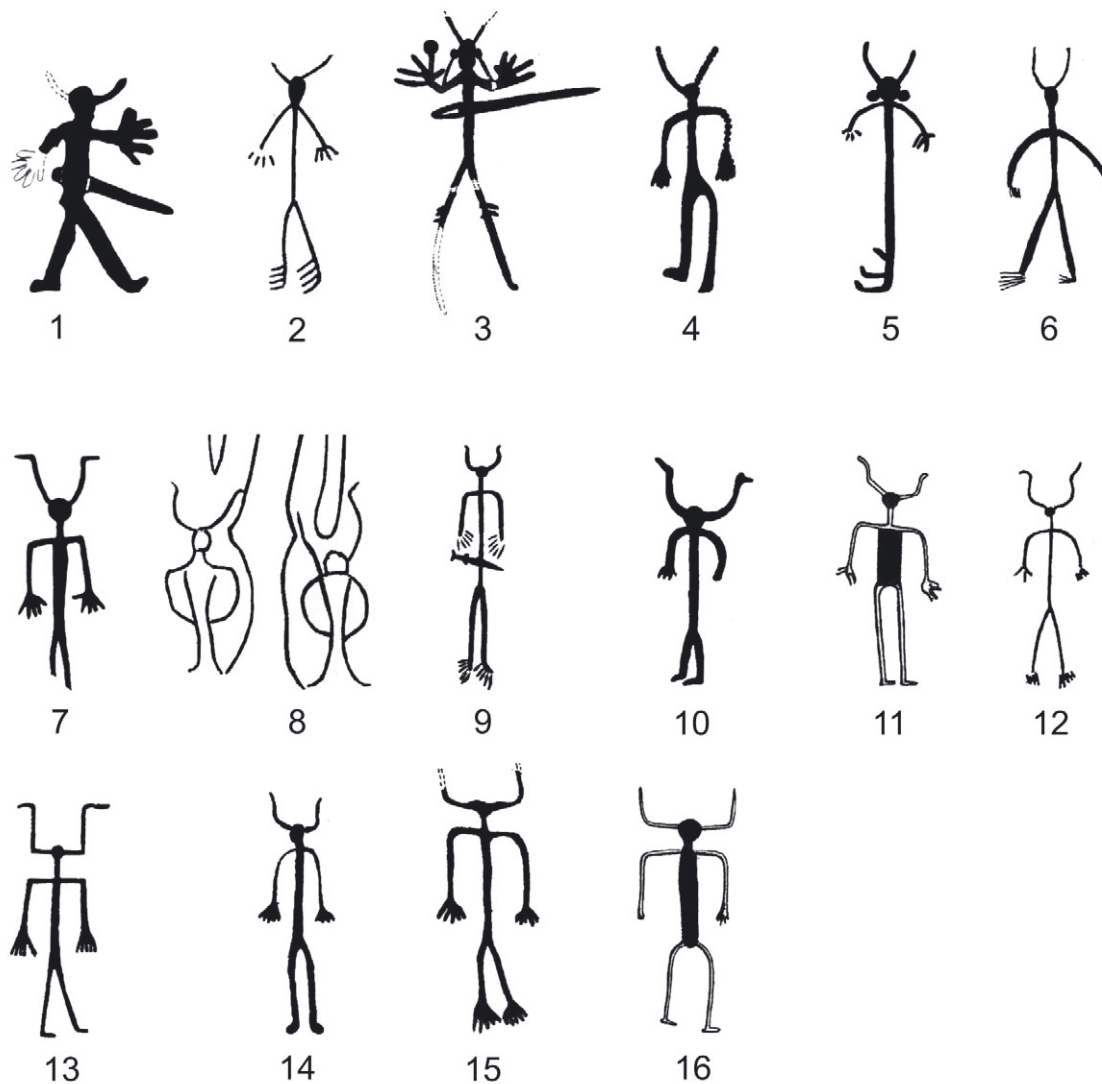


Fig. 2.40 Horned headgear depicted on Iberian stelae: **1.** Talavera de la Reina; **2.** Esparragosa de Lares I; **3.** Olivenza; **4.** Valdetorres I; **5.** El Viso I; **6.** Las Herencias II; **7.** Alamillo; **8.** São Martinho I; **9.** Magacela; **10.** Aldeanueva de San Bartolomé; **11.** Écija III; **12.** Fuente de Cantos; **13.** El Coronil; **14.** Écija V; **15.** El Viso VI; **16.** Écija II (after Harrison 2004, fig. 7.13) (figures not to scale).

seem to be out of their war context, or at least are not embedded in a vivid, story-telling context: the warrior alone is the centre of attention, dissolved from the context he was acting in.

These three regions, despite certain specific differences in their depiction of horned headgear, represent the highest number of such depictions, and also share certain general similarities; it seems that all show complete or partially equipped warriors. This equipment though differs from region to region, according to different traditions and fighting techniques. Most of the warriors wear swords; in Scandinavia and the Iberian Peninsula we also see spears, whilst these are almost completely absent in Sardinia; instead, the Sardinian warriors bear stick or bow. Shields are worn by almost all warriors in all three regions; whereas axes are only depicted with warriors in Scandinavian. The Sardinian warriors are never connected with a means of transport; but a third of the Iberian warriors are depicted with chariots, and several Scandinavian warriors (and bulls!) on or close to ships.

The correlation between the Iberian Peninsula, Sardinia and the Nordic Bronze Age in the matter of horned headgear might be related to the fact that all finds show figures with horned

headgear which bear (or are associated with) other arms and armour. As already pointed out by Brandherm, we cannot automatically assume an adoption of a specific meaning in the use of horned headgear across such a wide geographical area;⁷²³ though, he sees in the beginning of the development of horned headgear in Anatolia and the Levant, a common symbolic ancestor as represented by the bull or weather gods of the Hittite, Hurrian and Semitic pantheon. The two small statues of a warrior or god from Enkomi with horned headgear might demonstrate just such an adoption (Fig. 2.33.4–5). Horns or horned headgear, however, is a widely distributed and long lived common motif, evident since the Palaeolithic, and will have come into fashion independently again and again.⁷²⁴ It is not necessary therefore to seek a single causal link of development, and we must take into account the many different practical and cultural reasons and networks which influenced the development, both locally and regionally, of horned headgear. We can perhaps see in horned headgear a significant element of connection between the Nordic Bronze Age, the Urnfield culture, and various Mediterranean networks from c. 1200 BC onwards and as a thread, which ‘leads from war and social upheaval in the east Mediterranean over Sardinia and Iberia to Viksø with offshoots to adventurous sea travels, warfare, material culture emulation, transfer of cosmological elements, myth-making and the transport of bronze along the Atlantic coasts’⁷²⁵ and copper mining or trade, as Vandkilde pointed out recently remains to be seen in further research.

Catalogue

Cat. no. 121. Viksø, Denmark – bog find – two complete helmets. Measurements: Helmet A: height: 17.7cm; diameter: 21.7 × 20.6cm. Helmet B: height: 17.7cm; diameter: 19.9 × 22cm – Nationalmuseet København, inv. no. B 13, 552–553 – Fig. 2.36.1. References: Norling-Christensen 1943; Broholm 1944, 253, pls. 67–68; Norling-Christensen 1946; Althin 1952; Kossack 1954, 46; Brøndsted 1958, II, 186; Brøndsted 1962, II, 186; Hencken 1971, 11, 169–174, figs. 138–139; Vandkilde 2013.

The Viksø helmets were discovered in 1942 during peat digging in the Brøns Mose at Viksø, in the northwest of Copenhagen. A nineteenth century map suggests that the ‘Brøns Mose’ bog was a pond or a lake during the Bronze Age. The helmets were found together with additional pieces of pottery and wood and are dated to Period IV (c. 1200/1100–1000 BC).⁷²⁶ The find was published by Norling-Christensen, who mentioned that at least one helmet might have been standing on an ash wood tray (or shield?); however, radiocarbon dates of the wooden remains thought to have derived from the tray are much older than the helmets.⁷²⁷ The peat workers moreover noted that the ceramic pot was found above the helmet, and is therefore not necessarily associated with them.

In 1944, the alloy composition of the helmets was studied;⁷²⁸ unfortunately, the analytical method used is not described, so we cannot be sure if the high amount of Sn of the cap of 16.8 wt% is due to corrosion influence or not. We certainly cannot comment, therefore, on the question of the use of regular imported metal supplies or the use of recycled metal. Both helmets show low-level impurities of lead (0.3–0.9 wt%), arsenic (0.2 wt.%), antimony (0.1–0.2 wt.%) and nickel (0.1–0.3 wt.%) as well as traces of silver (0.05–0.06 wt.%).

⁷²³ Brandherm 2011, 49.

⁷²⁴ Hencken 1971, 171–173.

⁷²⁵ Vandkilde 2013, 175; referring to Ling et al. 2013 for copper mining and trade.

⁷²⁶ Vandkilde 2013, 165.

⁷²⁷ Norling-Christensen 1946; Vandkilde 2013, 165.

⁷²⁸ Vandkilde 2013, 167.

2.4 Analyses Helmets

The manufacturing process is largely the same for all helmets of Class I and will therefore be explained based on information from the helmets of Type Pişcolt, accompanied by additional data from helmets of Type Oranienburg, Type Paks, and Type Nagytétény. The helmets, as were the greaves and cuirasses, were sampled either with a 1mm drill to detect the alloy composition or a micro-sample was taken to enable further metallographic analyses of the microstructural features. Micro-samples were only taken from incomplete or fragmented armour.

Drilled samples were analysed using a Scanning Electron Microscope (SEM) equipped with an Energy Dispersive X-Ray Spectroscopy (EDXS), which enabled measurements directly on the metal and permitted the avoidance of corrosion. The micro-samples were mounted in epoxy resin for metallographic analyses and polished with diamond paste up to 0.25 µm of granulometry. Those samples were studied by SEM-EDXS and Light Optical Microscope (LOM) using Bright Field (BF) and Dark Field (DF) contrast methods before and after etching (for observation of corrosion and microstructural features respectively). The chemical characterisation was carried out via SEM-EDXS (Evo40 Zeiss with PENTAFET® EDXS detector sensitive to light elements, $Z > 5$). The main elements identified were Cu, Sn, Pb, As, S, Fe, Zn, Ni, Ag, Bi, Co and Au. In the original routine the detection limit for most elements was 0.1 wt.%. The operating conditions were an accelerating voltage of 20 kV, chamber pressure lower than 10^{-5} mbarr (for the SEM). The EDXS was calibrated with a cobalt reference sample, an acquisition time of 60 seconds with 2000 channels of 5 eV each and ZAF 5 correction. Real reference standards were used for the quantitative analyses in order to improve the accuracy of the measurements. The compositions reported (normalized and in weight percentages) correspond to the mathematical average of 5 to 20 spectra with suitable fit index per each sample. Element concentrations < 0.3 wt.% were considered as semi-quantitative and taken into account only when the identification peaks were clearly visible in the acquired spectrum. Due to the presence of inter- and intra-crystalline corrosion products, the matrix was in most of the samples clearly visible and etching was not necessary. In any case, etching was carried out after SEM-EDXS analyses since etching solutions such as ethyl alcohol solution of ferric chloride acidified by hydrochloric acid affect the composition of inclusion and corrosion products by the introduction, for instance, of Cl and Fe to the composition of patina and inclusions. In most cases, intergranular corrosion or ghost microstructure present in the inner layers of corrosion patina exhibited the microstructural features needed to reconstruct the thermomechanical history of the object.⁷²⁹ All compositions reported are normalised and in weight percentage.

According to the microstructure observed, the most probable thermo-mechanical history of the object was suggested. Moreover, also the total deformation of the original as-cast ingot was calculated. The average total deformation depends less on the tin content of the helmets (which would have also influenced the annealing temperature and the number of necessary annealing circuits), and more on the thickness of the as-cast plate and the zone of the helmet from which the sample was taken. The deformation applied can be defined by two types:

1. Sheet working to achieve the final thickness (highest impact of deformation rate, which is defined by the reduction of thickness). The deformation applied has to be defined as mono- or bi-axial in order to decide if one or two orthogonal cross-sections are needed for the interpretation of the inclusions
2. Shaping (deep drawing) to achieve the final shape, which, accordingly, also changes the shape of inclusions, but in a more limited way. The information provided clearly depends on the sampling position, but can also provide information about point 1

The total amount of applied deformation can be calculated by measuring the length and thickness of $\text{Cu}_{2-x}\text{Fe}_x\text{S}$ -inclusions usually present in archaeological bronzes. These inclusions deform in a similar manner to the metallic matrix and, moreover, are not influenced by the

⁷²⁹ Piccardo 2000; Ienco et al. 2007.

common annealing temperatures. Thus, their shape factor (SF, thickness/length ratio) gives clear information about the total amount of deformation as well as the direction of the mechanical deformation applied during the manufacturing process.⁷³⁰ For the calculation of the SF only complete inclusions must be used, since some can be broken as a consequence of the effect of external factors, such as a violent corrosion processes (Fig. 2.41). Attention has to be paid to not measure flattened cavities as deformed $\text{Cu}_{2-x}\text{Fe}_x\text{S}$ -inclusions ($\text{Cu}_{2-x}\text{Fe}_x\text{S}$ enriches on the inside of the cavities and is with them flattened during deformation; the thus created ‘line’ of $\text{Cu}_{2-x}\text{Fe}_x\text{S}$ -inclusions is much thinner than pure $\text{Cu}_{2-x}\text{Fe}_x\text{S}$ -inclusions and gives a wrong impression of the actually carried out total deformation). The calculated SF cannot take into account the massive material losses occurring during shaping, such as flaking off of oxides, polishing, grinding and use. Recent experiments carried out on the production of bronze sheets with 13 wt.% Sn showed that from the as-cast to the final sheet, incorporating some 18 to 23 steps for each annealing (2–5h in total) and cold deformation (3–4h in total), the weight loss was in the range of 7–30%.

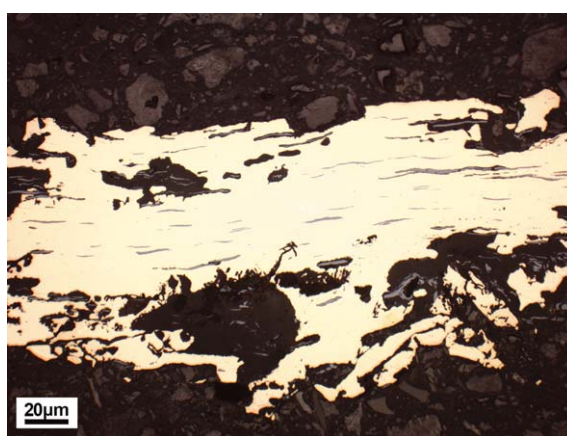


Fig. 2.41 Cross-section of the helmet of Type Pișcolt from Sâg, Romania, close to the knob. The micro-sample is unetched. Note the massive deformation visible by the light grey, highly elongated $\text{Cu}_{2-x}\text{Fe}_x\text{S}$ -inclusions. In the corroded area, these inclusions are heavily deformed and torn apart due to the heavy corrosion (dark grey).

The average SF (shape factor) and the corresponding percentage of reduction of the as-cast plate was calculated for every helmet cap fragment analysed according to the deformation of its $\text{Cu}_{2-x}\text{Fe}_x\text{S}$ -inclusions. To have a statistical validation of this method, it is important to measure the SF of at least 100 inclusions on a minimum of three fields of observation.

2.4.1 Chemical Characterisation – Cap Helmets

So far, five helmets of Type Oranienburg, eight helmets of Type Paks and an associated cheek plate, one helmet of Type Nagytétény, ten helmets of Type Pișcolt and the only helmet of Type Malpensa, have been chemically analysed (Tab. 2.16 and 2.17). The numbers presented in Tab. 2.17 show a wide range for Pb and As as a result of the low sensibility of the Prompt Gamma Activation Analyses (PGAA), the analyses on the corroded surface via Particle-induced X-ray emission (PIXE) and the fact that Pb was ignored by the Time of Flight Neutron Diffraction (ToF-ND).⁷³¹

Elements such as Ni, Ag, As, and Sb as well as Fe, S and Pb are common in prehistoric bronzes and detected as minor and trace alloying elements according to their concentration. Such elements are connected to the smelting and casting processes of copper and copper ore.

⁷³⁰ Piccardo – Pernot 1997; Mödler – Piccardo 2013.

⁷³¹ Mödler et al. 2013; Mödler et al. 2014.

Cat. No.	Type	Find Site	Analyses	Cu	Sn	Pb	Sb	As	S	Fe	Zn	Ni	Ag	Bi	Co	Au	Cd	Analytical Method
1	Oranienburg	unprovenanced (Greece?)	cap/knob	90.0	10.0	n.d.	n.d.	tr.		tr.	n.d.		n.d.					XRF (1)
6		Spišská Belá	knob	85.1	13.5	0.2		0.5	0.3	0.2		0.1	0.2					SEM-EDXS (2)
			cap close to knob	89.0	8.6	0.4	0.2	0.2	0.9	0.8		0.1	0.1					
11		Sâg	cap close to knob	89.2	10.3	0.2	0.1	0.1	0.3	tr.		0.1	tr.					
			knob	84.5	14.4	0.2	0.3	0.2	0.4	tr.		0.2	0.1		tr.			
20	Paks	unprovenanced	cap	87.5	12.2	tr.	tr.	tr.		0.1	tr.	0.1	tr.	tr.	tr.	tr.	tr.	AAS (3)
			knob	86.9	12.9	tr.	tr.	tr.		0.1	tr.	0.1	tr.	tr.	tr.	tr.	tr.	
		unprovenanced	rivet	87.3	12.5	tr.	tr.	tr.		0.1	tr.	0.1	tr.	tr.	tr.	tr.	tr.	
21			cap	87.6	12.1	0.2	tr.	tr.		tr.	tr.	tr.	tr.	tr.	tr.	tr.	tr.	
	Veliko Nabrđe	unprovenanced	knob	90.0	5.9	1.2	0.6	tr.		0.7	tr.	0.4	tr.	tr.	tr.	tr.	tr.	SEM-EDXS (2)
			rivet	90.7	5.2	1.0	0.6	1.0		0.9	tr.	0.4	tr.	tr.	tr.	tr.	tr.	
23		Poljanci I	cap close to rim	87.9	10.8	0.3	0.2	0.2	0.5	0.1		0.2	0.1		0.1	0.3	0.3	
24			cap close to rim	87.1	10.9		0.2	0.2	0.5	0.3	0.1	0.3	0.3		tr.	0.3	0.5	
28	Hočko Pohorje	Strassengel	cap close to knob	89.0	8.5	0.1	0.3	0.5	0.4	tr.	tr.	1.0	0.0					EDXRF (4)
			knob	87.2	8.1	0.8	0.5	1.0	0.6	0.3		1.4	0.1		0.1			
30		Wöllersdorf	cheek plate	91.2	7.1	0.2		0.4	0.4	0.3		0.5	0.1					
31			cheek plate	86.9	12.2	0.3		tr.	0.7	tr.		tr.	tr.	tr.	tr.			
41	Pişcolt	Schlisdorf	cap	87.0	11.7	0.3	0.2	0.0		tr.	tr.	0.1	0.1					SEM-EDXS (5)
			knob	88.0	10.0	0.4	0.2	0.1		tr.	tr.	0.1	0.1					
		Škocjan	knob	88.3	10.2	0.5	0.2	0.2	0.5	0.1		0.1	0.2					
43			cap	89.8	9.0	0.1	n.d.	tr.	tr.	tr.	n.d.	0.1	0.1		n.d.	0.2		

Tab. 2.16 Alloy composition of Bronze Age cap helmets. Analytical method: (1) = Buchholz et al. 2011, 146 (surface analyses, considered as qualitative); (2) = Mödinger et al. 2013; (3) = Born – Hansen 2001, 270; (4) = Krause 2003 (surface analyses, considered as qualitative); (5) = Mödinger 2014a; (6) = Born – Hansen 1992; (7) = Born – Hansen 2002; (8) = the author for this study; (9) = Teržan et al. 2015; (10) = Gambart et al. 2017. According to the different methods used and cited, different sensitivities have to be noted (tr. = traces; n.d. = not detected).

Cat. No.	Type	Find Site	Analyses	Cu	Sn	Pb	Sb	As	S	Fe	Zn	Ni	Ag	Bi	Co	Au	Cd	Analytical Method
44	Pişcolt	Hajduböszörmény	knob		16.16	1.1												AAS (6)
			cap		10.43	1.6												
45		Mezőkövesd	knob		16.65	1												
			cap		11.57	0.8												
46		Endrőd	cap	91.0	7.0	1.4		0.3		0.2		0.1						SEM-EDXS (5)
			knob	89.7	7.5	1.9		0.3	0.5	0.1		0.1						
47		Şoarş	cap	87.3	10.3	1.6		0.3	0.3	tr.		0.4	tr.		0.1	tr.		
			knob	92.9	1.7	0.3	1.6	1.1	0.3	0.1		1.1	0.6					
48		Pişcolt	cap	84.6	11.0	3.1	0.3	0.3	0.4	0.1		0.1	0.2					AAS (6)
			knob	91.5	6.3	1.2		0.4	0.2	0.1		0.3						
50		unprovenanced	cap	89.7	8.4	0.4												
			knob	88.5	9.8	0.4												
51		unprovenanced	cap	87.0	11–12	0.5												AAS (7)
			knob	90.8	7.6	0.8												
52		unprovenanced	cap	89.93	8.26	1.21	0.09	0.20		0.04	0.02	0.13	0.06	<0.025	0.08	<0.01	<0.001	
			knob	89.93	8.09	1.35	0.07	0.20		0.04	0.02	0.11	0.55	<0.025	0.11	<0.01	<0.001	
55	Pişcolt (associated)	unprovenanced	rivet	90.25	7.75	1.37	0.06	0.30		0.04	0.01	0.11	0.06	<0.025	0.11	<0.01	<0.001	XRF (8)
			cap	89.4	9.7	0.7	0.2	tr.						0.0				
57		Şkočjan (inv. no. 47.627)	knob	86.2	11.7	0.3	tr.	ld		0.2	tr.	0.7	0.3	tr.	0.7			
			inside sheet	90	9.2	0.2	0.2	0.2	0.1	0.1	0.2	0.2	0.3					
61	Malpensa	Malpensa	outside sheet	86	11	0.2	0.1		0.5	1.2	0.7	0.2	0.2					SEM-EDXS (10)

Tab. 2.16 continued.

Cat. No.	Type	Find Site	Analyses	Cu	Cu abs. unc.	Sn	Sn abs. unc.	Pb	Pb abs. unc.	As	As abs. unc.	Analytical Method
10	Oranienburg	Dunaföldvár	cap	83.8	1.0	12.4	0.5	3.7*	0.9	< D.L.		PGAA (1)
				85.5		11.6	0.61	0.2		0.1		PIXE (1)
8		Keresztút	cap	81.6	1.6	13.6	0.7	4.0*	1.7	< D.L.		ToF-ND (sdv: 1.1) (1)
				82.5		14.1	1.10	2		0.5		PGAA (1)
14		unprovenanced	cap	90.6	1.0	6.3	0.3	2.3*	1.0	< D.L.*		ToF-ND (sdv: 2.6) (1)
				83.1		8.7	0.59	1.8		3.6		PGAA (1)
15	Paks	Paks	cap	88.1	0.4	9.5	0.4	1.7*	4	0.1*	0.01	PIXE (1)
				91.5		6.9	0.36	0.6	0.3			ToF-ND (sdv: 2.8) (1)
37	Nagytény	Nagytény	cap	88.9	0.6	10.7	0.6	< D.L.		< D.L.		PGAA (1)
				89.3		10.1	0.38	0.2		0.1		PIXE (1)
44		Hajduböszörmény	knob	92.3	0.5	7.1	0.4	n.d.				ToF-ND (sdv: 0.7) (1)
				92.0	0.3	8.0	0.2					PGAA (2)
45	Piscolt	Mezőkövesd	knob	88.3	0.3	8.0	0.8	2.8	0.2			PIXE (2)
				92.1	0.5	7.8	0.5	2.5**				PGAA (2)
			cap	91.7	0.3	8.3	0.2					ToF-ND (2)
				87.6	0.5	12.3	3.9	< DL				PGAA (2)
			cap	85.0	0.40	12.0	1.06	2.4	0.07			PIXE (2)
				91.3	0.3	8.73*	0.2					ToF-ND (2)
			knob	88.6	0.3	11.4	0.3	n.d.				ToF-ND (2)
				84.9	0.6	13.0	1.4	tr.				PIXE (2)
			cap	84.5	0.6	14.9	3.4	< DL				PGAA (2)
				81.7	0.3	13.7	2.7	1.5	0.2			PIXE (2)
			cap	86.9	0.3	12.5*	0.3					ToF-ND (2)
				89.3	0.3	10.7	0.3	n.d.				ToF-ND (2)
				88.0	0.26	10.3	0.44	1.0	0.07			PIXE (2)

Tab. 2.17 Chemical characterisation of armour from Hungary by PGAA, PIXE and ToF-ND in wt.% (Mödlinger et al. 2013; Mödlinger et al. 2014). The focus on the analyses was on the detection of alloying elements as Sn and Pb. Results clearly deriving from analyses on severely corroded areas were excluded. The ToF-ND data is corrected for the mass fraction of Cu and Sn measured by PGAA. The measured values are marked in brackets. Since ToF-ND analyses ignored the Pb content, these results are normalised to the sum of the Cu and Sn content according to the corresponding data by PGAA or PIXE. Analytical method: (1) = Mödlinger et al. 2013; (2) = Mödlinger et al. 2014 (tr. = traces; n.d. = not detected; DL = detection limit. Sdv. = standard deviation. (*) Pb- or As-concentration measured by PGAA can only be considered qualitatively. (**) Pb close to detection limit of PGAA: 2.8 wt.% with 54% rel. unc.).

Due to their low and different boiling point, elements like As and Sb vary in quantity during any re-melting and recycling processes involving copper or bronze. Together with Ag, these elements concentrate as minor or trace elements at the grain boundaries, while Fe, Pb (up to 1 wt.%) and S are usually found as inclusions (i.e. as iron rich copper sulphides or lead nodules). Surface analyses⁷³² obviously revealed higher amounts of elements ‘concentrating’ in the corrosion due to the faster diffusion of copper ions in soil, thus only providing qualitative or semi-quantitative analytical results. In the case of surface analyses carried out on the patina, detected elements such as Al, Si, P, Ti derive from the soil, S, Fe, Co, Ni might derive in unknown quantities from the soil or be part of the metal, while Cu, Sn, Pb, As, Sb, Bi are part of the alloy only.

In Chart 2.1 the alloy compositions of the three main types of eastern European helmets are indicated. At the base of the graph are the analyses as indicated in Tab. 2.16. Due to the wide uncertainty range, the analyses indicated in Tab. 2.17 were not taken into account. The differences in the alloys chosen for caps and knobs, are obvious: while for the caps all helmets show an alloy composition ranging between 7–12 wt.% of Sn, the alloy diversity is much higher for the smaller components of the helmets (such as knobs). The alloy range of 7–12 wt.% Sn is connected to:

1. the optimum fluidity of the alloy,⁷³³ which permits the casting of thinner bronze plates for the production of the cap and thus shortening significantly the following working steps to reduce the thickness, and
2. increasing the tensile strength and hardness of the alloy.

Between the different types, the higher amounts of Pb for the cap of helmets of Type Pişcolt is significant. For the helmet from Sehlisdorf, which shows rather low amounts of Pb, we have to note that the analytical base are analyses on the corroded surface. Significantly lower amounts of Pb are furthermore noted on the helmet from Škocjan and the unprovenanced helmet of Type Pişcolt (cat. no. 50). Helmets Type Oranienburg tend to contain less Sn than helmets of Type Paks, but this might be mitigated given the opportunity to analyse the clean metal of the Hungarian helmets instead of the external patina (as has so far been the case, together with bulk analyses on corroded samples without knowing the corrosion thickness) (Tab. 2.17).

As demonstrated by recently published analyses, helmets of Type Oranienburg show a rather uniform alloy composition.⁷³⁴ With the exception of the cap of the helmet from Spišská Belá, which contains 8.6 wt.% Sn, the helmets analysed were made of a binary CuSn alloy with 10.3–14.4 wt.% Sn. Most common trace elements are S and Fe, followed by Pb, Ag, As and Ni. Only on the helmets from Dunaföldvár and Keresztéte were higher amounts of Pb measured,⁷³⁵ which is connected to the analytical methods used (surface analyses via PIXE; low sensibility for Pb with the PGAA). Also, the knob of the Biecz helmet contains slightly higher amounts of Pb.⁷³⁶

For helmets of Type Pişcolt, the amount of Sn ranges between 6–12 wt.% for both cap and knob. Only the knob of the helmet from Şoarş shows significantly less Sn, with 1.7 wt.%, whilst the knobs of the helmets from Hajduböszörmény and Mezőkövesd demonstrate significantly higher amounts of Sn, with over 16 wt.%.⁷³⁷ Such high amounts of Sn measured on Late Bronze Age bronzes are rare (assuming the analyses were not influenced by the presence of corrosion products). The rather high amounts of Sb, As and Ni of 1–1.6 wt.% of the knob of the helmet of Type Pişcolt from Şoarş indicates the use of Fahlore with (almost) no previous recycling process for the production of the copper which was used for the knob.

⁷³² For example, surface analyses were carried out on the unprovenanced helmet of Type Pişcolt (cat. no. 55) and other, mainly Hungarian, armour: Mödler et al. 2013; Mödler et al. 2014.

⁷³³ Piccardi et al. 2009.

⁷³⁴ Mödler et al. 2013.

⁷³⁵ Mödler et al. 2014.

⁷³⁶ R. Cowel and K. Hyne, British Museum, Department of Conservation and Scientific Research, internal file number 6427.

⁷³⁷ Born – Hansen 1992, 339–356.

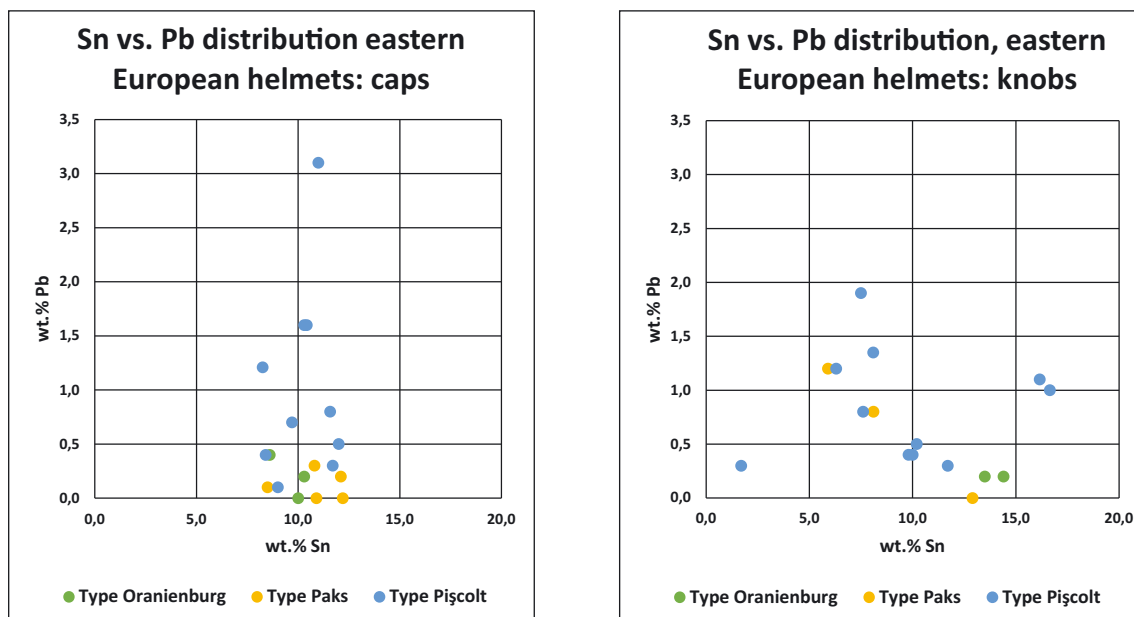


Chart 2.1 Sn vs. Pb distribution of eastern European helmets. The base of Chart 2.1 are the values indicated in Tab. 2.16. The uncertainty range for the SEM-EDXS is about 5%. Left: Sn vs. Pb distribution of the cap of the helmets. Right: Sn vs. Pb distribution of the knobs of the helmets.

The Sn amount of the helmet's knob shows a rather wide range, from 1.7–16.6 wt.%, for helmets of Type Pişcolt, 5.9–12.9 wt.% for helmets of Type Paks and for helmets of Type Oranienburg from 13.5–14.4 wt.%. The rather high amounts of Ni (1.4 wt.%) and As (1 wt.%) of the knob of the helmet of Type Paks from Strassengel should also be noted; these might again be connected to the use of Fahlore. The only analysed helmet of Type Nagytétény contains 7–8.5 wt.% Sn in the knob (helmet from Nagytétény). Thus, no specific preference in the use of Sn for the knob according to helmet type is perceptible; only the rather high amount measured on the two helmets of Type Oranienburg is unexpected, but might be mitigated against by further analyses of the knobs on other helmets of Type Oranienburg. For the cap, Sn was added in similar quantities: helmets of Type Pişcolt show 7–11.7 wt.% Sn, helmets of Type Paks 8.5–12.2 wt.% Sn, helmets of Type Oranienburg 8.6–12 wt.% Sn and only helmet of Type Nagytétény analysed 7–8 wt.% Sn.

The alloy composition of the analysed helmets of Type Pişcolt differs from those of the older helmets of Type Oranienburg and Type Paks, since the Pb amount of the helmets of Type Pişcolt on both cap and knob is significantly higher, usually around 0.8–2 wt.%, and reaching up to 3.1 wt.% (Tab. 2.16). This is in agreement with the general tendency of central and eastern European Ha B1 bronzes containing significantly more (intentionally added) Pb than older bronzes. The helmets of Type Pişcolt from Sehlsdorf, Škocjan and the unprovenanced helmet cat. no. 50 though show lower amounts of Pb of ≤ 0.5 wt.% in both cap and knob. The caps of other cap helmets instead contain max. 0.4 wt.% Pb. On the cap of the helmet from Nagytétény, the Pb amount could not be exactly detected (PIXE: 2.8 wt.%; PGAA: under detection limit). The knobs analysed from the helmets of Type Oranienburg (Spišská Belá and Sâg), and the two helmets of Type Paks (cat. nos. 15 and 20) show the lowest Pb amounts. The Pb amount on helmets of Type Paks though reaches up to 1.2 wt.% (cat. no. 21). The amount of Pb in the knob of the Nagytétény helmet is found to be around 2.8 wt.% with 54% relative uncertainty by the PGAA, close to its detection limit, while PIXE showed 1.4 wt.% Pb.

The two cheek plates analysed differ widely in their composition; the one from Hočko Pohorje, Slovenia, has up to 12.2 wt.% Sn and less minor elements, while the second one from Wöllersdorf, Austria, only 7.1 wt.% Sn with slightly higher amounts of trace elements.

The rivets analysed from the two helmets of Type Paks (cat. nos. 20 and 21) have 5.2 to 12.5 wt.% Sn, whilst the rivet studied from an unprovenanced helmet of Type Pişcolt (cat. no. 52) has

7.7 wt.%. Without further analyses, no specific pattern is discernible, but we might exclude a tin amount depending on date or type of object at least for the chronological period and helmet type concerned. The wide variability of the Sn amount found in rivets is clearly illustrated by the variability found in those rivets used in swords.⁷³⁸

On some of the helmets studied, both cap and knob could be sampled. Thus, the use of different alloys for the purely cast knob and the severely deformed cast bronze plate, which became the cap, could be detected. According to the composition of knob and cap the helmets analysed are divided into the following three groups:

1. the same alloy (difference in Sn ≤ 1 wt.% and minor elements ≤ 0.3 wt.%)
2. a similar alloy (difference in Sn 1–4.5 wt.%)
3. two different alloys (> 4.5 wt.% Sn difference).

The division is made according to notable changes in the material characteristics (e.g. from an alloy with 1.7 wt.% Sn to another one with 10.3 wt.% Sn, as noted on the helmet from Şoars).

The chemical composition of the alloys used for the production of both cap and knob of the helmet of Type Paks cat. no. 20, as well as the two helmets of Type Pişcolt (cat. nos. 46 and 52), indicates the use of the same alloy for the production of the two helmet parts. Moreover, the analysed rivet from the unprovenanced helmet of Type Paks (cat. no. 20) was made with the same alloy as the cap and the knob. The differences in the Pb amounts measured on cap and knob of the Endrőd helmet are the result of analysing the as-cast structure of the knob. Its microstructure contains larger Pb inclusions than found in a severely worked bronze; during analyses, the first might have been touched.

The helmet of Type Paks from Strassengel and the two helmets of Type Pişcolt cat. nos. 41 and 50), seem to have been made with a similar alloy (differences in Sn max. 1.7 wt.%).⁷³⁹ On the helmet of Type Paks from Strassengel, which also shows a similar Sn amount for both cap and knob, only the amounts of Pb, As and Ni differ. The analyses of the Sehlsdorf helmet have to be considered qualitative, since they were made on a significantly corroded surface. The differences in the minor elements detected in the Škocjan samples indicate the use of a slightly different alloy. We might also add – with reservation, due to the restrictions of the analytical methods used – the two Hungarian helmets from Paks and Nagytétény; both show similar amounts of Sn for both cap and knob (Tab. 2.17).

For those helmets with the same or similar alloy composition in both cap and knob, we might assume that once the cap was finished, the remaining alloy from the cast of the cap was melted again to be used for the cast-on of the knob. If necessary, further scrap metal or ‘fresh’ metal was added, which might have changed the alloy composition but only marginally (e.g. such as for the helmet from Škocjan).

The helmets of Type Oranienburg from Sâg and Spišská Belá both show a significantly different alloy composition for cap and knob: the caps have 8.6 and 10 wt.% Sn respectively, while the knobs show significantly higher amounts of Sn with 13.5–14.4 wt.%. Also the helmets of Type Pişcolt from Mezőkövesd and Hajduböszörmény show >5 wt.% Sn in the knob than in the cap, while the Pb amount differs only in max. 0.5 wt.% (referring to the AAS-results; see Tab. 2.16). An expected difference in the colour of both cap and knob for the helmets from Hajduböszörmény and Mezőkövesd, because of having a difference of 5 wt.% in Sn, could not be observed due to the present corrosion.⁷⁴⁰

Unlike these four helmets, the unprovenanced helmet of Type Paks cat. no. 21 and three helmets of Type Pişcolt (cat. nos. 47, 48, and 51), show higher amounts of Sn in the cap than in the

⁷³⁸ E.g. Riederer 2004.

⁷³⁹ Nevertheless, we have to keep in mind the different analytical methods used: the cap helmet from Strassengel, as well as the helmet of Type Pişcolt from Škocjan, were analysed by the author by means of SEM-EDXS; the unprovenanced helmet cat. no. 50 was studied by AAS and without taking into account elements other than Cu, Sn and Pb; the analyses of the Sehlsdorf helmet are from surface analyses only and were carried out on a corroded surface.

⁷⁴⁰ Ammannati et al. 2006.

knob. The knob of the Şoarş helmet contains less than 2 wt.% Sn, but significantly high amounts of Sb, As and Ni (over 1 wt.% each), while the cap has over 10 wt.% Sn, and no especially high amounts of minor elements. The knobs of the helmets from Pişcolt and the unprovenanced helmet (cat. no. 51) contain 4 wt.% less Sn than the cap. The cap from the helmets of Type Pişcolt from Pişcolt and the unprovenanced helmet cat. no. 51 show significantly higher amounts of Pb than the knobs.⁷⁴¹ Considering the recently carried out analyses, we cannot assume that the results from the unprovenanced helmet (cat. no. 51) need suggest a different workshop, as suggested by Born and Hansen,⁷⁴² especially as it is rather similar to the alloy composition of the helmets from Şoarş and Pişcolt, which both show significantly higher amounts of Sn in the cap than in the knob.

At least for the helmet from Şoarş, the difference in the amount of Sn used in the cap and knob must have resulted in a visible colour difference: while the cap is a tin-bronze with 10.3 wt.% Sn and 1.6 wt.% Pb, the knob contains 0.3 wt.% Pb with only 1.7 wt.% Sn only.

In summary, the measured amounts of Sn in cap helmets indicates that its amount does not depend on the type of helmet, the geographical distribution, nor the chronological classification. Instead, significantly higher amounts of Pb were noted on Ha B1 helmets of Type Pişcolt. Since detailed studies on minor and trace elements and on the origin of the metal were not the primary interest in this study, concerned as we are with manufacturing techniques, they must be discussed elsewhere.

2.4.2 Chemical Characterisation – Crested Helmets

To gain more information about the origin of the ores used in the production of the three helmets of Type Lueg, all of them were recently analysed by J. Lutz with XRF (X-ray fluorescence analyses), NAA (Neutron Activation analyses, including quadrupole ICP-MS) and multicollector-ICP-MS (inductively coupled plasma mass spectrometry).⁷⁴³ The helmets from Piller Sattel and Anlaufstal were sampled on the cap, whilst analyses on the helmet from Pass Lueg included both cheek plates and the two halves of the cap. The most likely area of origin of the ores used for the production of the helmets is the Greywacken zone in the eastern Alps, known to be mined in the Bronze Age (including the areas of Mitterberg/Salzburg, Kelchalm/Tyrol, and Viehhofen/Salzburg). Comparing the composition of the helmets with the already known data, the results fit best with the Mitterberg samples,⁷⁴⁴ even though the helmets contain more Sb than the latter group of results. Also, the results of lead-isotope analyses so far indicate a close relation to slag from the Mitterberg region. The amount of trace elements in the helmets is rather low; the use of Fahlore therefore does not seem likely, if we do not want to assume several cycles of recycling and its accompanying loss of Sb and As. The helmets from Piller Sattel and Anlaufstal both contain about 8 wt.% of Sn; whereas the Sn amount of 10–12 wt.% Sn from the helmet from Pass Lueg, and especially that from a cheek plate, with 14 wt.% Sn, is clearly higher. The bronze includes the typical trace elements of European Bronze Age finds (Tab. 2.18).⁷⁴⁵

Neither the alloy composition nor the material structure of any helmets of Type Mantes has yet been analysed. However, three helmets of Type Biebesheim have been analysed. The two helmets from Biebesheim were already analysed in the 1960'.⁷⁴⁶ The two fragments of helmet B show a widely varying amount of Sn (6.4–10 wt.%) and Pb (1.2–3 wt.%). Helmet A instead has 10 wt.% Sn and almost 1 wt.% Pb. An unprovenanced helmet (cat. no. 100), related to crested helmets of Type Biebesheim, was analysed with AAS by Born and Hansen.⁷⁴⁷ Despite 7 wt.%

⁷⁴¹ Mödlinger 2014a.

⁷⁴² Born – Hansen 1992, 346.

⁷⁴³ Lutz 2011.

⁷⁴⁴ Lutz 2011, 115, fig. 1.

⁷⁴⁵ Lutz 2011, tab. 1.

⁷⁴⁶ Jorns 1964, 76–85; the analytical method is not mentioned.

⁷⁴⁷ Born – Hansen 2001, 270, no. 1125.

Cat. No.	Type	Find Site	Analyses	Cu	Sn	Pb	Sb	As	S	Fe	Zn	Ni	Ag	Bi	Co	Au	Cd	Analytical Method
83	Lueg	Pass Lueg	cheek plate (left)	83.0	11.4	tr.	0.4	0.3		0.2	tr.	0.3	tr.	tr.	tr.	tr.		ICP-MS, XRF (1)
			cheek plate (right)	79.0	14.3	tr.	0.4	0.3		tr.	tr.	0.3	tr.	tr.	tr.	tr.		
			cap (half 1)	85.0	11.9	tr.	0.2	0.3		0.1	tr.	0.3	tr.	tr.	tr.	tr.		
			cap (half 2)	82.0	10.0	tr.	0.2	0.2		tr.	tr.	0.3	tr.	tr.	tr.	tr.		
84		Piller Sattel	cap	89.0	7.7	tr.	0.1	0.5		0.2	tr.	0.1	tr.	tr.	tr.	tr.		
85		Anlauffal	cap	87.0	7.8	tr.	0.6	0.5		tr.	tr.	0.4	tr.	tr.	tr.	tr.		
86	Biebesheim	Biebesheim A	cap (half 1)	0.0	9.6	0.9	0.4	0.2		0.0	0.0	0.3	0.1	tr.	tr.	tr.		unknown (2)
			cap (half 2)	0.0	10.0	0.9	0.2	0.4		0.0	0.0	0.6	0.2	tr.	tr.	tr.		
			rivets	0.0	8.0	0.3	0.2	0.1		0.0	0.0	0.3	0.1	tr.	tr.	tr.		
				0.0	7.6	0.3	0.1	0.1		0.0	0.1	0.3	0.1	tr.	tr.	tr.		
87		Biebesheim B	cap (half 1)	0.0	6.4	1.2	0.1	0.3		0.0	0.0	0.2	0.1	tr.	0.1	tr.		
			cap (half 2)	0.0	10.0	3.0	0.1	0.4		0.0	0.0	0.2	0.2	tr.	0.1	tr.		
100	Biebesheim related	unprovenanced	cap	91.6	7.1	0.4	0.1	0.4	tr.	0.1	0.0	0.2	0.1	tr.	tr.	tr.		AAS (3)
67	Biebesheim related (?)	Podcrkavlje	cheek plate	87.3	9.9	1.3	0.5	0.8	0.1	0.1		0.4	0.1					SEM-EDXS
102	Bernières d'Ailly	Bernières d'Ailly	cap (half 1 & 2)		8.0													SEM-EDXS (4)
118		Vila Cova de Perrinho	cap (ARQ027)	92	7.7	n.d.		n.d.		n.d.								portable XRF (5)
			cap (ARQ028)	92	8.2	n.d.		n.d.		n.d.								

Tab. 2.18 Alloy composition of Bronze Age crested helmets. Analytical method: (1) = Lutz 2011; (2) = Jorns 1964 (analytical method was not mentioned); (3) = Born – Hansen 2001; (4) = Lehoëff 2011; (5) = Bottaini – Rodrigues 2011b (according to the different methods used and cited, different sensitivities have to be noted) (tr. = traces; n.d. = not detected).

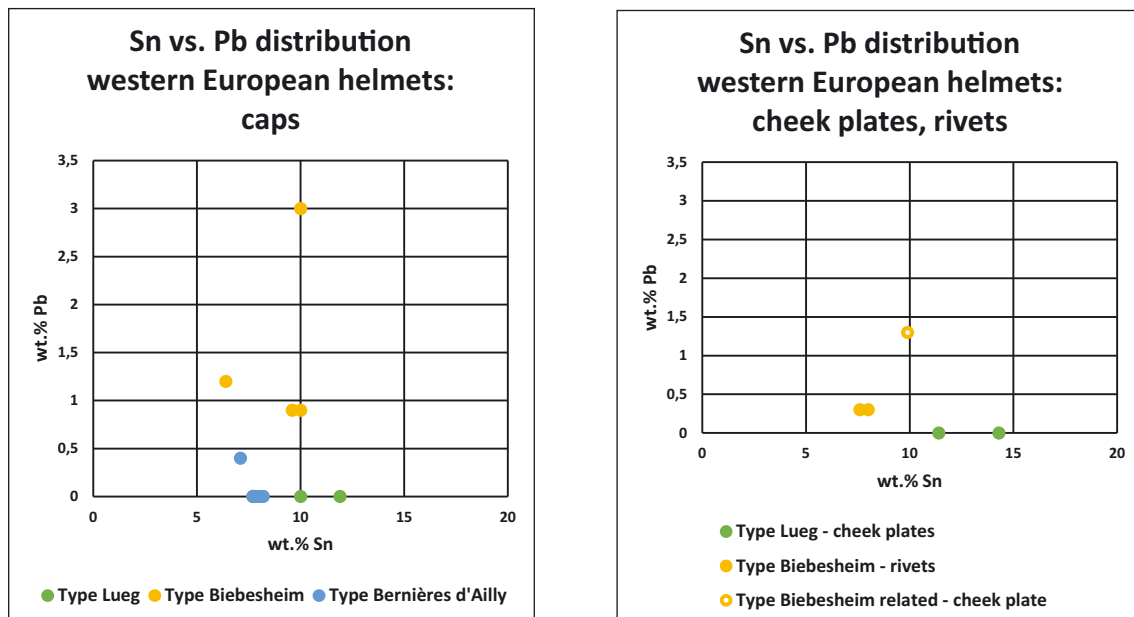


Chart 2.2 Sn vs. Pb distribution of western European helmets. The base of Chart 2.2 are the values indicated in Tab. 2.18. The uncertainty range for the SEM-EDXS is about 5%. Left: Sn vs. Pb distribution of the cap of the helmets. Right: Sn vs. Pb distribution of the cheek plates and rivets of the helmets.

Sn, no major or minor alloys were detected (Tab. 2.18). The earlier analysis of the two Biebesheim helmets⁷⁴⁸ must be used with a certain amount of caution, due to the unknown analytical method used, and in light of the lack of further analyses on Western European crested helmets. These helmets show (as the potentially related cheek plate from Podcrkavlje) a relatively high amount of Pb of 1–3 wt.%, which might contribute toward the chronological classification of this helmet type, as leaded bronze appears in large numbers during Ha B1 in both central Europe and western Europe (relative with the Wilburton phase).⁷⁴⁹ However, considering find spot and connection to the Atlantic Bronze Age, the Pb amount does not necessarily point to a potentially later production date.⁷⁵⁰

The crested helmets of Type Bernières d'Ailly from Vila Cova de Perrinho were analysed via portable XRF.⁷⁵¹ Apart from copper, only Sn was detected and is present in both fragments around 8 wt.%. The helmets from Bernières d'Ailly, Armancourt and Montmacq, are currently undergoing analyses using PIXE, radiography, SEM-EDXS and metallography. The publication is in preparation.⁷⁵²

As visible in Chart 2.2, even though only a small number of analyses have so far been carried out on western European helmets, a certain trend is evident concerning the amounts of Sn and Pb used in the manufacture of the different helmet types: Type Biebesheim contains in comparison with Type Lueg and Bernières d'Ailly significantly more Pb, whilst helmets of Type Lueg have more Sn than the other two types so far analysed. This will need to be confirmed through further analyses.

2.4.3 Metallographic Characterisation and Construction – Cap Helmets

Different parameters and characteristics of the studied objects, and here in particular the helmets, enable us to reconstruct aspects of their manufacture. The most important basis for this

⁷⁴⁸ Jorns 1964.

⁷⁴⁹ See Gerloff 2010, tab. 3.

⁷⁵⁰ Northover 2012, 174–183.

⁷⁵¹ Bottaini – Rodrigues 2011b, tab. 1.

⁷⁵² The publication is in preparation by Brun et al.

are the chemical and metallographic characterisation, the observation of the object's surface in order to detect manufacturing traces, and the objects dimensions, such as weight and thickness. Ten helmets were sampled for metallographic studies. Some helmets could unfortunately not be sampled, since the museums concerned did not want their condition to be compromised, or the helmets had suffered some recent heat treatment during restoration (such as the unprovenanced helmet cat. no. 51), or were not accessible because the helmets are held in private collections.

Though typologically associated with western European helmets, most of the helmets of Type Mantes and Type Montbellet underwent the same production processes as other cap helmets, with the exception of the small, central ridge on the cap, or in the application of the knob or socket.

All prehistoric bronze objects were initially cast, and, if necessary, deformed to give them their final shape. The first step in the production of a helmet was in casting a thin circular disc (Fig. 2.42). This was most likely achieved by means of a (bivalve) mould made of fired clay or lost-wax-casting, since no stone moulds for the production of thin, flat bronze discs or ingots are known. Also sand casting (both as an open or closed cast) cannot be completely excluded, but unfortunately leaves no traces in the archaeological record. The use of an open mould, however, is less likely due to the oxidation of the surface, if not charcoal was immediately placed on top of the molten metal to prevent rough surface and oxidation. The thickness and shape of the as-cast plate, in respect of the optimum filling of the mould, depends on several factors such as casting temperature, thermal properties, shape and orientation of the mould, pouring rate and, of course, the composition of the alloy.

Since bronze is unlikely to be made thicker after casting (apart from some stiffening of the edges), the thickness of the cast bronze plate could not have been thinner than the rim of the helmet. This provides a minimum thickness of the cast bronze plate of at least 4–5mm for helmets of Type Pişcolt, min. 1–2mm for helmets of Type Paks, min. 2–3mm for helmets of Type Oranienburg, and at least 1–4mm for helmets of Type Nagytétény. For western European helmets of Type Montbellet and helmets of Type Mantes (some of them as massive as helmets of Type Pişcolt), the thickness of the rim ranges from 1–5mm. Also, the diameter of the cast bronze disc used in the production of helmets varies. Knowing the weight of the helmet made from this disc, and the minimum thickness of the rim, we can calculate a minimum diameter for the cast bronze discs; which have a diameter which ranges between 20–30cm. We must also make extra allowance in these estimations for perhaps several more centimetres, so cracks caused by material tension during the deformation process could be chiselled off before they reached too deep into the centre of the disc or bronze sheet.

Different from the rivet holes on the significantly lighter, thinner and smaller cap helmets, the rivet holes of helmets of Type Pişcolt were already present in the mould model, as it is indicated by their mainly smooth edges and oval shape, orientated so as to point from the rim to the knob, as if they were stretched in the direction of the top of the helmet. The presence of rivet holes already in the mould supports the use of lost wax casting for the cast bronze plate used in the production of helmets of Type Pişcolt. The only exception might be the unprovenanced helmet of Type Pişcolt (cat. no. 55). It shows rivet holes, which were already present in the cast bronze disc and eventually enlarged during the following manufacturing process. This was possible only since this helmet is much thinner at the rim than all other helmets of Type Pişcolt. On all other cap helmets, the rivet holes were usually punched through from the outside to the inside of the sheet after shaping and decorating were done.

The helmets of Type Pişcolt with the lowest amount of Sn (cat. nos. 46 and 52 with 7–8.3 wt.% Sn), also contained over 1 wt.% of Pb, which increased the casting fluidity.⁷⁵³ Nevertheless, the unprovenanced helmets of Type Pişcolt cat. no. 51 and 52 are covered with pores and small casting defects. Most of the cap of the helmets contain 9–12 wt.% Sn. The bronze with 10

⁷⁵³ Piccardo et al. 2009; Piccardo et al. 2010.

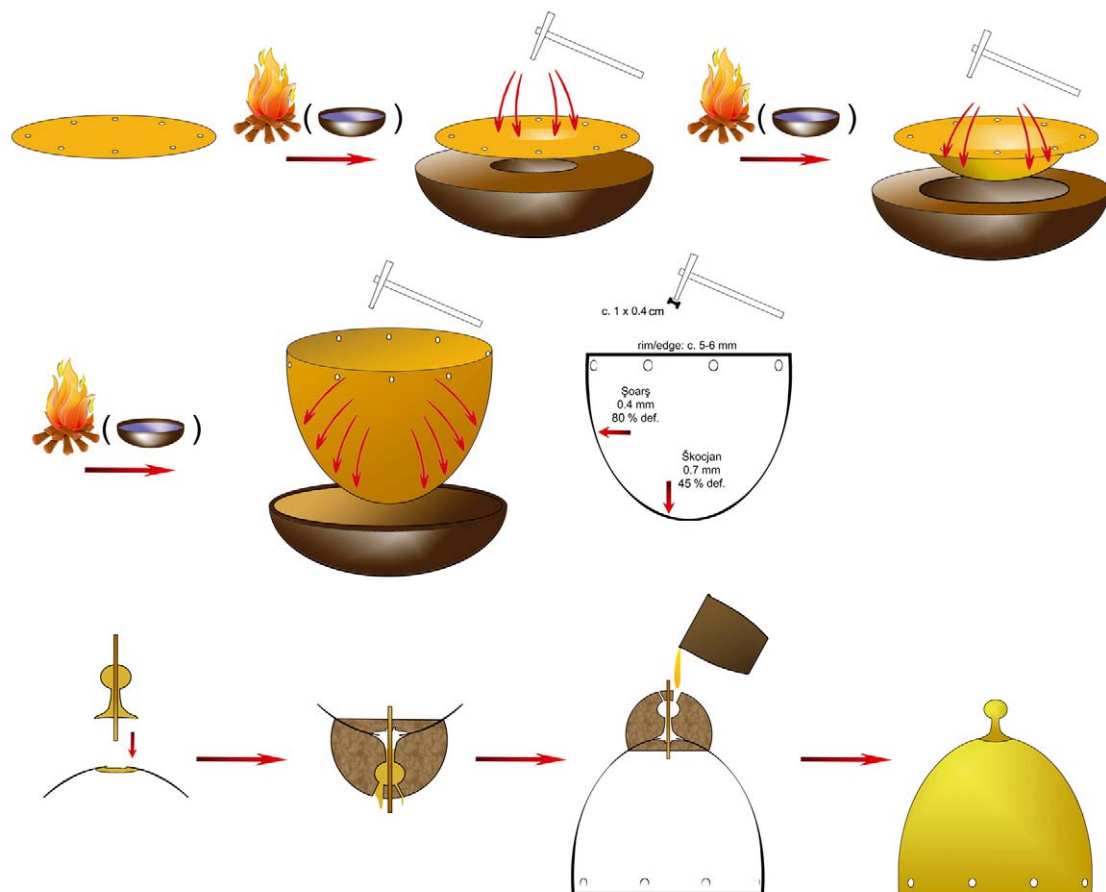


Fig. 2.42 Reconstruction of the manufacturing process of the cap helmets, demonstrated with the manufacture of helmets of Type Pişcolt (modified after Mödler 2014a). The graph includes the amount of deformation noted on the samples from the helmets from Škocjan and Şoarş. The rivet holes were pre-cast only for helmets of Type Pişcolt, not for the other cap helmets (for other cap helmets, they were punched through once the cap was finished). The round bronze disc was then deformed by deep-drawing or die forging most likely over a wooden die, as also indicated by the direction, form and cross-section of the hammering traces. Forming the cap lead to differing thickness of the cap. As a final step, the knob was cast-on (see also Fig. 2.49).

wt.% Sn does not only have the best fluidity values of the Cu-Sn system, but also the most equilibrated and optimum material characteristics for undergoing further working procedures.

After casting the disc, chiselled off parts (e.g. sprue, flashing) were collected and potentially used for the cast-on of the knob, as the similar alloy composition of both cap and knob of some of the helmets suggests (e.g. the unprovenanced helmet of Type Paks cat. no. 20, as well as the helmets of Type Pişcolt cat. nos. 46 and 52).

To give the cast plate a three-dimensional, bowl-like shape, the flat plate had to be severely deformed. All cap helmets show a thicker and more massive rim (which helped stiffen the helmet), which gets thinner towards the top of the cap. At the top of the cap, the thickness again increases and the metal is less deformed. The varying thickness of the helmet caps indicates instead the use of an open die for further shaping (deep-drawing), than the primary use of a high bowed stake with round face. The varying thickness is clearly visible on more massive helmets, such as the helmets of Type Pişcolt, but also helmets of Type Montballet, like that from Thonberg.⁷⁵⁴ According to the application of deep-drawing (since it would have been difficult to reach the top of the cap with the hammer during driving in an open die), this zone remains slightly thicker than the central part.

⁷⁵⁴ Schauer 1982c, fig. 10.

Conversely, the use of a high bowed stake with round face would have resulted in the production of a much thinner top to the cap. If we assume that the helmets were made from a circular flange cut out of a previously made thin sheet, which was then was deformed by ‘raising’, there would be no such difference in metal deformation and thickness. The remains of hammering traces inside the helmets (even in really thin ones), however, indicate the use of deep-drawing instead of rising as a shaping technique; with the use of a high bowed stake with round face, no hammering traces would be found inside the helmet but would occur on the outside (if not flattened and polished away during further work on the surface). Massive hammering traces are particularly evident on the inside of helmets of Type Pişcolt (Fig. 2.3). Also, vertical cracks due to material stress during die forging are noted on the helmets of Type Pişcolt from Hajduböszörmény, Şoarş, Endrőd⁷⁵⁵ and an unprovenanced helmet (cat. no. 51),⁷⁵⁶ as well as on older helmets. The production of the helmets resembles that of the 5th century BC bronze cauldron from Estissac, France, which is just slightly wider than the helmets.⁷⁵⁷

The reduction of thickness and the shaping of the cast bronze disc was achieved by several cycles of annealing, cold hammering and most likely also water quenching of the bronze – the latter at least for the first working steps involving massive deformation of the as-cast plate. Hot deformation can be excluded according to the composition of the bronze and the high thermal conductivities of the alloys.

According to the cap’s Sn-amount, annealing took place between 550–630°C. This broadly overlaps with the temperature range of 520–586°C, where the solubility of tin achieves its maximum with 15.8 wt.% in copper. Annealing, for example, with a tin bronze with 14 wt.% Sn, below 300°C results in the formation of the unwanted, brittle δ -phase at the α -grain boundaries, which significantly decreases the workability of the alloy. An annealing temperature above 590°C instead results in the formation of a second phase (β -phase). Since β -phase has a body centred cubic lattice, it can be deformed a very similar way as the α -phase, characterised by a face centred cubic lattice.⁷⁵⁸ However, if during the annealing steps the temperature remains circa at 550±10°C (according to the alloy composition), no further β -phase is produced. To lock all possible solid state transformation of the β -phase eventually formed (mainly after solidification because during annealing it should be avoided), or of the α -solid solution (where the Sn solubility decreases with the temperature below 520°C), the bronze is quenched after each thermal treatment. Quenching between 500–600°C actually prevents the formation of the brittle δ - and ϵ -phases.⁷⁵⁹

The micro-samples of the ten helmets studied were taken from the cap of two helmets of Type Oranienburg (Sâg and Spišská Belá), five helmets of Type Paks (Veliko Nabrđe, Poljanci I, Strassengel) and two helmets of Type Pişcolt (Škocjan and Şoarş). The knob of the helmet of Type Oranienburg from Sâg, and two cheek plates from helmets of Type Paks (Wöllersdorf and Hočko Pohorje), were also analysed.

According to the microstructure presented in the following we can reconstruct the thermo-mechanical history of each helmet. Microstructural and compositional features of the cross sections of the helmet samples generally show a still inhomogeneous solid solution with deformed, polygonal recrystallised crystals with slip lines, indicating cold deformation as a final working step, visible for example on the samples from the helmets from Poljanci I (Fig. 2.43 with intergranular corrosion, recrystallised grains with slipping bands, and mechanical twins crossing each other), Strassengel and Spišská Belá (Fig. 2.44), and Veliko Nabrđe (Fig. 2.45).

On the helmet from Şoarş, Pb is regularly distributed in the metallic matrix in the form of fine, globular inclusions. The microstructure of the tin-bronze matrix consists of polygonal grains with slip bands and mechanical twins which are typical of recrystallisation annealing

⁷⁵⁵ Mödlinger 2014a.

⁷⁵⁶ Born – Hansen 1992, 343.

⁷⁵⁷ Piccardo – Pernot 1997; Pernot 2000, fig. 1.

⁷⁵⁸ Piccardo et al. 2010, 12.

⁷⁵⁹ Ammannati et al. 2006; Piccardo et al. 2010, 14.

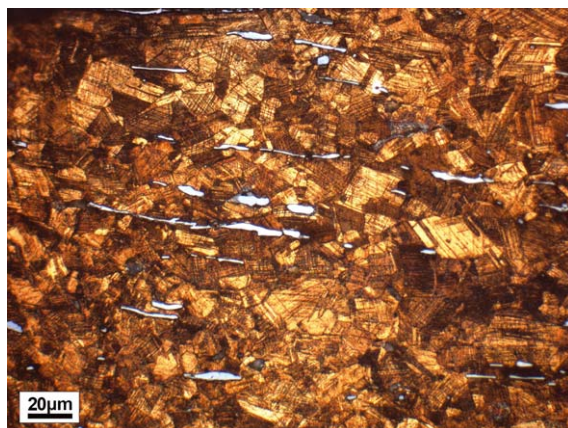


Fig. 2.43 Microstructure from the cap of the helmet from Poljanci I. The sample was taken close to the rim of the helmet and etched with FeCl_3 . Elongated $\text{Cu}_{2-x}\text{Fe}_x\text{S}$ -inclusions (light grey) are visible, as well as polyedric recrystallised α -grains with twins and high amounts of strain lines, the latter indicating a final deformation below the recrystallisation temperature.

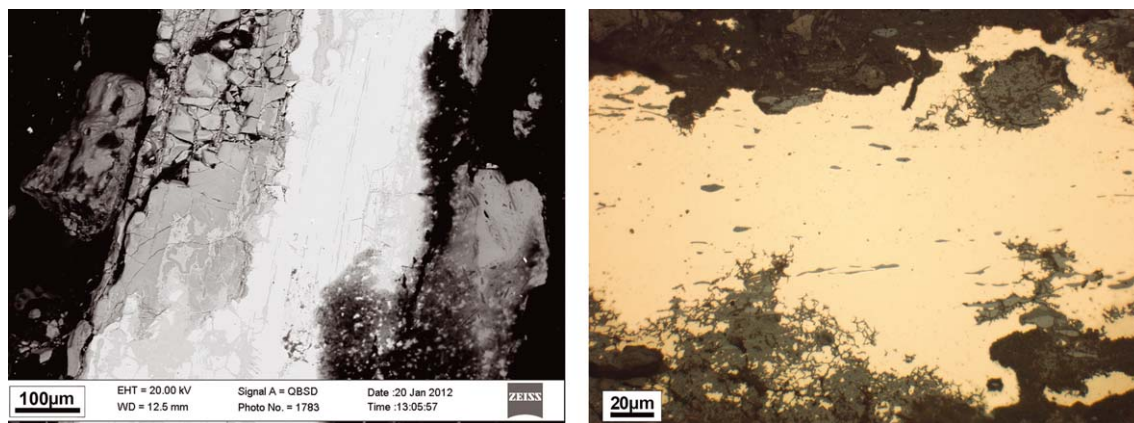


Fig. 2.44 Intergranular corrosion shows recrystallized grains with slipping bands and mechanical twins crossing each other. Both samples were taken close to the socket/knob and are unetched. The SEM-image of the helmet from Strassengel (left) shows the microstructure with elongated $\text{Cu}_{2-x}\text{Fe}_x\text{S}$ -inclusions (light grey 'lines'), a few Pb-inclusions (white spots on the top), and a significant level of corrosion (dark and light grey). The highly elongated $\text{Cu}_{2-x}\text{Fe}_x\text{S}$ -inclusions indicate a massive deformation in the area sampled. The sample from the helmet from Spišská Belá (right) show in the light optical microscope much less deformed $\text{Cu}_{2-x}\text{Fe}_x\text{S}$ -inclusions (dark grey spots in the light yellow metal matrix), and a very fine grain size. The grains as well as their internal structure (twins, strain lines) are outlined by corrosion.

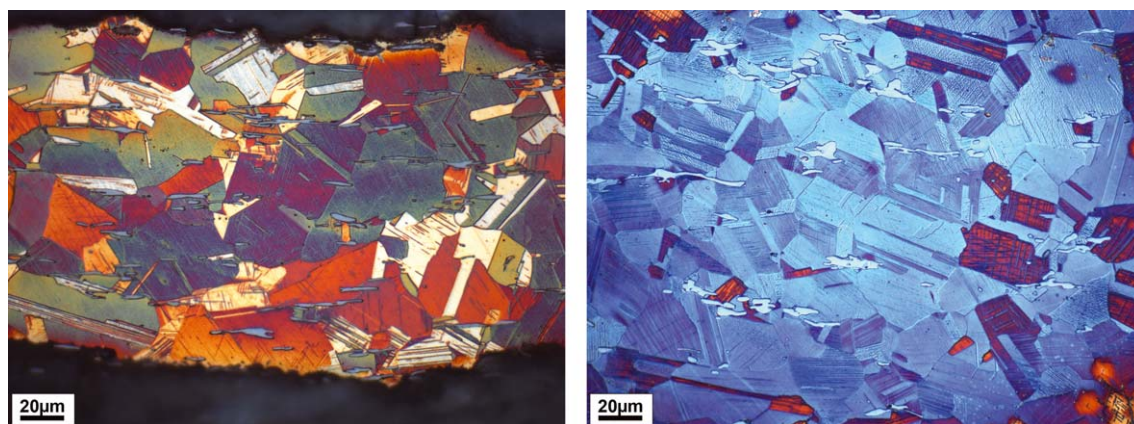


Fig. 2.45 Microstructure from the cross-sections of the cheek plate from Hočko Pohorje (left) and of the helmet from Veliko Nabrđe (right). The sample from the helmet was taken close to the rim of the helmet. Both samples were etched with Klemm II. Compared to other samples (see e.g. Fig. 2.43) the level of deformation of $\text{Cu}_{2-x}\text{Fe}_x\text{S}$ -inclusions, which indicate the total deformation applied to the metal sheet, is low.

followed by a light mechanical deformation as shown by slip bands and mechanical twins without affecting the lead inclusions shape (Fig. 2.46). As indicated by annealing twins slip lines, the last step of work on the cap of the helmet from Škocjan was a light cold hammering. Close to the surface, the grains are richer in Sn than in the central zone of the cap, rounded and unde-

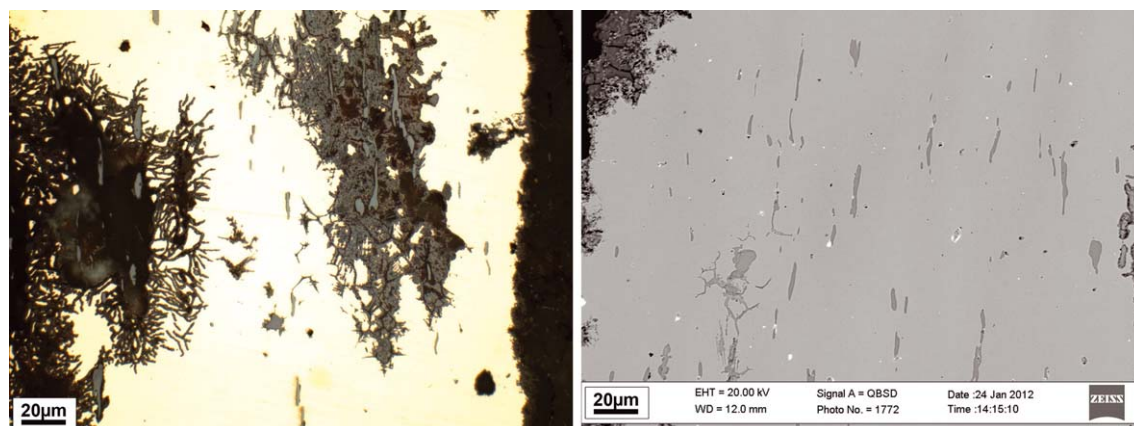


Fig. 2.46 Helmet from Șoarș, Romania. SEM-picture of the micro-sample from the mid of the cap (right). The white dots are Pb-inclusions, the elongated, light grey areas are $\text{Cu}_{2-3}\text{Fe}_x\text{S}$ -inclusions indicating the total deformation of the cap of 67%. Corrosion is outlining the grain structure. The image at the left shows the unetched microstructure in the light optical microscope. On the left, we see bacterial induced corrosion, so called 'tentacle' corrosion, which appears in oxygen-low environments (as described in Piccardo et al. 2013). In the centre of the sample, further corrosion is outlining the grain structure with twins and strain lines, the latter indicating a final deformation below the recrystallisation temperature.

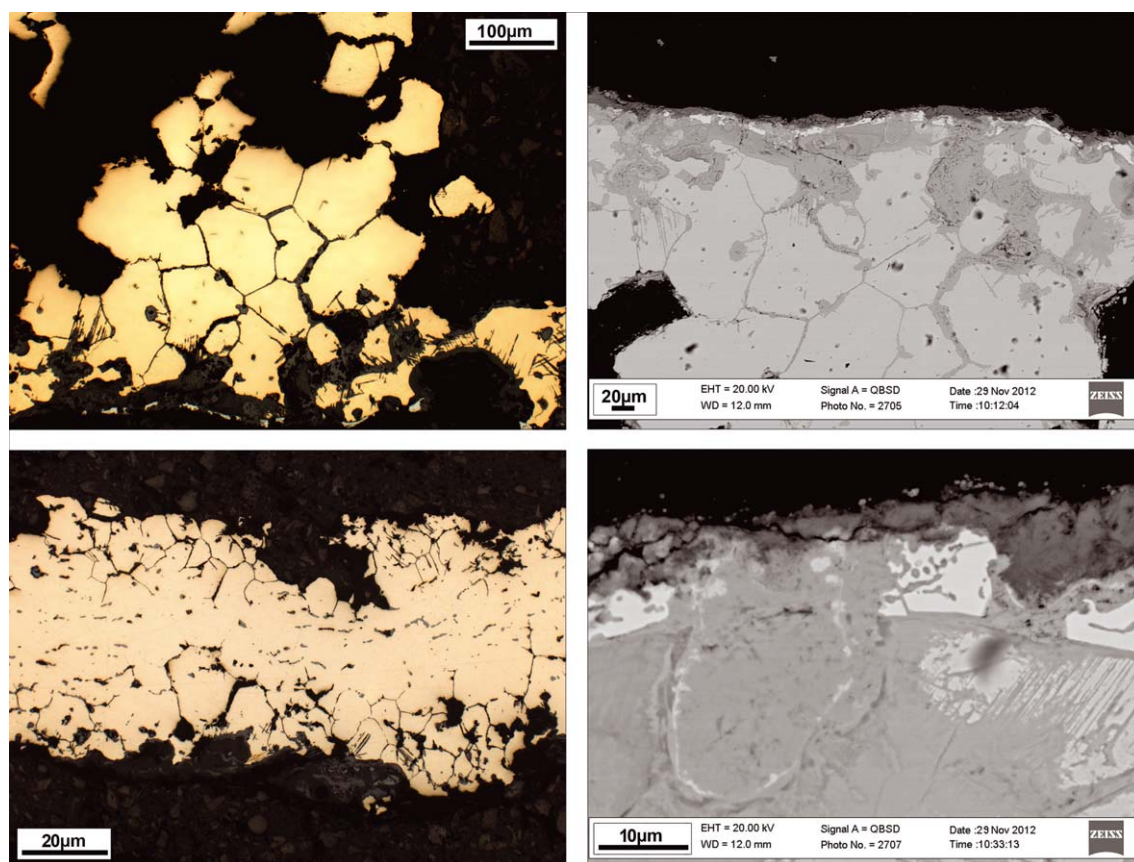


Fig. 2.47 Helmet from Škocjan, Slovenia. The bronze sheet of the cap is severely corroded and only light deformed (c. 45%). Note the inter- and intra-crystalline corrosion following the metal structure and the remains of $\alpha+\delta$ eutectoid (light grey) on the surface of the cap (on the picture above left: at the bottom of the sample; on the two SEM images on the right on the top of the sample the white layer).

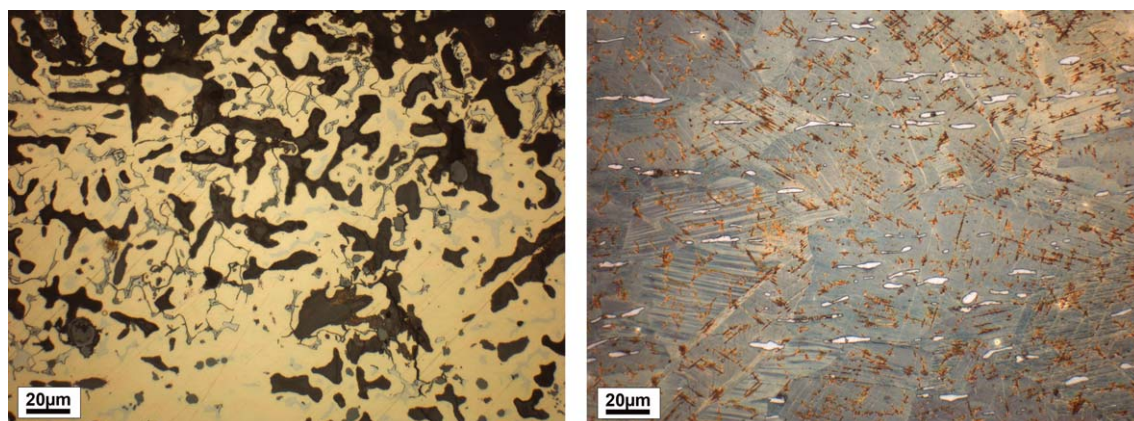


Fig. 2.48 Unetched microstructure of the cast-on helmet knob from Spišská Belá (left). Between the dendrites, $\alpha+\delta$ eutectoid is visible (light grey). $\text{Cu}_{2-x}\text{Fe}_x\text{S}$ -inclusions (grey) are, since the knob was not deformed, still round. Corrosion is appearing dark grey. On the right, the microstructure of the cheek plate from Wöllersdorf, etched with Klemm II (right). $\text{Cu}_{2-x}\text{Fe}_x\text{S}$ -inclusions (light grey) are elongated and indicate a certain level of deformation. The rather large grains show both twins and strain lines, the latter indicating a final deformation below the recrystallisation temperature.

formed, as ‘frozen’ during their growth. This indicates a local thermal treatment at high temperature, most likely as a result of the cast-on process of the knob. This is supported by the detection of a less than $10\mu\text{m}$ layer of $\alpha+\delta$ eutectoid on the outer surface of the cap close to the knob (Fig. 2.47). Today, only the δ -phase with its much higher resistance to corrosion is still present. The Sn needed for the formation of the $\alpha+\delta$ eutectoid on the cap’s surface derives from the knob during the cast-on process due to Sn-sweating.⁷⁶⁰

The metallurgical analyses showed the same *modus operandi* for the two cheek plates studied from Hočko Pohorje and Wöllersdorf (Fig. 2.48, right): with the casting of a small, raw disc with at least 2.8mm of thickness, mechanical shaping by several steps of cold hammering and recrystallisation annealing probably followed by quenching in order to avoid the precipitation of brittle phases. The last step of thermomechanical treatment was a slight deformation.

As described above, to pass from the as-cast bronze disc to the final shape of the helmet’s cap, several steps of cold deformation by hammering followed by recrystallisation annealing treatments were applied. The total amount of deformation applied can be calculated, as previously stated, by measuring $\text{Cu}_{2-x}\text{Fe}_x\text{S}$ -inclusions usually present in archaeological bronzes. The average SF (shape factor) of the sulphide inclusions and the corresponding percentage of reduction of the as-cast plate were calculated for every helmet cap fragment (Tab. 2.19).

Cat. No.	Type	Find Site	Sampled Area	Thickness Cap (mm)	Average Total Deformation (%)	Min. Thickness of as-cast (mm)	Thickness Rim (mm)	Sn wt % in Alloy
6	Oranienburg	Spišská Belá	cap close to knob	0.3	79	1.7	–	8.6
11		Sâg	cap close to knob	0.4	88	3.2	–	10.3
23	Paks	Veliko Nabrđe	cap close to rim	1.0	78	5.7	–	10.8
24		Poljanci I	cap close to rim	0.5	85	4.4	3	10.9
28		Strassengel	cap close to socket	0.5	94	9.6	–	8.5
30		Wöllersdorf	cheek plate	0.7	77	3.2	–	7.1
31		Hočko Pohorje	cheek plate	0.4	83	2.8	–	12.2
43	Pişcolt	Škocjan	cap close to knob	0.7	40–45	1.3	–	9
47		Şoarş	cap central	0.4	80	1.4	4–5	10.3

Tab. 2.19 Average total deformation and thickness of the as-cast rough plates used for the production of helmets.

⁷⁶⁰ Meeks 1986; Mödler 2014a.

The average total deformation depends less on the tin amount of the helmets, and more on the thickness of the as-cast plate and the zone of the helmet the sample was taken from. The calculated SF cannot take into account the massive material losses occurring during shaping, such as the flaking off of oxides produced during the annealing process, polishing, grinding and use (Tab. 2.19). Opposite to the uniform deformation level of 80–95% of helmets of Type Paks, helmets of Type Pişcolt are less deformed (Şoarş, middle of the cap, 80%; Škocjan, cap close to the knob, 40–45%), which is in agreement with open die forging, where the rim and top of the cap are less deformed than the zone in between these. Helmets Type Pişcolt were certainly not cast directly into a bowl shape; this would have resulted in much lower differences in metal thickness and much less metal deformation as we can identify in the microstructure of the helmets of Type Pişcolt.

Knobs or sockets appear first on the helmet of Type Oranienburg and are commonly found on Late Bronze Age helmets in central and eastern Europe. The only helmets without knobs or sockets in eastern Europe are imported: one helmet of Type Montbellet from Szikszó (cat. no. 74), and an unprovenanced crested helmet, said to be from Hungary (cat. no. 100). Inside the hollow knob or socket, a plume could be placed. Helmets Type Nagytétény, however, do not provide a means by which such a plume could be applied; the solid knob was the only decorative element of the helmet.

So far, three different methods for applying these knobs and sockets can be identified:

1. The knob of the Aegean helmet cat. no. 1 is formed out of the same bronze sheet as the cap, but with double its thickness.⁷⁶¹
2. The knob can be riveted on to the cap from the outside with several rivets (the earliest example so far known being the helmet of Type Oranienburg from Knossos) or from the inside with a single rivet (e.g. helmets of Type Nagytétény).
3. The knob or socket can be cast onto the cap. This is observed on all helmets of Type Oranienburg (apart cat. nos. 1 and 2), helmets of Type Paks, and helmets of Type Pişcolt (Fig. 2.49). None of the helmets demonstrate evidences of welding or soldering processes.

The different methods of joining the knob and cap might indicate different production centres for the two helmets of Type Oranienburg cat. nos. 1 and 2 than for the other European helmets, and might also represent certain developments in their technique of manufacture. Repairs have also been observed on the knobs. The knob from the helmet of Type Oranienburg from Žaškov shows a cast-on on the lower part. A drop of metal from the upper part of the socket is still visible inside the central hole, which formerly passed all the way through the spool-shaped knob.

Only one micro-fragment was taken from all the knobs of the cap helmets, since the macroscopic studies already clearly demonstrate cast-on knobs for all cap helmets, except the helmets of Type Nagytétény and the two helmets of Type Oranienburg cat. nos. 1 and 2. The knob from the helmet from Spišská Belá is as-cast, as is indicated by globular $\text{Cu}_{2-x}\text{Fe}_x\text{S}$ inclusions, $(\alpha+\delta)$ -eutectoid, and its dendritic structure (Fig. 2.48, left).

Their perfect geometry and the horizontal decoration of most knobs, as well as imprints or deformation of the latter, indicate the use of a hand-turned lathe for the production of the wax model, at least for helmets of Type Pişcolt. For helmets with cast-on knob, the production process is described in the following: the central wooden stick inside the knob was also used to fix the wax model on its axis once covered in clay. A hole was punched in the top of the helmet's cap. Inside the helmet, the top was filled with some drops of wax and then covered with clay. The wax knob with the surrounding clay placed on in. The wax knob and the wax disc inside the helmet were joined and the wooden stick inside the knob perforated the wax disc, which resulted in the flashing around the central hole, which is still visible today (Fig. 2.49). These were all then heated to pour out the wax. The clay was baked (with a temperature lower than the recrystallisation temperature of the alloy of the cap) but not burnt, in order to not harm the

⁷⁶¹ Buchholz et al. 2010.

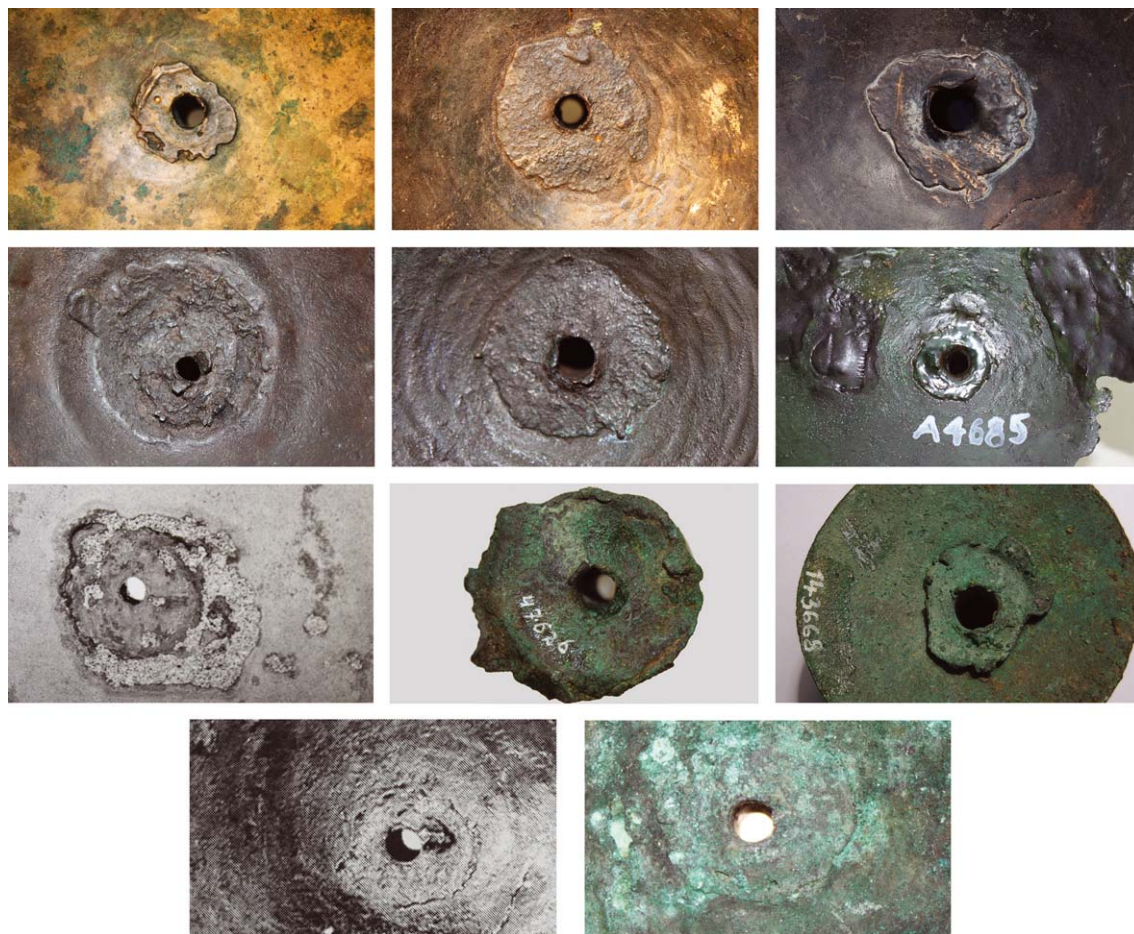


Fig. 2.49 Inside view of the cast-on knobs of helmets of Type Pişcolt. Note the untreated surface of the knobs. From left to right. First row: Hajdúböszörmény, Mezőkövesd, Sehlisdorf. Second row: Endrőd, Pişcolt, Şoarş. Third row: unprovenanced helmet cat. no. 52 (after Born – Hansen 2001, fig. 203), Služin, Škocjan. Fourth row: unprovenanced helmet cat. no. 51 (after Born – Hansen 1992, fig. 8), unprovenanced helmet cat. no. 55.

bronze helmet or to alter the microstructure of the cap. To improve the attachment of the knob to the cap, the baked clay with the helmet was possibly warmed before casting, which slows down the cooling rate and thus reduces micro-segregation. Further traces of deformation visible in the microstructure of the cap close to the knob are the result of deformation applied after the cast-on of the knob (as seen on the cap from the Škocjan helmet) as a finishing process to remove or fix eventual casting defects. Usually, the knob was cast-on on the very top of the cap and cannot be moved even today. Only the knob of the unprovenanced helmet cat. no. 50 is slightly off centre, and the knob on one unprovenanced helmet (cat. no. 51) can be slightly moved.⁷⁶²

Once the final shape of the cap was achieved and the knob or socket applied, the outer surface of the cap was polished and smoothed. The final polishing of the surface was carried out with materials such as grinding stones, ceramics, sand, and clay, with the support of leather or other organic or inorganic substances to obtain an optimum smooth and shiny surface. Rivet holes punched through from the outside to the inside with a chisel (when wider) or a pin/punch (when smaller) on all but helmets of Type Pişcolt. If the decoration of the knob of helmets of Type Pişcolt turned out slightly blurred or distorted, it could be overworked with punches and chisels (Fig. 2.50).

⁷⁶² Born – Hansen 2001, 248.



Fig. 2.50 The perfect geometry of all knobs, and the horizontal decoration of most knobs of helmets of Type Pişcolt, as well as imprints or deformation of the latter indicate the use of a hand-turned lathe for the production of the wax model. Once the knob was cast onto the cap, the decoration could then be adapted with a punch or chisel (e.g. for the herringbone motif), as noted on the depicted knob of the helmet of Type Pişcolt cat. no. 55.

The decoration applied on helmets of Type Paks enhanced the stiffness of the thin cap and permitted a much thinner rim than is known from the helmets of Type Oranienburg. Once the cap was finished, cheek plates, plume and inner organic padding, possibly with a neck guard, were, if necessary, attached to the helmet. Aristotle notes in his history of animals also the use of sponges for helmets and greaves to better absorb weapon impacts.⁷⁶³ If not a separate organic cap was worn under the helmet, the organic lining had to be attached directly onto the helmet with rivets all around the edge. Usually, the organic inlay was folded up onto the outside of the helmet, and therefore double-fixed to the rim. The presence of this organic material resulted, during deposition, to the formation of a different coloured ‘band’ on several helmets (i.e. consisting of different corrosion products) than that found on the rest of the outside of the cap (Fig. 2.51).

Cheek plates were attached to the helmet with bronze wire or directly to the inner organic padding. They were not attached directly with rivets to the helmet, since this would decrease the mobility of the plates. The rivets on helmet and cheek plates served to attach the inner organic padding, which might have consisted of linen, wool, fur, leather, rushes or similar materials, or a combination of these. If only small holes along the edge are present, they served to attach the inner organic lining of the cheek plates (Fig. 2.52).

2.4.4 Metallographic Characterisation and Construction – Crested Helmets

So far, microstructural analyses of crested helmets have been performed and published only for the three helmets of Type Lueg and one helmet of Type Bernières d’Ailly.⁷⁶⁴ The cap of the helmet from Pass Lueg was sampled twice, close to the rim. On the cheek plates, the inward bent rim was sampled. All samples show polygonal α -grains with deformation twins and elongated $\text{Cu}_{2-x}\text{Fe}_x\text{S}$ -inclusions. The latter indicating a total amount of deformation of approx. 20–30% on the right cheek plate and about 10% on the left cheek plate.⁷⁶⁵ The slip lines on both cheek plate samples are likely the result of the final deformation of the rim while folding it. In the left half of the helmet ($\alpha+\delta$)-eutectoid is still present, and indicates that the helmet did not undergo much recrystallisation (indicated also by the larger size of the grains). According to the elongation of the $\text{Cu}_{2-x}\text{Fe}_x\text{S}$ -inclusions, the right half of the helmet was much more worked than the left half, which might be also due to the lower tin content and therefore lower castability, resulting in an as-cast state which needed more deformation to reach the necessary size and thickness.

⁷⁶³ Aristotle V, 16 after Buchholz et al. 2010, 142.

⁷⁶⁴ Lippert 2010; Mehofer 2011.

⁷⁶⁵ Mödler – Piccardo 2013.



Fig. 2.51 Helmets of Type Pişcolt from Hajdúböszörmény (above left) and Mezökövesd (below left), both Hungary, from the outside; no scale. Different corrosion products relating to the organic inlay attached with rivets to the helmet. On the helmet from Hajdúböszörmény the drop-like traces of the removal of the corrosion during restoration (?) are still visible. In the small picture, one of the rivet holes from the helmet from Sehlisdorf, Germany (above right, © Landesamt für Kultur und Denkmalpflege Schwerin), is depicted.



Fig. 2.52 Detail of the cheek plate from Ialysos, Greece (© British Museum, photo: M. Mödler).

The helmet from the Piller Sattel was sampled close to the right rim.⁷⁶⁶ In the area sampled, traces of hammering are visible. The microstructure consists of deformed α -grains with deformation twins and slip lines. These might be as a result of processes of destruction before the deposition of the helmet. The almost globular $\text{Cu}_{2-x}\text{Fe}_x\text{S}$ -inclusions demonstrate a maximum amount of deformation of 10%. Due to the distortion of the grains as a result of the purposeful destruction of the helmet, the hardness, at 173–180 HV,⁷⁶⁷ is rather high, though the tin content

⁷⁶⁶ Mehofer 2011, 125.

⁷⁶⁷ Mehofer 2011.

is low. The helmet from Anlaufstal was also sampled.⁷⁶⁸ The deformation of the $\text{Cu}_{2-x}\text{Fe}_x\text{S}$ -inclusions reveals the total amount of deformation, which should be around 20%. The last step of production was annealing followed by light deformation, as is indicated by the presence of slip lines.

From the helmet from Bernières d'Ailly, today kept in Rome (cat. no. 102), two samples of the two halves of the helmet were taken.⁷⁶⁹ According to the microstructure published by Lehoërff, the helmet was as a last step severely deformed, as indicated by the deformed grains and the clearly visible strain lines. The bronze sheet is said to have achieved a total deformation of 70–80%.⁷⁷⁰ The composition of the helmet was analysed by SEM-EDXS and said to be made of a binary alloy of Cu and Sn only, containing around 8 wt.% Sn.⁷⁷¹ The presence of Pb (white spots) and S ($\text{Cu}_{2-x}\text{Fe}_x\text{S}$ -inclusions) is indicated on the published SEM-image.⁷⁷²

2.4.4.1 Notes on the Construction of the Pass Lueg Helmet

Both halves of the crest and cap of the Pass Lueg helmet have wider lips under the crest toward the front and the back of the helmet, overlapping each other for about 1.4–2cm. These lips are fixed together with a rivet at the front and back of the helmet. Both rivets are hidden under the inside of the bent rim of the helmet. On the crest, the two halves of the helmet were fixed together by further overlapping, by means of rectangular parts of the right side of the helmet, which were bent over the left side. In total, there must have been ten such lips on the crest, four of which are still present, with the location of the remaining six visible through the different corroded areas. These overlapping parts occurred every 4–5cm. These overlapping parts are not present on crested helmets of Type Mantes, Biebesheim and Bernières d'Ailly: here the rim of one half of the helmets was bent completely over the edge of the other half along the crest zone.

The vertical convex rib on the central point of the crest was not only decorative, but served as stabilisation for the helmet. The edge of the Pass Lueg helmet was bent at different breadths along the inside, leaving no place for a possible organic inlay. It seems reasonable to assume a separate organic cap was used under the helmet instead. In contrast, the parts of the edges bent inside on the cheek plates did leave sufficient space to fix an organic inlay and to improve the comfort of the helmet when worn. Unlike the helmets from Anlaufstal and Pass Lueg, it seems likely that an organic lining was attached inside the helmet from the Piller Sattel and fixed by means of the inward bent rim.⁷⁷³ Just below the central boss on each side, two rivet holes were attached to fix the cheek plates on the Pass Lueg helmet. On the left side of the helmet, rivet holes with an 8cm distance from each other were applied. On the right side, the rivet holes have a distance of almost 7cm.

On both the front and back of the helmet, the outer overlapping part of the helmet, where it covered the opposite side of the cap, broke apart, resulting in the appearance on each half of an approx. 1.5cm long horizontal crack. No traces of polishing are visible on the helmet's surface. However, inside the helmet circular traces of hammering parallel to the edge are visible. During the restoration of the helmet, two additional rivet holes were punched through, as the splashed metal sheet on the inner side of the helmet demonstrates (the 'new' rivet holes were not drilled, as previously suggested by Mehofer).⁷⁷⁴ They were probably applied to give the helmet with asymmetric cheek plates a more even look.

The upper ends of both of the Pass Lueg cheek plates were bent inwards up to a length of 1.4cm, leaving space for an organic filling (e.g. leather, linen or felt, or a combination of all). On

⁷⁶⁸ Mehofer 2011, 121, pl. 2.11–13 (wrong scale).

⁷⁶⁹ Lehoërff 2011. The exact sampling location was not indicated.

⁷⁷⁰ Lehoërff 2011, 48.

⁷⁷¹ Lehoërff 2011, 48.

⁷⁷² Lehoërff 2011, fig. 2i.

⁷⁷³ Egg – Tomedi 2002, 549.

⁷⁷⁴ Mehofer 2011, 122.

the front side of the cheek plates, four lips are still visible, and on the side bent back, five lips. On the front side, they are all in more or less the same position on both cheek plates, their position relative to the horizontal lines of pellets. On the left cheek plate, one lip is broken off; on the right cheek plate, two are broken off.

The compositional differences (Tab. 2.18), as well as the number of flanges and the technique of the rivet holes for applying the cheek plates, were previously thought to be an indication for the production of the helmet from the Piller Sattel in a different workshop than that to the other two helmets of Type Lueg.⁷⁷⁵ It has to be pointed out that differences in the amount of tin for the production of the same type of objects alone are certainly not a sufficient base for the conclusion that the objects were produced in different workshops. However, since the three helmets show many similarities in manufacturing technique, all three helmets might easily have been produced in the same workshop.

Concerning the Pass Lueg helmet, it seems reasonable to assume that, for whatever reason, an earlier (original?) right cheek plate was substituted with a new one, which was produced as an exact replica of the left cheek plate, including the distance between the rivet holes. When the craftsman realised that the holes in the helmet were not symmetrical, he had to apply further rivet holes to the new cheek plate. The owner of the helmet then continued to use the helmet with asymmetrical cheek plates.⁷⁷⁶ Until now we do not know any complex decorated helmet which bears exactly the same decoration as any other helmet, nor with identical measurements in the execution of the decoration (the Pass Lueg cheek plates are obviously identical – the lines and some circles being exactly the same size and in the same place, as one is a copy of the other, as described above). In a workshop, it is easy to suppose that the shaping process was more constant than the composition of the alloy. The latter might be affected by different cycles of recycling processes and supply, while the shaping method is instead part of a ‘school’ or tradition in the workshop.

⁷⁷⁵ Mehofer 2011, 127.

⁷⁷⁶ Another interpretation is offered by Kyrle 1918, Lippert 2011 and Mehofer 2011, who suggest that the ‘newer’ right cheek plate from the Pass Lueg helmet might have originally belonged to another helmet, the ‘missing fourth helmet’ of the Lueg type.