

Rock Art and Metal Trade

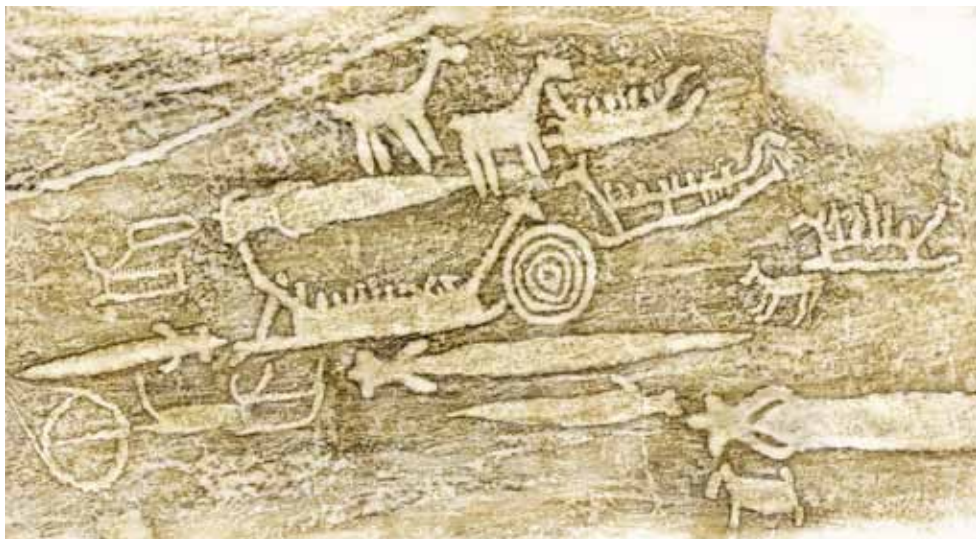
Introduction

In this paper, we argue that Nordic Bronze Age rock art was influenced by certain European regions and networks, which supplied metal to Scandinavia, and that the local figurative repertoire replied to changing metal sources and networks in a distinct manner (fig. 1).

We attempt to exemplify this hypothesis by comparing rock art and other stylistic forms and features from different regions. However, an important precondition is new scientific evidence that shows that Scandinavian bronzes were produced with non-local copper and tin, predominantly of Mediterranean and northern Alpine origin (Ling et al. 2013, 2014).

The supply of copper and tin to southern Scandinavia increased significantly around 1600 BC (Vandkilde 1996, 2014), and after this date started rock art motifs to appear which depicts metals and equipment communicating personal status and non-domestic cosmopolitan features. First weapons, oxhide ingots, chariots and representations of the sun, and later armour and mirrors (Kaul 1998; Coles 2005; Ling 2008). These figurative features articulated exclusive 'social codes' or 'core values' which were shared over large parts of Europe (cf. Thrane 1990; Treherne 1995; Kaul 1998; Fredell 2003; Harrison 2004; Coles 2005; Kristiansen & Larsson 2005).

Figure 1. Prominent components of Scandinavian Bronze Age ideology comprising of moving metals, ships, celestial symbols and warrior iconography. Rock art panel from Ekenberg, Östergötland, Sweden. Documentation by Evers, source SHFA.



Metal sources, networks and suppliers

In order to recognise external influences in Scandinavian rock art it is important to understand and give an account of the metal sources the region was connected to during the Bronze Age. The lead isotope and chemical composition of metal artefacts provides essential information in this regard (see Ling et al. 2013, 2014 for a comprehensive review of the data and a detailed description of the methodology used). In general, artefacts dated to the Early Bronze Age (2000 – 1600 cal BC) correlate with copper ores found in northern Tyrol and a lesser extent the British Isles. In the subsequent period 1600 – 1300 cal BC most Scandinavian bronzes correlate with Cypriote ores and some to sources in the western Mediterranean. In the 1300 – 900 cal BC interval western Mediterranean ores dominate and continues to be common dur-

ing 900 – 700 cal BC, although most of the analysed objects have signatures consistent with northern Tyrol during this last period. The following discussion of the relationship between Scandinavia and other European regions, and the impact and influence this had on Scandinavian rock art, is structured after these phases.

2000 – 1600 cal BC: LNII - Period1b

During this first phase when northern Tyrol was the main supplier of copper to Scandinavia figurative rock art was sparse and mostly derive from the later part of the phase (Ling 2008). Rock art is limited to a few localities and the repertoire only comprise of a small number of images and expressions such as axe depictions, ships, foot soles, cup marks and celestial symbols. Imported metal probably reached Scandinavia via groups belonging to the Central

Figure 2. The histogram shows which particular ore bearing regions that supplied copper to Sweden during various periods of the Bronze Age.

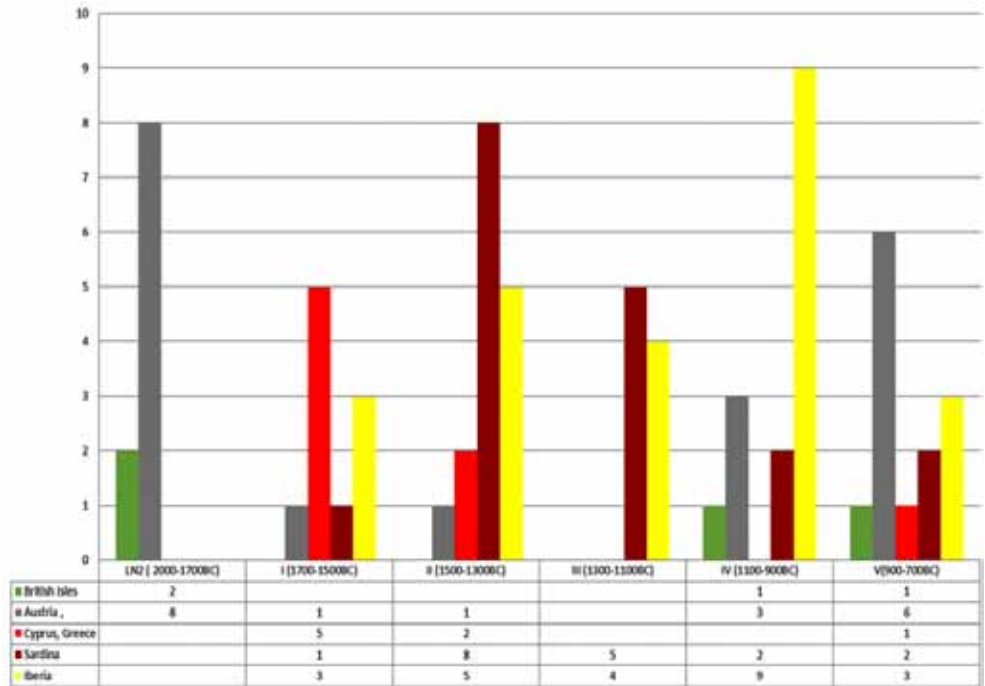




Figure 3. Map showing the major sources of copper and tin that supplied Scandinavia with metal in the Bronze Age. Copper deposits are marked with yellow stripes while sources of tin are marked with silver.

Figure 4. Early rock art depiction of an axe from Simris in eastern Scania juxtaposed with Anglo-Irish inspired axes from the Fjälkinge hoard (after Skoglund in prep.). Frottage: Gerhard Milstreu.





Figure 5. Top left; Arreton axe. Bottom left; depictions of Arreton type axes from Simris. Right depictions of Arreton axes from Stonehenge (after Skoglund in prep).

European Únětice complex, but there are no clear-cut rock art motifs that show any figurative or formative Únětice connections. This is a reverse situation from contemporary Scandinavian bronzes, which are highly influenced by Únětice and Alpine forms. There are in fact several metal objects found in Scandinavia that belongs to the Únětice sphere (Vandkilde 1996; Kristiansen 1987).

Copper and finished alloys were also supplied to Scandinavia from the British Isles, although in less quantities than from the continent (Forssander & Butler 1968; Vandkilde 1996). There are both figurative and non-figurative rock art in Britain from this period (Bradley 2009), such as early depictions of axes and halberds from Scotland dated to 2000 – 1900 BC (Jones 2015). The first depicted metal objects in Scandinavian rock art are axes belonging to the British tradition, e.g. from Simris in south-eastern Scania, which closely resemble two Anglo-Irish inspired flange axes dated to 2000 – 1700 BC from the Fjälkinge hoard in eastern Scania (Vandkilde 1996:81, 191). Another connection that needs to be stressed is the similarities between axe depictions from

Stonehenge dated to the Arreton phase (1750 – 1500 BC) and recently found axe-carvings from the Simris site (Skoglund in prep).

1600-1300 cal BC: Period 1b-III

This phase saw the first boom of Scandinavian figurative rock art, and it is also at this time that Mediterranean copper was introduced in Scandinavia (Ling et al. 2013; 2014). It is important to emphasise that this copper was transported through a chain of trade networks from the south to the north, which was the case throughout the Bronze Age. It is likely that the motor for much of this trade was Nordic amber, which is a common feature in European prestige contexts, including the eastern Mediterranean (Beck et al. 1974; Beck & Shennan 1991; Kaul 2013; Czebreszuk 2013). The most convincing evidence that amber was traded for metal is finds of Baltic amber in the same regions as the copper deposits that were supplying metal to southern Scandinavia (Ling et al. 2014; cf. Harding 1984, 1990).

At the beginning of the phase, rock art was still rather sparse in Scandinavia with



Figure 6. Copper and tin bearing regions with finds of Baltic amber marked with red circles.

ships being the most common subject. However, new motifs were also introduced such as bulls and complex compositions of bulls and ships. The bull image may have been introduced from the eastern Mediterranean, where representations of bulls were established ritual features (Hodder 2012). This hypothesis is supported by provenance studies, which show that some Scandinavian bronzes dated between 1600 and 1300 BC have clear consistencies with copper from Cyprus, both in terms of lead isotope and trace elements (Ling et al. 2014).

Furthermore, the most compelling expressions of these interactions are recent finds of rock art oxhide ingot representations in Scandinavia (Ling & Stos-Gale 2015). Intriguingly, some of the sites with early representations of ships also have images of oxhide ingots. E.g. the first recognised oxhide is from Torsbo in Bohuslän (panel Kville 156:1), an area that is well-known for rock panels with depictions of ships dated to 1600 – 1500 BC (Ling 2008). The shape of this particular ingot has the same characteristics as contemporary Late Minoan I 'Kissenbarren' or pillow ingots from the Hagia Triada and Tyllissos settlements on Crete (Gale 1991: 202, pl. 2a-c; cf. Buchholz 1959).

It is remarkable that the chronology of rock art ship depictions correspond very well with potential oxhide images.

Other significant features on the panels in Torsbo and other sites in northern Bohuslän are depictions of large bulls in close proximity to ships. These compositions may be an expression of the potency of the rock, and an extension of the transformation between stone/animal and ship (Ling & Rowlands 2013). Ships may have been regarded as almost living and partly fragile beings during the Bronze Age, and setting them in stone and attributing them with strong features or symbols such as bulls may have been done to ensure ship durability and safe journeys. Moreover, there may have been a metonymic relationship between rock art representing animal ship transformations and the social reality of ships with animal features, being sent on the ocean to hunt.

About 1400 BC the horse takes over the transformative role of the bull in southern Scandinavia and becomes an integral part of ship prows (Kaul 1998; Ling 2013). Shore line dating of rock art panels in various



Figure 7. Rock art depictions of bulls and ships dated to 1600-1400 BC from Tanum & Kville in Bohuslän, western Sweden. Documentation by C Claesson, Rock Care, Evers and THU . Source SHFA. Aspeberget: Foto Gerhard Milstreu.

regions in Scandinavia demonstrates that ships with horse-prows first occur around this time (Ling 2013), which is also supported by contemporary bronze razors that are adorned with horse heads. Kaul argues convincingly that horse representations on Nordic razors as well as on Nordic rock art ships are inspired by the shape of Mycenaean bronze razors (Kaul 2013). The shape of Nordic razors differs, with one exception, from European Middle Bronze Age razors, but have similarities with examples found in the Aegean. The resemblance is however not exact; Nordic razors with horse heads are cast in one piece, whereas Aegean razors have handles made of wood, bone or ivory secured by rivets (Kaul 2013:462). Figurative links to eastern Mediterranean iconography are also found on the stone slabs with rock art from the Kivik cairn in eastern Scania, which belongs to the later part of

Period II (1500 – 1300 BC) when Nordic rock art reached a new level of complexity with horse drawn chariots, omega signs, weapons and conical hats (Randsborg 1993).

Another remarkable connection between Scandinavia and the east Aegean is revealed by provenance studies of 290 glass beads from Danish Bronze Age graves dated to around 1400 BC, which have provided unexpected evidence of contact between Egypt, Mesopotamia and Denmark (Varberg, Gratuze & Kaul 2015). It should be noted that oxhide ingots are also depicted during this later phase, e.g. on the intriguing rock art panel Östra Eneby 1:1 near Norrköping in eastern Sweden. The panel includes depictions of three ships, dated to 1400 – 1300 BC (Ling 2013: 85), with out-turned prows ending in animal heads that have strong similarities with Nordic horse-head razors.



Figure 8. Left, right and top centre: oxhide ingots from Crete dated to 1600 – 1400 BC (photograph: Z. A. Stos-Gale). Bottom centre: depiction of an oxhide ingot from the rock art panel Kville 156:1 in Bohuslän (photograph: A. Mederos; after Ling & Stos-Gale 2015, fig. 8).

Figure 9. Ship depiction with an oxhide ingot onboard, Norrköping, eastern Sweden (photograph: Catarina Bertilsson; after Ling & Stos-Gale 2015, fig. 10).



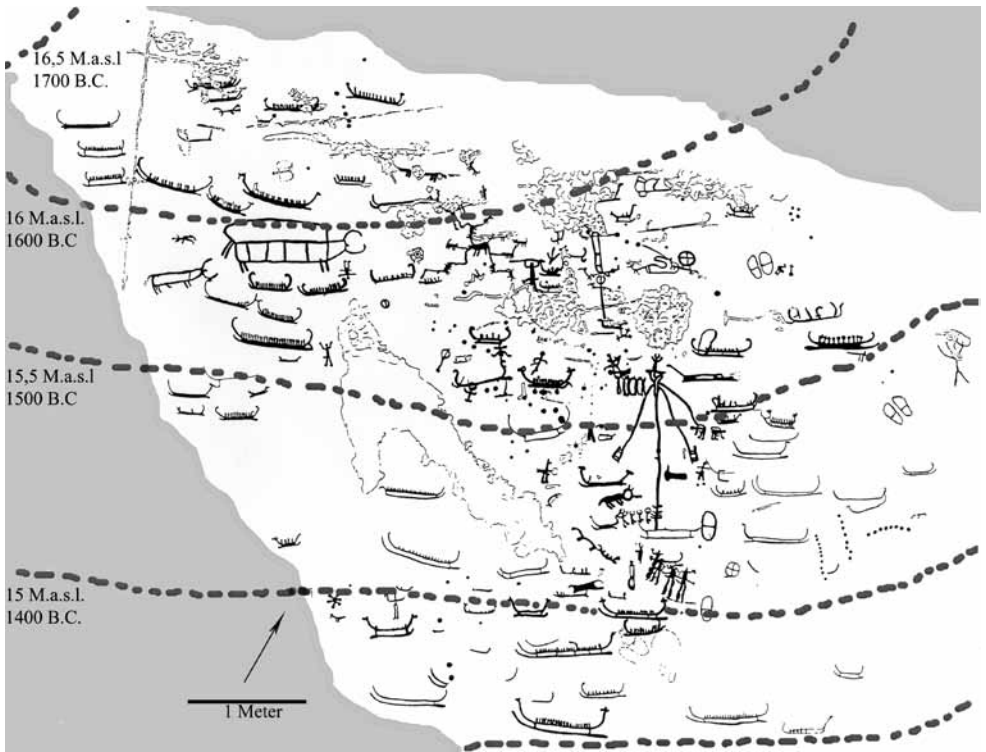


Figure 10. The rock art panel Tanum 311 with superimposed shore levels (documentation by Milstreu and Pröhl 1996), demonstrating the maritime association of the panel and the changing significance of bulls and horses in association with ships in Scandinavian rock art (after Ling 2008, figure 7.26).

Onboard the largest ship are two warriors and an object that strongly resembles an oxhide ingot. The ingot has two relatively straight sides and can be dated to about the same time as the ship, 1400 – 1200 BC (cf. Lo Schiavo et al. 2005: 405). As this area may have been a prominent meeting place during the Bronze Age (Fredell 2003: 221), and as several rock art areas in Scandinavia may have served as important maritime meeting grounds, it is likely that it was in these regions that metal was brought in and then distributed inland.

To conclude, several Scandinavian rock art representations from this period appears to be inspired by east Aegean iconography, such as bulls, oxhide ingots, horse drawn chariots, sun horses and other celestial symbols (Thrane 1990; Kristiansen & Larsson

2005; Kaul 2013:462), demonstrating the interconnectedness of Bronze Age Europe, with wide-ranging trade and interaction.

Turning back to the supply of copper to Scandinavia, about 1500 BC and onwards it appears that copper exchange networks along the Atlantic seaboard occupied a dominant position. Nordic bronze swords and other Middle Bronze Age (1500 – 1100 BC) artefacts share isotopic signatures with British swords, which in turn are consistent with copper ores from the western Mediterranean (Ling et al. 2014). Copper from this region may have been transported to the north either via the Garonne axis from northern Iberia to the French Atlantic coast and then northwards to Brittany, the British Isles and Scandinavia, or through south-western Iberia and Galicia northwards

across the Celtic Sea to Brittany, Britain and Scandinavia.

1300-700 cal BC: Period IV – V. The Atlantic Bronze Age

During this time, western Mediterranean ore sources, in particular from Iberia and Sardinia, were the main suppliers of copper to Scandinavia. Several flange hilted swords and the majority of contemporary daggers have a metal composition that corresponds with copper ores from southern Spain while most of the socketed axes belonging to Period IV correlates with Nuragic (Sardinian) copper. Further evidence of Bronze Age trade contacts between Scandinavia and Iberia are finds of Baltic amber in the ore bearing regions of the western Mediterranean, which indicate that amber was traded for metals (Ling et al. 2014). This fits well with the dating of Scandinavian Bronze Age artefacts that matches western Mediterranean ore signatures. This circumstance is moreover emphasised by the find of a typical Galician palstave from Lake Tåkern in Sweden (Nordén 1925; cf. Monteagudo 1977, pl. 86, 87 & 100). The importance of this palstave and the similarities between Scandinavian and Iberian rock art (see below) were already mentioned by Artur Nordén in the nineteen twenties (Nordén 1925). Gordon Childe also expressed interest in the palstave and inquired the curator at the Museum of Gothenburg about the find circumstances, noting that similar examples have been found in southern England, western France and Sardinia, and that the find from Tåkern constitutes the most northern example of this type (Childe n.d.).

Similarities between depictions of bi-horned warriors in Extremaduran rock art, Nuragic Late Bronze Age figurines and stone statues from Sardinia and the horned bronze figurines from Grevensvænge in Denmark (fig. 12) should be seen against this background (Harrison 2004; Coles 2005; Vandkilde 2013). Even though these horned anthropomorphic representations were produced in far removed regions, they belong to the same 1200 – 800 BC time frame and bear witness of long range interaction



Figure 11. Iberian type palstave found in Lake Tåkern, Sweden (Göteborgs stads-museum).

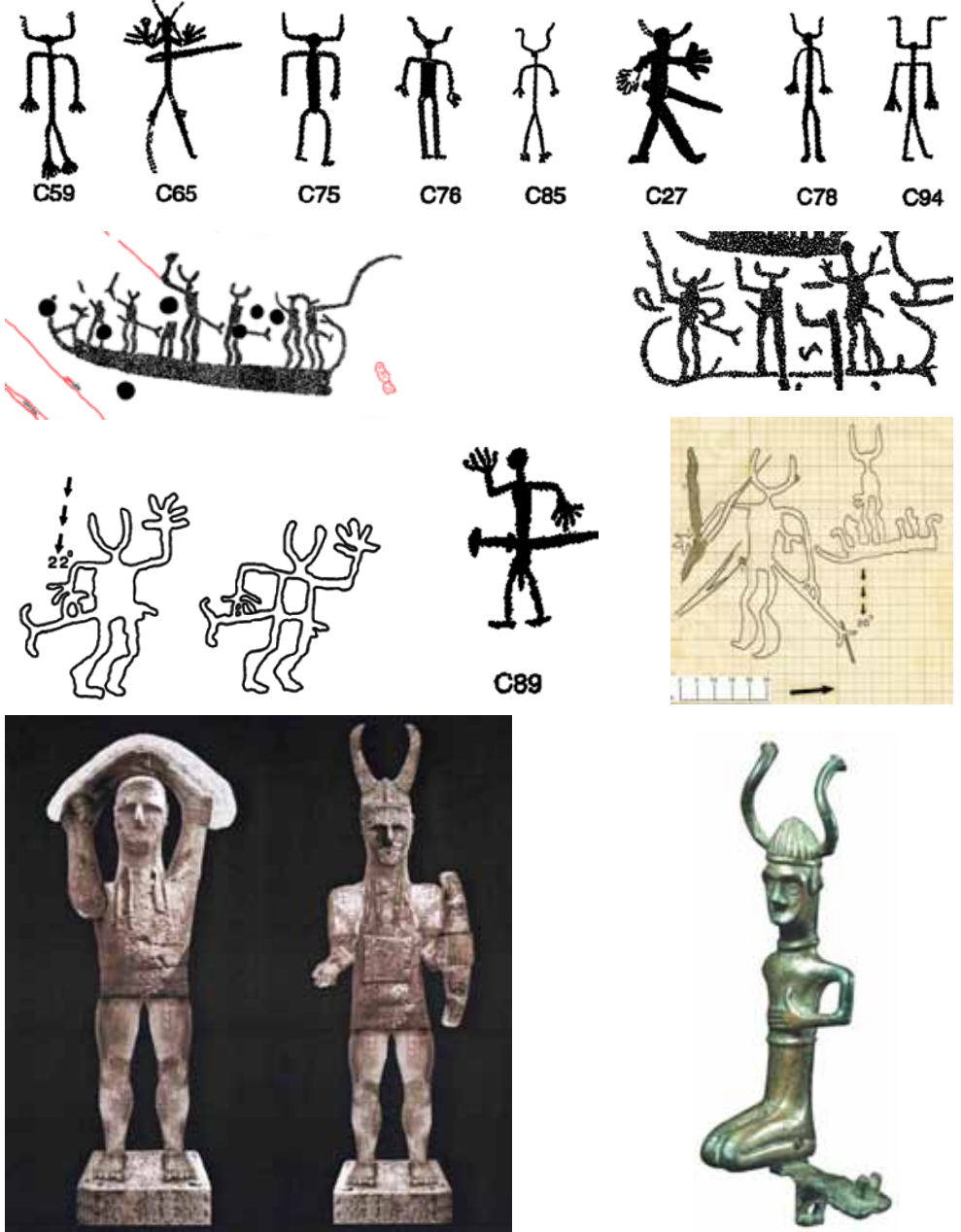
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and constitute a vivid representation of *pan European warrior symbolism* (Harrison 2004:60).

That two Herzsprung type shields from Fröslunda in western Sweden are made of copper from the Ossa-Morena massif in Extremadura further accentuates this notion. These so called U-notched Fröslunda shields are dated to about 1100 – 800 BC (Uckelmann 2012). Interestingly, there are 46 stelae with depictions of Herzsprung shields from this particular phase depicted in Extremaduran rock art (Harrison 2004:124). However, most of these are of the slightly earlier V-notched type, but there are at least two representations of U-notched shields (cf. Uckelmann 2012:129, fig. 15b). The U-notched shields are in any case regarded as a close derivative of the V-notched type. Altogether, the distribution of V- and U-notched Herzsprung shields has a clear Atlantic pattern, stretching from Iberia, via the British Isles to Scandinavia; although it has to be stressed the latter are only of the U-notched type (Uckelmann 2012:50-62, 127-137, pl. 160; Gräslund 1967).

There are some other figurative categories of interest when comparing Scandinavian and Extremaduran rock art from about 1200 – 800 BC. We have already mentioned the similarities between Iberian bi-horned warriors and the figurines from

Figure 12. Rock art warrior depictions. Top row: warriors with horned helmets on Iberian stelae (after Harrison 2004). Second row: Scandinavian warriors with horned helmets from Tossene 926:1 (after Bengtsson 2009). Third row: warriors making similar gestures. Left: two Scandinavian figures from Bottna (source SHFA), middle: Iberian figure from Baixo Alemtejo (after Harrison 2004, C 89), right: horned figure from Bottna in a similar pose as the Iberian warriors in the top row (source SHFA). Bottom row: Nuragic stone sculptures/statues and the horned bronze figurines from Grevensvænge in Denmark



Grevensvænge, but there are also parallels between Iberian and Scandinavian warrior depictions. Not only are several attributed with similar horns, there are also obvious similarities in gestures and weapon representations. In general, the same categories of weapons, shields, daggers, bows, spears and swords are depicted in both regions, but not the same specific types. The greatest difference between Iberian and Scandinavian rock art is that the former portrays immobile images of warriors and weapons, whereas the latter depicts scenes with active warriors.

Chariot depictions from the two regions also have several similarities (Thrane 1990; Harrison 2004). The chariot bodies, draught poles and sometimes yokes and reins are depicted from above, whereas the wheels and draught horses are represented from a side view perspective. Chariots were widely used during the Bronze Age in the Near

East and eastern Mediterranean where they were employed as fast and prestigious military vehicles, first as mobile archery platforms and later in the Aegean to transport warriors who fought on foot (Littauer & Crouwel 1983, 1996; Piggott 1983), and it is clear that they were employed in Iberia and southern Scandinavia during the Late Bronze Age, as well as in other regions of temperate Europe (Pare 2004).

Depictions of mirrors may be another feature that connects these remote regions. Iberian stelae have 42 mirror representations, constituting the largest group in Europe (Harrison 2004:151). As they are represented in a masculine martial setting they can be understood as an element of the expression of warrior ideology (cf. Treherne 1995). According to our view, similar mirror depictions are also found on at least three sites in Bohuslän in western Sweden (Kville 216:1, Tossene 46:1 and Fredsjö 427:4 cf. Bengtsson 2009), albeit in fewer numbers.

Figure 13. Distribution of Herzsprung shields. 1, V-notched shields. 2, U-notched shields. 3, uncertain U-notched shields. 4, Sardinian type (modified after Gräslund 1967, fig. 9).

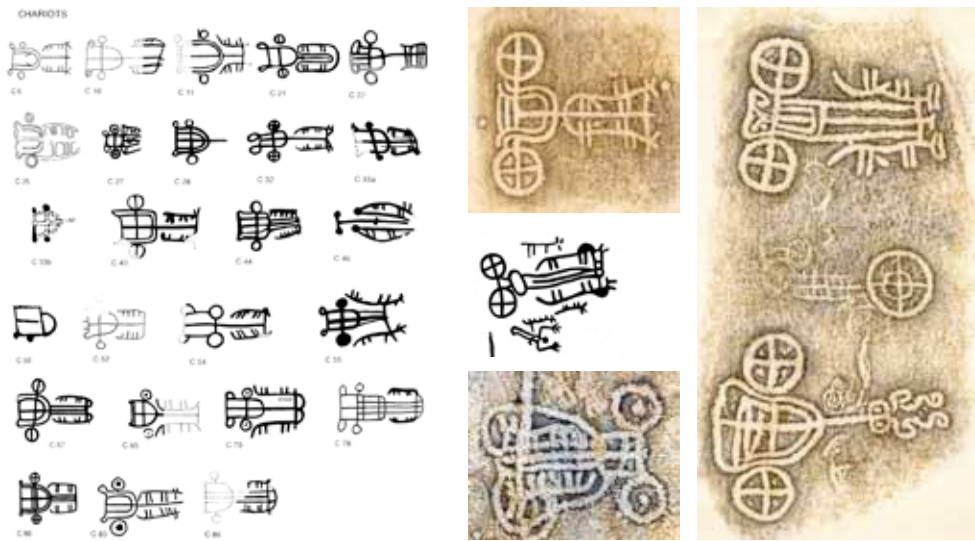




Figure 14. Gestures in figurative rock art, adorants from Sweden and Iberia. Top left: Iberian stela C 65 from Olivenza (after Harrison 2004). Top right and bottom: Scandinavian figures from Askum 68:2 and 70:1 (after Bengtsson 2002).



Figure 15. Iberian and Scandinavian depictions of chariots. Left: Iberian stela (after Harrison 2004, figure 7.16). Right, clockwise from centre: Askum 67:1 (after Bengtsson 2002), Brastad, Frännarp and Brastad (source SHFA).



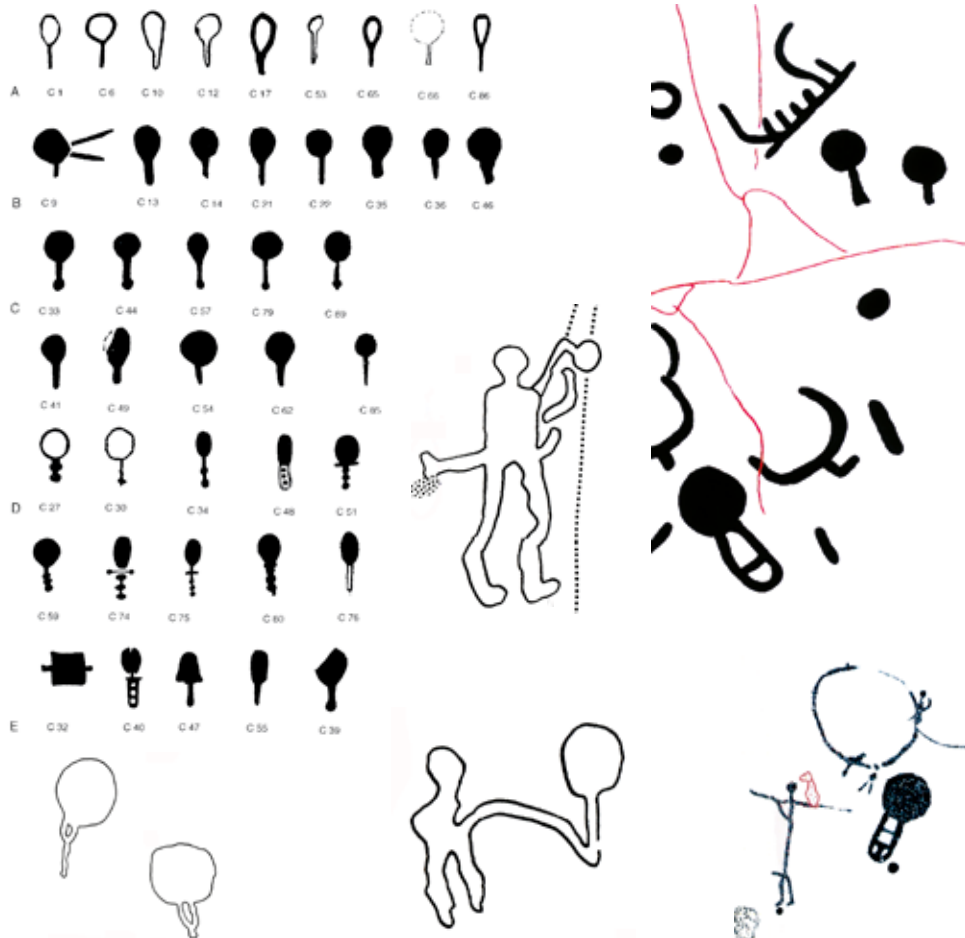


Figure 16. Iberian and Scandinavian mirror depictions. Left: Iberian stelae (after Harrison 2004, figure 7.18). Right, clockwise from top left: Tossene 427:4 (after Bengtsson 2009), Kville 211 (after Fredsjö 1981), Tossene 46:1 (after Bengtsson 2009), Kville 211 (after Fredsjö 1981), Kville 212 (after Fredsjö 1981).

These mirror representations are as in Iberia found in close association with martial motifs such as warriors, bi-horned figures and war canoes, and they are undoubtedly a local articulation of pan European warrior symbolism.

However, the most concrete evidence of interaction and contact comes from analysis of strontium- and oxygen isotope signatures in human bone from the Isle of Thanet,

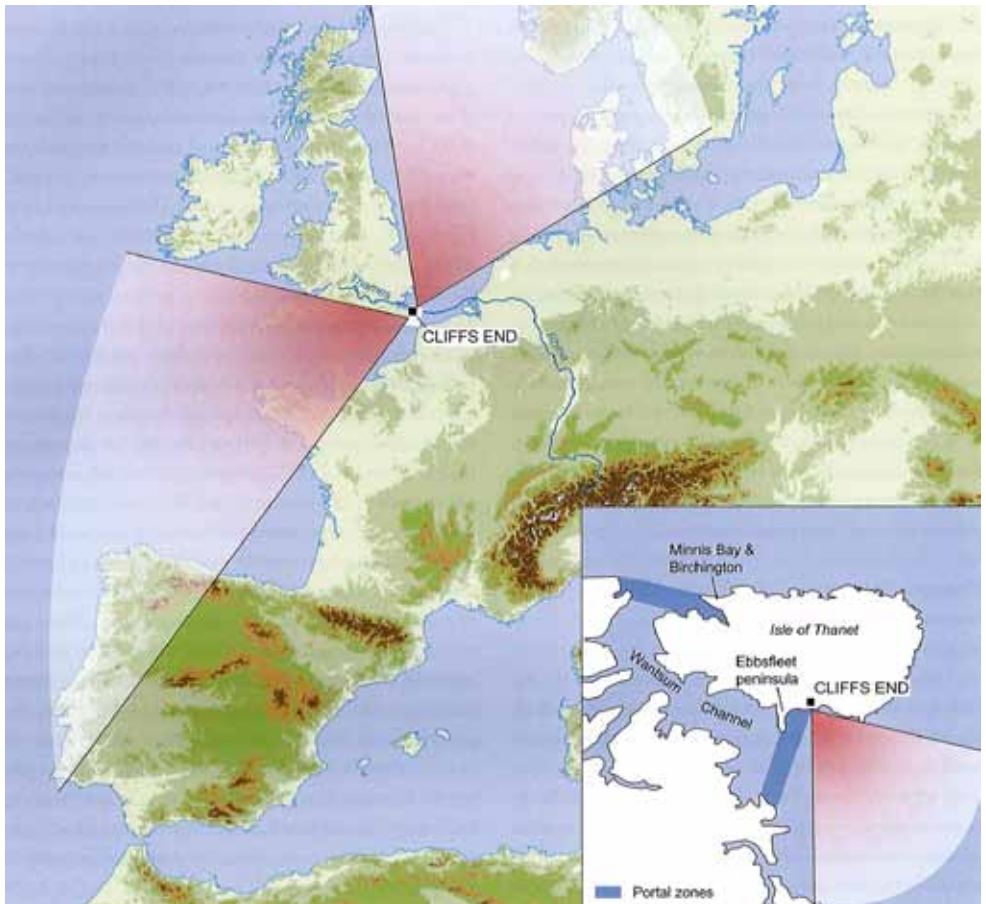
on the most easterly point of Kent on the British Isles. The site is interpreted as a Late Bronze Age trading centre with findings of bun ingots and Baltic amber. Some of the analysed individuals have clear Scandinavian or Mediterranean signatures that show that groups from these two regions interacted with local people from Kent (McKinley et al. 2013).

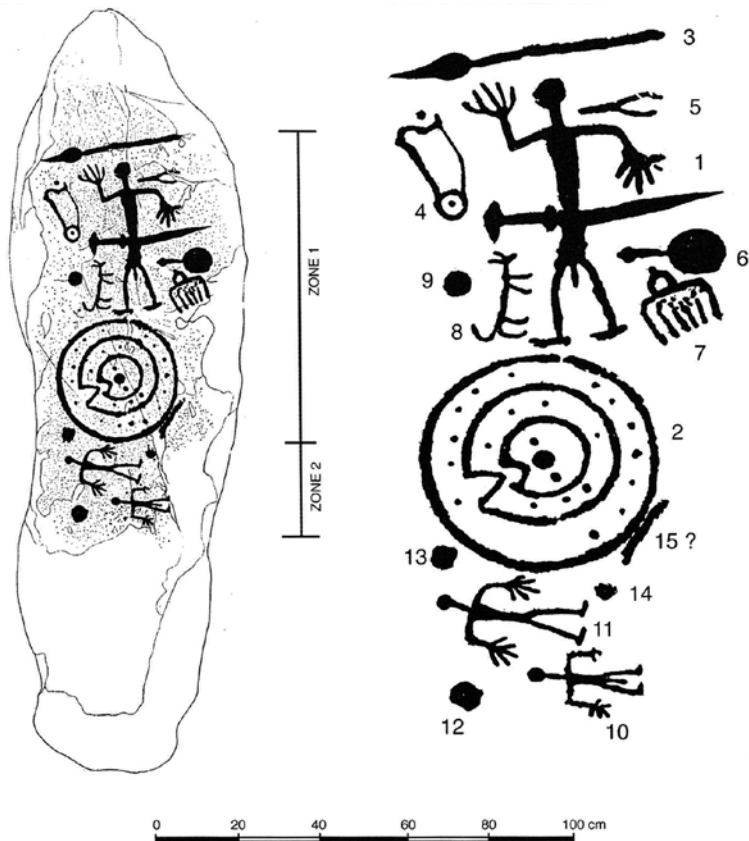
Discussion: the nature of interaction

Against the background that several Nordic bronzes have signatures corresponding with Iberian ores, and that certain codes and core values were expressed in both regions, it is possible to make some inferences regarding the nature of interaction between Scandinavia and Iberia. It is probable that boats were used for transporting copper and amber along maritime networks that followed the Atlantic seaboard. Sewn-plank boats capable of long-distance sea journeys were developed already around 1800 – 1600 BC on the British Isles (Cunliffe

2001; McGrail 1993) and Scandinavian rock art and prehistoric boat finds document a long-term tradition of building sea-worthy vessels (Crumlin-Pedersen 2003; Kaul 2003; Ling 2008). Similarities between the Hjortspring boat from 350 BC and rock art ship depictions show that this tradition probably stretches back to at least 1600 BC (Crumlin-Pedersen 2003; Ling 2008). Moreover, sea tests of the Hjortspring boat replica have demonstrated that it was a well-designed and effective craft. With a skilled crew it could cover up to 100 km per day and carry a cargo of 700 kg (Crumlin-Pedersen 2003;

Figure 17. The strategic position of the Isle of Thanet for maritime trade between Scandinavia and Iberia along the Atlantic seaboard (after McKinley et al. 2014, fig. 6.1).





C 89. ERVIDEL II, Portugal

Figure 18. Iconographic expression of pan European warrior symbolism. The Ervidel II stelae from Baixo Alemtejo, Portugal (after Harrison 2004, C 89).

cf. Vinner 2003). Following the North Sea coast and including stops to rest and resupply a similar boat could reach the west coast of Sweden from south-eastern England in less than two weeks.

Brittany and the British Isles occupied strategic midway positions in this maritime network and it is worth to once again emphasise that interaction involving Nordic and Mediterranean people has been substantiated by strontium- and oxygen isotope signatures in human bone from the Isle of Thanet. There are of course several other places that may have been crucial for trade along the coasts of Western Eu-

rope, such as the Isle of Scilly, Isle of Wight, Plymouth, Southampton, Salcombe and the Thames estuary (cf. McGrail 1993; Needham 2009; Needham et al. 2013). A key feature in understanding the Bronze Age Atlantic network system is the availability of tin, which probably was a main reason why groups from both the north and south directed their trade routes via the British Isles. Traders were in all likelihood not searching separately for tin or copper, and the opportunity obtain both or supplementing Iberian copper with British tin accentuates the probability that locations on the British Isles and in Brittany acted as transit centres



Figure 19. Hypothetical European trade routes for the supply of copper and tin to Scandinavia during the Bronze Age. Copper bearing regions are marked in black while the tin bearing region in Cornwall and a possible influx of tin from the east are marked with silver.

within the Atlantic network system. An important observation in this regard is lead isotope analysis of a Late Bronze Age tin ingot from Vårdinge in Sweden that corresponds with ores found in Cornwall (Ling et al. 2014).

Returning to Scandinavian rock art, even if this particular medium was noticeably influenced by far removed regions in the Atlantic network, it is important to underline that several similar iconographic elements, codes and core values were shared over large parts of Europe, although expressed in other materials. In the following we attempt to explain why Scandinavian rock art was more influenced by southern regions involved in the Atlantic network system, whereas Scandinavian bronzes, burial practices and houses had more in common with Central Europe.

Throughout the Bronze Age, Scandinavia was involved in two general exchange networks: a dominant terrestrial that was geared towards Central Europe,¹ and an Atlantic system. It is this latter maritime system that foremost inspired in Scandinavian rock art with cosmopolitical features. The Atlantic maritime networks funneled precious metals in raw state, such as copper, gold and tin from the western Mediterranean and the British Isles in exchange for Baltic amber (Harding 1984, Murillo-Barosso & Martín-Torres, 2012, Rowlands & Ling 2013). The agents that participated in the Atlantic trade were probably part of a rather exclusive group of travelling traders and warriors (Kristiansen & Larsson 2005) who had more in common with similar groups in far removed regions within the Atlantic system than with local groups and customs. The focussed but occasional

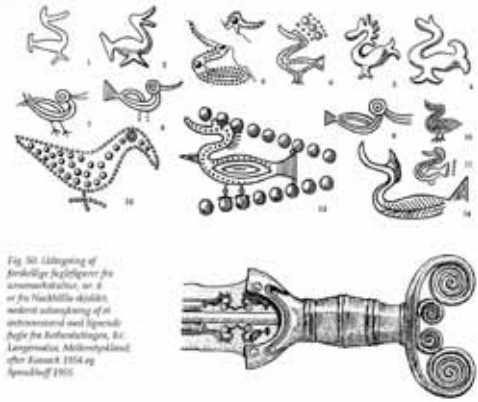
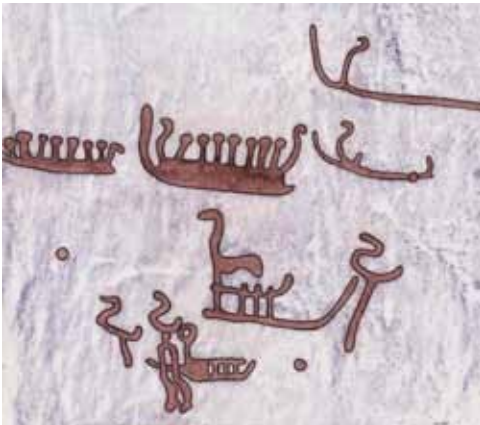


Fig. 50. Utgåvning av
 Fredrik Schilleren för
 armenochalken, nr. 2
 av På Nackhälla skölden,
 medeltid utgåvning av en
 antennen och spjett
 Agla på Bothenheiligen, Kr.
 Langensalza i Central
 Germany (after Kaul 2004,
 fig. 50).
 Speckhoff 1910

Figure 20. Left: aquatic birds influenced by Urnfield iconography on rock art from Tanum (source SHFA). Right: Urnfield iconography. Bird figure 6 is found on the Nackhälla shield from Halland in south-western Sweden, the antenna sword adorned with birds was found in Bothenheiligen, Kr. Langensalza in Central Germany (after Kaul 2004, fig. 50).

trade in metal and amber in raw form thus generated a common identity, shared values and codes which were foremost expressed in rock art.

However, this interaction did not generate shared forms in metals, burial practices or housing as these were closely associated with more traditional domestic practices and mundane life. Due to the maritime nature of the Atlantic system, which limited participation to a small segment of society with the organizational skills, knowledge and means to employ boats, this network had a somewhat limited impact on local Scandinavian culture. This was instead influenced by an intense and more permanent terrestrial system of networks with Central Europe. Small scale inter-regional exchange of prestige goods and some raw materials between Scandinavia and the continent can be traced back to the Neolithic (cf. Klassen et al. 2011; Sherratt 1997; Vandkilde 2007), but during the Bronze Age this exchange took on a much larger scale, encompassing a broad repertoire of both staple products and high-value items - including finished metal objects such as octagonal hilted swords, raw metals, textiles and amber, as well as cattle and agrarian products (cf. Kristiansen 1998; Earle & Kristiansen 2010; Kristiansen & Larsson 2005; Bergerbrant 2007). Although wealth-finance strategies

(Earle 1997, 2002; Kristiansen & Earle 2015) were highly important for establishing network relationships, the integration of staple products made this system more influential, and the permanence was sustained by closer and more intense political interaction including marriage alliances, which in turn led to strong similarities in metal forms and burial rites. As northern Alpine ore sources took on an increasing importance relative to Iberian metal in the last stage of the Bronze Age, Scandinavian rock art was clearly influenced by Central European Urnfield bird iconography, emphasising the importance of metal trade as a vehicle for cultural transmission.

Conclusion

Metal and mobility are pronounced features in Bronze Age Scandinavian rock art, with numerous and sophisticated depictions of ships, warriors, weapons, chariots and oxhide ingots along with symbolic representations. This Nordic figurative rock art was introduced, persisted and vanished with the Bronze Age, which underlines that the practice was closely linked to a set of distinctive conditions that prevailed during this period of European prehistory. Chief among these was the acquisition of copper and tin, as bronze was of central importance in both

economic production and social reproduction (cf. Pare 2000; Kristiansen & Earle 2015). Numerous rock art motifs that are inspired by a pan-European ideology convey that Scandinavia was well integrated in several European metal networks, which have now been substantiated by metal provenance studies (Ling et al. 2013, 2014), and it is significant that the Scandinavian rock art repertoire regardless of period responded to these connections and networks in a quite pronounced manner.

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Note

¹The contacts between Scandinavia and Central Europe are only cursory mentioned in this article as they are well described and analysed elsewhere (e.g. Kristiansen 1998; Earle & Kristiansen 2010; Vandkilde 1996, 2014).

References

- Beck, C.W. A.F. Harding, Hughes-Brock, H.** 1974. Amber in the Mycenaean world. *The Annual of the British School at Athens* 69: 145-172.
- Beck, C.W. Shennan, S.** 1991. *Amber in Pre-historic Britain*. Oxford: Oxbow Books.
- Bengtsson, L. (ed.)**. 2002. Arkeologisk rapport 6. Askum socken, Bohuslän del 3. Bengtsfors: Vitlycke museum.
- Bengtsson, L. (ed.)**. 2009. Arkeologisk rapport 7. Tossene socken. Göteborg: Vitlycke museum.
- Bergerbrant, S.** 2007. *Bronze Age identities. Costume, conflict and contact in Northern Europe 1600-1300 BC*. Stockholm: Stockholm University.
- Bradley, R.** 2009. *Image and audience: re-thinking prehistoric art*. Oxford: Oxford University Press.
- Butler, J.J.** 1963. *Bronze age connections across the North Sea: a study in prehistoric trade and industrial relations between the British Isles, the Netherlands, North Germany and Scandinavia c. 1700-700 B.C.* Groningen: J.B. Wolters.
- Buchholz, H.G.** 1959. Keftiubarren und Erzhandel im zweiten vorchristlichen Jahrtausend. *Prähistorische Zeitschrift* 37: 1-40.
- Childe, V.G. n.d.** (1938). Letter from V.G. Childe to N. Niklassen at Göteborgs Museum, Sweden. Dated 26/11/38. Registration number: 118/38.
- Czebreszuk, J.** 2013. Mysterious raw material from the far north: amber in Mycenaean culture. In: S. Bergerbrant, S. Sabatini (eds.). *Counterpoint: essays in archaeology and heritage studies in honour of Professor Kristian Kristiansen*. Oxford: Archaeopress, pp. 557-563.
- Coles, J.M.** 2005. *Shadows of a northern past: rock carvings of Bohuslän and Østfold*. Oxford: Oxbow.
- Crumlin-Pedersen, O.** 2003. The Hjortspring Boat in a Ship-Archaeological Context. In: O. Crumlin-Pedersen, A. Trakadas (eds.). *Hjortspring: A Pre-Roman Iron-Age Warship in Context. Ships and Boats of the North 5*. Roskilde: Viking Ship Museum, pp. 209-232.
- Cunliffe, B.W.** 2001. *Facing the Ocean: The Atlantic and Its Peoples, 8000 BC-AD 1500*. Oxford: Oxford University Press.

- Earle, T.** 1997. *How chiefs come to power. The political economy in prehistory.* Stanford: Stanford University Press.
- Earle, T.** 2002. *Bronze Age economics: the beginnings of political economies.* Boulder: Westview Press.
- Earle, T. Kristiansen, K. (eds.)**. 2010. *Organizing Bronze Age Societies. The Mediterranean, Central Europe & Scandinavia Compared.* Cambridge: Cambridge University Press.
- Forssander, J. E.** 1936. *Der Ostskandinavische Norden während der ältesten Metallzeit Europas.* Lund: C. W. K. Gleerup.
- Fredell, Å.** 2003. *Bildbroar: figurativ bildkommunikation av ideologi och kosmologi under sydskandinavisk bronsålder och förromersk järnålder.* Gothenburg: Gotarc.
- Fredsjö, Å.** 1981. *Hällristningar Kville härad i Bohuslän, Kville socken.* Göteborg: Fornminnesförening i Göteborg.
- Gale, N.H.** 1991. Copper oxhide ingots: their origin and their place in the Bronze Age metals trade in the Mediterranean. In: N.H. Gale (ed.). *Bronze Age trade in the Mediterranean: papers presented at the conference held at Rewley House, Oxford, in December 1989.* Jonsered: Paul Åström, pp. 197-239.
- Gräslund, B.** 1967. The Herzsprung shield type and its origin. *Acta Archaeologica* 38: 59-71.
- Harding, A.** 1984. *The Mycenaeans and Europe.* London: Academic Press.
- Harding, A.** 1990. The Wessex connection: developments and perspectives. In: T. Bader (ed.). *Orientalisch-ägäische Einflüsse in der europäischen Bronzezeit: Ergebnisse eines Kolloquiums.* Bonn: Habelt, pp. 139-155.
- Harrison, R.** 2004. *Symbols and warriors. Images of the European Bronze Age.* Bristol: Western Academic & Specialist Press.
- Hodder, I.** 2012. *Entangled: an archaeology of the relationships between humans and things.* Malden: Wiley-Blackwell.
- Jones, A.** 2015. Rock art and the alchemy of bronze. Metal and images in Early Bronze Age Scotland. In: P. Skoglund, J. Ling, U. Bertilsson (eds.). *Picturing the Bronze Age.* Oxford: Oxbow Books.
- Kaul, F.** 1998. *Ships on bronzes: a study in Bronze Age religion and iconography.* Copenhagen: National Museum of Denmark.
- Kaul, F.** 2003. The Hjortspring Boat and Ship Iconography of the Bronze and Early Pre-Roman Iron Age. In: O. Crumlin-Pedersen, A. Trakadas (eds.). *Hjortspring. A Pre-Roman Iron-Age Warship in Context.* Ships and Boats of the North 5. Roskilde: The Viking Ship Museum, pp. 187-208.
- Kaul, F.** 2004. *Bronzealderens religion. Studier af den nordiske bronzealderns ikonografi.* Copenhagen: Det kongelige nordiske oldskriftselskab.
- Kaul, F.** 2013. The Nordic razor and the Mycenaean lifestyle. *Antiquity* 87 (336): 461-72.
- Klassen, L. Petrequin, P. Cassen, S.** 2011. The power of attraction... Zur Akkumulation sozial wertbesetzter alpiner Artefakte im Neolithikum Nord- und Westeuropas. In: S. Hansen, J. Müller (eds.). *Sozialarchäologische Perspektiven: Gesellschaftlicher Wandel 5000–1500 v. Chr. zwischen Atlantik und Kaukasus.* Berlin: Verlag Phillip von Zabern, pp. 13-40.
- Kristiansen, K.** 1987. From stone to bronze – the evolution of social complexity in Northern Europe, 2300 – 1200 BC. In: E. Brumfiel, T. Earle (eds.). *Specialization, exchange, and complex societies.* Cambridge: Cambridge University Press, pp. 30-51.
- Kristiansen, K.** 1998. *Europe Before History.* Cambridge: Cambridge University Press.
- Kristiansen, K. Earle, T.** 2015. Neolithic versus Bronze Age social formations: a politi-

cal economy approach. In: K. Kristiansen, L. Šmejda, J. Turek (eds.). *Paradigm found: archaeological theory - past, present and future: essays in honour of Evžen Neustupný*. Oxford: Oxbow Books, pp. 234-247.

Kristiansen, K. Larsson, T.B. 2005. *The Rise of Bronze Age Society. Travels, Transmissions and Transformations*. Cambridge: Cambridge University Press.

Ling, J. 2008. *Elevated Rock Art — Towards a Maritime Understanding of Bronze Age Rock Art in Northern Bohuslän, Sweden*. Gothenburg: Gotarc.

Ling, J. 2013. *Rock art and seascapes in Uppland*. Oxford: Oxbow.

Ling, J. Rowlands, M. 2013. Structure from the North and content from the South. Rock art, metal trade and cosmopolitical codes. In: E. Anati (ed.). *Art as a source of history - L'arte come sorgente di storia*. Capo di Ponte: Edizioni del Centro, pp. 187-196.

Ling J. Hjärthner-Holdar, E. Grandin, L., Billström, K., & Persson, P.-O. 2013. Moving metals or indigenous mining? Provenancing Scandinavian Bronze Age artefacts by lead isotopes and trace elements. *Journal of Archaeological Science* 40 (1): 291-304.

Ling J., Stos-Gale, Z., Grandin, L., Billström, K., Hjärthner-Holdar, E. & Persson, P.-O. 2014. Moving Metals II: Provenancing Scandinavian Bronze Age Artefacts by Lead Isotope and Elemental Analyses. *Journal of Archaeological Science* 41(1): 106-132.

Ling, J. Stos-Gale, Z. 2015. Representations of oxhide ingots in Scandinavian rock art: the sketchbook of a Bronze Age traveller? *Antiquity* 89 (343): 191-209.

Littauer, M. A. Crouwel, J. H. 1983. Chariots in Late Bronze Age Greece. *Antiquity* 57 (221): 187-192.

Littauer, M. A. Crouwel, J. H. 1996. Robert Drews and the role of chariotry in Bronze

Age Greece. *Oxford journal of archaeology* 15 (3): 297-305.

Lo Schiavo, F. Giunlia-Mair, A. Sanna, U. Valera, R. (eds.). 2005. *Archaeometallurgy in Sardinia: From the origin to the beginning of Early Iron Age*. Montagnac: Editions Mergoil.

McGrail, S. 1993. Prehistoric Seafaring in the Channel. In: C. Scarre, F. Healy (eds.). *Trade and Exchange in Prehistoric Europe*. Oxford: Oxbow Books, pp. 199-210.

McKinley, J. Schuster, J. Millard, A. 2013. Dead-Sea Connections: A Bronze Age and Iron Age Ritual Site on the Isle of Thanet. In: J. Koch & B. Cunliffe, (eds.). *Celtic from the West 2: rethinking the Bronze Age and the arrival of Indo-European in Atlantic Europe*. Oxford: Oxbow Books, pp. 157-184.

McKinley, J. Leivers, M. Schuster, J. Marshall, P. Barclay, A. Stoodley, N. 2014. *Cliffs End Farm Isle of Thanet, Kent: A mortuary and ritual site of the Bronze Age, Iron Age and Anglo-Saxon period with evidence for long-distance maritime mobility*. Salisbury: Wessex Archaeology.

Monteagudo, L. 1977. *Die Beile auf der Iberischen Halbinsel*. München: C.H. Beck'sche Verlagsbuchhandlung.

Needham, S. 2009. Encompassing the Sea 'Maritories' and Bronze Age Maritime Interactions. In: P. Clark (ed.). *Bronze Age Connections Cultural Contact in Prehistoric Europe*. Oxford: Oxbow Books, pp. 12-37.

Needham, S., Parham, D. Frieman, C.J. 2013. *Claimed by the Sea: Salcombe, Langdon Bay, and Other Marine Finds of the Bronze Age*. York: Council for British Archaeology.

Nordén, A. 1925. *Östergötlands bronsålder: Med omkr. 500 textbilder och 141 pl.* Linköping: H. Carlsons bokhandel.

Pare, C. 2000. Bronze and the Bronze Age. In: C. Pare, ed. *Metals Make the World Go Round: Supply and Circulation of Metals in*

Bronze Age Europe. Oxford: Oxbow Books, pp. 1-38.

Pare, C. 2004. Die Wagen der Bronzezeit in Mitteleuropa. In: M. Fansa, S. Burmeister (eds.). *Rad und Wagen: Der Ursprung einer Innovation Wagen im Vorreden Orient und Europa*. Mainz: Philipp von Zabern, pp. 355-372.

Piggott, S. 1983. *The earliest wheeled transport: from the Atlantic coast to the Caspian Sea*. London: Thames and Hudson.

Randsborg, K. 1993. Kivik. *Archaeology & iconography*. Copenhagen: Munksgaard.

Rowlands, M. Ling, J. 2013. Boundaries, Flows and Connectivities: Mobility and Stasis in the Bronze Age. In: S. Bergerbrant & S. Sabatini, eds. *Counterpoint: Essays in Archaeology and Heritage Studies in Honour of Professor Kristian Kristiansen*. Oxford: Archaeopress, pp. 517-529.

Sherratt, A. 1997. Resources, technology and trade: an essay on early European metallurgy. In: A. Sherratt. *Economy and society in prehistoric Europe*. Edinburgh: Edinburgh University Press, pp. 102-133.

Skoglund, P. in Prep. *Rock art through time*. Oxford: Oxbow.

Thrane, H., 1990. The Mycenaean fascination: a northerners' view. In: T. Bader (ed.). *Orientalisch-ägäische Einflüsse in der europäischen Bronzezeit: Ergebnisse eines Kolloquiums*. Bonn: Habelt. pp. 165-179.

Treherne, P. 1995. The warrior's beauty: the masculine body and self-identity in Bronze Age Europe. *Journal of European Archaeology* 3 (1): 105-144.

Uckelmann, M. 2012. *Die Schilde der Bronzezeit in Nord-, West- und Zentraleuropa*. Stuttgart: Franz Steiner Verlag.

Vandkilde, H. 1996. *From stone to bronze: the metalwork of the late Neolithic and*

earliest Bronze Age in Denmark. Aarhus: Jutland Archaeological Society Publications.

Vandkilde, H. 2007. Culture and change in Central European prehistory: 6th to 1st millennium BC. Aarhus: Aarhus University Press.

Vandkilde, H. 2013. Bronze Age voyaging and cosmologies in the making: the helmets from Viksø revisited. In: S. Bergerbrant, S. Sabatini (eds.). *Counterpoint: essays in archaeology and heritage studies in honour of Professor Kristian Kristiansen*. Oxford: Archaeopress, pp. 165-177.

Vandkilde, H. 2014. Breakthrough of the Nordic Bronze Age: Transcultural warriorhood and a Carpathian crossroad in the sixteenth century BC. *European Journal of Archaeology* 17 (4): 602-633.

Varberg, J. Gratuze, B. Kaul, F. 2015. Between Egypt, Mesopotamia and Scandinavia: Late Bronze Age glass beads found in Denmark. *Journal of archaeological science* 54: 168-181.

Vinne, M. 2003. Sea trials. In: O. Crumlin-Pedersen, A. Trakadas (eds.). *Hjortspring: A Pre-Roman Iron-Age Warship in Context. Ships and Boats of the North 5*. Roskilde: Viking Ship Museum, pp. 103-118.