

HARM'S WAY

An Approach to Change and Continuity in Prehistoric Combat

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Warfare has been recognized as an important factor in past societies, but the way it contributes to change is still not very well understood. When it comes to ancient war, archaeology faces a problem: we are rarely able to address the intentions behind wars. This article seeks to take a look at the micro-scale of warfare and address what, and how, it contributed to change. To achieve this it was necessary to take a close-up look at combat, weapons and fighters as elementary parts of warfare. The use-wear analysis of 208 Early Nordic Bronze Age spears and swords, and 15 Late Neolithic halberds will be used as a case study to address several problems: 1. the (non-) functionality of early weaponry; 2. the conduct of combat; 3. the relation between weapons, fighters and combat. A hypothesis will be formulated in order to understand combat in terms of communication as a mediator between different agents of warfare.

Keywords: use-wear analysis, weapons, combat, techniques of the body, change, warfare

INTRODUCTION

It seems as if warfare is one of the most persistent activities in human history, with its origin far in the past (Keeley 1996; Guilaine & Zammit 2005). War has been researched in various disciplines such as sociology (e.g. Münkler 2005), history (e.g. Keegan 1994; Contamine 1986) or psychology (e.g. LeShan 1992). Yet, in archaeology it is very elu-

sive; evidence always seems to be notoriously difficult to obtain and is rarely unambiguous (cf. Wileman 2009). Warfare is uncanny, because the death and destruction it brings makes it an unpleasant topic. Despite this, it is important to research every detail of it to understand its mechanisms. Prehistoric archaeology cannot work like history, and it is problematic to write generalized histories about the ups and downs of warfare over time. Something individual is represented in the materialities of war available to archaeology, for example a sword, an injured skeleton or even a hill-fort, giving us the unique opportunity to come closer to the unknown individuals who fought wars, and a look inside the machinery (Molloy 2012).

Vandkilde (2011:377) discussed whether warfare could be responsible for major social changes, and maintained that the way in which it works is still little understood. How could warfare have such an influence? It was felt that this problem needed to be addressed on a smaller scale than large-scale socio-cultural changes. Due to the nature of archaeology it has to rely on the material remains to gain insight into such questions. Close combat weapons are archaeologically well known. O'Connell has argued that the relation between humans and weapons is more intimate and complex than has been admitted (1988:5). However, he himself has a rather static view of the history of weapons and does not allow for much change up until early modern times (O'Connell 1988:9–10). It is here archaeology can make a contribution. Due to their potential use in interpersonal fighting, close-combat weapons can perhaps be viewed as intimately entangled with the fighters (Malafouris 2008; Molloy 2008; Warnier 2011). Weaponry could be seen as an elementary aspect of the material culture of warfare, representing its micro-scale.

The use-wear analysis of weapons was considered the best method of providing a close-up view in order to get close to the individual fighter. Early specialized weaponry faces considerable scholarly scepticism about its functionality, even from renowned researchers proposing a great impact of warfare on past societies (Harding 2007; Mercer 2006; Osgood *et al.* 2000). Thus, specialized weaponry from the Late Neolithic and the first period of the Early Nordic Bronze Age has been analysed with regard to its use wear. The sample comprises a normal cross-section through the material and can therefore be seen as representative. Fifteen of the 41 known Late Neolithic halberds and 208 weapons (158 spears, 50 swords) of the approximately 600 known have been analysed (Horn 2013). The geographical frame spans from Southern Norway and Southern Sweden to Denmark and Northern Germany. For concision these regions have loosely been summarized under the term Southern Scandinavia. This transitional phase brought with it great changes in metal-

lurgy, but also in social structure. New forms of close-combat weaponry emerged, with spears and swords replacing the halberd of earlier times.

Several questions form the basis of this article. Why and how can we trace the impact of warfare on humans and material culture? Was the weaponry used at all? What does warfare as a relational system change apart from the intentions and achievements of past war parties? Lastly, in what way could warfare have developed such an impact? The following considerations aim to contribute to the scholarly discourse on warfare and its material culture. Due to their hypothetical nature they are open to critique and scrutiny.

DEFINING WARFARE

Since Keeley's (1996) polemic account, the presence of war in prehistoric societies is no longer denied (Ferguson 2008:502). However, the scale and especially the definition of warfare is still debated (see e.g. Guilaine & Zammit 2005:1–39; Otto 2006:23–28; Vandkilde 2006; Peter-Röcher 2009:14–26; cf. Wileman 2009 with older literature). Points of general agreement seem to be that warfare is a social group action involving violent means to achieve a goal. Weapons have been recognized as a very important feature in the definition and study of war (Bleed & Scott 2011). It has recently even been suggested by Beyneix (2013) that warfare is archaeologically only recognized by the presence of specialized weaponry. This led him to assume that “true” warfare only occurs with the beginning of the Bronze Age. Arguments against such a hypothesis are provided by depictions of Neolithic archery warfare (Christensen 2004:135). Furthermore, the dead in the mass grave from Talheim were massacred using a multifunctional tool: the adze (König & Wahl 1987). Apart from that, there is specialized weaponry present early on, such as specialized war arrows (Sarauw 2007:73) and close-combat weaponry in the form of halberds (Horn forthcoming). Specialized weaponry could perhaps be regarded as a consequence rather than a necessary prerequisite of warfare (Harding 2007:178; Molloy 2012:91).

For a definition of warfare the focus on specialized weaponry is possibly too tight. Thus, it is perhaps more useful to view weapons, whether specialized or not, as a part of the technology of warfare. Such a view could help to highlight the planned nature of warfare and separate it from other forms of violence, for example manslaughter, domestic violence or a simple brawl. These outbreaks of violence have a strong affective connotation and are mostly spontaneous. War may also originate in strongly felt affection, see for example the *Iliad*. Nonetheless, when it

comes to the actual engagement in warfare, technology becomes more important. Thus, a definition of warfare and combat specifically involving technology will be attempted. However, it should also be kept in mind that the presented definition is a working hypothesis.

Warfare can perhaps be defined as the engagement of at least two groups of people with at least one party willing to resolve an issue by the use of force and without the willingness or ability to employ other means such as (competitive) exchange. In warfare and combat, technology is utilized as a means to advance one's own effort. In turn the technology changes the way warfare is conducted. A prerequisite to establish a state of combat or warfare is the will of both sides to engage. Sometimes this may be facilitated by the sheer will to survive if one side is surprised by the attack and solely defending, or in siege warfare when the defending action requires setting up fortifications. If a party was not willing or able to engage in any action, no state of warfare would be established, and the according party forfeits whatever the issue was.

THE PROBLEM OF RITUAL

Weapons as part of the technology of warfare form an important part of the material remains of many regions. Yet, early weaponry has been viewed as many things, including not being fit for fighting. One of the earliest specialized weapons of Europe is the halberd (3800–1800 BC; Horn forthcoming). This weapon was “a pointed blade affixed at or near the end of a shaft and transversely to it” (Ó Ríordáin 1937:240). Halberds are frequently portrayed as a non-functional class of weapons solely for prestige or ritual purposes. The arguments of a “weak construction”, “unsuitable” and “unused” were repeated for over 70 years (Ó Ríordáin 1937:241; cf. O’Flaherty 1998). Some authors even shroud this weapon with an aura of mystique (O’Flaherty 1998:92; for example Lenerz-de Wilde 1991:48) leaving the whole group unexplained and one-dimensional. To the eye of the modern researcher the halberd has an odd form, and maybe the reason for its interpretation as non-functional is found in its “otherness”. However, this explanation does not fit with the specialized weaponry of the subsequent phase. With the onset of the Early Nordic Bronze Age (period I, 1800–1500 BC) new weapons emerged in the form of the sword and the spear of bronze. Both weapon forms are quite well known from later historical periods as functional weapons. Nevertheless, swords of the Sögel/Wohlde complex have also been portrayed as technologically ill-constructed and solely fit for stabbing (Fontijn 2005:146). Similarly, early spears are considered by some

to be “clumsy” (Harding 2007:76) or generally not fit for fighting (Mercer 2006:131). Some scholars acknowledge the use of spears in combat, but limit their functionality by interpreting them purely as throwing or thrusting weapons (Osgood 1998:91; Osgood *et al.* 2000:22).

Maybe one problem in the interpretation of these weapons is that symbolic aspects overshadow the technological ones, as was stated by Leroi-Gourhan in his great study on prehistoric body technique (1993:184). This insight is valuable and in many senses related to source criticism and a critical review of interpretation of the (non-)functionality of weapons. Furthermore, it may help to contextualize the archaeological remains and analyse their technology.

In order to define combat wear and understand its significance it may be helpful to address the ritualistic aspects first. The distribution of early weaponry in Southern Scandinavia seems to be rather dense (figure 1). However, if the temporal dimension of a span of approximately 1000 years (2500–1500 BC) is considered, the impression of density vanishes quickly. Even though the three weapon forms overlap considerably, they also seem to gravitate in different directions. In that sense regions are defined by the lack of a weapon rather than by its presence. Swords are almost absent in Zealand, Öland, Gotland, and Southern Sweden apart from the surroundings of Mälardalen. The distribution of halberds seems to be more closely related to spears, though there are very few finds north of Scania.

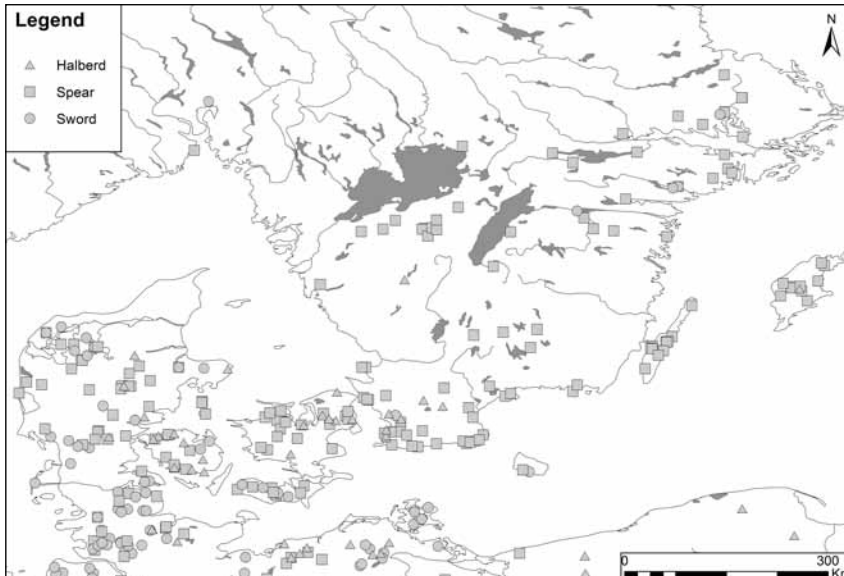


Figure 1. Distribution of early specialized weaponry in Southern Scandinavia.

Unfortunately, over a third of the contexts are unknown or uncertain, and as such, there is a margin of error. However, most of the weapons are considered to have come from ritual contexts: graves, hoards and possibly single depositions (figure 2). Burials and sacrifices probably had different recipients and different messages to convey, but both take place in a ritual context. Only one weapon, a spear, comes from a settlement context, but even this piece was discovered in a grave within the settlement. The problem is that the archaeological material itself mediates a strong ritualistic message concealing other information. This in turn may not only shape the interpretation of past objects, but also our perception of when, where, and how many objects were in use. The premise for the following is that the known weapons are just a fraction of what constituted past reality.

It should be borne in mind that ritual contexts provide us with weaponry in the first place. Nonetheless, apart from the ritualistic background of their deposition they could possess traces of further ritual treatment. Other acts could be performed, such as intentional destruction. This ritual is known from various European regions and times: the Neolithic (Larsson 2011), the Copper Age (Horn 2011), throughout the Bronze Ages (Nebelsick 1997, 2000; York 2002:83–84), and the Late Iron Age (Sievers 2010:68–69; Whitley 2002:223–224).

There are many ways weapons could be intentionally destroyed, including the removal of the handle (Horn 2011; Nebelsick 2000:160–162), extreme deformation (Sievers 2010:68–69) or “hacked” cutting edges (Bridgeford 1997:106–107). In the sample presented, one halberd

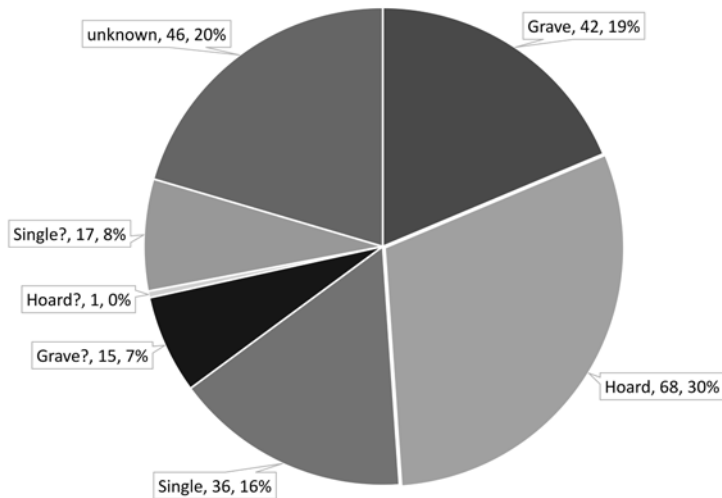


Figure 2. Overview of the find contexts of the analysed weapons.



Figure 3. Halberd from Stolpe (Germany, LMSH KS 541).

(Stolpe, Germany) was deliberately chopped in half (figure 3). From a European perspective it has been argued that the removal of the handle occurs quite frequently on halberds (approx. 40%; Horn 2011). Unfortunately, the number of halberds analysed for this contribution is too small to make any meaningful comparison. Nevertheless, it seems that they repeat that pattern. One of the main indicators of this treatment is a plastic deformation along the longitudinal axis of the object, called twisting (Horn 2011). Only a small quantity of swords and spears possess this feature (8–10%). Circumstantial evidence brings the hoard from Bondesgårde, Torsted (Denmark), into scope: a total of 40 spears enclosed in a small stone setting together with axes (Becker 1964). Due to spatial restrictions they were probably deposited without handles.

The spears from Bondesgårde possibly underwent another ritual performance. Fourteen spears have fractured tips. While this could be caused by corrosion, two of them show an additional curvature in this area. At the same height six other spears are fractured on their cutting edges or received a blow to the same area. This kind of damage affects roughly a quarter of the total length below the tip. Potentially half of the spears from Bondesgårde received a strike which damaged their tip immediately before deposition. The blow was not necessarily aiming to destroy the tip. While such damage might still occur in combat, there is further evidence that this use-wear pattern is a remnant of a ritual performance.

The hoard from Dystrup (Denmark) provides eight Apa-type swords, and parallels Bondesgårde as a hoard with an outstanding number of one particular weapon type (Wincentz Rasmussen & Boas 2006). Both finds are unified overall by very limited traces of use. Nonetheless, the hoard from Dystrup has a very similar pattern of damage. Three swords are broken and two have fractures on their cutting edges in an analogous area compared to the spears. In both cases it is approximately half of the

weapons that exhibit such damage. Perhaps the conspicuous amount of objects, the analogous damage pattern, and the similar number of affected weapons as well as the lack of other traces of use could point to a ritual performance.

Considering the evidence, it is quite possible that Late Neolithic and Early Bronze Age weapons were subject to ritual performances leaving visible traces. But does that mean these objects were purely ritual weapons not fit for combat? Before this question can be considered, we have to ask: Why would we expect fighting to leave any traces at all?

TECHNOLOGIES OF COMBAT

Mauss (1992) popularized the term “techniques of the body” and Leroi-Gourhan subsequently introduced it into archaeology with a thorough discussion of the social and biological basis and its implications (1993). Techniques of the body first and foremost refer to knowledge of body movements and do not necessarily depend on material culture. The use of objects, however, does shape and transform bodily techniques. In his dossier Mauss called this “the formation of mechanical ‘pairs of elements’ with the body”. He used the explicitly archaeological example of an Abbevillian (“Cellean”) hand axe and its relation to the techniques of forceful movements and holding (Mauss 1992:471–472). Bodily techniques and pairs of elements are set in a socially learned habitus (Mauss 1992:456) not always following the most efficient or even functional way of doing things (see for example Warnier 2011).

Going back to the previously stated definition of warfare and the involvement of technology, maybe we are able to differentiate two kinds of technologies. One is the body techniques. The other component is objects employed as weapons. Together they establish mechanical pairs of elements. The weapons could be termed “practical technology” as defined by Hayden (1993:203). Nevertheless, this technology does not only involve a practical dimension. It includes technological knowledge from the “recipes of action” to techno-science (Schiffer & Skibo 1987:597–598) and their materiality that is constitutive for individuals and the social (Tilley 2007:17; see also Kuijpers 2013; Molloy 2008). To acknowledge this complexity the term *material technology* will be used.

Fighting does not only require holding a weapon, it necessitates a whole set of different bodily techniques (Warnier 2011). A combatant needs to know how to move his arm to get a proper swing, his feet for positioning, his head to avoid the most lethal blows, his eyes to be aware along with a multitude of other motions. All these are techniques of the

body which are utilized in fighting, but are not exclusive to it. Every offensive or defensive manoeuvre is made up of a combination of bodily techniques, and a set of manoeuvres or movements makes up a style of fighting. Fighting style can be separated into two levels. There is an overarching level that is established by how a combatant aims to defeat an opponent. The combination of cutting and thrusting manoeuvres and the necessary defensive movements establish, for example a style of fighting we could call fencing. According to the specific pair of elements this style is particularized by necessitating a variation of the bodily techniques involved in every movement. Thus, a stab with a Mycenaean sword (Molloy 2008) may look very different from a stab with a halberd (O'Flaherty 2007). If both were used in a fencing fighting style each would represent a variation of that style. Therefore, a particular fighting style interlinks fighter and weapon intimately.

Presumably, weapons are employed to enhance the capacity to hurt or kill an opponent even in the animal realm (O'Connell 1988:14; Wileman 2009:12). At the same time they are possibly the first line of defence if a fighter wants to avoid bodily harm. Due to the resistance, damage is likely to occur when two weapons meet. Resistance could also come from armour, a shield, bone or if a strike misses and comes into contact with natural features, for example stones on the ground. The material deforms according to a range of physical properties of the objects involved (O'Flaherty *et al.* 2011). It should be kept in mind that damage jeopardizes the physical integrity of a weapon, and fighters probably tried to avoid it (Molloy 2008:126). Thus, combat damage is potentially accidental, which may increase the diversification of damage.

From the observation of ritual damage we obtain some information that can be used to define what combat damage should look like. Combat damage should not directly destroy a weapon (contrary to figure 3). Instead traces should be more subtle with a variety of damage on an individual weapon, little obvious pattering in placement, damage type and strength of related weapons. Nevertheless, since combat damage is linked to the way weapons are handled, patterning could occur. Therefore, the boundary between combat and ritual damage is perhaps blurred.

Before proceeding with the combat damage, a difficulty with regard to the relation of techniques of the body and use wear has to be addressed. A single technique or even a certain set of motions are potentially indistinguishable. For example, removing the bark from a tree or killing a person could involve very similar movements. The people who massacred the individuals in Talheim with their adzes probably did not need any special motions for simple blows against the skull, especially

when the enemy was already lying on the ground (König & Wahl 1987). A similar case could be made for the hammer-like weapon found in Tollense, Germany (Jantzen *et al.* 2011). Perhaps it can be said that the fewer techniques of the body vary, the smaller the chances of observing it in the use-wear traces.

IN HARM'S WAY – THE COMBAT TRACES OF EARLY WEAPONS

Use wear has been defined in accordance with academic literature on use-wear analysis (Bridgford 1997, 2000; O'Flaherty 2011). Both spears and swords show impact damage, plastic deformations, repairs and tip use wear attributable to combat (figure 4). Impact damage includes notches, indentations and blow marks. Sometimes it causes material displacement. Plastic deformation includes curvatures and fractures. Impact damage entails a plastic deformation just as plastic deformations are caused by impacts. Both were separated according to the scale of their occurrence. Impact damage is locally very restricted and the shape of the impacting edge is partially visible. In contrast, plastic deformations occur on a larger scale and affect wider parts of the weapon. Tip use wear includes impact damage as well as plastic deformation, but in that case it is the placement that matters. Repairs are a very blurred form of combat trace (Kristiansen 1984, 2002), but they potentially signify certain areas where such damage appeared.

According to the different placement and occurrence of use wear, it is possible to attribute it to different motions (Molloy 2011:75–77; Anderson 2011; Schauer 1979). Due to the angle and directionality of certain fighting techniques they make different parts vulnerable to damage. Impact damage along the cutting edges and on the body perhaps indicates a cutting movement because it exposes more of the cutting edge than other motions. Use wear on tips could indicate thrusting as a combat manoeuvre, since the tip is the first to meet resistance. However, an imprecise parry of a thrusting attack might still leave damage on the cutting edge or the body of either weapon. Plastic deformation and tip use wear could occur if the spears were thrown, but the evidence for cutting movements shows that they were rather held in hand. However, this cannot rule out that spears may occasionally have been hurled at an enemy. Due to the trajectory of thrusting it is unlikely that most tip damage originates from contact with another weapon. Human skin and flesh are probably not resistant enough to cause such deformations. Accordingly, tip damage and some plastic deformations could

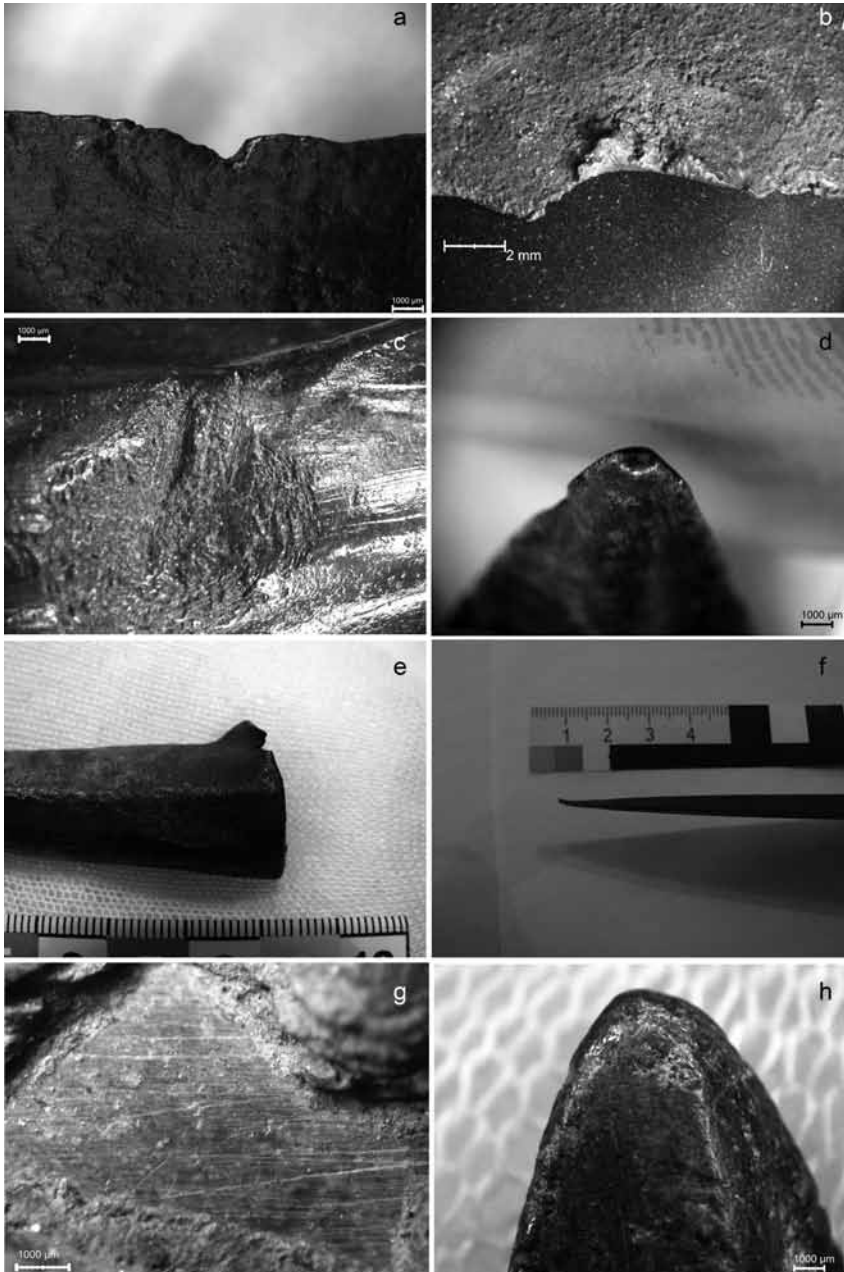


Figure 4. a. Notch (LMSH KS 12578); b. Indentation with material displacement (NMK B 11203); c. Blow mark slightly affected by corrosion (LMSH KS 6164); d. Tip pressure (LUHM 17217); e. Curvature on the socket of a spear (SHM 1985 (1853)); f. Curvature on the tip of a sword (NMK B 1698); g. Striations (NMK 6469); h. Tip reduced due to repair (SHM 13035.1).

count as secondary proof for the existence of body armour or shields at the time, despite the lack of archaeological remains. However, one has to keep in mind that bones could be a source of this kind of damage as well (O’Flaherty 2007).

Potentially, all these different damage types could point to various fighting styles (Horn 2013). While some swords show several categories of damage simultaneously, not all of them are damaged in all the different ways. Thus, the sum of damage types can perhaps be interpreted as the sum of all the possible movements performed with a particular form of weapon. As an example, the summary of combat traces on swords provides evidence indicating that swords were used in motions establishing a complex fencing style that includes cutting and thrusting manoeuvres (figure 5). Damage on tips such as pressure, curvature, fractures, along with other curvatures and fractures on the body of the weapon may primarily occur from thrusting movements. Cutting exposes more of the longitudinal axis of the given weapon. Subsequently, it is assumed that damage on the cutting edge and the body of the weapon – such as notches, indentations and blow marks, summarized as impact damage – accounts for such manoeuvres. Interestingly the same categories of damage are also visible on spears (figure 6) and halberds across all the types and variants. It is even more intriguing that swords and spears do not exhibit any statistically significant variation in the patterning of the quantities of the various damage categories (figure 7). A χ^2 test confirmed the impression the charts convey ($p = 0.82275$). This suggests they were used in combat in a very similar manner, employing both tips and cutting edges. These results suggest that swords, spears and halberds were used in a complex fencing style employing, among other motions, cutting and thrusting. There is a major disjunction between the logical inference of varying bodily techniques and the uniformity of observable traces.

These observations confirm Clements’ (2007) suggestion that the separation of thrusting and cutting as a means to fight is a myth. This result also implies that a separation of spears and lances into several functional classes as suggested by Tarot (2000:41–45) for the Swiss Bronze Age material does not fit with the Southern Scandinavian evidence. In contrast, the presented case supports results deduced from later material in Britain and the Urnfield culture in Germany (Anderson 2011; Schauer 1979). The result of this study shows early weaponry to be fully functional. Regardless of the perceptions of modern researchers of functional technical design, prehistoric individuals considered these weapons fit for fighting and frequently took them into battle. It is possible to view these early weapons as specialized weaponry that gained importance

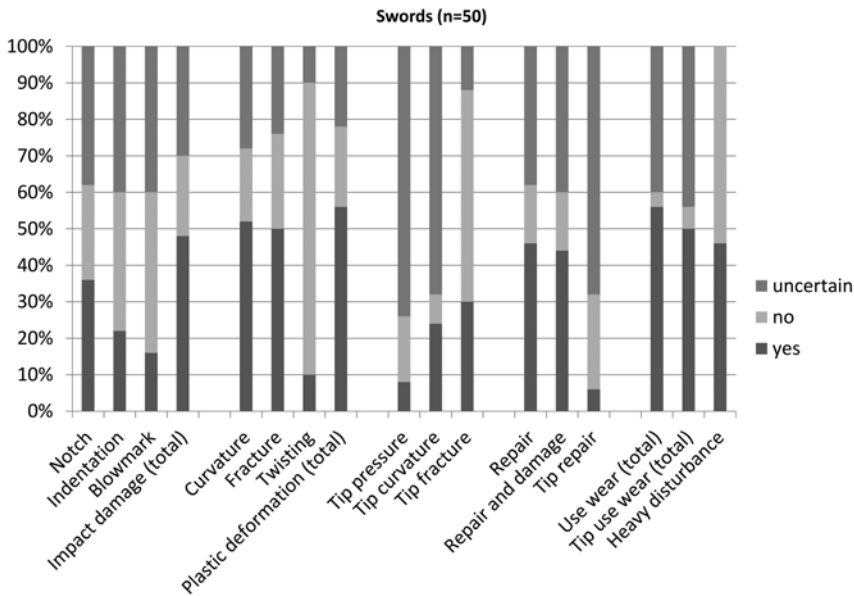


Figure 5. Chart use wear visible on swords; see table 1.

Table 1. Use wear visible on swords; see figure 5.

Swords (n=50)			
	yes	no	uncertain
Notch	18	13	19
Indentation	11	19	20
Blowmark	8	22	20
Impact damage (total)	24	11	15
Curvature	26	10	14
Fracture	25	13	12
Twisting	5	40	5
Plastic deformation (total)	28	11	11
Tip pressure	4	9	37
Tip curvature	12	4	34
Tip fracture	15	29	6
Repair	23	8	19
Repair and damage	22	8	20
Tip repair	3	13	34
Use wear (total)	28	2	20
Tip use wear (total)	25	3	22
Heavy disturbance	23	27	0

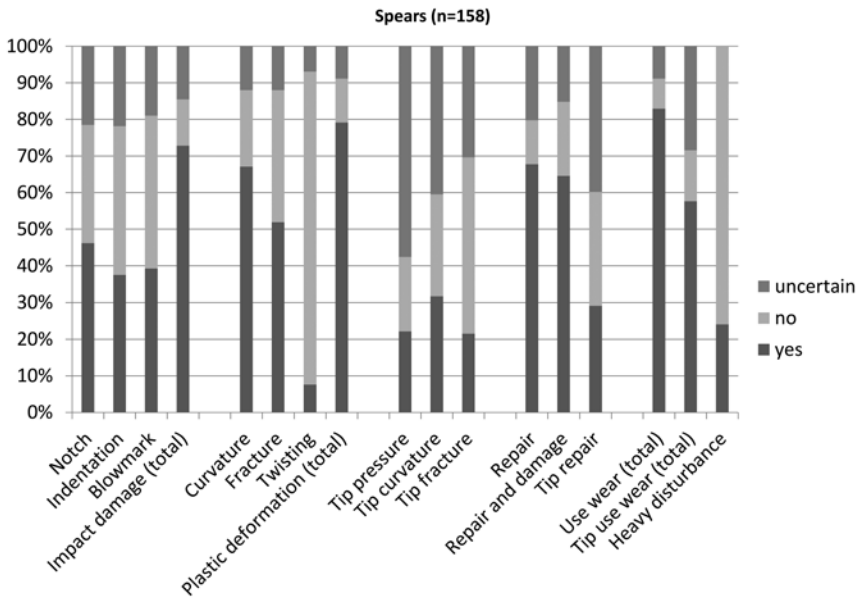


Figure 6. Chart use wear visible on spears; see table 2.

Table 2. Use wear visible on spears; see figure 6.

Spears (n=158)			
	yes	no	uncertain
Notch	73	51	34
Indentation	60	65	35
Blowmark	62	66	30
Impact damage (total)	115	20	23
Curvature	106	33	19
Fracture	82	57	19
Twisting	12	135	11
Plastic deformation (total)	125	19	14
Tip pressure	35	32	91
Tip curvature	50	44	64
Tip fracture	34	76	48
Repair	107	19	32
Repair and damage	102	32	24
Tip repair	46	49	63
Use wear (total)	131	13	14
Tip use wear (total)	91	22	45
Heavy disturbance	38	120	0

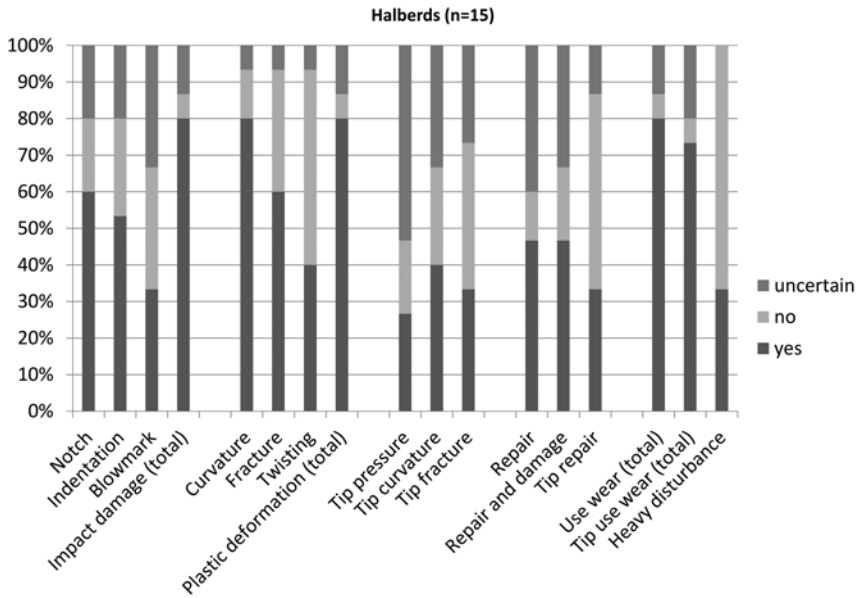


Figure 7. Chart use wear visible on halberds; see table 3.

Table 3. Use wear visible on halberds; see figure 7.

Halberd (n=15)			
	yes	no	uncertain
Notch	9	3	3
Indentation	8	4	3
Blowmark	5	5	5
Impact damage (total)	12	1	2
Curvature	12	2	1
Fracture	9	5	1
Twisting	6	8	1
Plastic deformation (total)	12	1	2
Tip pressure	4	3	8
Tip curvature	6	4	5
Tip fracture	5	6	4
Repair	7	2	6
Repair and damage	7	3	5
Tip repair	5	8	2
Use wear (total)	12	1	2
Tip use wear (total)	11	1	3
Heavy disturbance	5	10	0

in ritual contexts rather than to interpret them as non-functional, symbolic weapons. Nonetheless, the similarity of the fighting style, despite the quite varied morphology, is a problem that needs to be addressed.

COMBATANTS, WEAPONS, AND ENEMIES – HYPOTHESIS OF A RELATIONAL SYSTEM

There is a marked difference in the morphology of the weapon forms. According to Mauss (1992) the bodily techniques and the object form employed constitute different pairs of elements. Logically, we should expect certain differences in the manoeuvres to successfully strike or defend. Blades of halberds were angled differently to the fighter than the blade of a sword or spear, making a different motion necessary to hit an opponent with the cutting edge or tip. A cut with a halberd could be inflicted in a scythe-like or hooking motion (Brandherm 2004:322). The cutting edge on swords is usually longer than that of the other weapon forms, which changes the way a cut is drawn. Spears and halberds possess wooden handles and were perhaps two-handed. Perhaps it is reasonable to assume that the handle played a role in defending and attacking as it did in later periods (Anglo 2000:148–171; Schulze 2007:63–71). So, why does the use wear not vary significantly?

Manoeuvres like cutting and thrusting are distinguished to a lesser degree by the specific techniques of the body involved. Instead they are defined by the part of the weapon that is supposed to inflict damage. Due to its position, a desire to strike with a certain part of the weapon may be assumed. Thrusting or stabbing was carried out with the tip of a weapon regardless of how the blade was angled. The stress of impact is mostly focussed on the tip. Conversely, the attempt to inflict a cut will leave the cutting edges more open, and therefore, more vulnerable to damage. Resistance in both cases could come from bone, defensive weaponry or successful but somewhat careless parries. Damage is determined by the relative position of the impacted and impacting object. Both objects potentially receive damage. This, however, is randomized by the accidental nature of combat damage. Consequently, the notch does not inform whether the fighter was attacking or defending; different motions could leave similar use-wear traces.

As a result, we can say that the problem is possibly rooted in the indistinguishability of the archaeological evidence. We may not be able to discern the particular combination of techniques of the body necessary to conduct a certain movement. Nevertheless, there may still be the possibility to address change. Manoeuvres are constrained by the ability of

the fighter. It is thus possible that the design of the weaponry is adjusted to the requirements of fighters; a phenomenon also observed by Warnier (2011:369). A combatant and his weapon form a relational system; they embody each other's qualities (Malafouris 2008:122; Molloy 2008:119; Warnier 2011). Therefore, new weapon designs possibly include prior knowledge of fighting. Halberds, spears and swords are close combat weapons with a tip and a cutting edge. Fighters potentially remained within the same frame of fencing despite changing weapon forms. This could subsequently lead to minor changes in the techniques of the body not observable by means of use-wear analysis.

These considerations leave a problem. The visible changes in weaponry, the inferred subtle changes in body techniques and the stability of the overall fighting style inferred from the evidence of the use-wear analysis form a relational system that requires mediation between combatants, their material technology, and opponents along with their material technology. So the question could be: What mediates between the different agents?

As previously mentioned, the ritual contexts of discovery leave a gap in our knowledge about how many weapons were actually in existence. Presumably, there were many more than we know. The damage on weapons tells us that people fought, but it does not tell who was involved. Southern Scandinavia is potentially highly interconnected with a shared iconography (Kaul 2004), and material culture (for example Vandkilde 1996). Amongst other means, canoes possibly facilitated high mobility and fast travel (Ling 2008). Maybe this interconnectedness was already present in the Neolithic, as can be seen through the distribution of flint daggers (Apel 2001). There is potential that it formed in even earlier times (Zvebil 2006). Though it is just circumstantial evidence, this closely related system possibly led to tension of differing interests relieved through combat and warfare. This assumption is perhaps supported by the interpretation of the rock-art ships as war canoes (Ling 2008:224–225) and a deceased male from Over Vindinge (Denmark) with a period I spear embedded in his pelvis (Kjær 1912). Judging by the frequency of combat damage on the weapons, these engagements could have happened regularly.

Deleuze and Guattarie (1987:360) argued that the exteriority of warfare only exists in its own metamorphosis. It is an ever-flowing field of coexistence and competition. In that sense warfare could be defined as perpetual field of interaction. Perhaps, in the words of Schiffer and Skibo (1997:44), this field did not only provide space for person-to-person interaction, but also for person-to-object and object-to-object interaction. Consequently, it could be argued that combat is the mediator and the

canvas on which people negotiate. Fighters establish this relational system by means of engagement, which influences them in return. This is the interdependency of agent and structure on which Giddens (1986:25–28) elaborated. Yet, how can we imagine what happens during combat?

Benjamin (1991:141) argues in his metaphysical discussion of language that everything has its own language, and that language with spoken words is just a special case. In combat humans perform in unison with their weapons a constant series of attack and defence, action and re-action, movement and counter-movement. In the sense of language, they exchange arguments. Thus it can perhaps be said that fighting, and on a larger scale warfare, establishes a space for communication without spoken words. In their search for a decisive advantage humans take different material technologies to the battlefield. Molloy and Grossman (2007) reasoned that fighting requires training which transfers knowledge into bodily know-how. In close combat it is impossible to think about the next move for very long, and it is necessary to act quickly. Thus, fighters also take their sets of techniques of the body to combat. Both material and bodily technology are negotiated on the canvas of fighting and mediated by it.

Benjamin (1991:148) maintains that the language of things has to be interpreted; turned back into the spoken language of humans to be understood. Combat itself needs to be analysed by the fighters; bodily know-how has to be re-interpreted into knowledge. Fighters are not just free agents in that they are constrained by prior training, traditions, physical abilities, weapons and ultimately by their adversary. Changing the learned techniques of the body is a difficult process, even if better ways of doing things are known. Mauss highlights this anecdotally (1992:456): “the habit of swallowing water and spitting it out again has gone. In my day, swimmers thought of themselves as a kind of steamboat. It was stupid, but in fact I still do this: I cannot get rid of my techniques.” Despite the deterministic undertone, today it is known that the nerve cells in the motor cortex are suitable for “re-programming” (Kandel 2000:34–35), but it requires a lot of work and is a slow process. This is so deeply engrained that it is here, as Malafouris (2008) contends, a weapon is embodied in the fighter defining his very personhood and influences his motions and emotions (see also Warnier 2011). In view of that, the material technology is perhaps the easiest part to change in this relational system. Thus, adjustments take on an archaeologically recognizable form in the morphology of the weaponry. Logically, this changes bodily techniques leading to changing pairs of mechanical elements. Nonetheless, the habitus in the Maussian sense can possibly be regarded as a conservative element constraining change (Mauss 1992:456).

Prior embodied knowledge (Molloy 2008:119; with older literature) and the need for a certain symmetry in fighting (O'Connell 1989) facilitate the new designs. This ensures a certain continuity in the fighting style. In regard to the weaponry considered here, this means that the changes in the techniques of the body, while present, remain archaeologically elusive, and the style of fighting visible in combat wear remains more or less stable.

Summarizing the arguments, combat is probably a deeply socially embedded and, *horribile dictu*, meaningful interaction. It is a serially “executed social practice” (Fahlander 2003:16, 31–36). It shapes bodily and material technologies which might reflect back on broader developments. Without the space to go into detail here, weapons are part of conspicuous larger-scale developments: The subsequent Period II of the Early Nordic Bronze Age sees the wider introduction of swords into Swedish material culture and with that a higher frequency of weapon depositions in graves (Kristiansen 1998: Fig. 34). In another example, copper halberds emerge in Southern Scandinavia among the first complex metal objects (Horn forthcoming). Therefore, combat introduces change on a micro-level, affecting the material and bodily technology of war. In this way warfare could change the social fabric, the relational system of humans and material culture, apart from the expressed and perceived intentions of past competitors.

SUMMARY

This article has been based on a definition of warfare with an emphasis on engagement and technology. Both have been argued to be important features in warfare and therefore combat. In this light, the use-wear analysis of 208 spears and swords of period I of the Early Bronze Age and 15 Late Neolithic halberds has been used to hypothesize how combat contributes to change aside from the personal aims of fighters. The first line of argument was a critical view of the interpretations of early weaponry and the ritual performances these weapons were subject to.

The technology of warfare has been separated into material technology and the techniques of the body in order to explain the occurrence of combat wear on weapons. Specific sets of the techniques of the body form fighting styles. Different weapon forms logically necessitate different bodily techniques. The use-wear analysis of the early weapons did not only prove them to be fully functional, it also showed that despite a different material technology they were essentially used in the same complex fencing style. Thus, in relation to the material technology, different

techniques of the body have been merged into a similar fighting style. As a result it can perhaps be said that material technology was changed in accordance with the requirements of the preferred fighting style of the fighters, thereby only slightly changing their bodily techniques.

From that result a hypothetical model was inferred. Combat can be regarded as a meaningful social practice; a temporal structure established by fighters as a relational system. Fighting establishes a space for communication in a language without spoken words. This provides a canvas for the negotiation of material and bodily technology, but combat also actively mediates between the agents involved. Micro-level change is introduced and potentially builds up to cultural shifts.

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REFERENCES

- Anderson, K. 2011. Slashing and Thrusting with Late Bronze Age Spears: Analysis and Experiment. *Antiquity*. Vol. 85 (328). Pp. 599–612.
- Anglo, S. 2000. *The Martial Arts of Renaissance Europe*. London/New Haven: Yale University Press.
- Apel, J. 2001. *Daggers, Knowledge & Power*. Uppsala: Acta Universitatis Upsaliensis.
- Becker, C. J. 1964. Neue Hortfunde aus Dänemark mit frühen bronzezeitlichen Lanzen spitzen. *Acta Archaeologica*. Vol. 35. Pp. 115–152.
- Benjamin, W. 1991. Über Sprache überhaupt und über die Sprache des Menschen. In: Tiedemann, R. & Schweppenhäuser, H. (Eds). *Gesammelte Schriften*. Vol. 2. Pp. 140–157. Berlin: Suhrkamp Verlag.

- Beyneix, A. 2013. Gewaltsamer Tod am sonnigen Mittelmeer. *Archäologie in Deutschland*. Vol. 2013 (1). Pp. 3–32.
- Bleed, P. & Scott, D. D. 2011. Contexts for Conflict: Conceptual Tools for Interpreting Archaeological Reflections of Warfare. *Journal of Conflict Archaeology*. Vol. 6 (1). Pp. 42–64.
- Brandherm, D. 2004. Porteurs de hallebardes? Überlegungen zur Herkunft, Entwicklung und Funktion der bronzezeitlichen Stabklingen. *Varia Neolithica*. Vol. 3. Pp. 279–334.
- Bridgford, S. D. 1997. Mightier than the Pen? An Edgewise Look at Irish Bronze Age Sword. In: Carman, J. (Ed.). *Material Harm: Archaeological Studies of War and Violence*. Pp. 95–115. Glasgow: Cruithne Press.
- Bridgford, S. D. 2000. *Weapons, Warfare and Society in Britain 1250–750 BC*. Thesis (PhD). University of Sheffield.
- Christensen, J. 2004. Warfare in the European Neolithic. *Acta Archaeologica*. Vol. 75 (2). Pp. 129–156.
- Clements, J. 2007. The Myth of Thrusting versus Cutting with Swords. In: Molloy, B. (Ed.). *The Cutting Edge: Studies in Ancient and Medieval Combat*. Pp. 168–176. Stroud: Tempus Publishing.
- Contamine, P. 1986. *War in the Middle Ages*. Weinheim: Wiley.
- Deleuze, G. & Guattari, F. 1987. *A Thousand Plateaus: Capitalism and Schizophrenia*. Minneapolis: University of Minnesota Press.
- Fahlander, F. 2003. *The Materiality of Serial Practice: A Microarchaeology of Burial*. Gotarc Serie B. No. 23. Göteborg: Bohuslän 5.
- Ferguson, R. B. 2008. Archaeology, Cultural Anthropology, and the Origins and Intensifications of War. In: Arkush, E. N. & Allen, M. W. (Eds). *The Archaeology of Warfare: Prehistories of Raiding and Conquest*. Pp. 469–523. Gainesville: University Press of Florida.
- Fontijn, D. 2005. Giving up Weapons. In: Parker Pearson, M. & Thorpe, I. J. (Eds). *Warfare, Violence and Slavery*. BAR International Series 1374. Pp. 145–154. Oxford: Archaeopress.
- Giddens, A. 1986. *The Constitution of Society*. Berkeley: University of California Press.
- Guilaine, J. & Zammit, J. 2005. *The Origins of War: Violence in Prehistory*. Oxford: Blackwell Publishing.
- Harding, A. 2007. *Warriors and Weapons in Bronze Age Europe*. Budapest: Archaeolingua.
- Hayden, B. 1993. *Archaeology: The Science of Once and Future Living Things*. New York: W. H. Freeman.
- Horn, C. 2011. Deliberate Destruction of Halberds. In: Uckelmann, M. & Mödinger, M. (Eds). *Bronze Age Warfare: Manufacture and Use of Weaponry*. BAR International Series 2255. Pp. 53–65. Oxford: Archaeopress.
- Horn, C. Forthcoming. Few and Far Between: Early Halberds in Europe. *Mitteilungen des Deutschen Archäologischen Institutes, Römische Abteilung*.
- Horn, C. 2013. Weapons, Fighters, and Combat: Spears and Swords in Early Bronze Age Scandinavia. *Danish Journal of Archaeology*. DOI: 10.1080/21662282.2013.838832.
- Jantzen, D. et al. 2011. A Bronze Age Battlefield? Weapons and Trauma in the Tollense Valley, North-Eastern Germany. *Antiquity*. Vol. 85 (328). Pp. 417–433.

- Kandel, E. R. 2000. The Neurobiology of Behaviour. In: Kandel, E. *et al.* (Eds). *Principles of Neural Science*. Fourth Edition. Pp. 5–66. New York: McGraw-Hill Professional.
- Kaul, F. 2004. *Bronzealderens religion: Studier af den nordiske bronzealders ikonografi*. Copenhagen: Det Kongelige Nordiske Oldskriftselskab.
- Keegan, J. 1994. *A History of Warfare*. London: Random House.
- Keeley, L. H. 1996. *War before Civilization: The Myth of the Peaceful Savage*. Oxford/ New York: Oxford University Press.
- Kjær, H. 1912. Et mærkeligt arkæologisk-antropologisk fund fra stenalderen. *Aarbøger for Nordisk Oldkyndighed og Historie*. Pp. 58–72.
- König, J. & Wahl, H. G. 1987. Anthropologisch-traumatische Untersuchung der menschlichen Skelettreste aus dem bandkeramischen Massengrab bei Talheim, Kreis Heilbronn. *Fundberichte Baden-Württemberg*. Vol. 12. Pp. 65–186.
- Kristiansen, K. 1984. Krieger und Häuptlinge in der Bronzezeit Dänemarks: Ein Beitrag zur Geschichte des bronzezeitlichen Schwertes. *Jahrbuch des Römisch-Germanischen Zentralmuseums*. Vol. 31. Pp. 187–208.
- Kristiansen, K. 1998. *Europe Before History*. Cambridge: Cambridge University Press.
- Kristiansen, K. 2002. The Tale of the Sword: Swords and Swordfighters in Bronze Age Europe. *Oxford Journal of Archaeology*. Vol. 21 (4). Pp. 319–332.
- Kuijpers, M. H. G. 2013. The sound of fire, taste of copper, feel of bronze, and colours of the cast: sensory aspects of metalworking technology. In: Stig Sørensen, M. L. & Rebay-Salisbury, K. (Eds). *Embodied Knowledge: Perspectives on Belief and Technology*. Pp. 137–150. Oxford: Oxbow.
- Larsson, L. 2011. The Ritual Use of Axes. In: Davis, V. & Edmonds, M. (Eds). *Stone Axe Studies III*. Pp. 203–214. Oxford: Oxbow Books.
- Ling, J. 2008. *Elevated Rock Art: Towards a Maritime Understanding of Rock Art in Northern Bohuslän, Sweden*. Göteborg: Intellecta Solana.
- Lenerz-de Wilde, M. 1991. Überlegungen zur Funktion der frühbronzezeitlichen Stabdolche. *Germania*. Vol. 69 (1). Pp. 25–48.
- Leroi-Gourhan, A. 1993. *Gesture and Speech*. Cambridge: MIT Press.
- LeShan, L. 1992. *The Psychology of War: Comprehending its Mystique and its Madness*. Chicago: Noble Press.
- Malafouris, L. 2008. Is it ‘me’ or is it ‘mine’? The Mycenaean sword as a body-part. In: Robb, J. & D. Boric, D. (Eds). *Past Bodies*. Pp. 115–123. Oxford: Oxbow Books.
- Mauss, M. 1992. Techniques of the Body. In: Crary, J. & Kwinter, S. (Eds). *Incorporations*. Pp. 455–477. New York: Zone Press.
- Mercer, R. 2006. By Other Means? The Development of Warfare in the British Isles 3000–500 B.C. *Journal of Conflict Archaeology*. Vol. 2 (1). Pp. 119–151.
- Molloy, B., 2008. Martial Arts and Materiality: A Combat Archaeology Perspective on Aegean Swords of the Fifteenth and Fourteenth Centuries BC. *World Archaeology*. 40 (1). Pp. 116–134.
- Molloy, B. 2011. Use-Wear Analysis and Use-Patterns of Bronze Age Swords. In: Uckelmann, M. & Mödinger, M. (Eds). *Bronze Age Warfare: Manufacture and Use of Weaponry*. BAR International Series 2255. Pp. 67–84. Oxford: Archaeopress.
- Molloy, B. 2012. Martial Minoans? War as Social Process, Practice and Event in Bronze Age Crete. *The Annual of the British School at Athens*. 107. Pp. 87–142.

- Molloy, B. & Grossman, D. 2007. Why Can't Johnny kill? The Psychology and Physiology of Interpersonal Combat. In: Molloy, B. (Ed). *The Cutting Edge: Studies in Ancient and Medieval Combat*. Pp. 188–202. Stroud: Tempus Publishing
- Münkler, H. 2005. *Die neuen Kriege*. Hamburg: Rowohlt Verlag.
- Nebelsick, L. 1997. Auf Biegen und Brechen. Ekstatische Elemente bronzezeitlicher Materialopfer. In: Hänsel, A. & Hänsel, B. (Eds). *Gaben an die Götter: Schätze der Bronzezeit Europas*. SMPK Museum für Vor- und Frühgeschichte Bestandskatalog 4. Pp. 35–41. Berlin: Unze Verlagsgesellschaft.
- Nebelsick, L. 2000. Rent Asunder: Ritual Violence in Late Bronze Age Hoards. In: Pare, C. F. E. (Ed.). *Metals Make the World Go Round: The Supply and Circulation of Metals in Bronze Age Europe*. Pp. 160–175. Oxford: Oxbow Books.
- O'Connell, R. L. 1989. *Of Arms and Men: A History of War, Weapons and Aggression*. Oxford: Oxford University Press.
- O'Flaherty, R. 1998. The Early Bronze Age Halberd: A History of Research and a Brief Guide to the Sources. *Journal of the Society of Antiquaries of Ireland*. Vol. 128. Pp. 74–94.
- O'Flaherty, R. 2007. A Weapon of Choice. Experiments with a Replica Irish Early Bronze Age Halberd. *Antiquity*. Vol. 81. Pp. 423–434.
- O'Flaherty, R. et al. 2011. Ceremonial or Deadly Serious? New Insights into the Function of Irish Early Bronze Age Halberds In: Uckelmann, M. & Mödinger, M. (Eds). *Bronze Age Warfare: Manufacture and Use of Weaponry*. BAR International Series 2255. Pp. 39–52. Oxford: Archaeopress.
- Ó Ríordáin, S. P. 1937. The Halberd in Bronze Age Europe: A Study in Prehistoric Origins, Evolution, Distribution and Chronology. *Archaeologia*. Vol. 86. Pp. 195–321.
- Osgood, R. 1998. *Warfare in the Late Bronze Age of North Europe*. Oxford: Archaeopress.
- Osgood, R. et al. 2000. *Bronze Age Warfare*. Stroud: Sutton Publishing.
- Otto, T. 2006. Conceptions of Warfare in Western Thought and Research: An Introduction. In: Otto, T. & Thrane, H. & Vandkilde, H. (Eds). *Warfare and Society: Archaeological and Social Anthropological Perspectives*. Pp. 23–28. Aarhus: Aarhus University Press.
- Peter-Röcher, H. 2009. *Gewalt und Krieg im prähistorischen Europa: Beiträge zur Konfliktforschung auf der Grundlage archäologischer, anthropologischer und ethnologischer Quellen*. Bonn: Rudolf Habelt Verlag.
- Sarauw, T. 2007. Male Symbols or Warrior Identities? The “Archery Burials” of the Danish Bell Beaker Culture. *Journal of Anthropological Archaeology*. Vol. 26 (1). Pp. 65–87.
- Schauer, P. 1979. Eine urnenfelderzeitliche Kampfweise. *Archäologisches Korrespondenzblatt*. Vol. 9. Pp. 69–80.
- Schulze, A. 2007. *Mittelalterliche Kampfesweisen: Der Kriegshammer, Schild und Kolben*. Mainz am Rhein: Verlag Philipp von Zabern.
- Schiffer, M. B. & Skibo, J. M. 1987. Theory and Experiment in the Study of Technological Change. *Current Anthropology*. Vol. 28 (5). Pp. 595–622.
- Schiffer, M. B. & Skibo, J. M. 1997. The Explanation of Artifact Variability. *American Antiquity*. Vol. 62 (1). Pp. 27–50.
- Sievers, S. 2010. *Die Waffen aus dem Opidum von Manching*. Wiesbaden: Reichert Verlag.

- Tarot, J. 2000. *Die bronzezeitlichen Lanzenspitzen der Schweiz unter Einbeziehung von Liechtenstein und Vorarlberg*. Bonn: Rudolf Habelt Verlag.
- Tilley, C. 2007. Materiality in Materials. *Archaeological Dialogues*. Vol. 14 (1). Pp. 16–20.
- Vandkilde, H. 1996. *From Stone to Bronze: The Metalwork of the Late Neolithic and Earliest Bronze Age in Denmark*. Aarhus: Aarhus University Press.
- Vandkilde, H. 2006. Warfare and Society: Archaeological and Social Anthropological Perspectives. In: Otto, T. & Thrane, H. & Vandkilde, H. (Eds). *Warfare and Society: Archaeological and Social Anthropological Perspectives*. Pp. 9–19. Aarhus: Aarhus University Press.
- Vandkilde, H. 2011. Warfare in Temperate Europe. In: Hansen, S. & Müller, J. (Eds). *Sozialarchäologische Perspektiven: Gesellschaftlicher Wandel 5000–1500 v. Chr. zwischen Atlantik und Kaukasus*. Archäologie in Eurasien 24. Pp. 365–380. Darmstadt: Philipp von Zabern Verlag.
- Warnier, J. P. 2011. Bodily/Material Culture and the Fighter's Subjectivity. *Journal of Material Culture*. Vol. 16 (4). Pp. 359–375.
- Whitley, J. 2002. Objects with Attitude: Biographical Facts and Fallacies in the Study of Late Bronze Age and Early Iron Age Warrior Graves. *Cambridge Archaeological Journal*. Vol. 12 (2). Pp. 217–232.
- Wileman, J. 2009. *War and Rumours of War: The Evidential Base for the Recognition of Warfare in Prehistory*. BAR International Series 1984. Oxford: Archaeopress.
- Wincentz Rasmussen, L. & Boas, N. A. 2006. The Dystrup Swords: A Hoard with Eight Short Swords from the Early Bronze Age. *Journal of Danish Archaeology*. Vol. 14 (1). Pp. 87–108.
- York, J. 2002. The Life Cycle of Bronze Age Metalwork from the Thames. *Oxford Journal of Archaeology*. Vol. 21 (1). Pp. 77–92.
- Zvelebil, M. 2006. Mobility, Contact, and Exchange in the Baltic Sea Basin 6000–2000 BC. *Journal of Anthropological Archaeology* 25. Pp. 178–192.