ROUND SHIELDS AND BODY TECHNIQUES: EXPERIMENTAL ARCHAEOLOGY WITH A VIKING AGE ROUND SHIELD RECONSTRUCTION

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BACKGROUND

Two technological elements can be distinguished in human societies in general: one is body techniques; the other is the material culture (or extrasomatic technology) that has been employed (Horn 2013:100). Together they establish mechanical pairs of elements (Mauss 1992). Taking the example of an Abbevillian hand axe and its relationship to forceful movements and the firm manner in which the hand axe is held, Mauss emphasized that techniques of the body is intimately connected with material culture; that material technologies shape and transform bodily techniques to a considerable extent (Mauss 1992: 471-472). In fact, any extrasomatic technology has the potential to either encourage or facilitate certain sets of corporeal movements and to restrict, or otherwise discourage, others. Extrasomatic technology, therefore, is often produced with body techniques in mind. A desirable result is an ergonomic design which, through rational and calculative thought processes, has been found suitable for the purpose of achieving a specific goal or end. While the archaeological remains of Viking Age round shields can offer details regarding the construction of shields, they provide, in and of themselves, only vague and limited inferences into the second aspect of Mauss' mechanical pairs of elements, body techniques. It may be argued, moreover, that a shield construction cannot be fully understood without any knowledge of body techniques, given the interconnected nature of the mechanical pairs of elements. Experimental archaeology has the potential to offer further insight into this subject.

While a few experimentations with round shields have previously been undertaken, it is clear that these have generally been committed towards understanding merely constructional features of round shields or carried out without an emphasis placed on the simulation of combative conditions. Experiments involving the testing of constructional features - preeminently the leather or gut facing - have revealed some information regarding the significance of individual constructional components and the composition of shields (e.g. Nielsen 1991; Paulsen 1998; Short 2000:40-43; Pauli Jensen 2007:369-371). These tests, however, have been carried out by methods involving the fastening of the shield to a static podium, consequently eliminating the agentic factor and therefore not directly testing any body techniques (fig. 4.1).

Figure 4.1: Test with replica round shield. Notice the fastening of the shield to the static podium (adopted from Short 2000: 43).

In doing so, the experiments have disregarded a highly significant factor, namely the influence of the agent on the manner by which the shield would meet the opposing force and absorb or deflect it. Tests undertaken by reenactors and martial artists, who, on the other hand, have focused on body techniques, have also been found lacking in the extent to which the tests are meant to simulate combative conditions. These investigations into Viking Age combat generally suffer from one or more of the following points of critique:

1. The shields used in the experiment have not been constructed on the basis of the archaeological record. Most modern round shields are merely intended to appear as Viking Age shields on an aesthetic level. They therefore have a tendency of being made exceptionally robust or have been constructed by relatively inexpensive methods, such as the use of plywood shield boards. These shields naturally react differently than any archaeologically-based Viking Age round shield which is of a relatively light design.
2. The offensive weapons used in the experimental tests are historically inaccurate or blunt. A live blade, which is balanced and formed in a manner that is representative of a Viking Age weapon, possesses attributes different to those of blunt weapons (which can't cut) and historically inaccurate weapons, wherefore different results can be expected.
3. The attacks in the experiments are carried out without intent. Owing perhaps to insufficient training in combative arts, inadequate protective equipment or a general fear of inflicting and/or sustaining injury, it is common to see offensive maneuvers to be withheld or carried out without proper force. The attacks are sometimes for the same reasons subconsciously directed only at the shield, not towards the opponent.

4. The shield is used passively. Although not a fallacy in itself, such experiments disregard an active use of the shield and appear to be undertaken under the assumption that the shield is merely to be held statically against incoming attacks.

Accordingly, there has not yet been a scientifically documented experiment that has employed archaeologically-based round shield reproductions in tests designed to investigate body techniques. To attain a more functional understanding of Viking Age round shields, therefore, it was found necessary to construct a round shield which was in line with the archaeological record and thereafter undertake practical experimentation with it under conditions designed to simulate combative scenarios.

The experiment presented in the following pages was carried out in accordance with the controlled approach and thereby places itself within the traditional and positivistic branch of experimental archaeology (Beck 2011: 181; Rasmussen 2001:6). As such, the standards of the experiment are those of scientific experiments directly in line Baconian and Newtonian patrimony and have been presented accordingly (Bacon 1853 [1620]).

AIM

The aim of this experiment was to determine what body techniques Viking Age round shields are inclined to facilitate and which they restrict or otherwise discourage. More specifically, the aim was to critically assess body techniques in terms of deflection and to obtain empirical data outlining the effects associated with an aggressive as well as relatively passive use of the shield. The terms “aggressive” and “passive” are used here to describe the extent to which the shield is actively thrusted forward to meet the attackers blow.

HYPOTHESIS

The Viking Age round shield was of a relatively thin design without any straps that could fasten the shield more firmly to the arm, such as is the case with other medieval shields, e.g. kite shields (Oakeshott 1996: 176-177; see also Wyley 2002). In contrast to the latter, this allows the round shield to be rotated freely during the fight and to be used aggressively. Thus, it may be hypothesized that using the round shield in this manner is somehow advantageous in combative scenarios involving the use of this type of shield.

The hypothesis can be verified by demonstrating its opposite. If “advantageous” is defined to mean, among other things, that the shield will incur less damage from an attack, an analysis can be crafted on the basis that the shield will incur more damage when used passively, as this is in accordance with the hypothesis. Moreover, the principles of torque dictate that the movements of a more outstretched arm are relatively easy to influence, wherefore shield also can be expected absorb more power when held closer to the body since it is less likely to deflect the incoming attack (fig. 4.2). It is also clear that the closer any limb is held to a person’s body, the more connected it is with his or her overall body mass which requires even more force in order to be acted upon.

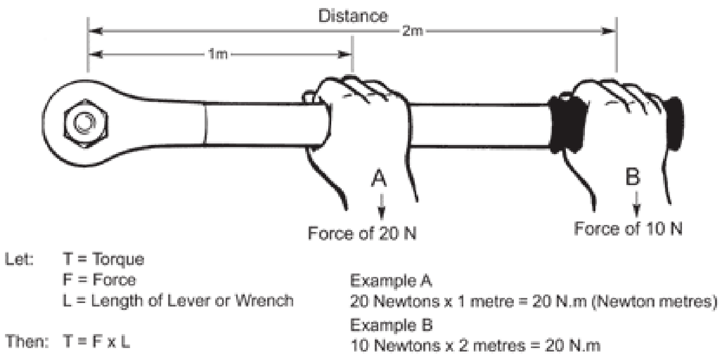

Figure 4.2: Diagrammatic explanation of the principle of torque (adopted from Gedore 2016).

The Round Shield "Reconstruction"

The round shield was constructed in York by Nigel Milham under the direction of the author who provided a detailed data set and guidelines based on the information contained in chapter four. Although several well-preserved shields have been found from the Scandinavian Viking Age – most notably the shields found at Gokstad (Nicolaysen 1882: 62) and Trelleborg (Dobat 2013: 163 ff., 222 ff.) - there is unfortunately no fully preserved shield in existence which could be reconstructed, wherefore there technically cannot in this case be spoken of a *reconstruction* per se. Instead, the shield in question represents an interpolation of an incomplete archaeological record. It can, however, with defensible reasons be said to be representative of Viking Age round shields since it is in line with the data gained from archaeological finds.

The planks used for the round shield were made of Norway spruce wood (*Picea abis)*. They were initially sawn and made to be 18 mm thick. The planks were hand worked with chisels and a plane, and then sanded to finish before sealing with a blend of Danish and Teak oil. It would have been preferable to have initially have cleaved the planks but the process was unfortunately too time consuming. Instead of cleaving the planks, however, their initial thickness was used to remove any warp in the planks during the construction in order to ensure structural strength. The final thickness of the boards measured 8 mm, tapering down to 6 mm towards the edges. Eight planks were used to construct the shield. The plank edges were beveled and glued together with casein glue. The glue was made in accordance with a medieval recipe dating to the early 12th century which describes the glue as being particularly effective when applied to wood, mentioning also shields in the same context (Theophilus 1961 [c.1100]): 16-17). A circular aperture (measuring 12.5 cm in diameter) for hosting the shield boss was made in the center of the board. A hand-forged shield boss of iron (type R564) was fastened to the shield board with six hand-forged iron rivets (fig. 4.3).

Figure 1: Hand-forged shield boss and rivets of iron

Structural strength was provided by the handle, leather facing and rawhide edging. The handle, measuring 80.8 x 2.1 x 2.6 cm in LxWxH, respectively, was fastened across the boards using six iron rivets, including two of the aforementioned boss rivets (fig. 4.4-6).

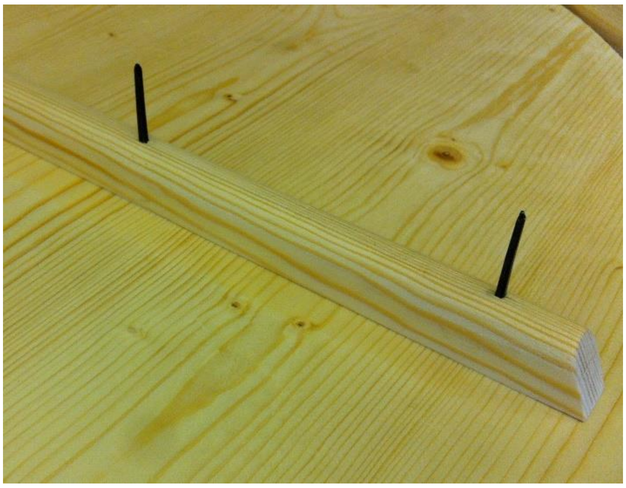

Figure 2: Two iron rivets hammered through the shield board and handle.

Figure 3: The rivet is hammered backwards and back into the handle.

Figure 4: The four clenched rivets of iron that fasten the handle to the shield board. The handle was further secured to the shield board by two additional rivets which were subsequently added in conjunction with the fastening of the shield boss.

The leather facing of the shield, sealed with a traditional local beeswax treatment, was made from pigskin and had a thickness of 1 mm. The rawhide edge, measuring 3 cm in width, had been lashed using artificial sinews, this being the closest replication available of genuine sinew. It should be noted that the nature of the shield rim stitching material remains an open question as there has not been found any such material; leather or sinew, however, remain plausible options. The seam technique used was running stitches, illustrated in fig. 4.7-8. The final product weighed 3.9 kg and measured 89 cm in diameter (fig. 4.9).

Figure 5: Schematic drawing of rawhide edge stitching (adopted from Hjardar & Vike 2011: 184).

Figure 6: The stitching of the rawhide edge.

Figure 7: The round shield.

The Swords

Two swords were used in the experiment: one sharp and one blunt. The sharp sword is a handcrafted and fully-functional, single-edged JP type B sword, produced by Albion Swords Ltd. based on museum research and testing (Albion 2016a). The type B sword dates to AD c. 750-820 and Petersen judges the sword to be contemporary with the shield boss of the shield (R564) used in the experiment, given that all shield bosses found with type B sword has been of type R564 (Petersen 1919:62-65; Jones 2000: 18). The sword, named T*he Berserkr* by Albion, was inspired by a sword recovered in 1909 from a burial mound at North Arhus Farm, Hjartdal Parish, Telemark, Norway (Albion 2016a). The Berserkr is influenced by other single-edged sword originals which have been examined and documented by swordsmith Peter Johnsson (ibid). As with much of Peter Johnsson's work, it is apparent that much emphasis has been placed on obtaining the correct balance, weight and dimensions. (table 4.1; fig. 4.10a). Although a hybrid, the Berserkr thus qualifies as a clear example of this early Viking Age sword type. The sword was used in the attacks directed against the opponent behind the reconstructed shield.

The second sword, also made by Albion Swords Ltd. and designed by Peter Johnsson, is a blunt sparring sword (Albion 2016b). The sword, named *The Vittfarne* by Albion, is designed to be handled and appear as a JP type Z sword, but possesses a blade with rounded edges (table 4.1; fig. 10b). The sword was not employed in the attacks of the experiment, but was held by the shield-bearer merely in order to restrict movements that are unsuitable when yielding both sword and shield. The JP type Z sword is dated to the end of the Viking Age and admittedly a younger type than JP B (Petersen 1919; Jones 2000: 18). The chronological incongruences are, however, inconsequential in this scenario, given the function of the latter sword and the aim of the experiment.

	The Berserkr (JP B)	The Vittfarne (JP Z)
Total length (cm)	91.4	90.5
Blade length (cm)	75	74.9
Blade width (cm)	5	5.4
Centre of Balance (cm)	11.4	11.75
Centre of Pressure (cm)	47.3	52.4
Weight (kg)	1.2	1.15

Table 4.1: Specifications of The Berserkr sword and The Vittfarne sword (adopted from Albion 2016a and Albion 2016b, respectively).

Figure 4.10a-b: The Berserkr (above) and Vittfarne sword (below) (adopted from Albion 2016a and Albion 2016b, respectively).

Protective Equipment

A set of protective equipment were used by both the defender and attacker in the trials, owing to the dangerous nature of the experiment. The defender (shield-bearer) wore metal equipment comprised of iron mail, armor plates and a helmet, all replicas of later medieval originals. Protective equipment of organic material was also worn to better absorb impact. These comprised a set of protective gloves and a gambeson. The attacker wore less protective equipment, which was comprised of a modern fencing mask, a gambeson and mail skirt of iron.

PROCEDURE

Figure 4.11: The initial starting position for the first four of experimental trials. Please note that the protective equipment is composed of a mix of modern HEMA equipment and reproductions of Medieval plate armor; it is not to be taken as representative of Viking Age protective equipment and was merely used in the experiment out of practical considerations in relation to safety.

Given the nature of controlled experiments, the general approach was to isolate as many variables as possible and to change one variable at a time while providing measurable and repeatable results that are empirical in nature (Beck 2011: 181-182; Rasmussen 2001:6). To achieve this, the experiment followed a strict procedure in relation to testing and recording results.

The experiment was conducted through a series of trials in which the sharp sword was employed in standardized attacks directed at the shield bearer, who responded differently to the same attack in each round. The attacker, who held the sword in the right hand, directed powerful attacks towards the left side of the head of the shield bearer each time. The defender would then employ the shield to parry the attack by bringing it forwards and meeting the attack. The shield was not held statically since, firstly, it did not offer full protection when held against the body and, secondly, for the inability to retain the shield in position when held in an outstretched arm. The attacker and shield bearer stood approximately 2 m apart at the beginning of each trial, requiring the attacker to bridge the gap by a step in his attack.

Held in the left hand, the starting position of the shield (the guard) of the first four scenarios was arranged so that the shield was gripped in a c. 90° angle in relation to the shield-bearer’s forearm, resulting in that the shield boss pointed forward towards the attacker (fig. 4.11). With the shield facing forwards, the attacks would inevitably be parried to one of the sides, wherefore the deflective capabilities of the shield was tested in four separate scenarios:

1. Aggressive shield-use, aiming to situate the shield on the outside of the opponent's sword hand.
2. Passive shield-use, aiming to situate the shield on the outside of the opponent's sword hand.
3. Aggressive shield-use, aiming to situate the shield on the inside of the opponent's sword hand.
4. Passive shield-use, aiming to situate the shield on the inside of the opponent's sword hand.

Figure 4.12: The initial starting position for the last two experimental trials. Please note that the protective equipment is composed of a mix of modern HEMA equipment and reproductions of Medieval plate armor; it is not to be taken as representative of Viking Age protective equipment and was merely used in the experiment out of practical considerations in relation to safety.

The above manner of grasping the shield – i.e. centering it in front of the body with shield boss facing forwards – is rather axiomatically understood as a conventional method of handling the shield (e.g. Short 2009: 29ff.). However, while this certainly makes use of the defensive virtues of the shield's surface area, recent observations made by Roland Warzecha (2014) (concerning the possibility of shield-edge-striking in single combat) and the morphology of shield boss type R564, particularly tall specimens possessing high walls and protruding carinations, suggest certain advantages of employing the shield in an angled manner (fig. 4.12). Shield-edge-striking allows for trapping and creating openings for the sword to exploit, while the aforementioned morphology of the shield boss, when employed in this manner, is more liable to come in contact with the opponent's sword and interfere with its momentum. Three additional trials were therefore dedicated to test the shield's deflective capabilities from a starting position whereby the shield was held in an angled manner with the rim facing forwards and the shield boss positioned on the left side of the shield bearer. With the shield positioned in this manner, then, three separate scenarios were tested to test the deflective capabilities of the shield when thrusted forward at varying degrees:

1. Aggressive shield-use, aiming to situate the shield on the inside of the opponent's sword hand.
2. Less aggressive shield-use, aiming to situate the shield on the inside of the opponent's sword hand.
3. Passive shield-use, aiming to situate the shield on the inside of the opponent's sword hand.

At the end of each trial, the shield was inverted since it was expected to sustain some damage. The shield was, for the same reason, subjected to examination and photographic documentation of potential damage after each attack. The trials themselves were filmed from two separate angles. The body techniques contained in each of the trials were evaluated on the basis of the amount of damage to the shield and the effectiveness of the parry.

RESULTS

The following pages present the results gained from the experimental trials. The footage of the trials, which was shot from two separate angles, has been made available on Combat Archaeology's Youtube Channel: https://youtu.be/A8dhCQ4or_8. Photographic documentation of the shield damage and the quantitative recording of the same can be found below.

Trial 1

This trial tested the effects associated with an aggressive shield-use, aiming to situate the shield on the outside of the opponent's sword hand.

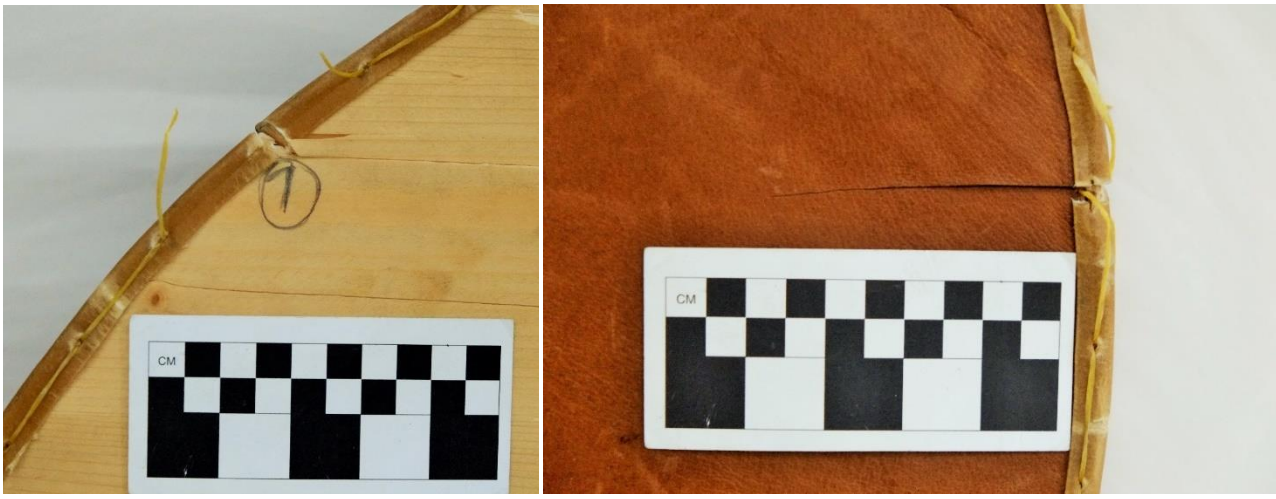

Figure 4.13a-b: Damage to shield after Trial 1.

Damage: The rim of the shield received a 1.3 cm deep cut. The full width of the rawhide edge was severed. The outer leather surface displayed damage in the form of a cut, measuring 8.6 cm in length. Some splintering was visible beneath the leather facing.

Other observations: The attacker came in contact with the shield boss at the point of impact.

Trial 2 (fail) and 3

These trials tested the effects associated with a passive shield-use, aiming to situate the shield on the outside of the opponent's sword hand. Unfortunately, the attack in trial 2 was improperly placed on the shield owing to the slippery surface of the protective glove, wherefore the trial needed to be repeated (trial 3).

Figure 4.14a-c: Damage to shield after Trial 2 and Trial 3

Damage: In trial 2, the shield did not come in proper contact with the blade since the sword was slightly tilted at the point of impact. Nevertheless, the shield displayed a few damage traces, owing mostly to the flexibility of the sword. An examination revealed that the rim had obtained a 0.5 cm deep cut which had cleaved the shield board planking below the rawhide. The inner surface displayed no other damage traces. The outer surface of the rawhide edge – the side facing the opponent - was severed. The outer surface of the shield displayed a superficial cut in the leather facing which measured 4.5 cm in length.

In trial 3, the rim obtained a 0.9 cm deep cut which had cleaved the shield board planking below the rawhide edge. The outer surface of the rawhide was severed. The inner rawhide surface displayed no cut marks, suggesting that the impact had caused the rawhide to move at the time of impact. The impact of the sword had caused the planks to splinter 3 cm below the rim.

Other observations: The blade bent over the shield rim and came in contact with the defender's helmet in both trials. The blow from the attack in trial 3 was particularly powerful and would have injured the shield bearer considerably had he not worn a helmet. In trial 3, the attacker's hand came in light contact with the shield boss.

Trial 4

This trial tested the effects associated with an aggressive shield-use, aiming to situate the shield on the inside of the opponent's sword hand.

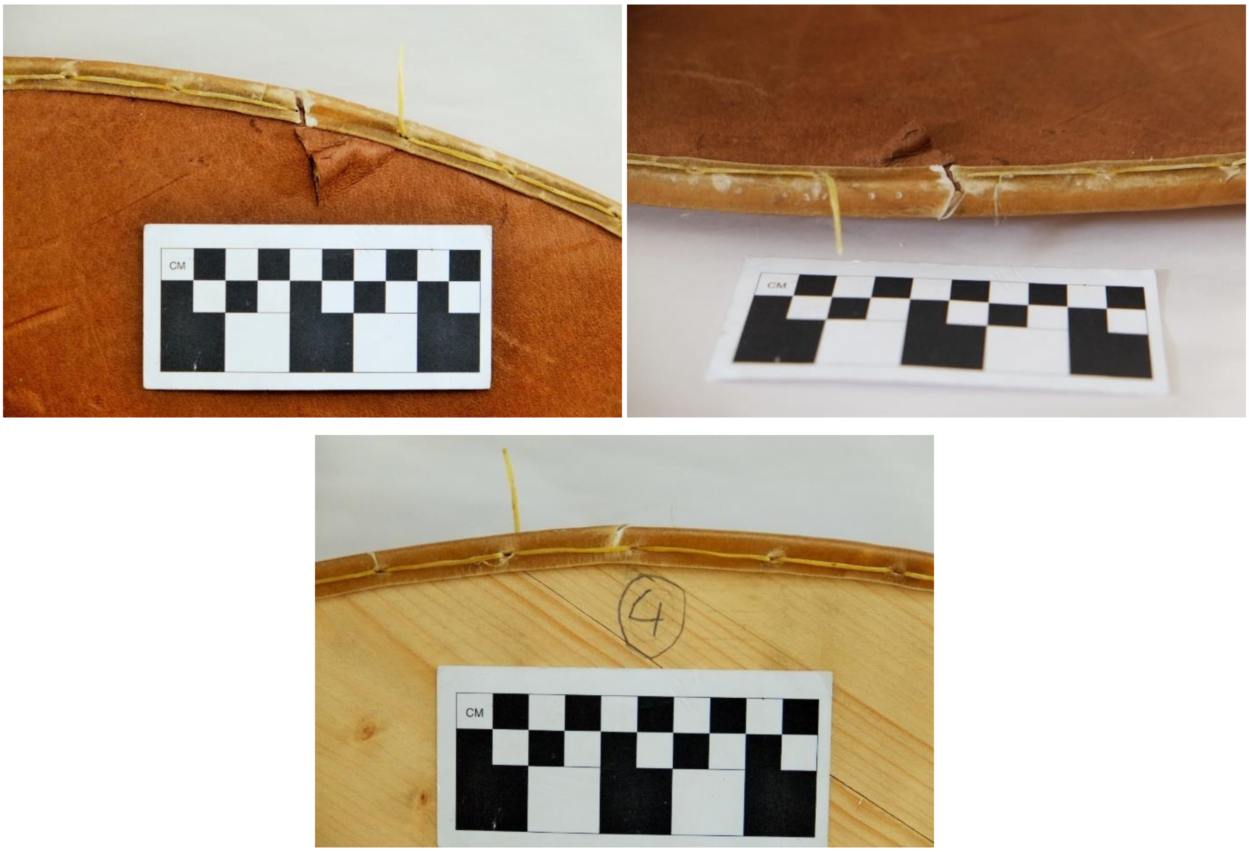

Figure 4.15a-c: Damage to shield after Trial 4

Damage: The rim of the shield received a 0.7 cm deep cut. The full width of the rawhide edge was nearly severed (only 0.2 cm of the inner rawhide edge was left intact). The outer leather surface displayed damage in the form of a shallow cut, measuring 3.5 cm in length. No other damage visible on the inner surface.

Other observations: Nil.

Trial 5

This trial tested the effects associated with a passive shield-use, aiming to situate the shield on the inside of the opponent's sword hand.

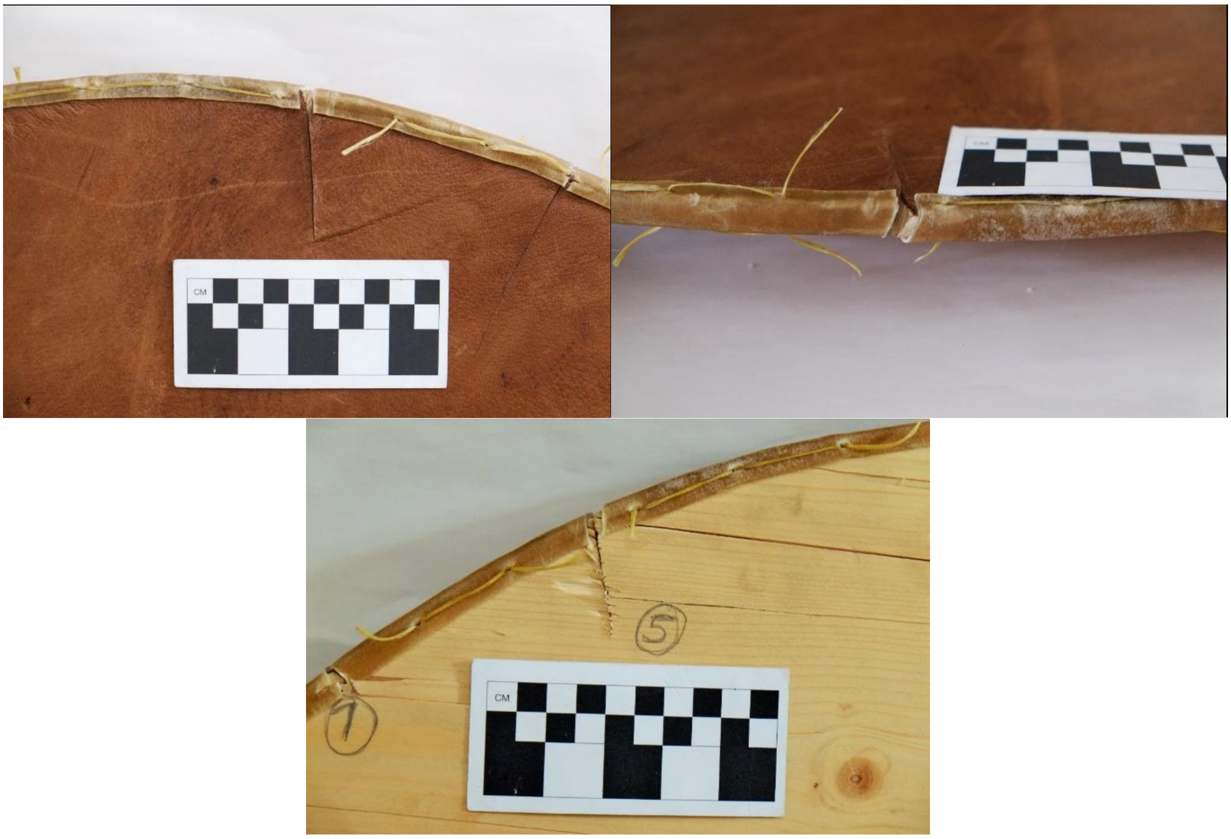

Figure 4.16a-c: Damage to shield after Trial 5

Damage: The rim of the shield received a 4.4 cm deep cut, completely severing the rawhide edging. An examination of the inner surface revealed that the attack had caused the plank to splinter in two places. The outer surface displayed damage in the form of a 5.9 cm long cut.

Other observations: Nil.

Trial 6

With the shield held now in an angled manner, this trial tested the effects associated with aggressive shield-use, aiming to situate the shield on the inside of the opponent's sword hand.

Damage: Nil.

Other observations: The sword only came in contact with the shield boss which deflected the attack so effectively that it severely twisted the sword arm of the attacker and interrupted the momentum of the strike. The shield also slipped so easily through on the inside of the attacker's sword-arm that the shield-bearer was required to withdraw the shield in order for the shield rim not to come in forceful contact with the attacker.

Trial 7

With the shield still held in an angled manner, this trial tested the effects associated with a relatively less aggressive shield-use, aiming to situate the shield on the inside of the opponent's sword hand.

Damage: Nil.

Other observations: The sword only came in contact with the shield boss which effectively deflected it away from the organic parts of the shield, thereby also interrupting the momentum of the strike. Although the shield was extended forward only half the distance of the previous trial, the shield easily slipped through on the inside of the attacker's sword-arm, opening up for the possibility of delivering a shield-edge-strike to the opponent.

Trial 8

With the shield held in an angled manner, this trial tested the effects associated with relatively passive shield-use, aiming to situate the shield on the inside of the opponent's sword hand.

Figure 4.17: Damage to shield after Trial 8

Damage: The rim of the shield received a 4.2 cm long cut running along the rawhide edge. Having encountered the blade at a c. 30° angle, the deepest end of the cut was 1 cm.

Other observations: The sword did not come in contact with the shield boss due to the greater distance between the combatants.

Trials	Length of cuts on outside of shield (cm)*	Damage to rawhide edge			Length of cuts on inner side shield (cm)**	Splintering	Other observations	Observations gained from video material
		Front	Top	Back				
1. Aggressive, outside	8.6	Severed	Severed	Severed	1.3	Vague indications of splintering	Nil	Sword hand came in contact with shield boss
2. Passive, outside (fail)	4.5	Severed	0.5 cm wide cut	Nil	0.5	Nil	No deep cuts on the outer face of the shield, except at the rim	Sword blade came in contact with helmet
3. Passive, outside	4.8	Severed	0.9 cm wide cut	Nil	0.9	Severe splintering 3 cm below rim on upper shield board planking	No deep cuts on the outer face of the shield, except at the rim	Sword blade came in contact with helmet
4. Aggressive, inside	3.5	Severed	Severed	Nearly severed (0.7 cm deep cut)	0.7	Nil	Only 0.2 cm of the rawhide remained intact	Nil
5. Passive, inside	5.9	Severed	Severed	Severed	4.4	Shield boards splintering in two places	Nil	Nil
6. Aggressive, inside (shield angled)	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Sword came in contact with shield boss
7. Less aggressive, inside (shield angled)	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Sword came in contact with shield boss
8. Aggressive, inside (shield angled)	Nil	4.2 (length), 1 (depth)	Nil	Nil	Nil	Nil	The shield suffered damage along the rim	Nil

Table 4.2: Summary of results

*Outer side of shield comprises the leather facing and shield board planking below this.

**The inner side of the shield comprises the inner shield board planking. The damage recorded in this section are cuts that have cleaved the shield through in its entirety.

DISCUSSION

The trials undertaken in this experiment illustrate the importance of the element of deflection in combative encounters with Viking Age round shields. Of the first three trials - where the aim was to maneuver so that the shield would be situated on the outside of the opponent's sword hand – the shield appears to have sustained greater damage in terms of cuts in the trial aimed at using the shield aggressively (Trial 1). While the measurements of the damage attained in Trial 3 (passive use), which are smaller, seem to argue against the aforementioned hypothesis, it should be noted that the shield sustained significant damage in the form of splintering of the upper shield board in Trial 3. Instead of penetrating into the shield, the shield board simply gave way to the incoming force. Although this may due to the angle of the incoming attack, it is more likely that the structural integrity of shield was already partly damaged beforehand in Trial 2 where the edge of the blade was not properly placed on the shield, rendering this trial unsuccessful. In consideration of the small deviation between the damage attained from cuts in Trial 1 and Trial 3 as well as the splintering of shield board in Trial 3, however, it may be postulated that the shield absorbed greater force in Trial 3, wherefore it attained greater overall damage.

Furthermore, it is also worth noting that the sword came in contact with the defender's helmet in both the unsuccessful and successful trial that aimed at situating the shield on the outside of the opponent's sword hand by passive shield use (Trial 2 and 3, respectively). The video material from both trials show that the flexible sword simply bent over the rim of the shield, which, also gave way to the incoming force due to the thin and flexible design. This suggests that a passive use of the shield in this scenario would be a risky maneuver, allowing the incoming blade to come dangerously close. Should the defensive response be performed as an aggressive action, on the other hand, the blade would effectively be deflected further away from the body (as shown in Trial 1).

In the next two trials of the experiment – where the aim was to maneuver so that she shield would be situated on the inside of the opponent's sword hand- the shield appears to have sustained significantly greater damage in the trial where the shield was used relatively passively. While the most significant damage to the shield in Trial 4 (aggressive shield use) was a 0.7 deep cut into the edge – not even fully penetrating the rawhide edge – Trial 5 (passive shield use) resulted in a 4.4 cm deep cut and splintering occurring in two places, causing severe damage to the structural integrity of the shield.

In Trial 6, 7 and 8, the shield had been angled so that the rim faced forwards. Tested with different levels of aggression (extension) in each trial, the aim was to thrust the shield rim forward towards the opponent and thereby situate his sword arm on the outside of the shield. This method of dealing with the incoming attacks proved effective in that they not only minimized the damage to the shield but also placed the defender in an advantageous position from which he could deliver a powerful shield-edge-strike. The only damage attained from these trials was minor shield rim damage in the form of a 4.2 cm long cut along the rim (1 cm deep), resulting from a passive use of the shield (Trial 8).

Some caution should be exercised when interpreting the data gained from these experimental trials. Firstly, the experiment involved several trials but only one reconstructed round shield. Employing a new round shield in each trial was unfortunately not liable due to the time and resources available. Consequently, it was necessary to limit the number of experimental trials to one per scenario. The results, therefore, if examined independently of one another, should be seen as merely suggestive and cannot be said to have any statistical significance. The data is nonetheless more pervasive when examined collectively in the context of the aim of the experiment, i.e. evaluating the overall deflective capabilities of the round shield. In addition, although the shield was turned after each trial to limit the influence of the blows from the former trials, it is possible that these impacts and cuts weakened the structural integrity of the shield, wherefore the subsequent trials may not be truly representative of the scenario that was to be tested. It is thus essential to examine both the qualitative and quantitative results when evaluating the effects of the attacks. Another reason to interpret the data with some caution is the agentic factor involved in the experiment. As an inherent consequence of testing body techniques, the experiment was conducted by using two individuals, an attacker and a defender, both trained in combative arts. Their movements were controlled to the best of their abilities but there is no denying that the agentic factor leaves room for human error. Lastly, as with all experimental archaeology, there is the uncertainty regarding the accuracy of the reconstruction. The shield is built on the basis of composite data and in accordance with available archaeological material; yet there is still a chance that it may not be fully representative of a Viking age round shield. In particular, the construction of the handle may be questioned in this regard. The defender experienced that the softwood handle was rather flexible which sometimes resulted in the shield reacting more unpredictably and with slightly delayed action. The flexibility of the handle also placed noticeable stress on the shield, wherefore it is questionable if a handle of softwood provides the optimal constructional support. Given the above and the little evidence available on round shield handles, it remains a possibility that the handle was constructed out of hardwood. A more accurate construction of the shield board may also influence future results. However, while it is probable that the shield would endure slightly more damage if the planks were cleaved out of slow growing timber with dense tree rings, the current construction was deemed sufficient for purpose of the experiment and general observations. The trials that resulted in the cleaving of the rawhide edge can also bring into question the accuracy of the stitching technique. A discontinuous seam would be more advantageous than a continuous seam in that it could isolate the damage made to the shield edging. Despite these uncertainties, the experiment has yielded unique results and remains informative on both a quantitative and qualitative level with regards to body techniques of Viking Age combat with round shields.

CONCLUSION

The methods by which the experiment was conducted cannot, strictly speaking, prove a hypothesis; it can only make a hypothesis probable, wherefore the following should be seen as a plausibility argument (Coles 1979; Reynolds 1977; Andraschko & Schmidt 1991; Beck 2011: 181). As witnessed, the results seem to favor the hypothesis that the round shields are most advantageously applied by use of relatively aggressive body techniques that meet the incoming force. There is not only a tendency for the shield to obtain relatively little damage when it is applied aggressively but it also creates a greater distance between the defender and the attacker's weapon, effectively minimizing the risk of being injured by the attack. The risk of not parrying the attack – especially if the shield has a relatively small diameter - is likewise minimized in virtue of the shield being extended forwards. It is equally important to note that the chances of meeting the incoming force with the shield boss is simultaneously increased as the shield is brought closer to the opponent, or, more specifically, to the hand and weapon of the attacker. In such encounters, the shield, as a whole, is least likely to suffer from damage since the shield boss not only is the most durable part of the shield but also the constructional feature with the highest capacity to cause deflection. A third consequence is that the impact may cause serious injury to the hand of opponent, particularly if the hand would be unprotected or the shield boss would be of a more protruding type (e.g. R565). The chances of coming in contact with the shield boss and the degree of deflection appear to increase when the shield is held in an angled position with the shield rim facing forward. While the lack of shield damage in these trials attest the functionality of the shield-edge-striking in single combat against strikes to the left side of the shield-bearer's head, the effectiveness of such a position may be questioned in the close-quarter contexts where strikes to the right side also were likely, e.g. in the case of battles or single combat against an experienced opponent. It is plausible to assume that a variety of shield guards was practiced and tactically adopted throughout the combative scenario in order to gain the advantage over an opponent who, if aware of the gambit, would counter and seek to do the same.

Following Mauss' account of the interplay between the material technology and body techniques, it is plausible to assume that the construction of round shields have been carried out with deflective capabilities in mind. To offer a few illustrations in light of the aforementioned findings: the thin and fragile design of the round shield can be explained by a more active and dynamic shield usage which would minimize the risk of damage to the shield as a result of deflective actions. In this manner, then, the shield could remain relatively light, an important advantage given that the shield was held and maneuvered only by the grip. The general lack of leather strap finds or finds of similar fastenings that would help secure the shield more readily to the shield bearer's arm is most likely also a result of such shield usage. Although the unlikelihood of the preservation of such artefacts should be accounted for, it seems likely that it was desirable not to attach the shield firmly to the arm; instead, the shield was intended to be maneuvered freely. To offer better protection against the powerful impacts that might occur as a result of such maneuvering, round shields were equipped with an iron boss, which formed the most durable part of the shield. The deflective capabilities of the various Viking Age shield boss types vary but appears to have been a core concern in their construction (Warming, forthcoming)). While other features endemic to Viking Age round shields – as well some more specialized cases - remain to be discussed, the above will suffice to illustrate the significance of body techniques in investigations of round shields and extrasomatic technologies in general.

Accordingly, this experiment has, by placing a high emphasis on historical accuracy and proper re-contextualization through experimentation, yielded empirical results that are not only been informative in relation to Mauss' mechanical pairs of elements but which can offer a more holistic and functionalistic understanding of Viking Age round shields and martial practices.

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