ON WAR ON BOARD

Archaeological and historical perspectives on early modern maritime violence and warfare

Edited by
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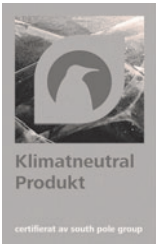

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Contents

An Introduction to Hand-to-Hand Combat at Sea – General Characteristics and Shipborne Technologies from c. 1210 BCE to 1600 CE

ROLF FABRICIUS WARMING

> Terrible is the battle of the sea for the eyes of man, and the senses refute and exalt it, for death is offered in it without any shelter from many troubles and torments. Either of these two things is enough to terrify humanity, let alone both together: the war and the sea.
>
> (Olivera 2008 [1555]:115, my translation)

While there has generally been a great commitment towards researching the use of naval power in European warfare in the past, surprisingly little focus has been centred on the subject of naval boarding and close quarter combat at sea in general. These aspects are largely attenuated in literature on war at sea (cf. Jesch 2001; Jesch 2002; Hildred 2011) and have to some extent sunken into oblivion under the enormous waves of literature on other naval subjects which have gained precedence in this research area, such as cannon fire, lines-of-battles and alike. Notwithstanding the significance of these other subjects, it is surprising that more attention is not given to naval hand-to-hand combat. It was, after all, not only the primary tactical means by which to achieve victory on the seas until the early modern period – and, for many forces, even beyond this date – but also the responsibility and habitude of a countless number of soldiers and mariners across the centuries. Indeed, for many of them, it was the path that led to their destruction. As such, the practice of naval hand-to-hand combat presents itself as an important but neglected aspect in literature on warfare at sea.

The question of how naval hand-to-hand combat practices were conducted aboard European warships of the past has become increasingly relevant with the recent archaeological discoveries of well-preserved Danish and Swedish warships in Scandinavian waters. These include *Gribshunden* (1495) and *Mars Makalös* (1564), both of which date to a period when naval hand-to-hand combat was at its zenith (discussed below; Warming 2015). Combined with historical sources, the state of preservation of these unique wrecks and their associated material culture provides an opportunity to

address practical and social questions regarding the life and conduct of soldiers aboard in new ways.

To move towards a more developed understanding of naval hand-to-hand combat through such specialized studies, however, it is essential to address certain misleading but influential perspectives on this topic which have posed challenges for progress in this research area in the past. Predominantly, this involves abandoning the pervasive notion that such practices are necessarily characterized by impulsive violence and uncontrollable chaos rather than any sort of tactics or instrumental violence. Such viewpoints have been most powerfully propagated through the entertainment industry's creative displays of boarding actions, wherein elaborate fencing choreographies and highflying stunts are recurring action scenes. In actuality, however, the practice of hand-to-hand combat in naval warfare was far from a haphazard affair left to be ruled by unmanaged aggression.

The aim of this chapter is to clarify the general role and nature of hand-to-hand combat practices in European naval warfare before its decline in the early modern period. More specifically, this chapter seeks to establish the fact that the practice of naval hand-to-hand combat expresses itself in history conjointly with careful tactical considerations as well as an awareness of the principles that govern the proceedings of seaborne combat. To this end, the chapter will be divided into two parts. The first will consider the question of what characterizes naval hand-to-hand combat and discuss the environmental and cultural factors which influence such practices in general. With this background, the second part will offer a general introduction to a selection of shipborne technologies that can be considered significant developments in the history of naval hand-to-hand combat tactics. Rather than being any definite work on naval hand-to-hand combat, this chapter is an attempt at providing a general introduction and bringing attention to the value of this topic, thereby setting the stage for more thorough research projects in the future.

The nature of naval hand-to-hand combat

The overall trajectory of the development of warfare at sea is marked by great variation, both in terms of the manner by which fleets have been prepared before battle and the methods by which the fighting has been carried out in practice. Such variances aside, however, the practice of naval hand-to-hand combat can be said to be characterized by a set of distinctive properties. A number of historical naval treatises from across the centuries

(treated below) offer valuable insight into these characteristics, highlighting how the hand-to-hand combat practices are greatly influenced by the maritime environment as well as by culture.

Generally, naval hand-to-hand combat has revolved around two overarching concerns, namely boarding and anti-boarding. Within a combative context, boarding entails a forceful, non-consented entry aboard a ship which is carried out with the intention of defeating the crew or taking control of their vessel along with her cargo. Such an entry has ordinarily been carried out from another ship or by use of smaller, more manoeuvrable watercraft deployed from ships or harbours. Anti-boarding may thus involve an active participation on behalf of the defending crew but can also entail a more passive use of technologies designed to impede a successful entry, e.g. an anti-boarding net. Fighting between boarding and anti-boarding forces can occur in the process of entering the ship or aboard her. Typically, these close quarter encounters were preceded by an exchange of missile attacks which served to suppress and weaken the enemy before boarding.

Perhaps the most characteristic feature of the actual clash between boarding and anti-boarding forces is the high intensity of the fighting. This tendency has often been recognized by historical tacticians who in their military treatises advise the use of heavy armour in the context of seaborne hand-to-hand combat. In his *Epitoma rei militaris* (or *De re militari*), written sometime in the late 4th or early 5th century CE, Publius Flavius Vegetius Renatus emphasizes the importance of heavy armour for soldiers aboard ships:

> Land warfare requires many types of arms; but naval warfare demands more kinds of arms, including machines and torsion-engines as if the fighting were on walls and towers. What could be crueller than a naval battle, where men perish by water and by fire? Therefore, protective armour should be a particular concern, so that soldiers may be protected with cataphracts, cuirasses, helmets and also greaves. No one can complain about the weight of armour, who fights standing on board ships. Stronger and larger shields are also taken up against the impact of stones. (Vegetius in Milner 2001:149)

Here, as Milner (2001:149, note 6) rightfully observes, Vegetius addresses an alleged unpopularity of wearing heavy armour in seaborne combat. While such sentiments may be grounded in concerns about mobility or the fear of drowning, Vegetius makes the point that there is no place for light-armed troops on board ships, reflecting the intensity level of such combative scenarios. On Vegetius' account, moreover, hand-to-hand combat –

or *comminus dimicare*, as he calls it – is the most dangerous aspect of naval warfare at close quarters (Milner 2001:150).

The need for heavy protective equipment in such encounters is likewise reflected in *Konungs Skuggsjá* (King's mirror), a Norwegian educational manuscript from ca. 1250 CE, in which the anonymous author advises that:

> Wide shields and chain mail of every sort are good defensive weapons on shipboard; the chief protection, however, is the gambison made of soft linen thoroughly blackened, good helmets, and low caps of steel (Anonymous 1917:217).

Interestingly, the above passage is the only section of the text where the author places such an emphasis on the protective equipment of the infantrymen, being comparable or surpassed only by the author's description of the armour for fighting on horseback.

The use of heavy infantry in naval hand-to-hand combat seems to have remained an important consideration even after the employment of firearm tactics at sea. In his *Espejo de Navegantes* from c. 1537 CE, Alonso de Chaves (who is the first to lay out naval instructions for the use of firearms at sea) describes the equipment necessary for carrying out boarding actions:

> Asimismo, si los nuestros saltaren en su nao, los primeros deben de llevar montantes, que es mejor arma en tal caso, y los de coselete con espada y rodela.
>
> (Bauer Landauer 1921: 470, quoting de Chaves c. 1537)

> Likewise, if our people jump onto their ship, the first should carry **montantes** which are better weapons for such a case, and men of the **coselete** [should have with them] sword and shield." *(my translation and emphasis).*

I have left *montantes* and *coselete* unchanged in the above English translation since these are used as specialized generic terms in this context and require further explanation. *Montante* is a term referring to large, double-edged swords with hilts for two-handed use. Although sometimes used synonymously with *Zweihänder* or *Doppel-händer*, the *montante* should be considered as a narrower reference to similar swords with designs native to the Iberian region. Interestingly, two-handed swords seem to have been methodologically employed in naval encounters in Scotland already in the late 15th century (Melville 2018: 131ff.) while two later fencing treatises by Domingo Luiz Godinho (2015 [1599]: rule 2a-b) and Diogo Gomes de Figueyredo (2009 [1651]: rule 11) describe how the *montante s*hould be

used on the gangway of a galley, reflecting its prolonged use as a weapon in naval warfare. In the context of seaborne formations armed with anti-boarding pikes (a typical feature of naval combat at this time), the *montante* would have been useful tool for crowd control and could have been used to hack to paths through the opposing formation, disrupting order by slashing and stabbing among the ranks. The second term in the above passage, *coselete*, translates as "cuirass." It is, however, also the generic name assigned to a class of heavily armoured pikemen who fought in the front ranks of pike-squares (*tercios*). In the above passage, *coselete* is seemingly used to describe the latter meaning. *Coselete* soldiers would wear full cuirass (hence their name) along with a morion, gorget, tassets, armour covering the upper and lower arms and metal-plated gauntlets (López & López 2012:36). Accordingly, de Chaves is assigning heavily armoured infantrymen to the task of undertaking boarding actions, thereby echoing the naval tacticians in their considerations regarding the use of protective equipment for ship-board hand-to-hand combat. As in terrestrial warfare, however, it is probable that the utility of heavy armour at sea gradually declined as firearms improved in the course of the 16th and 17th century CE.

The tactical emphasis on using heavy infantry forces in naval warfare throughout these centuries reflects a persistent awareness about the intensity of hand-to-hand combat at sea. The above sources illustrate that seaborne hand-to-hand combat forces were not selected at random or merely pulled from terrestrial ranks without considering the nature of fighting at sea. So, although terrestrial forces were commonly assigned shipborne duty, it is evident that specifically heavy infantry troops were preferred to carry out such tasks. The nature of fighting at sea also prompted the development of trained marine infantry and specialized arms for dealing with the many dangers of naval combat. An early example of this is the Byzantine *dorka,* which, as mentioned by Constantine VII in the 10th century CE, was a large iron shield used only in the navy because of its weight (*De Ceremoniis* 579 [II 15], 670 [II 45]; *De administrando imperio* 1:250 [51]); Grotowski 2010:213–214). Again, this suggests that seaborne combat was particularly intense, requiring sometimes different equipment than in terrestrial warfare. The apparent need for such heavy armour at sea is probably rooted in considerations regarding the dangers posed by missile exchanges as well as hand-to-hand combat scenarios. Heavy armour certainly would have been useful in all phases of the fight, given the overall intensity of seaborne combat that the historical tacticians seem to have stressed in their writings.

The overarching reason for this intensity of seaborne combat is chiefly to be found in the conditions brought about by the maritime environment. As illustrated in the quotation in the beginning of this chapter, shipborne soldiers were as much in danger of perishing at the hands of their enemies as by the natural environment. All ships are essentially floating sanctuaries which protect their crews from the seas. All ships can be understood as floating sanctuaries which protect their crews from the seas. A maritime battlefield can therefore be conceived as a sort of extreme island warfare, characterized by limited resources and a confined battlespace. Such maritime battlespaces, moreover, are typically severely lacking in safe entry and exit routes, although the fighting ships may be assisted by other ships. This has often been carefully exploited by the enemy, not least by friendly forces, as illustrated by a vivid first-hand account of a naval battle in the early 17th century by Alonso de Contreras (1582–1641):

> Our Captain then applied a refined stratagem: he allowed only a few people on deck, and had all the hatches carefully fastened down, so that people either had to fight or jump into the sea. It was a bloody confrontation.
>
> (Kirsch 1990: 67, quoting de Contreras 1961:84–86).

In hand-to-hand combat scenarios, where boarding and anti-boarding forces clash, the static conditions of maritime combat are amplified, especially in cases where the ships cling to one another by use of grapnels and alike. These circumstances render it difficult to disengage from the fight and offer little chance of escape. The two opposing forces are, quite literally, in the same boat, wherefore the mission becomes one of gaining ground and searching for a decisive victory.

As an inherent consequence, naval hand-to-hand combat scenarios are inclined to be fought out in the form of battles. Generally, battles can be distinguished from virtually all other forms of warfare- such as skirmishes, firefights and other minor engagements – by the desire or willingness to meet on a battlefield for a single, massive clash between armed men for the purpose of mass killing (perhaps, but not necessarily, with some other ultimate goal in mind). They are also said to be "one of the *most* organized, premeditated, regimented and patterned forms of human behaviour" (Staniforth et a. 2014: 77, my emphasis). As such, battles, however functional in appearance, are not simply pragmatically organized procedures contained within a social vacuum and devoid of a discursive history. They are inextricably bound up with cultural discourse and thus also a wide array of ideological assumptions and

social considerations that guide warfare (Carman 2009:39). Hand-to-hand combat in naval battles is no exception to this general rule.

Following this mode of thought, naval hand-to-hand combat can also be understood as a cultural performance where social preferences influence the nature of combative practices. It is, in fact, often challenging to discuss the functional and cultural factors independently of each other. This is perhaps most poignantly demonstrated by one of the methods used in motivating a boarding party during battle in the 16th century:

> During the battle, the Drummer, Fifer, and trumpets must always play, unceasingly, with the greatest arrogance, and as bravely as they can, because beyond enlivening the friendly crew, they are apt to frighten the enemy."
>
> (de Palacio 1986 [1587]:154)

As on land, naval battles included highly cultural elements and practices which could influence the course and outcome of the conflict. These often served to intimidate the enemy as well as to reinforce and legitimize the combative setting itself. Musical instruments, as exemplified above, was not the only measure used to this end. The maritime battlespace was also filled with a massive array of subtle, ritualized behaviour and symbolism, such as flags, uniforms and ornamentation. The significance of such elements and practices in relation to boarding actions in late medieval naval warfare have recently been highlighted by the discovery of a monstrous figurehead from the wreck of *Gribshunden*, a Danish warship which sank in 1495 CE off the coast of Ronneby (south-east Sweden). The figurehead, which was probably painted with vivid colours, would have been positioned just afore the forecastle containing the offensive combat unit and was the first "face" with which the enemy crew made contact (Warming 2014; Warming 2017). Certainly, an initial encounter with such a spectacle would have been startling, if not frightful, to the enemy. A figurehead of this sort may therefore not only have served a symbolic role which, among other things, helped to identify the ship; it could also have given the infantry unit in the forecastle a brief tactical advantage in combat. Although such cultural elements and practices did not necessarily serve an explicit tactical purpose in naval warfare, they were nonetheless part of the maritime battlespace. As such, they had the potential to evoke certain emotions and sets of behaviour amongst the shipborne soldiers and others operating within such battlespaces.

A brief history boarding and anti-boarding technologies

While naval hand-to-hand combat can be characterized by a set of unique properties and understood in relation to both environmental and cultural influences, it is evident, too, that this practice has assumed many different forms in the course of history as a result of technological innovations.

Space does not permit a full review of the contest between boarding and anti-boarding technologies in this place; however, the following should suffice as a general overview of the history of close quarter combat at sea and the main developments therein until the zenith of naval hand-to-hand combat tactics. Such technological overviews often give the impression of an evolutionary or linear process, but it is important to note at the outset that new technologies do not necessarily replace the old. The naval technologies discussed here often existed alongside each other, especially as navies were commonly composed of different types of vessels serving different functions. At other times, new strategies and challenges demanded the revival of older technologies, such as the renewed emphasis on galley warfare in Baltic waters in the 18th century. The following overview is therefore not intended to provide a comprehensive insight into all the combative technologies used by European navies in each respective period. Instead, the advancements discussed in this section represent a selection of technologies which can be said to have greatly influenced the practice of naval hand-to-hand combat and the overall trajectory of the development of warfare at sea. The details presented here simultaneously illustrate the veritable importance of hand-to-hand combat in naval warfare since the inception of sea battles and well into the early modern period.

Given the ubiquitousness of warfare in both past and present, it is plausible to assume that both boarding and anti-boarding actions have been carried out in one form or another since the inception of naval warfare, i.e. since the employment of watercraft sufficiently stable for hosting hand-to-hand combat scenarios or for the launching of missile attacks. The inception of this is challenging to pinpoint precisely in time and space. Perhaps the oldest depiction of a boat more advanced in its design than a canoe is a pictograph on a granite pebble found in the Khartoum Mesolithic layer in Sudan (Usai & Salvatori 2007). The pictograph, however, is rather abstract and does not allow for an interpretation of the stability of the watercraft in question. Being the only one of its kind, it is also quite the exception. Several finds from Egypt, however, suggest that early naval warfare could have been conducted as early as the Late Neolithic/Early Bronze Age. These include Amratian ceramics from c. 3500

BCE which are decorated with depictions of what are considered the earliest convincing evidence for the emergence of more stable watercraft (McGrail 2001:17). Another important find is the flint knife with ivory handle from Gebel-el-Arak (Abydos, Egypt), dated to c. 3300–3200 BCE, on which two types of vessels are depicted in association with terrestrial battle scenes (ibid.: 19). In consideration of the tendency for large-scale violence to intensify with increased political complexity and the dating of the aforementioned finds, it is interesting to note in this place – although not wholly surprising – that the development of more stable watercrafts coincides with the emergence of early nation states. Stable watercrafts would not only have facilitated geographical expansion but almost certainly also the projection of power at sea.

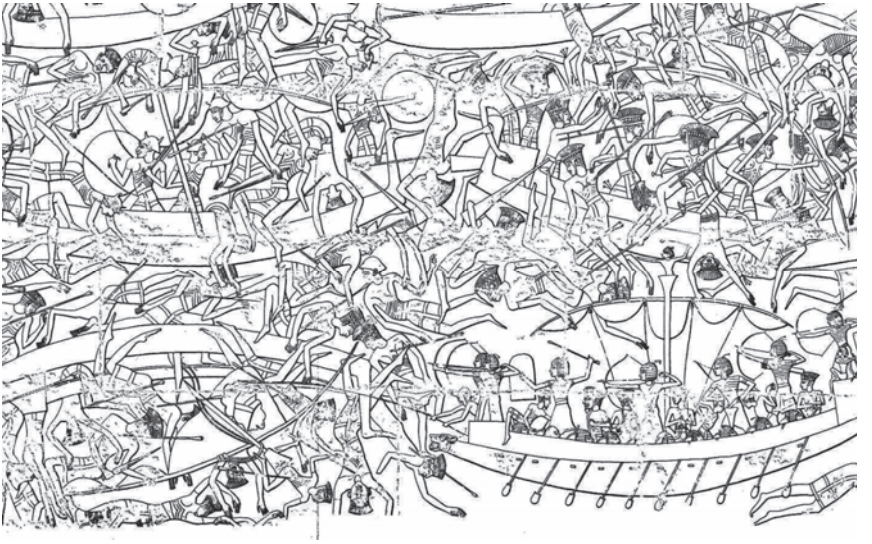

Figure 24: Detail from the relief at Medinet Habu, Luxorm depicting the Battle of the Delta in c. 1175 BCE (Courtesy of the Oriental Institute of the University of Chicago)

Notwithstanding these vindications, the first secure evidence of sea battles comes in the form of historical evidence from the Late Bronze Age. Contained in one of the few surviving documents which detail the reign of the last Hittite king, Suppiluliumas II, is a mentioning of a Hittite *naval* victory in 1210 BCE (Gurney 1952:1–32; Bryce 2007:7). The account simply states that the Hittites were victorious on the sea against an enemy based in Alasiya (modern day Cyprus), offering no further details about the exact identity of the enemy or how victory was achieved. It is probable that the naval encounter was concluded by means of hand-to-hand combat, but the

extant details are insufficient for drawing any decisive conclusion in this respect. Considerably more information is on the other hand available about the second battle in recorded history, namely the Battle of the Delta (c. 1175 BC) which was fought between the Egyptians and the Sea Peoples (Ermen & Ranke 1923: 648; Nelson 1943; Cornelius 1987). The proceedings of this battle are recorded on the reliefs of pharaoh Ramesses III's mortuary temple at Medinet Habu in Luxor, Egypt. The reliefs are composed of detailed battle scenes depicting both boarding and anti-boarding actions in which shipborne archers and hand-to-hand combat forces can be seen fully engaged in intense mêlée action (Figure 24). The belligerents are, among other things, using manned fighting tops, which probably functioned as observational posts in non-combative contexts, and grapnels which can be seen used to capsize enemy vessels. All in all, these scenes give the impression of a competent and well-established early naval institution. Specialized naval technologies and tactics, then, seem to have been in use at least as early as in the Late Bronze Age.

In Ancient Greece, naval warfare underwent several notable developments which came to have significant consequences for boarding actions. To avoid hand-to-hand combat encounters, Mediterranean navies developed ram-equipped warships which were deliberately used to collide with enemy ships in order to sink them. The earliest convincing evidence for a warship with a ram appears on the bronze fibula from a burial in Athens dating to around 850 BCE (Casson 1991: 76–77; Fawcett 1994: 84; cf. Mark 2008). By at least the 5th century BCE, frontal ramming – the deliberate head-on collision between two ships equipped with bronze rams – had become a common procedure (Murray 2012:17 ff.). This required that the bronze-casting technology had advanced to a point where bronze rams would survive repetitive ramming, a development that probably should not predate the latter half of the 6th century BCE (ibid.: 17, note 11).

Another early development in Greek naval combat was the so-called dolphin, a massive weight of led or iron which could be flung or dropped from a ship's yardarm onto an enemy vessel with enough force to sink it or damage its hull. As such, the dolphin, like the ram, should be understood as a technological device intended to counter boarding actions. While the exact origin of the dolphin remains unknown, several written sources (e.g. Thucydides 7.41 and 62; Aristophanes *Equit*. 762; Lucan's *Phars*. 3.635) attest that the device was in frequent use aboard ships as early as the 5th century BCE. In 2016, the Hellenic Ministry of Culture and Sports and the Woods Hole Oceanographic Institution recovered an artefact from the

Antikythera shipwreck (dated to c. 65 BCE) which has tentatively been identified as a dolphin (Mazza 2016). If correctly identified, the artefact recovered from Antikythera is the only extant example of such a device. The artefact in question is teardrop-shaped lead weight tipped with an iron spike, certainly capable of causing severe damage to the hull of enemy ships if dropped from a ship's yardarm.

By the early 4th century BCE, the Greeks had constructed siege engines called catapults (also known as ballistae in their more developed form) and began mounting them on the bows of some of their warships towards the end of the same century (Murray 2012:146–8; Marsden 1969; Marsden 1971). The catapult underwent a series of considerable developments during the 4th century BCE. Around the time of their first attested shipborne use (the Battle of Salamis in 306 BCE), engineers had worked out two basic design formulas for the catapult: one which shot stones; another for bolts (Murray 2012: 146–8). These two designs allowed fleets to attack enemy ships and personnel at greater distances with a variety of round ball shot and bolts, including incendiary devices. As such, catapults greatly complemented ramming and dolphin tactics, which sought to lessen the risk of being successfully boarded but could also be used in tandem with boarding tactics, depending upon the situation and range (Wallinga 1956: 29–50; Murray 2012: 162–70).

Another two significant technological devices designed to facilitate boarding actions emerged during the time of the Roman Republic. The first of these, the *corvus*, was a boarding ramp with an iron spike on its underside which was used to penetrate the decks of ships when lowered. The *corvus* thus allowed the renowned Roman land army to effectively engage in regular, terrestrial battles at sea. The first attested use of this device was in the Battle of Mylae in 260 BCE (Polybius' *Histories* 1.22), where the Roman navy used it against the Carthaginian navy with considerable success (Pitassi 2011: 41ff.). Another important Roman development was the *harpax* or *harpago* which was assumedly first employed at the Battle of Naulochos in 36 BCE (Murray 2012: 148). The device essentially consisted of a grappling hook on a wooden shaft which was attached to a long rope and could be shot onto an enemy ship by a heavy catapult. Using the trailing line, the crew could then haul the enemy ship alongside for boarding. Commanders could consequently not only force enemy ships to engage in close quarter battles but, to a certain extent, also control the manoeuvring of the enemy ship and thereby exploit more favourable positions for boarding actions.

While the above inventions all developed into new and improved varieties, and continued in use over the next few centuries, naval warfare did seemingly not undergo any considerable change in terms of new boarding and anti-boarding technologies until the Early Middle Ages. This change came with the development of Greek fire, which was famously employed by the Byzantine navy after its invention in c. 672 CE (Luttwak 2009:324). Greek fire was an incendiary weapon composed of a flammable liquid (probably based on petroleum) which could be ejected onto enemy ships and personnel from tubular projectors known as *siphons* (ibid: 325; Figure 25). The *siphons* could be mounted on protected platforms at the bow and, later, amidships and even at the stern of warships. Greek fire could also be weaponized and projected by other means, such as handheld *siphons* and earthen closed pots which could be thrown either by hand or catapults (Stanton 2015:15). The invention of Greek fire and the production of new warships, which were designed to better accommodate the weapon, made Byzantium less dependent on boarding than other contemporary powers. The weapon was nonetheless far from a universal solution and certainly had its limitations. In particular, the combination of the need for favourable weather conditions and precise sailing manoeuvres (whereby the ship could make use of its projectile weaponry but stay out of boarding range) as well as the short range of the *siphons* rendered Greek fire primarily useful as a defensive weapon in calmer waters (Luttwak 2009:325–326). Boarding actions therefore remained a common procedure even as Greek fire came to constitute an important anti-boarding measure in the Byzantine navy and in the fleets of rivalling powers – such as the Arabs – who later adopted the weapon.

Figure 25: Depiction of Greek Fire in the Madrid Skyltizes, an illuminated manuscript from the 12th century (Codex Skylitzes Matritensis, Bibliteca Nacional de Madrid, Vitr. 26-2, folio 34v. Courtesy of Bibliteca Nacional de Madrid)

Later in the Early Middle Ages, the renowned Scandinavian fleets of the Viking Age made use of relatively simple tactics to transform a naval battle into one with properties more reminiscent of terrestrial battles. When fighting at sea, the Scandinavians occasionally lashed a large body of their ships together in order to provide a more stable platform for fighting and boarding (Rodgers 1967:79–86; Jesch 2001:203–215; Jesch 2002). In doing so, they facilitated the manoeuvring of reserve troops which could be inserted from lighter vessels at points where the main struggle needed support (Figure 26). The lighter vessels could simultaneously be used to harass enemy flanks and for protection of their own, which was naturally the most favourable point of attack. The forces comprising the main formation could be arrayed in different ranks and assigned different roles depending on the range of their weapons. As described in the *Saga of Magnus the Good* (Sturluson's *Heimskringla* VIII), discussing the proceedings in the Battle of Aarhus (1044 CE), warriors could only use their hand-to-hand weapons at the bow; those farther off would fight with projectile weapons, including light javelins, arrows, stones, etc. (Rodgers 1967: 80 ff.). Abaft the mast, the warriors would be required to use bows and arrows. Shelter from these projectiles would be sought behind the high stem and stern posts as well as the rows of shields placed along the gunwhale. One such shield-rack can be observed along the upper edge of the sheer strake on the Skuldelev 5 ship-find, a small long ship excavated in Denmark along with four other ship-finds, all dating to the first half of the 11th century (Crumlin-Pedersen

2002:262–264). On another of these ship-finds, Skuldelev 1 (a medium-sized cargo ship), a conical, pointed object (probably an arrowhead) has seemingly pierced the top strake from the outside, suggesting how cargo ships of the period could also serve certain martial functions, either as logistical support or fighting platforms (ibid. 108; Ravn 2016:110–114). The reliance on infantry weapons and the general renunciation of anti-ship technology (apart from fire-ships) in seaborne combat in the Viking Age is a peculiar feature in galley warfare, clearly illustrating the importance of cultural choices and the non-linear development of boarding and anti-boarding tactics.

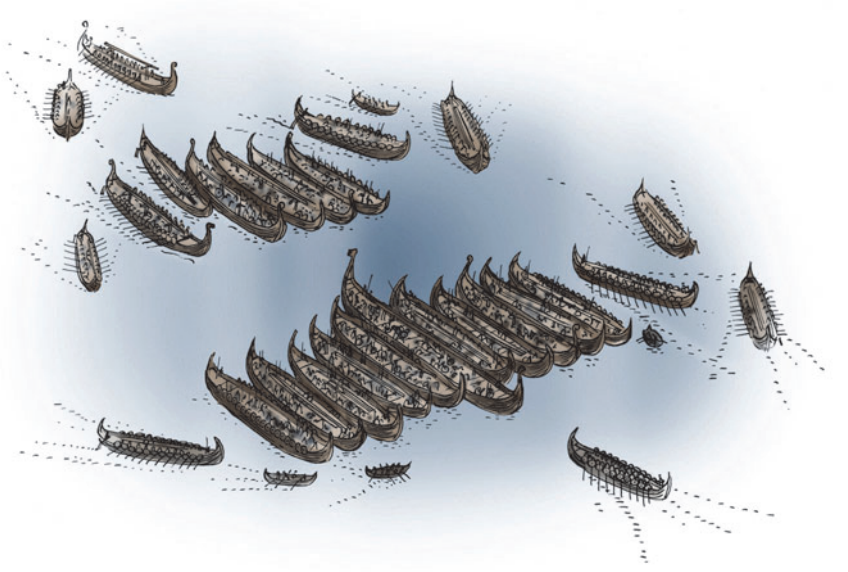

Figure 26: Viking Age fleets lashed together to provide a more stable fighting platforms at sea (adopted from Hjardar & Vike 2013: 86, artist: Anders Kvåle Rue)

Another major development in warfare at sea in the Early to High Middle Ages was the emergence of ship types with high freeboards and large elevated fighting platforms which allowed soldiers to obtain the height advantage in combative encounters. An early use of such a type in naval warfare was the cog, which could be constructed with both fore and aft castles for defence. It should be mentioned that towers had already been constructed aboard seagoing warships at least since the beginning of the First Punic War (261–241 BCE) on Roman quinqueremes and that the Byzantines were known to have built shipborne castles into some of their larger *dromons*

(Luttwak 2009:326 ff.; Pitassi 2011:46). The cog can nonetheless be said to represent a new technological development in this regard since it successfully integrated relatively large fore and aft castles as well as high freeboards into a sturdy seagoing design which relied on sailing propulsion instead of rowing. The design entailed that the ship had good seakeeping and was not reliant on many rowers for successful tactical manoeuvring; instead it could deploy a relatively large infantry force to carry out the fighting. Though mentioned in literary works as early as the 9th century CE, the archaeological and historical evidence suggests that the cog was not fully integrated into naval warfare in the form of the floating fortress that gained a near hegemony over the northern seas until the 13th or 14th century CE (Bill 2002; Bill 2003:41–43).

The Norwegian *Konungs skuggsjá*, written in c. 1250 CE, indicates an early Scandinavian use of martial cogs which were equipped with castles in both bow and stern as well as crow nests in the mast tops (Bill 2003: 45). In England, the cog accounted for about 57% of the 1300 ships attested for military service during the years 1337–1360 CE, proving itself as an effective engine of war in several major naval battles, including the Battle of Sluys in 1340 CE (ibid: 43). The castles facilitated boarding actions but also made it easier to repel attacks, especially since their height provided a better overview of the mêlée and much wider angles of attack for projectile firing. It is evident, too, that the enemy (should they be positioned at a lower height) would be at a disadvantage at close quarters owing to the challenges brought about by gravitational force. Other successful warship designs – such as the carrack and carvel – were later built with the same considerations in mind, although these were considerably more stable and spacious than the cog.

Notwithstanding the significance of the above developments, there can be no doubt that the employment of gunpowder weapons aboard ships was a particularly meaningful advancement in naval warfare, influencing both boarding as well as anti-boarding tactics to a considerable extent (cf. Friel 2003: 79). Ships were probably first equipped with guns during the first half of the 14th century, judging from the first mentioning of a gun bought for an English royal ship, the *All Hallows Cog*, in 1337 or 1338 CE. This is likewise supported by the first recorded instances of the employment of guns in naval battles in the first half of the 14th century, such as the Battle of Arnemuiden (1338) and Battle of Sluys (1340) (Friel 2003:72f.; Hildred 2011:12–3). Guns nevertheless seem to have remained relatively unimportant during the 14th century, serving only a minor role in battles (Friel 2003: 72ff.). The 15th

century, however, witnessed a dramatic increase in the appreciation for gunpowder weapons at sea, these chiefly being comprised of light ordnance, small bombards and breech-loading swivel guns which were carried high in the hull, i.e. on the upper deck and in the shipborne castles (Barfod 1990:131; Friel 1995:152f.; De Vries 1998:390; Friel 2003: Guilmartin 2011:130f.; Hildred 2011:13). Such early guns were light, anti-personnel guns and not intended for the sinking of ships. Instead, they mainly offered support for hand-to-hand combat forces in repelling or carrying out boarding actions (Mortensen 1999: 225ff.; Warming 2014). The recently identified wreck of *Gribshunden* (1495), Danish King John I's flagship, is possibly the most well-preserved Late Medieval warship (Einarsson 2008; Rönnby 2015; Eriksson 2016), representing the final historical stage of naval warfare where guns only played a minor role and served as support for infantry forces. The ship was a carrack carrying small wrought-iron guns, as evidenced by the discovery of several gun carriages and small shot. According to Caspar Weinrich's chronicle (p. 309), some 150 men perished with the ship when it sank, most of whom were assumedly soldiers (see Sjöblom 2015). Granting that the crew numbers listed in an earlier record from 1487 accurately represents the number of mariners aboard *Gribshunden* (30 men) at the time of her sinking, the soldiers may have totalled some 120 men, these constituting the main fighting force of the ship (see Barfod 1990:72). Several finds of mail confirm the presence of infantry forces and the general martial nature of the ship (Rönnby 2015). That they were also well-equipped for battling at long-range is evidenced by the recent excavation of 2019 (led by Södertörn University, Lunds University and Blekinge Museum) which uncovered, among other things, a crossbow, crossbow bolt and an early arquebus (Figure 27). Future experimental trials with replicas of these artefacts are currently being planned by Lunds University in collaboration with the current author in order to better illuminate the fighting capacities of the *Gribshunden* warship. Being the oldest carvel-built ship discovered in Nordic waters, the wreck simultaneously reflects a design that would come to facilitate the impending construction of gun ports and employment of heavier ordnance in wars at sea.

Figure 27: The crossbow stock recovered from the wreck of the *Gribshunden* (1495) during the 2019 excavation. The cut out for the trigger system can be seen in the middle. The original crossbow was probably equipped with a composite bow and spanned with a goat's foot lever. The remains of the stock measures 39 cm in length, 5 cm in width and 4.5 cm in depth (photo: Christoffer Sandahl, Blekinge Museum)

Ships capable of carrying enough heavy ordnance to sink other vessels did not appear until the late 15th or early 16th century. This advancement within naval warfare predominantly emerged as a result of improvements within gun, gun carriage and ammunition manufacture as well as a change in shipbuilding technique which allowed lidded gun ports to be placed close to the waterline (Konstam 1988; DeVries 1997; DeVries 1998; Hildred 2011:13; Warming 2014). The latter not only entailed an increase in ship stability and the ship's capacity for carrying heavy ordnance; it also allowed guns to be fired closer to the waterline. Mediterranean galleys circumvented some of the challenges involved in using heavy shipborne artillery and initially mounted a single large gun forward of the bow, thus becoming the first ships to take advantage of the use of heavy ordnance at sea (Sicking 2010:241). The first recorded sinking of an enemy vessel by use of ship-board gunpowder weapons can probably be accredited to the French galleys in the Anglo-French naval engagement off the coast of Brest, France, in 1513 CE (Spont 1897:146, 153). Some of the French galleys involved in this engagement were equipped with three Venetian basilisks; one shot from these, according to the 16th century historian Peter Martyr (1457–1526), could "strike through any ship" (ibid.:51).

Heavy ordnance also seems to have played a significant role in the fore-runner to this engagement the previous year, the Battle of St Mathieu (1512), where the *Mary Rose* (1545) shot away the main mast of *La Grande Louise*, the admiral ship of France. The design and armaments of *Mary Rose* herself, a carrack built in 1510–1511, also signal that heavy ordnance began to play a significant role in naval warfare around this time. Having been

submitted to extensive archaeological and historical studies after the rediscovery and excavation of the wreck in 1971–1978, it has become clear that the *Mary Rose* reflects an early attempt to introduce a higher number of heavier weapons lower down in the hull of warships. The transitional design of the *Mary Rose* is particularly evident as a result of her rebuilding in 1536, when a lower tier of gun ports was added, and further emphasis placed on the use and upgrade of heavy ordnance to the detriment of anti-personnel armaments (Hildred 2011:856 ff.).

However, a successful and dependable use of ordnance for long-distance battling was not only a matter of ordnance types or numbers; there was also a need for carefully planned tactics which were construed to inflict maximum damage to the enemy's ship whilst avoiding hand-to-hand combat engagements. The first "modern" naval battles, wherein artillery not only played a crucial role but was deliberately used as a tactical measure to defeat and sink large warships at a distance without engaging in hand-to-hand combat, did therefore not take place before the second half of the 16th century (Warming 2014). The proceedings of the Battle of Öland (1564) between the Swedish and Dano-Lübeckian fleets provide the first clear indication that heavy ordnance began to take the foreground over naval hand-to-hand combat tactics in this sense. During this battle, the Swedish warship *Mars* (1564) successfully sank the Lübeckian *Alte Barke* (1564) by use of its superior heavy ordnance, following the orders of King Erik XIV who had instructed that *Mars* was to use its guns to sink enemy vessels from a distance (Ekman 1946: 64; Höglund 2012:146; Sjöblom 2016:329). This is possibly the first recorded incident of planned long-range tactics which were successfully carried out in practice at sea. Eventually, however, *Mars* was successfully boarded and defeated by the Dano-Lübeckian fleet, after which it exploded and sank. The newly discovered wreck of the *Mars* (Rönnby 2012; Rönnby 2013) provides an important arena of research for investigations into naval hand-to-hand combat practices, not only because of its pivotal role in naval history but also since the wreck site is essentially a 16th century battlefield capsulated in time. The most recent investigations of this wreck site (season 2019) has underscored the research value of the site and its potential for understanding the life of the crew and soldiers aboard as well as the battle itself. Some of the recent findings include the only surviving example of a large boarding grapnel, a femur with sharp-edge trauma around the knee region (see Frederiksson & Sten, this volume) and several artefacts which have been tentatively identified as hand-held weaponry, including a grenade. *Mars* and the Battle of Öland (1564), together with the

decisive defeat of the Spanish Armada in 1588 CE, marked the beginning of the successful and dependable use of long-range guns as primary weapons in naval warfare, effectively ending the era of sea battles dominated by boarding (Probst 1992; Mortensen 1999:364; Parker 1988:92 ff.; Warming 2014). The potential of heavy ordnance fire in naval battles, however, was not fully realized until the 17th century when gun technology and tactics had developed even further (Friel 2003:79).

Accordingly, the 15th to 16th century can rightfully be regarded as the zenith of naval hand-to-hand combat in European naval history. It was not only a period of transition in which the tactical focus of naval warfare began to shift from boarding to heavy ordnance fire; it was also a time when shipbuilding placed heavy emphasis on high castles and size, achieving a previously unrivalled capacity for carrying infantry forces. This is perhaps most clearly reflected by the archaeological remains of the *Mary Rose*. Her heavy ordnance and placement of gun ports have been discussed above in relation to advancements within naval artillery and the newly given significance to long-distance battling; however, it is equally important to note that she was also equipped with high castles and carried large numbers of infantry forces, even after her rebuilding in 1536. Despite a general decrease in soldiers since her launch in 1511, she did, nonetheless, probably carry a crew of some 500 men into the Battle of the Solent (1545), most of whom drowned underneath the anti-boarding netting when she sank (Marsden 2003:10; Hildred 2011: 4ff.; Warming 2014). In addition to the Mary Rose, it should be mentioned that the 16th century was also witness to what can probably be regarded as the largest naval battle in European history, if understood in terms of a ship to men ratio, namely the Battle of Lepanto (1571). The galleys in this battle carried up to 400 men and the c. 400 galleys fighting at Lepanto may therefore have carried in total some 160,000 men, according to some estimates (e.g. Parker 1988:89).

Undoubtedly, the combination of large crews with soldiers in crammed formations and the increasingly effective use of ordnance fire entailed great losses of lives, even though certain measures were taken to protect the soldiers, such as special shipborne shields etc. The consequences of this unhappy marriage in the zenith of naval hand-to-hand combat could hardly have gone unnoticed. It is presumably what led the naval tactician Fernando Oliveira to remark about the general harmfulness artillery to humanity and his need to justify the use of such weapons in his naval treatise of 1555 (Oliveira 2008 [1555]: 41–42). Writing in a period which was witness to the ever more destructive and impersonal approach to waging war (Warming 2014), Oliveira

was probably not alone in his sentiments. The violence, now generated in a detached and distant way, was something new, having interesting psychological repercussions that are known to result in the violence becoming more extreme (Shalit 1988:77). It can be supposed that such violence induced a certain amount of fear, particularly in the many soldiers who were aboard some of these ships (for notions of fear at sea, see Hammar, this volume). What were their thoughts upon embarking from the port, knowing that they would encounter enemy fleets who were capable of injuring and killing many of them before they even had the chance to play a part in the battle? Given the large number of infantry forces, the repercussions of this method of waging war certainly must have impacted those involved, their families and the society as a whole. Naval warfare during this period should therefore be seen as stimulus for ideological change and as a contributing factor in the scepticism about the rightness of war that emerged in the 16th century (Tallett & Trim 2010:6; Warming 2014).

While the period described above may rightfully be understood as the zenith of naval hand-to-hand combat, it should be noted that the practice was never completely abandoned (e.g. Gilkerson 1991). Boarding and anti-boarding operations remained important considerations in later fleets even after tactical focus had shifted towards heavy ordnance fire. It often played an important part in the final phases of naval battles, although not necessarily to the same extent as in the past. Moreover, for fleets lacking or inexperienced in effective shipboard ordnance use, boarding remained the primary method by which to conclude a battle at sea. Boarding actions could also have been undertaken as a counter-measure if the enemy vessel possessed superior firepower or when it was desirable to capture the enemy vessel instead of destroying it. The ship was not only a prize in and of itself, but may also have carried valuable persons or materials, such as food, treasure, weaponry or information that could have aided naval intelligence. Thus, while boarding tactics lost some of its importance to navies after the advent of successful heavy ordnance fire, it remained a widely applied practice in Europe, both amongst naval fleets as well as amongst privateers and pirates. Boarding is still employed and practiced by modern day institutions – including special military task forces – as well as pirates, the latter of which have even resulted in the revival of specialized anti-boarding tactics in our modern day, such as electric fences and anti-boarding netting.

Conclusion

Far from being a frivolous or heedless affair, naval hand-to-hand combat was conducted with considerable deliberation and played a crucial role in determining the outcome of naval battles in the past. Heavily influenced by both culture and environmental constraints, the practice of naval hand-to-hand combat assumed several different forms across Europe in different historical periods, making use of the prevailing military wisdom of the day and the technology available to them. Like on land, seaborne combat involved both defensive and offensive tactics. The extent to which these were carried out and emphasized varied from fleet to fleet and ship to ship. Sometimes, an offensive naval hand-to-hand combat force was the main concern of a fleet or ship and operated alongside boarding technologies designed to facilitate such actions; at other times, infantry forces merely constituted support for anti-boarding technologies, these being intended for sinking vessels or otherwise deterring enemy boarding actions. As mentioned, the technological advancements treated in the course of these pages are not all-encompassing nor are they treated at a level of detail that would allow a full comprehension of the actual naval hand-to-hand practices which were erected around these developments. They do, nonetheless, illustrate the extent to which efforts were invested into the development of boarding and anti-boarding technologies across the centuries, reflecting also a past awareness of the underlying principles that seem to govern the proceedings and various stages of naval warfare. The several different facets of this study, each of which have varying connections with the subject and which have the potential to address it from several historical and archaeological viewpoints, are likewise not intended to constitute any definite work on naval hand-to-hand combat. Instead, this chapter has served to clarify the significance of the role of hand-to-hand combat and bring out a few new aspects and topics for further consideration. As such, it should be understood as an introduction to a topic deserving of a fuller exploration. It is to be hoped that more specialized studies in the future will be able to shed greater light on these aspects of naval warfare in their regional and temporal varieties.

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Figures and Tables

Figures

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What were the human experiences on board warships in the early modern period? Here, specific examples connected to battlefield situations and the practices on and below deck present clearer insights. Primarily, however, this anthology details the human organization of, and attitudes towards, systematic violence and warfare. How should we better explain and understand an addiction to war during this period and elsewhere in history?

On War on Board is the result of a collaboration between archaeologists and historians using both material sources and written documents. The contributing authors explore subjects connected to warfare based on their expertise and research interests.

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