



Sea Peoples, Egypt, and the Aegean: The Transference of Maritime Technology in the Late Bronze–Early Iron Transition (LH IIIB–C)

Citation

Emanuel, Jeffrey P. 2014. Sea Peoples, Egypt, and the Aegean: The Transference of Maritime Technology in the Late Bronze–Early Iron Transition (LH IIIB–C). *Aegean Studies* 1 (2014): 21-56.

Permanent link

<http://nrs.harvard.edu/urn-3:HUL.InstRepos:34903185>

Terms of Use

This article was downloaded from Harvard University's DASH repository, and is made available under the terms and conditions applicable to Other Posted Material, as set forth at <http://nrs.harvard.edu/urn-3:HUL.InstRepos:dash.current.terms-of-use#LAA>

Share Your Story

The Harvard community has made this article openly available.
Please share how this access benefits you. [Submit a story](#).

[Accessibility](#)

Sea Peoples, Egypt, and the Aegean: The Transference of Maritime Technology in the Late Bronze–Early Iron Transition (LH IIIB–C)

Jeffrey P. Emanuel

Harvard University

Abstract

The appearance of the brailed rig and loose-footed sail at the end of the Late Bronze Age revolutionized seafaring in the eastern Mediterranean. The most famous early appearance of this new technology is found in history's first visual representation of a naval battle, on the walls of Ramesses III's mortuary temple at Medinet Habu, where both Egyptian and Sea Peoples ships are depicted with this new rig, as well as top-mounted crow's nests and decking upon which shipborne warriors do battle. The identical employment of these innovative components of maritime technology by opposing forces in this battle suggests either some level of previous contact between the invaders and those responsible for designing and constructing Egypt's ships of war, or shared interaction with a third party, perhaps on the Syro–Canaanite coast. This article examines the evidence for the development of the brailed rig in the eastern Mediterranean, and explores the possibility that at least one group of Sea Peoples, who may have comprised a key part of the international economy of the Late Bronze Age in their role as "pirates, raiders, and traders" (Georgiou 2012: 527) – Artzy's "nomads of the sea" (1997) – played a similarly integral role in the transference of maritime technology between the Levant, Egypt, and the Aegean.

Introduction

The well-known relief from Medinet Habu showing Ramesses III's troops overwhelming a fleet of ships manned by so-called 'Sea Peoples' (Epigraphic Survey 1930 pls. 37–39, henceforth *MH* 1; Figure 1) is not just history's first representation of a naval battle: it also serves as a monumental "coming out party" of sorts for several new features of maritime technology, each of which is portrayed identically on both sides' ships (Figure 2). These features include the brailed rig and loose-footed squaresail, the top–

mounted crow's nest, and at least partial decking upon which opposing warriors are shown slinging missiles and brandishing swords. Each would become a key component of both Greek and Phoenician shipbuilding traditions in the Iron Age and beyond, with the brailed squaresail being used in the Mediterranean for two millennia before finally being displaced (Roberts 1991: 59; Wachsmann 1998: 174). While analogs exist in Aegean and Syro–Canaanite ship iconography for these components (the latter appearing almost exclusively in Egyptian art; Sasson 1966: 128; Stieglitz 2000: 12; see also below), individually or in various combinations, the images at Medinet Habu provide evidence for their development, while also presenting them together in a seagoing “package” for the first known time – remarkably, in identical form and use on vessels representing two distinctly different cultures.

Contact and Conflict in the Late Bronze Age Eastern Mediterranean

Seaborne threats to coastal polities, even from small numbers of ships, were a significant threat in the Late Bronze Age (*inter alia*, Baruffi 1998: 10–13, 188; Beckman 1994a: 27; 1994b: 31 no.33; Emanuel 2012a; forthcoming B; Singer 1983: 217; Wachsmann 1998: 320–321), as either the Sea Peoples themselves or what may to be a precursor to them can be found in the Amarna Letters and Hittite documents, intercepting ships at sea (e.g. EA 105, 114), conducting blockades (e.g. EA 126), and carrying out coastal raids around the Eastern Mediterranean, including on the maritime gateway to Egypt, the Nile Delta (e.g. CTH 147, 181; EA 38; cf. ; Emanuel 2012a; forthcoming B; Lambdin 1953; Linder 1970: 317–324; Wachsmann 1998: 130). This state of affairs is perhaps to be expected in such an affluent, internationalist period as the Late Bronze Age; after all, piracy is naturally most successful when coastal settlements and trade routes are present, regular, and prosperous (Horden & Purcell 2000: 157). The balance between respectable merchant activities and piracy may be seen in the entrepreneurial nature of commerce in this period: while the use of private intermediaries, itinerant sailors, traders, and in some cases mercenaries may have begun as an effort by states to expand their economic influence and regional prowess, and to gain an edge on their partners and rivals, the symbiotic relationship between the parties involved may have matured and mutated to such a degree that these

middle-men became integral parts both of international communication and of national economic activity (Artzy 1997: 2). In Artzy's words, they became "an essential part of a trade network, a position obtained because of their peculiar expertise: capital in the form of a boat and knowledge of navigation, the requirement for successful maritime commerce" (Artzy 1998: 445; Monroe 2010: 29). However, as the Late Bronze Age wore on and the economic situation became less favorable from the point of view of some "fringe" merchants and mariners, a number may have "reverted to marauding practices, and the image of 'Sea Peoples' familiar to us from the Egyptian sources emerged" (Artzy 1997: 12).

It should be no surprise that those who depended most on the sea for their livelihoods may have been among the earliest adopters of innovative maritime technology (Georgiou 2012: 527). The piratical element of these "nomads of the sea" (Artzy 1997; 2003: 245) may have driven the development of superior warships, raiding craft, and naval tactics whose technological needs were often at odds with the merchant vessels upon which they may have preyed. While the primary purpose of merchantmen, whose travel throughout the Late Bronze Age Eastern Mediterranean is attested both textually and archaeologically, the seagoing ships that were used for raids and other piratical activity, as well as in naval battles, had significant speed and maneuverability requirements in addition to the storage space needed to transport booty back from raids (see above). Thus, while the development of vessels for raiding and warfare was driven at least in part by what Wedde (1999: 465) terms "the struggle to place as many rowers as possible into as small a hull as practical" for the purpose of that speed and maneuverability, the presence of a rowing crew aboard merchant ships would have been at the expense of cargo (Georgiou 1991; Crielaard 2000: 56).

This pursuit reached its most advanced state around the Late Helladic (LH) IIIB–IIIC transition (ca. 1200 BC) with the development of the Helladic oared galley and the pairing of this vessel with the brailed rig and loose-footed squaresail.¹ This system consisted of lines attached to the bottom of a sail and run vertically through rings sewn into the front of the sail. From there, they were run over the yard and to the stern. Using this system, sails could be easily raised, lowered, and otherwise manipulated in a

manner similar to a set of Venetian blinds (cf. Roberts 1991 pls. XVIIa, XIX–XX; Wachsmann 1998: 251; Mark 2000: 130 fig. 5.8). To this point, sailing craft had relied on large square sails held fast by upper and lower yards. While clearly an advantage over oared propulsion alone, the boom-footed squaresail was most effective for downwind travel, as the lower yard prevented the trimming of the windward edge (Casson 1971: 273–274; Roberts 1991: 55, pls. XVIIIa, XX; Sølvér 1936: 460; but see Georgiou 1991). The loose-footed sail, on the other hand, offered much greater maneuverability, as well as the ability to sail much closer to the wind. Reconstructive evidence of this can be seen in the voyage of the *Kyrenia II*, a replica of a Hellenic sailing vessel, which was able to sail close-hauled at 60 degrees off the wind on its journey from Paphos to Piraeus – an angle roughly comparable to modern yachts (Cariolou 1997: 92–93; cf. also Katzev 1990; Roberts 1991: 57–59; 1995: 314).

A true break with prior ship design (as typified by Minoan sailing vessels and Cycladic craft like those depicted on the famous miniature fresco from the West House at Akrotiri), the Helladic oared galley has rightly been called both “a strategic inflection point in ship architecture” and “the single most significant advance in the weaponry of the Bronze Age Eastern Mediterranean” (Wedde 1999: 465). Thus, once outfitted with the brailed rig (perhaps ca. 1200 BC; Wachsmann 1998: 157), the galley became an ideal vessel for rapid travel and lightning-fast raids on coastal settlements:

In the beginning theailable square sail allowed hull forms quite unsuited to propulsion by sail of the Thera-type the opportunity to extend their cruising range due to the lightness of gear and ease of control. Skills learnt in handling the rig coupled with improvements in gear and fittings enabled effective courses to be sailed in a wide range of directions other than before the wind. The ability to conserve the strength of the rowing crew [and the ability to sail in most directions economically with small crews, given a slant of wind] opened greater horizons to military adventurers (Roberts 1991: 59).²

The Sea Peoples and the Helladic Oared Galley

In Ramesses III’s naval battle relief, rowers are only shown aboard the Egyptian ships. However, this does not mean that the Sea Peoples ships depended on wind as their sole means of propulsion; rather, as Wachsmann (1981) convincingly demonstrated

thirty years ago, the Sea Peoples ships pictured at Medinet Habu were patterned closely after Helladic oared galley prototypes (also Wachsmann 1982; 1998: 164–172; 2000: 116–122; 2013: 33–84; *contra*, e.g., O'Connor 2000: 85). No oars are shown and the sails, as on the Egyptian vessels, are clearly brailed up at the time of the battle; however, the more likely reason rowers are absent from this scene is because it was meant to depict a surprise attack by the Egyptian fleet, which pinned the Sea Peoples' vessels against land and prevented their escape (Nelson 1943: 46; Wachsmann 1981: 188; Barako 2001: 138). This is supported by the accompanying inscription, which refers to the Sea Peoples as being "capsized and overwhelmed where they are":

"Now then, the northern countries which were in their islands were quivering in their bodies. They penetrated the channels of the river-mouths. Their nostrils have ceased (to function, so) their desire is to breathe the breath. ...*They are capsized and overwhelmed where they are. ...Their weapons are scattered upon the sea.* His arrow pierces whom of them he may have wished, and the fugitive is become one fallen into the water."

Naval Battle Inscription (Wilson 1974: 263, henceforth ANET)

Further support for connecting warriors in the 'Sea Peoples' tradition to an adapted form of the Helladic oared galley design can be found on fragments of a decorated LH IIIC Middle krater from Pyrgos Livanaton (Homeric Kynos), which combine to depict a naval battle between spear-wielding warriors aboard antithetic oared galleys (Dakoronia 1987: 117–122; 2006; Wachsmann 1998: 130–132; Figure 3a). Though its sail, yard, and backstay are not pictured, the nearly complete ship at right, referred to as 'Kynos A' (Wedde 2000 no. 6003, henceforth W6003), bears a circular masthead from which a forestay and two brails are suspended, thus demonstrating that this vessel is outfitted with the brailed rig (cf. also a ship painted in silhouette on a LH IIIC stirrup jar from Skyros; W655). The spiked headgear worn by the Kynos warriors, who stand on an at least partial deck, appears to be an example of the "hedgehog helmet" motif that is commonly interpreted as being the Aegean representation of the feathered headdresses seen at Medinet Habu (Sandars 1985: 134; Vermeule & Karageorghis 1982: 132; Mountjoy 2005: 425; Yasur-Landau 2013: 30, 34). These "feather-hatted" and "hedgehog-helmeted" warriors appear around the Aegean and Eastern

Mediterranean at this time (Yasur-Landau 2013: 27; Emanuel forthcoming A; forthcoming B), and it may be no coincidence that some of their earliest representations can be found in the earliest scenes of naval combat, and in conjunction with oared galleys (Emanuel forthcoming A; forthcoming B).

The earliest representation of this type of headdress from the Aegean and the East Aegean–West Anatolian Interface³ may be found on a locally-made krater from Bademgediği Tepe (ancient Puranda), which Mountjoy has dated to the Transitional LH IIIB2–IIIC or LH IIIC Early (Meric & Mountjoy 2002: 92; Mountjoy 2005; 2011: 484, 487; see Benzi 2013: 521 for a LH IIIC Middle date). Like the Kynos krater (and like the Medinet Habu relief more broadly), the Bademgediği Tepe vessel features a scene of naval combat, albeit an unfortunately fragmentary one. Two ships face each other, and atop each deck is a row of warriors holding spears and round shields (Figure 4). We cannot see either ship's rigging, but the ship on the left (facing right) clearly depicts rowers manning oars on a level below that of the warriors, thus confirming the presence of at least partial decking, as on the Kynos vessels.⁴ If the feathered headdresses of the warriors on the Kynos and Bademgediği kraters do in fact mark them as Sea Peoples, then these may not only be Sea Peoples vessels, but participants in a battle scene portraying combat *between* ships manned by Sea Peoples. What this means is open to interpretation, but it may provide further evidence for the chaotic nature of the LH IIIB–IIIC (Late Bronze–Early Iron) transition in the Aegean and Eastern Mediterranean.

As might be expected given their different media and the fact that they are products of different cultures, there are noticeable differences between the representations from Kynos, Bademgediği Tepe, and Medinet Habu (see also above). For example, the Kynos warriors (and perhaps those from Bademgediği) wear loose garments on their upper bodies, while the images at Medinet Habu show the Sea Peoples wearing cuirasses and kilts. Additionally, the Kynos warriors bear hourglass-shaped shields, while the shields shown on the Bademgediği krater and at Medinet Habu are circular. There are also structural differences between the Kynos A vessel and the Sea Peoples prototype depicted at Ramesses III's mortuary temple. For example, while the single

quarter rudder depicted on Kynos A, characteristic of Mycenaean ships (Wachsmann 1998: 157), is paralleled on Sea Peoples ships N2 and N4, ships N1 and N5 have two quarter rudders. On the former, both are on the starboard quarter, while the latter has a rudder on either quarter, while no quarter rudder is depicted on ship N3.⁵

Additionally, aside from the yard and sail so clearly shown at Medinet Habu but altogether missing from the Kynos vessels, the most notable difference between Kynos A and the Sea Peoples ships may be the lack of a crow's nest atop the former's mast. Though it should be kept in mind that the absence of a feature in iconography does not necessitate its physical or historical absence, the crow's nest is neither a feature of Helladic ships, nor of Egyptian vessels in the pre-Medinet Habu period (cf. Wachsmann 1998: 253). Rather, the first crow's nests to appear in Late Bronze Age representations of seagoing ships come from depictions of Syro-Canaanite vessels in two Egyptian tombs, the 18th dynasty tomb of Kenamun (TT 162) and the 19th–20th dynasty tomb of Iniwia (Landström 1970 figs. 403, 406). Because of this, it has been suggested that the crow's nest originated in the area of the Syro-Canaanite littoral (e.g. Davies & Faulkner 1947: 43; Wachsmann 1981: 214; 1998: 51, 56). Given their regular contact with the region, as well as the clear value of a lookout on a raised platform for raiding and paramilitary functions, it is perhaps unsurprising that the Sea Peoples may have adopted the crow's nest from Levantine seafarers just as they may have adopted the brailed rig from this area (as previously suggested by Wachsmann 1981: 214–216; 1998: 252; 2013: 262n.135; cf. Raban 1989: 170; see also below).

If correctly dated to the late 18th or early 19th dynasties (first quarter of the 13th c. BC), an important but rarely-cited portion of a relief from Saqqara (Berlin 24025) may support the Syro-Canaanite origin of the crow's nest, loose-footed sail, and brailed rig, while providing a crucial missing link between Syro-Canaanite ship construction and the technology utilized by both sides of the naval battle.⁶ The mast, furled sails, downward-curving yard, and top-mounted crow's nest of the seagoing ship depicted in this relief are identical to those from Medinet Habu (Figure 5). Part of the yard, furled sail, and double backstay of a second, identically-rigged vessel is partially visible on

the left edge of the relief. Unfortunately, the mast and rigging are all that is shown of these ships; no hints are provided as to the hull design and shape.

Unlike the brailed rig, the downward-curving yard – likely the result of a light yard responding to downward pressure from the furled sails (Roberts 1991: 55) – can also be seen in depictions of Syro–Canaanite seagoing vessels from the 14th century, such as a sea-going ship in the tomb of Nebamun at Thebes (TT 17; Figure 6; cf. also a 13th century scaraboid from Ugarit, Wachsmann 1981 fig. 28b), as well as boom-footed riverine vessels in the tombs of Rekhmire (TT 100), Menna (TT 69), Amenemhet (TT 82), and Sennefer (TT 96B) (Landström 1970 figs. 316, 319, 399; Wachsmann 1982: 302). This feature does not appear again in Egyptian iconography after Medinet Habu.

Along with the yard, brailed sail, and crow's nest, the Syro–Canaanite origin of the vessel depicted in the Saqqara relief is suggested by the Canaanite amphorae being unloaded in the scene, and its date, while possibly a century or more earlier than Medinet Habu, is consistent with late 18th and early 19th dynasty references to Sea Peoples in the eastern Mediterranean (Vinson 1993; 1994: 42),⁷ including Ramesses II's 13th-century defeat of "rebellious-hearted Sherden" (see below). A Syro–Canaanite provenience of the top-mounted crow's nest and downward-curving yard helps explain both their *absence* on galleys depicted in their native Aegean milieu and their *presence* on Sea Peoples' vessels of Helladic oared galley type that are shown in the area of the Levant and Egypt, while the development of the brailed rig in the area of the Canaanite littoral could also explain its nearly simultaneous appearance on Egyptian and Aegean ships at a slightly later date.

Egypt, the Sea Peoples, and Technological Transference

Relevant differences having been noted, it is clear that Kynos A, if not the exact same ship as the Medinet Habu prototype, is an extremely close relative (and it can be cautiously suggested that the Bademgediği vessels are, as well, despite the lack of visible mast or rigging). As can be seen in Figure 7, mounting the yard and furling the sail on Kynos A in the manner shown at Medinet Habu, and adding the missing oars to

the Sea Peoples vessels, produces two nearly identical ships. The Aegean association of at least some Sea Peoples – in particular, the Philistines⁸ – provides a certain logic for their use of the Helladic oared galley, while the well-documented travels of these groups throughout the Eastern Mediterranean does the same for their adoption of the brailed rig and top-mounted crow's nest (though, as noted above, only the former appears on Aegean and Interface ships at this time). Further, while very few nautical references have been found in Philistine material culture, the connection between Sea Peoples and the brailed rig is further attested by ceramic evidence from Ekron (modern Tel Migne). Sherds of a Mycenaean III C:1 krater (Philistine Monochrome, 12th c. BC) feature the characteristic semi-circles of a furled brailed sail, along with the horizontal line of the yard and three vertical lines, which likely represent a mast and halyards or brails (T. Dothan & Zukerman 2004: 32, 33 fig. 15; Mountjoy 2005: 425; Wachsmann 2013: 64–65; Figure 8).⁹

How, though, did Egypt come to acquire and adopt these innovative components of maritime technology, which only appear on their ships in the early 12th century, in the context of a naval battle against the identically-equipped ships of the Sea Peoples? Maritime contact between Egypt and the polities of the Syro-Canaanite littoral is attested from at least the 18th dynasty (e.g. EA 101 and 105), with elements of ship construction being transferred to Egypt – and ships themselves being appropriated – by Thutmose III in the 15th century (Breasted 1906–7 §§454, 460, henceforth *BAR II*; Säve-Söderbergh 1946: 35; Sasson 1966: 128n.12; Wachsmann 1998: 313, 321, 330). Further, Thutmose III's shipyards, located in the Memphite district of *prw-nfr*, appear to have been staffed with Syro-Canaanite shipwrights (Glanville 1930; 1932; Säve-Söderbergh 1946: 37; Sasson 1966: 128; Redford 1992: 225; Wachsmann 1998: 223). Though the brailed rig is not yet attested at this early date, such close contact between Syro-Canaanite mariners and Egypt certainly demonstrates that direct transfer would have been possible, if it did in fact originate in this area. Its limited attestation on Egyptian ships, though – a corpus that consists only of the vessels portrayed on the Medinet Habu relief – suggests that there was little impetus for its adoption prior to the period of increased antagonistic contact with the Sea Peoples. Further, as previously noted, the sole representation of Egyptian ships utilizing the brailed rig depicts both

Sea Peoples and Egyptian sailors employing this new technology in identical fashion – a fact that suggests the lack of a temporal advantage on either side that would have come from significantly earlier or more direct adoption.

In light of this, I would suggest that, rather than adopting this technology directly from Syro–Canaanite shipwrights, its transfer may have taken place through contact with the aforementioned “pirates, raiders, and traders” – Artzy’s “nomads of the sea” – during the century prior to Ramesses III’s famous battle. The first overt mention of seaborne threats against Egypt during the Ramesside period can be found in the formulaic Aswan stele of Ramesses II’s (1279–1213) second year (cf. Redford 1971:118–119), in which the pharaoh claims (among other conquests) to have “destroyed the warriors of the Great Green (Sea)” so that Lower Egypt can “spend the night sleeping peacefully” (Kitchen 1996: 182, henceforth *RITAT* I; de Rougé 1877: 253.8; cf. Emanuel 2013: 24n.30). Ramesses first gives a specific name to these troublesome sea raiders in the Tanis II rhetorical stele, which tells of the “Sherden¹⁰... who came bold–[hearted...] in warships from the midst of the Sea,” and claims the pharaoh defeated them and “carried [them] off to Egypt” as prisoners – the first of many Ramesside claims to have taken members of this group captive:

“(As for) the Sherden of rebellious mind, whom none could ever fight against, who came bold–[hearted, they sailed in], in warships from the midst of the Sea, those whom none could withstand;

[He plundered them by the victories of his valiant arm, they being carried off to Egypt] – (even by) King of S & N Egypt, Usimare Setepenre, Son of Re, Ramesses II, given life like Re.”

RITAT II 120

Sherden seem to have been active along the eastern Mediterranean coast at the turn of the 13th century, albeit with widely differing levels of interaction and integration at different locales. Trade *emporia* dotted the region in this period, with shipping lanes and anchorages alike doubtless serving as tempting targets for skilled privateers and opportunities for similarly skilled swords–for–hire to defend those potential targets (cf., e.g., the possible “mercenaries [or mercenary] from the north who were in the service

of the Mycenaeans" aboard the Uluburun ship; Pulak 1998: 219; 2005: 308). Thus, we should not be surprised to find warship-sailing "Sherden of the Sea" at various locations around the eastern Mediterranean – particularly if their maritime exploits were by this time based in some part on piratical activity, as Ramesses II's inscriptions have traditionally been read as reporting. Certainly the characterization of the Sherden as those "whom none could ever fight against" suggests that they, like their fellow-travelers the Lukka (cf. EA 38), had been engaging in such activities for some time by this point. Further, if the encounter with the Sherden recorded in Tanis II took place while they were engaged in such marauding, then it stands to reason that Sherden sailors were employing the ships and/or sailing tactics that were best suited to sea raiding at this time – including, perhaps, brailed rig and top-mounted crow's nest.

A New Term for New Technology?

A noteworthy element of the Tanis II inscription is the fact, first observed by Yoyotte and subsequently followed by Kitchen, that the encounter it describes was unique enough that it apparently forced the Egyptians to invent a new term for "warship" in order to commemorate it. The result was the somewhat clumsy *ḥꜥw ḥꜥ (m-ḥry-ib pꜣ ym)*, which can be literally translated as "ships of fighting (in the heart/midst of the sea)" (cf. Yoyotte 1949: 67: "ships-of-warriors-on-the-sea"; Kitchen 1999: 174 (henceforth *RITANC* II): "ships of fighting"). As seagoing ships had been used for some time in the Egyptian military (for example, the *imw n tꜣ ḥꜥt* of Seti I and Thutmose III, which have been glossed 'warship' or 'battleship' in modern scholarship; Spiegelberg 1896: 82.5; Sethe 1909: 998.1; Jones 1988: 130.5, 131.13; cf. also Faulkner 1941: 18), the need to fabricate a new term suggests a certain lack of prior experience either with the type of vessel sailed by the Sherden, with the *capabilities* of those vessels, or with both. Thus, the term employed on Tanis II may have been intended to describe Sherden vessels as maritime fighting platforms (as the literal translation of the Tanis term may suggest), or it may have been a reference to a method of coastal marauding that made use of specialized ships or sailing techniques to conduct lightning-fast raids and then disappear back into the sea and over the horizon before military forces could be mobilized against them.

This absence of such fighting platforms from Egyptian maritime culture suggests, in turn, that the pharaoh's defeat of the Sherden may have taken place either on land or in the "river-mouths" of the Nile Delta, which had been defended against maritime aggressors at least since the time of Amenhotep III (1388–1351 BC),¹¹ and where the Egyptian army would have been better able to ensnare an enemy whose success was dependent on a combination of speed, stealth, and, above all, the avoidance of contact with professional soldiers (Ormerod 1924: 31; Wachsmann 1998: 320; Emanuel 2012a and forthcoming B; cf. Hom. *Od.* 14.262–72, 17.431–41). It was here, of course, that Ramesses III would later famously claim to have defended the coast against another, much larger onslaught of Sea Peoples.

The introduction of a new vessel type, perhaps by the aforementioned Sherden raiders, may also be supported by the determinatives used in the Tanis II inscription and in Ramesses III's Inscription of Year 8 at Medinet Habu. The determinative utilized with *ḥꜥw* in Tanis II is a typical Late Bronze Age Syro-Canaanite ship (Figure 9g), similar in form to the aforementioned trading vessels depicted in the 18th dynasty Tomb of Kenamun (Yoyotte 1949: 67; Landström 1970 fig. 403). At Medinet Habu, on the other hand, the determinatives are dramatically different. The Year 8 inscription mentions ships four times: the Sea Peoples' ships are referenced once, and three types of Egyptian vessels are said to have been "prepared like a strong wall...along the Nile mouth" against the assault (*MH I* pl. 46 col. 20; Edgerton & Wilson 1936: 54). Each reference to an Egyptian ship is accompanied by a distinct determinative, which seems related to that ship's function.

As can be seen from Figures 9a and 9b, two vessel types – *b3r* and *mnš* – were primarily utilized for cargo or transport (Artzy 1988: 184–185). The third is the *ḥꜥ* ship (*ḥꜥwt*), a term familiar from Tanis II; however, instead of being paired with a representation of a Syro-Canaanite cargo ship, as in Ramesses II's inscription, the associated determinative appears to be a vessel of the same type as that manned by the Egyptians in the naval battle relief (compare figures 9c and 9e). Much like the Tanis II determinative's relationship to the vessels from TT 162, the Medinet Habu determinative for *ḥꜥ* ships does not include the mast and rigging, but unlike the former, there are additional

details besides the essentials of the hull shape – in particular, the forecastle and steering oar which are such integral parts of the Egyptian vessels shown in the relief. The mention of the Sea Peoples' vessels also uses this term ("their ships [*ḥꜥwt*] and their goods were as if fallen into the water"; *MH* I pl. 46 col. 24; Edgerton & Wilson 1936: 54), with a determinative that is quite similar to that paired with the term in col. 20, but with a castle amidships that makes the vessel form more reminiscent of Egyptian traveling ships (compare figures 9d and 9f; see also below).

Sea Peoples and the Proliferation of Maritime Innovations

The aforementioned change in Egyptian terminology and determinatives following their encounter with the Sherden suggests that the ships of war depicted at Medinet Habu were developed after the defeat of this "rebellious-hearted" foe early in the 13th century. Further, the striking similarity between the two fleets in the naval battle relief raises the possibility that Ramesses II's capture of Sherden warriors resulted not just in an increase in the ranks of Pharaonic conscripts, but in the transference of maritime technology as well.

A similar example of such transference, during a military conflict that took place a millennium later, can be seen in Rome's ingenious reverse-engineering of Carthaginian warship design in the First Punic War, as told by Polybius in his well-known account of the genesis of the Roman navy (Polyb., *Hist.*, 1.20). More formal, and more chronologically relevant, technological transference in a maritime setting may be found in a unique text from the Hittite archives at Boğazköi (KUB III 82; Edel 1994a: 187). In this heavily reconstructed letter, Ramesses II evidently writes to Ḫattušili III that he is sending a pair of ships to the Hittite king (one at that time and one the following year), so that his shipwrights can "draw a copy" of it for the purpose of building a replica.¹² While the Amarna letters and other Late Bronze Age texts contain several references to the sharing of *people* (physicians, conjurers, craftsmen, and others; *inter alia*, EA 35, 49; KUB III 66, 67, 71; KBo I 10; cf. Linder 1970: 321; Zaccagnini 1983: 245–254; Gordon 1992; Podany 2010: 245), it is remarkable that Ramesses II may be sending not just a craftsman or shipwright, but a *physical ship* to the Hittites for replication. It is

further remarkable because of the Hittites' well-known lack of affinity for the sea. As a land empire, Hatti had long relied on its coastal vassals to move goods by sea and project naval power (Malamat 1971: 32; Sandars 1985: 140; Wachsmann 1998: 317, 323–324; Singer 2006: 249–250; cf., *inter alia*, RS 17.133; 18.148; 20.212; 20.238; 26.158; 94.2523; 94.2530).

However, there is evidence to suggest that Khattusha began looking to the sea with more interest in the waning years of the Late Bronze Age, possibly as a result of the threat posed by the growing Sea Peoples presence (e.g., Linder 1970; Singer 2000; 2006: 246, 250). Two texts in particular stand out in this regard. In the first, the Hittite king writes to the prefect of Ugarit about the “*Šikala* who live on ships,”¹³ and requests that a Ugaritian who had been taken captive by them be sent to Khattusha so that the king can question him about this people and their homeland:

“Thus says His Majesty, the Great King. Speak to the prefect:

Now, (there) with you, the king your lord is (still too) young. He knows nothing. And I, His Majesty, had issued him an order concerning Ibnadušu, whom the people from *Šikala* – who live on ships – had abducted.

Herewith I send Nirga’ili, who is *kartappu* with me, to you. And you, send Ibnadušu, whom the people from *Šikala* had abducted, to me. I will question him about the land *Šikala*, and afterwards he may leave for Ugarit again”

RS 34.129 (Hoftijzer & Van Soldt 1998: 343)

The second text, KBo XII 38, refers to a series of three naval skirmishes fought by Šuppiluliuma II against the “ships of Alašiya,” followed by a land battle (presumably against the same people he had fought at sea):

“The ships of Alašiya met me in the sea three times for battle, and I smote them; and I seized the ships and set fire to them in the sea.

But when I arrived on dry land(?), the enemies from Alašiya came in multitude against me for battle. I [fought] them, and [.....] me [.....]...”

KBo XII 38 (Güterbock 1967: 78)

The latter is reminiscent of Ramesses III's land and sea battles against the Sea Peoples which took place during this same general time frame (Otten 1963: 21; Singer 2000: 27), and it raises the question of whether Šuppiluliuma was facing repeated waves of raiders or migrant warriors, while clearly reinforcing that, during its last years, the Hittite Empire faced a significant threat from the previously distant Mediterranean coast.¹⁴ Rather than belonging to the Alašayan state, it is likely that the vessels against which Šuppiluliuma fought were called "ships of Alašiya" because they had either sailed eastward via, or launched from a captured portion of, Cyprus (*contra* Linder 1970: 319; cf. Wachsmann 1981: 187, as well as Hoffner 1992: 48, who refers to the matter as "unresolved"). The island had long been a target of seaborne raids cf. CTH 147:30), and textual evidence supports its use as a base for attacks from at least the 14th century to the end of the Late Bronze Age (see, e.g., RS 20.18 and EA 38, though in the latter the King of Alašiya is quick to protest that the raiders did not stage from an area under his control).

The Hittites' documented lack of association with the sea (other than by proxy) gives rise to two key questions. First, what ships did Šuppiluliuma use to engage the hostile "ships of Alašiya" at sea; and second, what use did Šuppiluliuma's mid-13th c. predecessor Hattušili III have for the reproductions of an Egyptian-supplied ship that seem to be referenced in KUB III 82? Though he does not say it directly, Edel posits an identical answer to each, suggesting that the ship sent for copying may have been specifically designed to fight against the Sea Peoples (Edel 1994b: 247; cf. also Raban 1995: 354). While possible, the question of how shipwrights in a country with very little maritime experience would have been able to draft a blueprint from Ramesses II's ship, and then accurately craft a seaworthy vessel from that design, is an important one (Basch 2009; see above on the problematic nature of this reconstruction). Likewise, while Ramesses II's defeat of the Sherden demonstrates that Egypt had discovered a successful method for dealing with these coastal marauders "whom none could [previously] withstand," evidence is lacking for the independent Egyptian development of a new type of ship capable of dispatching this threat at sea. Instead, if the ship being sent to Hatti did have to do with the Sea Peoples, it may be more likely that it was *one of the Sea Peoples' captured ships* that was being sent, so that Hattušili could

learn about this new threat and its associated technology (much like Šuppiluliuma and the Šikala a few decades later). Additionally, if this vessel was in fact to be rebuilt and sailed against those raiders who posed a growing threat to the coasts of Anatolia, the Levant, Cyprus, and Egypt, it stands to reason that the shipwrights responsible for copying its design were not Hittite, but belonged to one of Hatti's coastal vassals.

Hybrid Egyptian Warships, the 'Sherden of the Sea,' and the Helladic Oared Galley

The Egyptian ships depicted in the naval battle (aHawt) were neither Helladic galleys nor traditional Egyptian vessels. Instead, they were evidently developed by combining elements of the new Sea Peoples vessels and old, familiar riverine "traveling ships" into a hybrid form of warship. Though a lack of hogging trusses, seen on earlier Egyptian vessels, points to a sturdier hull than previous Egyptian boats and ships, the shape (absent the papyriform stern; Landström 1970: 108) and through-beams (Casson 1971: 37; Jones 1995: 59), the fore- and aftercastles, and the lion's head stem are consistent with the Egyptian shipbuilding tradition (Landström 1970: 98–115; cf. the tomb of Userhat (TT56; Landström 1970 fig. 343), which contains a depiction of a "traveling ship" with a lioness head at the bow, but with a papyriform stern).

As the first Sea Peoples group to be specifically named as such in the Egyptian sources – and the first whose capture and impressment is documented (Emanuel 2013: 15) – it is worth considering that elements of the ships sailed by the Sherden at the time of their initial defeat by Ramesses II may have been used as prototypes for the hybrid Egyptian vessels that were sailed against the maritime component of the latter invasion. Though horn-helmed warriors are present among the enemy sailors in the Medinet Habu relief (Figure 1, center and top right), it is important that their identity not be assumed, as identification of Sherden warriors is not as straightforward as it may seem.¹⁵ Additionally, there is no clear evidence that would compel us to ascribe an Aegean origin to the Sherden, despite the common assumption that they, like other Sea Peoples groups, would materially demonstrate their presence through Mycenaean IIC pottery deposits, among other features (*inter alia*, M. Dothan 1986; 1989; Stern 1991: 91; but see especially Gilboa 2006: 210; Emanuel 2012b; 2013: 22, 23n.5; and

the essays in Killebrew & Lehmann 2013). However, there are two reasons – the first textual, the second (and more convincing) archaeological – to associate this group with a variation of the Helladic oared galley, even if not necessarily with an Aegean home.

First, and most well-known, the Sherden are associated with their fellow Sea Peoples by virtue of their apparent participation in two separate invasions: the Libyan migration of Merneptah's fifth year (ca. 1209 BC), wherein they joined the Ekwesh, Teresh, and Shekelesh "of the foreign countries of the sea," as well as the Lukka (*RITANC* IV: 2–4, 7);¹⁶ and the invasion of Ramesses III's eighth year (ca. 1175 BC) as recounted in the posthumous Great Harris Papyrus, wherein they replace the Shekelesh from the Medinet Habu list and join the Philistines, Sikils, Denyen, and Weshesh among the named invaders (Emanuel 2013: 16–18, 26n.62).

The second is a recently-republished model of a Helladic galley from Tomb 611 at Gurob, near the Fayum in Middle Egypt (Figure 10; Wachsmann 2013). The model features a curved hull; stanchions, which on a real ship would have supported the superstructure and partial decking; and a stempost decorated with what may be an upturned bird's head similar to those on the Kynos and Bademgediği Tepe vessels (among many others in LH IIIB–C ship iconography; cf. a stirrup jar from Skyros and a LH IIIC pyxis from Tragana; Korrés 1985: 200; Wachsmann 1996; 1998: 134–135; Mountjoy 2005 pl. XCVIIa; see also Wachsmann 2013: 78–80 for further discussion, with references). Also present is the bow projection at the junction of stempost and keel, which would become a standard feature of Iron Age galleys (Wedde 1999 pl. XXXVII; Sea Peoples ships N.4 and N.5 have similar projections, but at the stern). The rows of black dots that flank the hull, interpreted by Wachsmann as oarports, make it probable that the vessel represented was a fifty-oared *pentekontor* (Emanuel 2012a; forthcoming A; forthcoming B).

A rare polychromatic representation of a Helladic oared galley (Wachsmann 2013: 26–27), the ship-cart model was painted with a base layer of white, over which black was applied over the bottom half of the hull, and a red stripe was added just below the caprail and above the oarports (Davis 2013: 219; Siddall 2013: 243, Table 1; in all, seven pigments were detected on the ship-cart model). The black pigment covering

the base of the hull was most likely intended to represent the coating of hull planking with dark pitch or asphalt, a practice which, though known from at least the Bronze Age,¹⁷ is clearly seen in physical representation here.

The Sherden are connected with this region by the monumental Wilbour Papyrus, a registry from the reign of Ramesses V that assesses landholdings in Middle Egypt for tax purposes (Gardiner 1941: 40; Faulkner 1953: 44–45). 109 Sherden, “standard-bearers of the Sherden,” and “retainers of the Sherden,” sometimes “together with [their] brethren,” are listed in the document as landowners and occupiers (cf. also Gardiner 1948a: 83). While both the “good Egyptian names” borne by these Sherden (Gardiner 1948a: 80) and the references within P. Wilbour to multigenerational residency (e.g., §§59.27.19 and 150.59.9, 25; Gardiner 1948b: 28, 62; Emanuel 2013: 19) seem to support significant “Egyptianization” by this time, the continuation of the term “Sherden” as an identifier for individuals at least into the 11th century suggests that complete assimilation into Egyptian society had not yet been achieved (Emanuel 2013: 18, 21) – as does the cultic ship–card model from Gurob, if in fact it does come, as Wachsmann has suggested, from the tomb of a Sherden individual or one of his descendants (Wachsmann 2013: 206).

None of the Sherden listed in P. Wilbour are explicitly associated with maritime pursuits,¹⁸ but this should not necessarily be surprising. While the seafaring nature of the Sherden is clear, an effort seems to have been made to downplay the nautical affinities of those who had entered Egyptian service and society. For example, Sherden in the Egyptian military and society are never referred to as being “of the Sea,” an epithet that appears to be reserved for those fighting against Egypt (Emanuel 2013: 15, 25n.35). Thus, the ship–cart from Gurob, if properly attributed to the Sherden, is powerful evidence not only for this group’s association with the Helladic oared galley, but also for at least one Sherden’s attempt to maintain his foreign identity during a period of accelerated acculturation into Egyptian society (for what may be an opposite example, cf. Petrie 1905: 22; Emanuel 2013: 21–22).

Egyptian Maritime Experimentation

As noted above, the new elements featured on the Egyptian ships at Medinet Habu are depicted in identical fashion to their Sea Peoples counterparts. Importantly, they are also depicted as seamlessly-integrated components of the vessels' largely Egyptian foundation. This suggests that, rather than being brand-new and experimental in nature at that time, Egyptian shipwrights and sailors alike had had some time to develop and familiarize themselves with the foreign components of this hybrid vessel. The loose-footed, brailed sail in particular was a radical change from the traditional Egyptian rig, with its boom and "web of lifts" (Raban 1989: 170; cf., *inter alia*, Roberts 1991: 55–56, pls. XVIIb, XVIIIa; Wachsmann 1998 fig. 2.11; Tzachili 1999) and the combination of this rigging and downward-curving yard seen in the Saqqara relief and showcased at Medinet Habu is not found in any other Egyptian representations (Raban 1989: 165). A search for evidence of this familiarization period in Egyptian sailing reveals some prior representations of what may be brailed sails, but each is problematic.¹⁹ An Abydos boat from the late 18th dynasty tomb of Neferhotep (TT 50), an Egyptian official during the reign of the final pre-Ramesside pharaoh, Horemheb (1319–1292 BC), shows a sail which may be interpreted as being brailed to an upward-curving yard. However, the boom is still present, no brailing lines are explicitly shown, and the ship appears elsewhere in the same relief with the sail secured to both upper and lower yards (Bénédict 1894 pl. III; Hari 1985 pl. LXXX; Figure 11). Turin Papyri 2032 and 2033, which date to the early Ramesside period, likewise show riverine vessels whose sails appear similarly brailed-up to upward-curving upper yards, but which still carry booms (Museo Egizio di Torino 1987: 195, fig. 270; for a color illustration, see Vinson 1994).²⁰ Though Georgiou (1991) has previously suggested the existence (and hypothesized about the capabilities) of brailed rigs on vessels with boom-footed sails, the appearance of these vessels' sails as being furled to the upper yards makes it unlikely that a brailing system was in fact being utilized (*contra* Vinson 1993 and Barako 2001: 216n.29), as a boom-footed sail would require brailing lines that encompass both yard and boom, with the latter (rather than the windward edge of the sail itself, as with a loose-footed sail) being manipulated for windward sailing (Georgiou 1991 pls. XXII–XXIII).²¹

At Medinet Habu, on the other hand, the brailed rig is paired with a loose-footed squaresail. Though not being utilized for propulsion in the relief, its employment in such form would logically seem to follow such a period of experimentation, even if that may not be depicted in the images from TT50 and the Turin Papyri. Further, though the Saqqara relief suggests that Egyptians may have come into contact with this sail type and rigging system (as well as the top-mounted crow's nest) via Syro-Canaanite traders in the late 18th or 19th Dynasties, it is possible that the full value of such a technological 'package' only truly became apparent when the Sherden and their aHaw aHA m-Hry-ib pA ym were encountered – and defeated – early in Ramesses II's reign. As Artzy (1997; 1998), Georgiou (1991), and Horden and Purcell (2000), among others, have noted, the distinction need not be binary, as both the Sherden and those aboard the ship offloading Canaanite amphorae in the Saqqara relief may belong to the population elements variously referred to as "pirates, raiders, and traders" or as "nomads of the sea." Further, they may be related (or even identical) groups; we simply lack the evidence, at present, to make such clear identifications and to draw such fine distinctions between the various individuals and groups operating in such capacities at this time. Appropriating this technology from these "rebellious-hearted" enemies in the first quarter of the 13th c., though, would have allowed for a "breaking in" period of roughly a century prior to the flawless integration of these components seen in the Egyptian ships whose naval triumph is memorialized at Medinet Habu.

Conclusion

Ramesses III's naval battle relief is valuable not only because of its status as the first pictorial record of such an encounter, but also because of the information it provides about the origin and travels of at least some of the Sea Peoples, as well as the clues it offers to the sources of galley design and several important components of maritime technology. The vessels seen at Medinet Habu, and their comparanda in other media, provide important insight into the process of development and innovation that would eventually spawn divergent lines of ship development in the Aegean and on the Phoenician coast, resulting in the Greek *dieres* and Phoenician bireme of the Iron Age (Casson 1971: 55–60; Basch 1987: 303–335; Wachsmann 1998: 174).

Acknowledgements

A preliminary version of this paper was presented at the Maritime Archaeology session of the American Schools of Oriental Research Annual Meeting on the 17th of November 2012. I would like to extend my heartfelt thanks to Professor Shelley Wachsmann (Texas A&M University) for his constructive feedback and research assistance on this topic over the past several years, as well as the anonymous *Aegean Studies* reviewers, whose welcome feedback and comments were incorporated into the final version of this paper. All remaining errors and omissions are, of course, entirely my own.

Bibliography

- Adams, M. J. & Cohen, M. E., 2013. 'The Sea Peoples in Primary Sources', in A. E. Killebrew & G. Lehmann (eds), *The Philistines and Other 'Sea Peoples' in Text and Archaeology*, Atlanta: 645–664.
- Ahlberg–Cornell, G., 1971. *Fighting on Land and Sea in Greek Geometric Art*, Stockholm.
- Artzy, M., 1997. 'Nomads of the Sea', in S. Swiny, R. L. Hohlfelder & H. W. Swiny (eds), *Res Maritimae: Cyprus and the Eastern Mediterranean from Prehistory to Late Antiquity* (ASOR Archaeological Reports 4), Atlanta: 1–16.
- Artzy, M., 1998. 'Routes, Trade, Boats, and 'Nomads of the Sea'', in S. Gitin, A. Mazar & E. Stern (eds), *Mediterranean Peoples in Transition, Thirteenth to Early Tenth Centuries BCE*, Jerusalem: 439–448.
- Artzy, M., 2003. 'Mariners and their Boats at the End of the Late Bronze Age and the Beginning of the Iron Age in the Eastern Mediterranean', *TA* 30: 232–246.
- Artzy, M., 2013. 'On the Other Sea Peoples', in A. E. Killebrew & G. Lehmann (eds), *The Philistines and Other 'Sea Peoples' in Text and Archaeology*, Atlanta: 329–344.
- Barako, T., 2000. 'The Philistine Settlement as Mercantile Phenomenon?', *AJA* 104: 513–530.
- Barako, T., 2001. *The Seaborne Migration of the Philistines*, PhD diss., Harvard University.

- Baruffi, J. T., 1998. *Naval Warfare Operations in the Bronze Age Eastern Mediterranean*, PhD diss., University of Chicago.
- Basch, L., 1987. *Le Musée Imaginaire de la Marine Antique*. Athens.
- Basch, L., 2009. 'Were the Hittites Able to Build a Replica of an Egyptian Ship According to Their Own Drawings?', in H. Nowacki & W. Lefèvre (eds.), *Creating Shapes in Civil and Naval Architecture: A Cross-Disciplinary Comparison*, Leiden: 65–72.
- Beckman, G. M., 1999. *Hittite Diplomatic Texts*. Atlanta.
- Beckman, G., 1994a. 'Akkadian Documents from Ugarit', in P. W. Wallace & A. G. Orphanides (eds.), *Sources for the History of Cyprus II: Near Eastern and Aegean Texts from the Third to the First Millennia B.C.*, Nicosia: 26–28.
- Beckman, G., 1994b. 'Hittite Documents from Khattusha', in P. W. Wallace & A. G. Orphanides (eds.), *Sources for the History of Cyprus II: Near Eastern and Aegean Texts from the Third to the First Millennia B.C.*, Nicosia: 31–35.
- Bénédite, G., 1894. 'Tombou de Neferhotpou', *MMAF* 5: 489–540.
- Benzi, M., 2013. 'The Southeast Aegean in the Age of the Sea Peoples', in A. E. Killebrew & G. Lehmann (eds.), *The Philistines and Other 'Sea Peoples' in Text and Archaeology*, Atlanta: 509–542.
- Breasted, J. H., 1906–7. *Ancient Records of Egypt*, vol. 2. Chicago.
- Bryce, T. R., 1992. 'Lukka Revisited', *JNES* 51: 121–130.
- Bryce, T. R., 1998. *The Kingdom of the Hittites*. Oxford.
- Caminos, R. A., 1954. *Late Egyptian Miscellanies*. London.
- Capart, J., 1931. *Documents Pour Servir à L'étude De L'art Égyptien*, vol. 2. Paris.
- Cariolou, G. A., 1997. 'Kyrenia II: The Return from Cyprus to Greece of the Replica of a Hellenic Merchant Ship', in S. Swiny, R. L. Hohlfelder & H. W. Swiny (eds.), *Res Maritimae: Cyprus and the Eastern Mediterranean from Prehistory to Late Antiquity* (ASOR Archaeological Reports 4), Atlanta: 1–16.
- Casson, L., 1971. *Ships and Seamanship in the Ancient World*. Princeton.
- Chadwick, J., 1973. *Documents in Mycenaean Greek*. Cambridge.

Chadwick, J., 1976. *The Mycenaean World*. Cambridge.

Chadwick, J., 1988. 'The Women of Pylos', in T. G. Palaima & J-P. Olivier (eds.), *Texts, Tablets and Scribes: Studies in Mycenaean Epigraphy Offered to Emmett L. Bennett, Jr.*, Salamanca: 43–95.

Cifola, B., 1994. 'The Role of the Sea Peoples at the End of the Late Bronze Age: A Reassessment of the Textual and Archaeological Evidence', *OrAnt* 1–2: 1–23.

Cline, E. H., & D. O'Connor., 2003. 'The Mystery of the Sea Peoples', in D. O'Connor & S. Quirke (eds.), *Mysterious Lands*, Portland: 107–138.

Cline, E. H., & D. O'Connor., 2012. 'The Sea Peoples', in E. H. Cline & D. O'Connor (eds.), *Ramesses III: The Life and Times of Egypt's Last Great Hero*, Ann Arbor: 180–208.

Crielaard, J. P. 2000. 'Homeric and Mycenaean Long-Distance Contacts: Discrepancies in the Evidence', *BaBesch* 75: 51–64.

Crouwel, J. H., 1991. *Mycenaean Pictorial Pottery* (Well Built Mycenae 21). Oxford.

Dakoronia, P., 1990. 'War-Ships on Sherds of LHIIIC Kraters from Kynos', in H. Tzalas (ed.), *TROPIS II: 2nd International Symposium on Ship Construction in Antiquity*, Delphi: 117–122.

Dakoronia, P., 1996. 'Kynos...Fleet', in H. Tzalas (ed), *TROPIS IV: 4th International Symposium on Ship Construction in Antiquity*, Athens: 159–172.

Dakoronia, P. 2006. 'Mycenaean Pictorial Style at Kynos, East Locris', in E. Rystedt & B. Wells (eds.), *Pictorial Pursuits: Figurative Painting on Mycenaean and Geometric Pottery* (Skrifter Utgivna av Svenska institutet i Athen 53), Stockholm: 23–29.

Dakoronia, P. & Mpougia, P., 1999. *Τον Καιρο των Μυκηναίων στη Φθιώτιδα*. Lamia.

Davies, N. de G. & Faulkner, R. O., 1947. 'A Syrian Trading Venture to Egypt', *JEA* 33: 40–46.

Davis, D., 2013. 'Ship Colors in the Homeric Poems', in S. Wachsmann, *The Gurob Ship-Cart Model and Its Mediterranean Context*, College Station: 219–224.

Deger-Jalkotzy, S., 1998. 'Sea Peoples in Cyprus and Israel: A Comparative Study of Immigration Processes', in S. Gitin, A. Mazar & E. Stern (eds.), *Mediterranean Peoples in Transition: Thirteenth to Early Tenth Centuries B.C.*, Jerusalem: 114–128.

Dothan, T., 1982. *Philistine Material Culture*. New Haven.

Dothan, T., 1998. 'Initial Philistine Settlement: From Migration to Coexistence', in S. Gitin, A. Mazar & E. Stern (eds.), *Mediterranean Peoples in Transition: Thirteenth to Early Tenth Centuries B.C.*, Jerusalem: 148–161.

Dothan, T. & Zukerman, A., 2004. 'A Preliminary Study of the Mycenaean IIC:1 Pottery Assemblages from Tel Miqne-Ekron and Ashdod', *BASOR* 333: 1–54.

Edel, E., 1994a. *Die Ägyptisch-Hethitische Korrespondenz aus Boghazköi I: Umschriften und Übersetzungen* (Abhandlungen der Rheinisch-Westfälischen Akademie der Wissenschaften 77). Opladen.

Edel, E., 1994b. *Die Ägyptisch-Hethitische Korrespondenz aus Boghazköi II: Kommentar* (Abhandlungen der Rheinisch-Westfälischen Akademie der Wissenschaften 77). Opladen.

Edgerton, W. F. & Wilson, J. A., 1936. *Historical Records of Ramesses III: Texts in Medinet Habu I-II* (Studies in Ancient Oriental Civilizations 12). Chicago.

Efkleidou, K., 2002. 'The Status of 'Outsiders' within Mycenaean Pylos: Issues of Ethnic Identity, Incorporation and Marginality', *Minos* 37: 1–23.

Emanuel, J. P., 2012a. '[Cretan Lie and Historical Truth: Examining Odysseus' Raid on Egypt in its Late Bronze Age Context](#)', in V. Bers, D. Elmer, D. Frame & L. Muellner (eds.), *Donum Natalicium Digitaliter Confectum Gregorio Nagy Septuagenario a Discipulis Collegis Familiaribus Oblatum*, Washington, DC.

Emanuel, J. P., 2012b. '[Šrdn of the Strongholds, Šrdn of the Sea: The Sherden in Egyptian Society, Reassessed](#).' Paper presented at the American Research Center in Egypt annual meeting, Providence, RI, Apr. 27–29.

Emanuel, J. P., 2013. '[Šrdn from the Sea: The Arrival, Integration, and Acculturation of a Sea People](#)', *JAEI* 5: 14–27.

Emanuel, J. P., forthcoming A. 'The Late Bronze–Early Iron Transition: Changes in Warriors and Warfare and the Earliest Recorded Naval Battles', in H. Whittaker, G. Wrightson & G. Lee (eds.), *Ancient Warfare: Introducing Current Research*, Cambridge.

Emanuel, J. P., forthcoming B. 'Black Ships and Fair-Flowing Aegyptus: Odysseus' Egyptian Raids in their Late Bronze–Early Iron Age Context.'

Epigraphic Survey, 1930. *Medinet Habu I: Earlier Historical Records of Ramses III* (Oriental Institute Publications 8). Chicago.

- Epigraphic Survey, 1932. *Medinet Habu II: Later Historical Records of Ramses III* (Oriental Institute Publications 9). Chicago.
- Eyre, C. J., 1992. 'The Adoption Papyrus in Social Context', *JEA* 78: 207–221.
- Faulkner, R. O., 1941. 'Egyptian Military Standards', *JEA* 27: 12–18.
- Faulkner, R. O., 1953. 'Egyptian Military Organization', *JEA* 39: 32–47.
- Gardiner, A. H., 1941. 'Ramesside Texts Relating to the Taxation and Transport of Corn', *JEA* 27: 19–73.
- Gardiner, A. H., 1948a. *The Wilbour Papyrus II: Commentary*. London.
- Gardiner A. H., 1948b. *The Wilbour Papyrus III: Translation*. London.
- Gardiner, A. H., 1960. *The Kadesh Inscriptions of Ramesses II*. Oxford.
- Genz, H., 2013. 'No Land Could Stand Before their Arms, from...Ḫatti...on? New Light on the End of the Hittite Empire and the Early Iron Age in Central Anatolia', in A. E. Killebrew & G. Lehmann (eds.), *The Philistines and Other 'Sea Peoples' in Text and Archaeology*, Atlanta: 469–478.
- Georgiou, H. S., 1991. 'Bronze Age Ships and Rigging', in R. Laffineur & L. Basch (eds.), *Thalassa: L'Egée Préhistorique Et La Mer* (Aegaeum 7), Liège: 61–71.
- Georgiou, H. S., 2012. '[Bronze Age Sailing and Homeric Evidence](#)', in G. S. Korres, N. Karadimas & G. Flouda (eds.), *Archaeology and Heinrich Schliemann: A Century After His Death: Assessments and Prospects, Myth–History–Science*, Athens: 523–529.
- Glanville, S. R. K., 1930. 'Records of a Royal Dockyard at the Time of Thutmose III: Papyrus British Museum 10056, Part I', *ZÄS* 66: 105–121.
- Glanville, S. R. K., 1932. 'Records of a Royal Dockyard at the Time of Thutmose III: Papyrus British Museum 10056, Part II', *ZÄS* 68: 7–41.
- Gordon, C. H., 1992. 'The Mediterranean Synthesis', in W. A. Ward & M. S. Joukowsky (eds.), *The Crisis Years: The 12th Century B.C. from Beyond the Danube to the Tigris*, Dubuque: 188–196.
- Güterbock, H. G., 1967. 'The Hittite Conquest of Cyprus Reconsidered', *JNES* 26: 73–81.
- Hari, R., 1985. *La Tombe Thébaine du Père Divin Neferhotep (TT50)*. Geneva.

Hawkins, J. D., 1990. 'The New Inscription from the Südburg of Boğazköy–Khattusha', *AA* 1990: 305–314.

Hawkins, J. D., 1995. *The Hieroglyphic Inscription of the Sacred Pool Complex at Khattusha (SÜDBURG)* (Studien zu den Boğazköy–Texten 3). Wiesbaden.

Hawkins, J. D., 2009. 'Cilicia, the Amuq, and Aleppo: New Light in a Dark Age', *NEA* 72: 164–173.

Heltzer, M., 1979. 'Some Questions Concerning the Sherdana in Ugarit', *IOS* 9: 9–16.

Hoffner, Jr., H. A., 1992. 'The Last Days of Khattusha', in W. A. Ward & M. S. Joukowski (eds.), *The Crisis Years: The 12th Century B.C. from Beyond the Danube to the Tigris*, Dubuque: 46–52.

Hoftijzer, J. & Van Soldt, W., 1998. 'Texts from Ugarit Pertaining to Seafaring', in S. Wachsmann, *Seagoing Ships and Seamanship in the Bronze Age Levant*, College Station: 333–344.

Horden, P. & Purcell, N., 2000. *The Corrupting Sea: A Study of Mediterranean History*. Oxford.

Hurwit, J., 1985. *The Art and Culture of Early Greece, 1100–480 B.C.* Ithaca.

Jones, D., 1988. *A Glossary of Ancient Egyptian Nautical Titles and Terms*. London.

Jones, D., 1995. *Boats*. London.

Katzev, M., 1990. 'An Analysis of the Experimental Voyages of Kyrenia II', in H. Tzalas (ed.), *TROPIS II: 2nd International Symposium on Ship Construction in Antiquity*, Delphi: 245–256.

Killebrew, A. E., 2007. 'The Canaanite Storage Jar Revisited,' in S. White Crawford, A. Ben-Tor, J. P. Dessel, W. G. Dever, A. Mazar & J. Aviram (eds.), *Up to the Gates of Ekron: Essays on the Archaeology and History of the Eastern Mediterranean in Honor of Seymour Gitin*, Jerusalem: 166–188.

Killebrew, A. E., 2013. 'Early Philistine Pottery Technology at Tel Migne–Ekron: Implications for the Late Bronze–Early Iron Age Transition in the Eastern Mediterranean', in A. E. Killebrew & G. Lehmann (eds.), *The Philistines and Other 'Sea Peoples' in Text and Archaeology*, Atlanta: 77–130.

Killebrew, A. E. & Lehmann, G. (eds.), 2013. *The Philistines and Other 'Sea Peoples' in Text and Archaeology*. Atlanta.

- Kirk, G. S., 1949. 'Ships on Geometric Vases', *BSA* 44: 93–153.
- Kitchen, K. A., 1996. *Ramesside Inscriptions Translated and Annotated: Translations II*. Cambridge.
- Kitchen, K. A., 1999. *Ramesside Inscriptions Translated and Annotated: Notes and Comments*, vol. 2. Cambridge.
- Korrés, G. S., 1989. 'Representation of a Late Mycenaean Ship on the Pyxis from Tragana, Pylos', in H. Tzalas (ed.), *TROPIS I: 1st International Symposium on Ship Construction in Antiquity*, Delphi: 177–202.
- Kuentz, C., 1928. *La Bataille de Qadech: Les Textes ('Poème de Pentaour' et 'Bulletin de Qadech') et les Bas-Reliefs*. Cairo.
- Lambdin, T. O. 1953. 'The Miši-People of the Byblian Amarna Letters', *JCS* 7.3: 75–77.
- Landström, B., 1970. *Ships of the Pharaohs: 4000 Years of Egyptian Shipbuilding*. Garden City.
- Lehmann, G., 1979. 'Die Sikilaju: Ein Neues Zeugnis zu den 'Seevölker'-Heerfahrten im Späten 13 Jh. v. Chr. (RS 34.129)', *UF* 11: 481–494.
- Linder, E., 1970. 'Naval Warfare in the El-Amarna Age, in D. J. Blackman (ed.), *Marine Archaeology*, Hamden: 317–324.
- Malamat, A., 1971. 'The Egyptian Decline in Canaan and the Sea-Peoples', in B. Mazar (ed.), *The World History of the Jewish People III: Judges*, New Brunswick: 23–38.
- Manassa, C., 2003. *The Great Karnak Inscription of Merneptah: Grand Strategy in the 13th Century BC*. New Haven.
- Mark, S. E., 2000. *Homeric Seafaring*, PhD diss., Texas A&M University.
- Meric, R. & Mountjoy, P., 2002. 'Mycenaean Pottery from Bademgediği Tepe (Puranda) in Ionia: A Preliminary Report', *IstMitt* 52: 79–98.
- Millet, N. B., 1987. 'The First Appearance of the Loose-Footed Squaresail Rig in the Mediterranean', *JSSEA* 17: 89–91.
- Monroe, C., 1990. *The Boatbuilding Industry of New Kingdom Egypt*, MA Thesis, Texas A&M University.
- Monroe, C., 2010. 'Sunk Costs at Late Bronze Age Uluburun', *BASOR* 357: 19–33.

- Moran, W. L., 1992. *The Amarna Letters*. Baltimore.
- Mountjoy, P. A., 1998. 'The East Aegean–West Anatolian Interface in the Late Bronze Age: Mycenaeans and the Kingdom of Ahhiyawa' *AS* 48: 33–67.
- Mountjoy, P. A., 2005. 'Mycenaean Connections with the Near East in LH IIIC: Ships and Sea Peoples', in R. Laffineur & E. Greco (eds.), *Emporia: Aegeans in the Central and Eastern Mediterranean* (Aegaeum 25), Liège: 423–431.
- Mountjoy, P. A., 2011. 'A Bronze Age Ship from Ashkelon with Particular Reference to the Bronze Age Ship from Bademgediği Tepe', *AJA* 115: 483–488.
- Mountjoy, P. A. & Gowland, R., 2005. 'The End of the Bronze Age at Enkomi, Cyprus: The Problem of Level IIIB', *BSA* 100: 125–214.
- Muhly, J. D., 1984. 'The Role of the Sea Peoples in Cyprus During the LC III Period', in V. Karageorghis & J. D. Muhly (eds), *Cyprus at the Close of the Late Bronze Age*, Nicosia: 39–56.
- Murray, A. S., Smith, A. H. & Walters, H. B., 1900. *Excavations in Cyprus: Bequest of Miss E. T. Turner to the British Museum*. London
- Museo Egizio di Torino, 1987. *Civiltà Degli Egizi: La Vita Quotidiana*. Milan.
- Nelson, H. H., 1943. 'The Naval Battle Pictured at Medinet Habu', *JNES* 2: 40–55.
- O'Connor, D., 2000. 'The Sea Peoples and the Egyptian Sources', in E. Oren (ed.), *The Sea Peoples and Their World: A Reassessment* (University Museum Monographs 108), Philadelphia: 85–102.
- Oren, E. D., 1973. *The Northern Cemetery of Beth Shan*. Leiden.
- Ormerod, H. A., 1924. *Piracy in the Ancient World*. Baltimore.
- Otten, H., 1989. 'Die Hieroglyphen–Luwische Inschrift', *AA* 1989: 333–337.
- Petrie, W. M. F., 1905. *Ehnnaysia, 1904*. London.
- Pirenne, H., 1940. *Economic and Social History of Medieval Europe*. New York.
- Podany, A., 2010. *Brotherhood of Kings: How International Relations Shaped the Ancient Near East*. Oxford.

- Pomey, P., 'On the Use of Design in Ancient Mediterranean Ship Construction', in H. Nowacki & W. Lefèvre (eds.), *Creating Shapes in Civil and Naval Architecture: A Cross-Disciplinary Comparison*, Leiden: 49–63.
- Prior, C. A., 2013. 'Radiocarbon Age Analysis of the Gurob Ship–Cart Model', in S. Wachsmann, *The Gurob Ship–Cart Model and Its Mediterranean Context*, College Station: 239–242.
- Pulak, C., 1998. 'The Uluburun Shipwreck: an Overview', *IJNA* 27: 188–224.
- Pulak, C., 2005. 'Who Were the Mycenaeans Aboard the Uluburun Ship?', in R. Laffineur & E. Greco (eds.), *Emporia: Aegeans in the Central Mediterranean* (Aegaeum 25), Liège: 295–310.
- Raban, A., 1989. 'The Medinet Habu Ships: Another Interpretation', *IJNA* 18: 163–171.
- Raban, A., 1995. 'The Sea Peoples and Thera Ships', in H. Tzalas (ed.), *TROPIS III: 3rd International Symposium on Ship Construction in Antiquity*, Delphi: 353–366.
- Redford, D. B., 2006. 'The Tjekker', *Scripta Mediterranea* 27–28: 9–14.
- Roberts, O. T. P., 1991. 'The Development of the Brail into a Viable Sail Control for Aegean Boats of the Bronze Age', in R. Laffineur & L. Basch (eds.), *Thalassa: L'Égée Préhistorique Et La Mer* (Aegaeum 7), Liège: 55–64.
- Roberts, O. T. P., 1995. 'An Explanation of Ancient Windward Sailing: Some Other Considerations', *IJNA* 24: 307–315.
- Roberts, R. G., 2009. 'Identity, Choice and the Year 8 Reliefs of Ramesses III at Medinet Habu', in C. Bachhuber & R. G. Roberts (eds.), *Forces of Transformation: The End of the Bronze Age in the Mediterranean* (BANEAThemes from the Ancient Near East 1), Oxford: 60–68.
- Robinson, A., 2009. *Lost Languages: The Enigma of the World's Undeciphered Scripts*. London.
- Rougé, E. de, 1877. *Inscriptions Hiéroglyphiques Copiées en Égypte Pendant la Mission Scientifique de M. le Vicomte Emmanuel de Rougé*. Paris.
- Sandars, N. K., 1985 [1978]. *The Sea Peoples: Warriors of the Ancient Mediterranean*, 2nd ed. London.
- Säve-Söderbergh, T., 1957. *Four Eighteenth Dynasty Tombs*. Oxford.

Schulman, A. R., 1968. 'A Private Triumph in Brooklyn, Hildesheim, and Berlin', *JARCE* 7: 27–35.

Sethe, K., 1909. *Urkunden des Ägyptischen Altertums IV: Urkunden der 18. Dynastie* IV. Leipzig.

Siddall, R., 2013. 'Analysis of the Pigments from the Gurob Ship–Cart Model', in S. Wachsmann, *The Gurob Ship–Cart Model and Its Mediterranean Context*, College Station: 243–247.

Singer, I., 1983. 'Western Anatolia in the Thirteenth Century B.C. According to the Hittite Sources', *AS* 33: 205–217.

Singer, I., 2000. 'New Evidence on the End of the Hittite Empire', in E. Oren (ed.), *The Sea Peoples and Their World: A Reassessment* (University Museum Monographs 108), Philadelphia: 21–34.

Singer, I., 2006. 'Ships Bound for Lukka: A New Interpretation of the Companion Letters RS 94.2530 and RS 94.2523', *AltF* 33: 242–262.

Sølver, C. V., 1936. 'Egyptian Shipping of about 1500 B.C.', *MM* 22: 430–469.

Spiegelberg, W., 1896. *Rechnungen aus der Zeit Setis I.* Strassburg.

Stager, L. E., 1995. 'The Impact of the Sea Peoples in Canaan (1185–1050 BCE)', in T. E. Levy (ed.), *The Archaeology of Society in the Holy Land*, London: 332–348.

Stager, L. E. & Mountjoy, P. A., 2007. 'A Pictorial Krater from Philistine Ashkelon', in S. White Crawford, A. Ben-Tor, J. P. Dessel, W. G. Dever, A. Mazar & J. Aviram (eds.), *Up to the Gates of Ekron: Essays on the Archaeology and History of the Eastern Mediterranean in Honor of Seymour Gitin*, Jerusalem: 50–61.

Stager, L. E., Schloen, J. D. & Master, D. M. (eds.), 2008. *Ashkelon 1: Introduction and Overview*. Winona Lake.

Stern, E., 1991. 'Phoenicians, Sikils, and Israelites in the Light of Recent Excavations at Dor', in E. Lipiński (ed.), *Phoenicia and the Bible* (Studia Phoenicia 11), Leuven: 85–94.

Steffy, J. R., 1994. *Wooden Ship Building and the Interpretation of Shipwrecks*. College Station.

Stieglitz, R. R. 2000. 'Hebrew Seafaring in the Biblical Period', *MHR* 15.1: 5–15.

Stone, B. J., 1995. 'The Philistines and Acculturation: Culture Change and Ethnic Continuity in the Iron Age', *BASOR* 298: 7–32

Tartaron, T. F., 2013. *Maritime Networks in the Mycenaean World*. Cambridge.

Tiboni, F., 2005. 'Weaving and Ancient Sails: Structural Changes to Ships as a Consequence of New Weaving Technology in the Mediterranean Late Bronze Age', *IJNA* 34.1: 127–130.

Tzachili, I., 1999. 'Before Sailing: The Making of Sails in the Second Millennium B.C.', in P. Betancourt, V. Karageorghis, R. Laffineur & W-D. Niemeier (eds.), *Meletemata: Studies in Aegean Archaeology Presented to Malcolm H. Weiner as he Enters his 65th Year* (Aegaeum 20), Liège: 857–862.

Vermeule, E. & Karageorghis, V., 1982. *Mycenaean Pictorial Vase Painting*. Cambridge.

Vinson, S., 1993. 'The Earliest Representations of Brailed Sails', *JARCE* 30: 133–150.

Vinson, S., 1994. *Egyptian Boats and Ships*. Buckinghamshire.

Wachsmann, S., 1981. 'The Ships of the Sea Peoples', *IJNA* 10: 187–220.

Wachsmann, S., 1982. 'The Ships of the Sea Peoples (*IJNA*, 10.3: 187–220): Additional Notes', *IJNA* 11: 297–304.

Wachsmann, S., 1996. 'Bird Head Devices on Mediterranean Ships', in H. Tzalas (ed.), *TROPIS IV: 4th International Symposium on Ship Construction in Antiquity*, Athens: 539–572.

Wachsmann, S., 1997. 'Were the Sea Peoples Mycenaeans? The Evidence of Ship Iconography', in S. Swiny, R. L. Hohlfelder & H. W. Swiny (eds), *Res Maritimae: Cyprus and the Eastern Mediterranean from Prehistory to Late Antiquity* (ASOR Archaeological Reports 4), Atlanta: 339–356.

Wachsmann, S., 1998. *Seagoing Ships and Seamanship in the Bronze Age Levant*. College Station.

Wachsmann, S., 2000. 'To the Sea of the Philistines', in E. Oren (ed.), *The Sea Peoples and Their World: A Reassessment* (University Museum Monographs 108), Philadelphia: 103–143.

Wachsmann, S. 2003. "A Complex Migration: Did the Philistines get to Canaan by Land or by Sea?" *BAR* 29.6: 22, 64.

- Wachsmann, S., 2013. *The Gurob Ship–Cart Model and its Mediterranean Context*. College Station.
- Ward, W. A. & Joukowsky, M. S. (eds), 1992. *The Crisis Years: The 12th Century B.C. from Beyond the Danube to the Tigris*. Dubuque.
- Wedde, M., 1991. 'Aegean Bronze Age Ship Imagery: Regionalisms, a Minoan Bias, and a 'Thalassocracy' in R. Laffineur & L. Basch (eds.), *Thalassa: L'Egée Préhistorique Et La Mer* (Aegaeum 7), Liège: 73–94.
- Wedde, M., 1999. 'War at Sea: The Mycenaean and Early Iron Age Oared Galley', in R. Laffineur (ed.), *Polemos: Le Contexte Guerrier en Égée à l'âge du Bronze* (Aegaeum 19), Liège: 465–476.
- Wedde, M., 2000. *Toward a Hermeneutics of Aegean Bronze Age Ship Imagery*. Mannheim.
- Wedde, M., 2005. 'The Mycenaean Galley in Context: From Fact to *Idée Fixe*', in R. Laffineur & E. Greco (eds.), *Emporia: Aegeans in the Central Mediterranean* (Aegaeum 25), Liège: 29–38.
- Wilson, J. A., 1974. 'Egyptian Historical Texts', in J. B. Pritchard (ed.), *Ancient Near Eastern Texts Relating to the Old Testament*, Princeton: 227–263.
- Yasur–Landau, A., 2010a. *The Philistines and the Aegean Migration at the End of the Late Bronze Age* Cambridge.
- Yasur–Landau, A., 2010b. 'On Birds and Dragons: The Sea Peoples and Mycenaean Ships', in Y. Cohen, A. Gilan & J. R. Miller (eds), *Pax Hethitica: Studies on the Hittites and Their Neighbours in Honour of Itamar Singer*, Weisbaden: 399–410.
- Yasur–Landau, A., 2013. 'The 'Feathered Helmets' of the Sea Peoples: Joining the Iconographic and Archaeological Evidence', *Talanta* 44: 27–40.
- Yon, M., 1992. 'The End of the Kingdom of Ugarit', in W. A. Ward & M. S. Joukowsky (eds), *The Crisis Years: The 12th Century B.C. from Beyond the Danube to the Tigris*, Dubuque: 111–122.
- Yoyotte, J., 1949. 'Les Stèles de Ramsès II a Tanis: Première Partie', *Kémi* 10: 65–75.
- Zaccagnini, C., 1983. 'Patterns of Mobility Among Ancient Near Eastern Craftsmen', *JNES* 42: 245–264.

Yurco, F. J., 1999. 'Sea Peoples', in K. A. Bard & S. B. Shubert (eds), *Encyclopedia of the Archaeology of Ancient Egypt*, London: 876–879.

Zangger, E., 1995. 'Who Were the Sea Peoples?', *Saudi Aramco World* 46: 21–31.

Figures

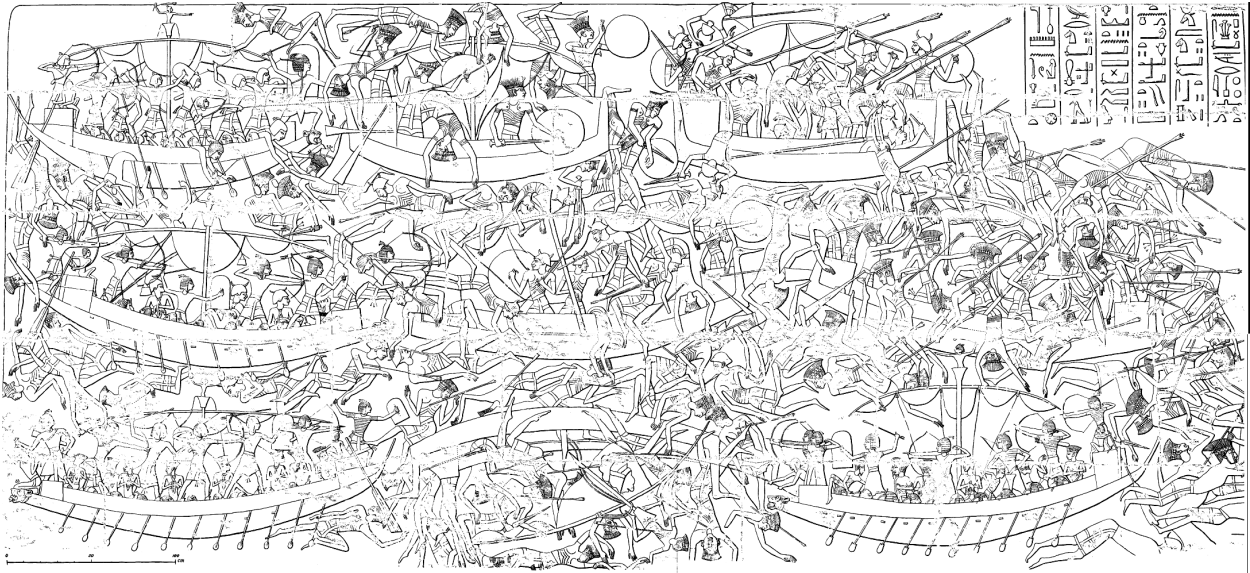


Figure 1. Naval battle relief from Ramesses III's mortuary temple at Medinet Habu (MH I pl. 39).

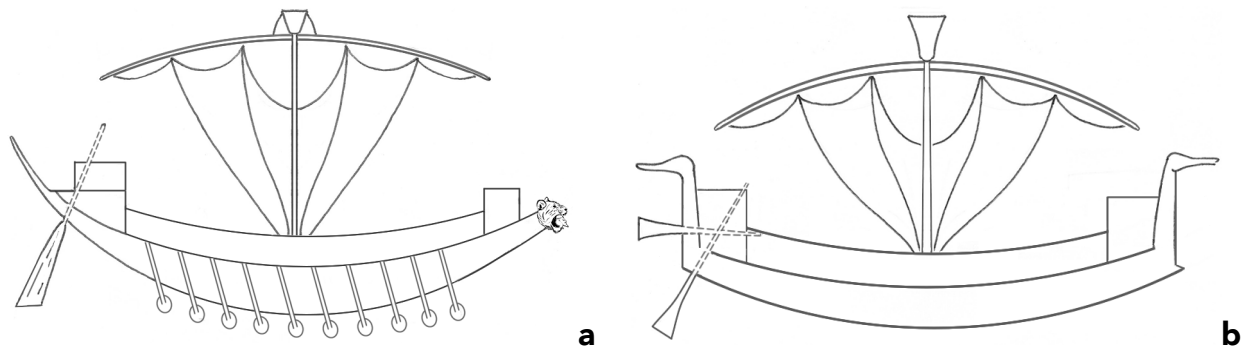


Figure 2. (a) Egyptian ship from the Medinet Habu naval battle (illustration by the author); **(b)** Sea Peoples ship from the Medinet Habu naval battle (illustration by the author).

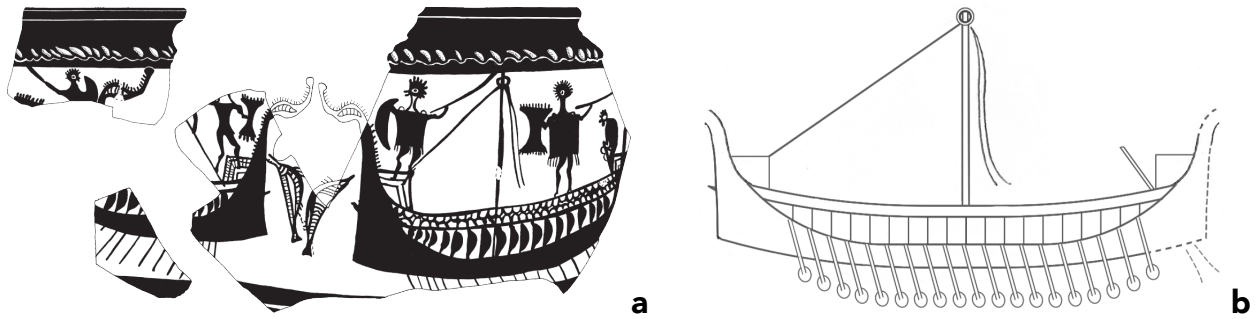


Figure 3. (a) Sea battle illustration on a LH IIIC Middle krater from Pyrgos Livanaton (after Mountjoy 2011 fig. 2); **(b)** "Kynos A" vessel from Pyrgos Livanaton (illustration by the author).



Figure 4. Sea battle illustration on a Transitional LH IIIB2–IIIC Early (or LH IIIC) krater from Bademgediği Tepe (after Mountjoy 2011 fig. 3)

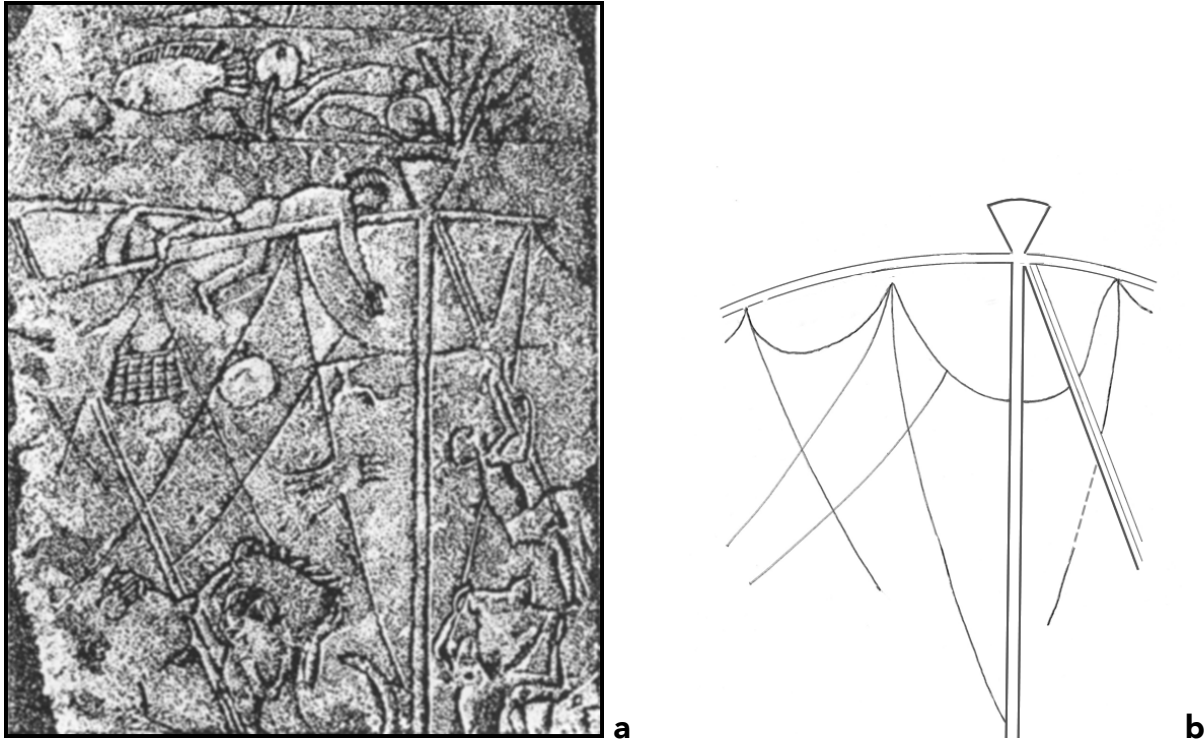


Figure 5. (a) Relief from Saqqara showing two vessels with downward-curving yards, brailed rigs, and top-mounted crow's nests (Berlin 24025); **(b)** Detail of the mast, yard, and rigging of a late 18th–early 19th dynasty relief from Saqqara (illustration by the author)

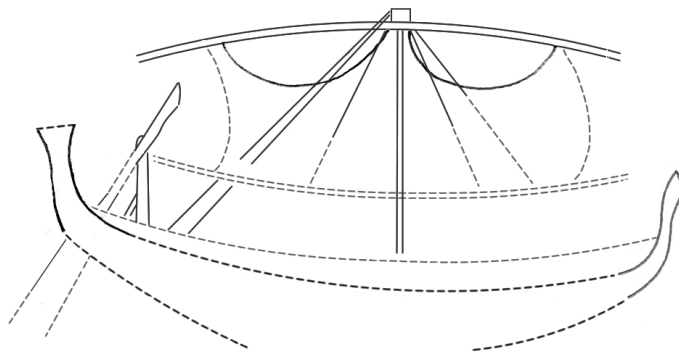


Figure 6. Syrian ship from the tomb of Nebamun (TT 17; illustration by the author).

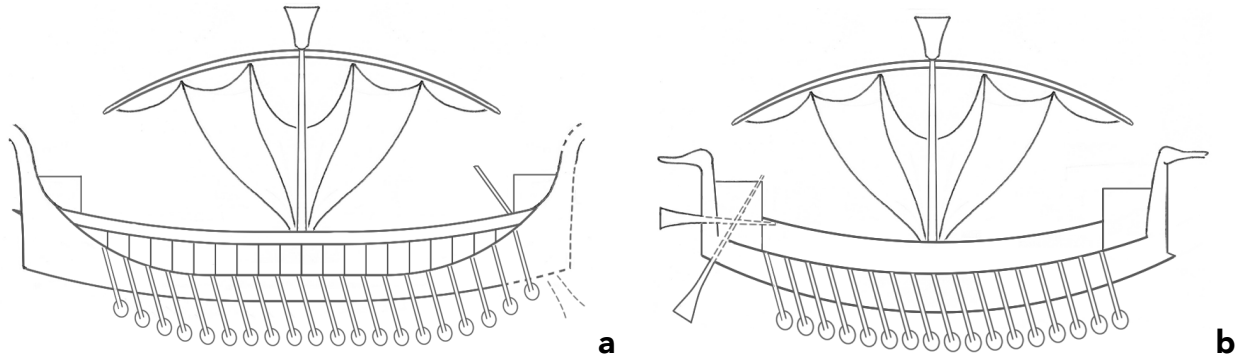


Figure 7. (a) Kynos A with Sea Peoples rigging added; **(b)** Sea Peoples ship from Medinet Habu, with oars added (illustrations by the author).

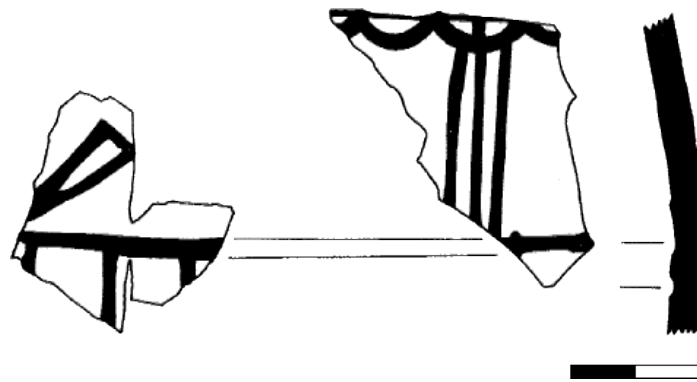


Figure 8. Philistine monochrome sherd from Ekron showing a braided sail (after Dothan & Zukerman 2004 fig. 35.10).

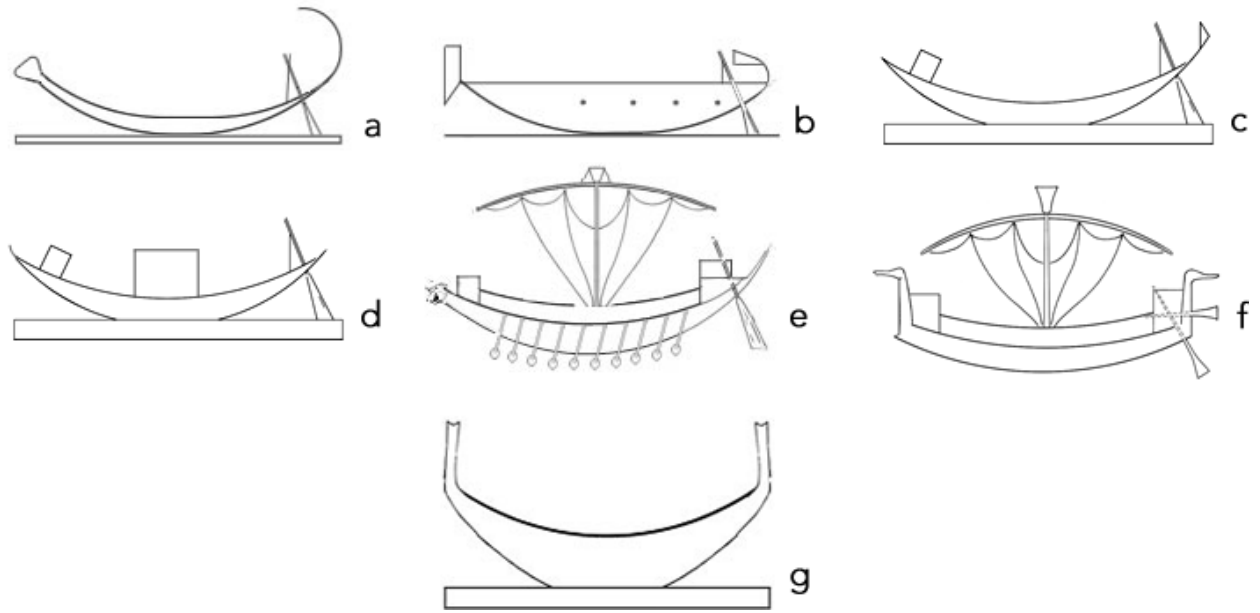


Figure 9. Ramesside ship determinatives and the vessels from Medinet Habu **(a)** *b3r* determinative, Great Inscription of Year 8, Medinet Habu (MH); **(b)** *mnš* determinative, MH; **(c)** *ḥḥwt* determinative, MH; **(d)** *ḥḥwt* determinative used in reference to Sea Peoples vessels, MH; **(e)** Egyptian warship from the naval battle relief, MH; **(f)** Sea Peoples vessel from the naval battle relief, MH; **(g)** *ḥḥw* determinative, Tanis II rhetorical stele, Ramesses II

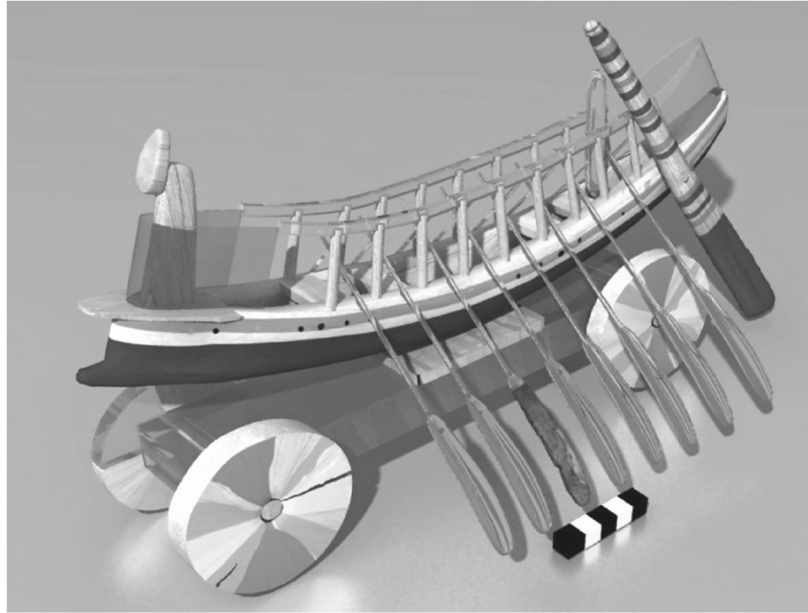


Figure 10. Gurob ship-cart model as reconstructed (© Institute for the Visualization of History, Inc.).

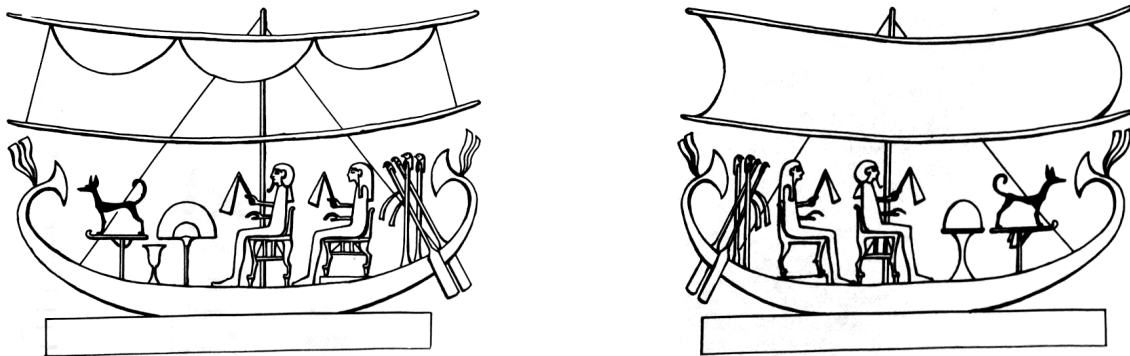


Figure 11. Abydos boat of Neferhotep (TT 50; after Hari 1985 pl. XXX).

Notes

¹ Tiboni (2005: 127, 130) partly credits the introduction of brails, and the “great development in sailing all around the Mediterranean basin” in the Late Bronze Age, to changes in weaving technology that allowed for the creation and use of twill sails.

² As Monroe (1990: 87) has noted, another advantage of the loose-footed sail is that “warriors would not be obstructed by [the lower yard] as they moved about the decks, throwing spears, shooting arrows, etc.”

³ Following Mountjoy (1998: 33), the East Aegean–West Anatolian Interface (henceforth “the Interface”) is defined as “an area which forms an entity between the Mycenaean islands of the central Aegean and the Anatolian hinterland with Troy at its northern extremity and Rhodes at its southern one.”

⁴ Though the rowers are not identical, the Bademgediği krater and the fragments from Kos are similar in their depiction of these crewmembers, while only the bent backs of the rowers on Kynos A are shown in the form of “lunettes” (Wachsmann 1998: 131–2, esp. fig. 7.9; 2013: 74–5).

⁵ Wachsmann (1998: 175) notes that there may be multiple reasons for this inconsistency: “Presumably, the normal complement was two steering oars, and those missing are attributable to loss during battle. In this matter they differ from contemporaneous representations of craft from the Aegean but seem to herald the use of the double steering oars that were to become common equipment on Geometric craft. Alternately, the Sea Peoples may have adopted the use of a pair of quarter rudders after encountering and capturing Syro–Canaanite and Egyptian seagoing ships that normally used two steering oars, one placed on either quarter.” These cases may be simultaneously correct; if so, this would be yet another example of technological transference involving the Sea Peoples.

⁶ Capart (1931: 62), followed by Vinson (1993: 136n.12, 138–139), assigned this artifact to the late 18th dynasty; Schulman (1968: 33) assigned it specifically to the reign of Horemheb (1319–1292), with whose term the 18th dynasty culminated; Millet (1987), on the other hand, is an outlier, dating the piece to 1350 BC. A late 18th through early 20th dynasty date is supported by ceramic parallels (see below), and such a date would place the appearance of this vessel at the same general time as the first recorded

appearance of the Sherden on Egypt's coast. While Capart noted the similarity between the top-mounted crow's nest on Berlin 24025 and the Medinet Habu ships, only Millet and Vinson (1993: 138–139; 1994: 42) have, to the present author's knowledge, noted the similarity in yard and rigging, and thus the possible true significance of this piece.

⁷ The storage jars shown here are consistent with Killebrew's (2007: 167–173, figs. 1.3, 4.6) Family 11 Form 22, which was in use from the 14th into the 12th centuries BC (late 18th–20th dynasty in Egypt).

⁸ Though the ceramic phenomenon associated with the Sea Peoples is complex and open to different interpretations (see most recently the essays in Killebrew & Lehmann 2013), archaeological evidence for the Philistines in particular points to the Aegean as a strong cultural influence (see, inter alia, T. Dothan 1982; 1998; Stager 1995; Stone 1995; Barako 2000; Yasur-Landau 2010).

⁹ Additionally, on the possibility of such a representation from Ashkelon, see Stager, Schloen & Master (2008: 270 fig. 15.40) and Stager & Mountjoy (2007: 50–61). Cf. a LCIII graffito from Enkomi showing what may be a loose-footed sail that has been brailed up (Wachsmann 1981: 206–209, figs. 22a–b), as well as one of the 13th–11th c. boats incised on the cliffs above the Me'arot river in northern Israel, which appears to display a brailed, loose-footed sail on downward curving yard, along with what may be a forward-looking bird-head finial on the stem (Artzy 2003: 241 fig. 13; 2013: 338 fig. 4:5).

¹⁰ Sherden (*šrdn*, *š3rd3n3* or *š3rdyn3*; possibly Akkadian *še-er-ta-an-nu*; cf. EA 81, 122–3) is also glossed "Shardana" or "Sherdanu"; for a more comprehensive biographical sketch of this group, see Cavilier (2005); Emanuel (2012b; 2013); Wachsmann (2013, esp. 183–190).

¹¹ An inscription by Amenhotep son of Hapu, an official of Amenhotep III, refers to the need to secure "the river-mouths" (the Nile Delta): "I placed troops at the heads of the way(s) to turn back the foreigners in their places. The two regions were surrounded with a watch scouting for the Sand-rangers. I did likewise at the heads of the river-mouths, which were closed under my troops except to the troops of royal marines" (BAR II §916; Helck 1958: 1821.13f).

¹² Sizable gaps make this Akkadian text, and Edel's reconstruction, highly problematic, particularly with regard to the reference to building a ship from a blueprint – something for which there is no clear precedent until nearly a millennium later (Christopher Monroe, personal communication, 2012; also Basch 2009: 65–70). Interestingly, though the reference to building replicas is reconstructed by Edel (v.8), the instruction to caulk the ships with bitumen so they do not “go down in the middle of the sea” (vv.10–12) may suggest Ramesses II intended for the Hittite king to build seaworthy vessels (cf. Pomey 2009: 49–63).

¹³ The *Šikala* have been connected to two groups of Sea Peoples from the records of Merneptah (1213–1203 BC) and Ramesses III (1183–1152 BC): the *Škrš* (= *šá-ka-lú-ša* ‘*Shekelesh*’; Lehmann 1979; Yon 1992: 116; Redford 2006: 11) and the *Škl* (= *ší-ka-ar* ‘*Sikil*’ or ‘*Tjeker*’; Wachsmann 1982: 297; 1998: 359n.10; Rainey 1982: 134; Stager 1991: 19n.23).

¹⁴ Cf. the Südburg inscription, which Singer (2000: 27) interprets as recording “an extensive campaign of the last Hittite king along the whole length of Anatolia’s Mediterranean coast” (Otten 1989; Hawkins 1990; 1995; Hoffner 1992). Singer connects Šuppiluliuma’s battles against “the enemies from Alašiya” and against Tarkhuntaša to a “last-ditch attempt to block the further advance of the Sea Peoples.” Though the threat from the coast to Khatti’s Anatolian holdings is clear, the eventual fall of Khattusha itself may not have resulted directly from the increased violence in the Mediterranean that marked the transition from the Late Bronze Age to the Iron I (see now Genz 2013; also, inter alia, Hoffner 1992; Barako 2001: 45n.22; Bryce 1998: 374–379; Hawkins 2009: 164).

¹⁵ Cf. Emanuel (2013: 16) on the problems inherent in the identification of Sherden in Ramesside iconography. Wachsmann (2013: 206), on the other hand, has argued – not necessarily incorrectly – that “the Medinet Habu naval battle relief indicates unequivocally that Sherden participated in a naval invasion of Egypt,” and has further suggested that the Weshesh and Sherden were the only Sea Peoples participants in this battle (Wachsmann 2013: 190; cf. Emanuel 2013: 26n.61–62).

¹⁶ Though not specifically referenced as being “of the foreign countries of the sea,” the Lukka had been known for piracy since at least the Amarna period (cf. EA 38).

¹⁷ References to the use of pitch or asphalt to seal wooden ships can be seen in such diverse ancient examples as the instructions for building Noah's Ark (Gen. 6:14); the aforementioned letter from Ramesses II to Khattushili II (KUB III 82; cf. Casson 1971: 211–2; Kurt 1979: 33; Steffy 1994: 277); and in the epithet μέλαινα ναῦς 'black ships' in the Homeric epics (Emanuel forthcoming B).

¹⁸ By contrast, three "members of a [cargo] ship's crew" are mentioned in the text as having been allotted land (§123.47.39, 47.49, and 48.3; Gardiner 1948a: 83; 1948b: 50).

¹⁹ Despite the present author's differences in some aspects of interpretation (see below), Vinson (1993) remains the authoritative prior study on this topic.

²⁰ A final example, which is both unprovenanced and unparalleled in Egyptian iconography, is a carved block that has the appearance of a river boat with a loose-footed sail brailled into fore-and-aft configuration – a representation that is "unique in pre-classical nautical art." Vinson (1993: 135–136n.9) considers this an Amarna-period representation, but recognizes that it is "prudent to retain at least some skepticism of any such object that has neither a certain provenience nor any parallel."

²¹ If these representations do in fact depict brailled rigging, though, then they may provide evidence for experimentation by the end of the 18th dynasty – though the presence of booms reveals the lack of a loose-footed sail, thereby demonstrating that the complete rigging-and-sail package seen at the end of the Late Bronze Age was neither fully understood nor being properly implemented at that time.