

## Bronze Age sailing and Homeric evidence

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Heinrich Schliemann's research and excavations continue to be controversial even a century after his death. Historical aspects have been discussed extensively and eloquently elsewhere.<sup>1</sup> We may still ask, however, to what extent information from the Homeric poems is pertinent to the Bronze Age.

This paper deals with a technical topic: ships and sailing. How many and how valid are the parallels between the Homeric texts and archaeological data for this topic? Although much information in the *Odyssey* clearly refers to a later period, here is the earliest account of seafaring that has come down to us in the Greek language. Linear B, to be sure, tells us far less about ships and the sea than the *Odyssey*. So, like Schliemann, we turn to Homer. The Homeric sources continue to provide valuable information for the interpretation of the material culture of the Late Bronze Age, but they must be used with circumspection. The goal is to shed some light on the ways in which maritime exchanges and passages could have been undertaken in the Aegean in the Late Bronze Age.

The primary archaeological sources of information about Aegean Bronze Age boats are models, images on miscellaneous objects, ceramics, seals and wall paintings, in addition to recent studies of Bronze Age shipwrecks.<sup>2</sup> The West House paintings from Akrotiri Thera depict a repertoire of ships of all types and sizes and, in all stages of use. The great amount of detail allows elements of naval design to be discussed.

Comparison with descriptions in the Homeric poems may bring together images and nautical terms.

### I. The Ship

We begin by taking a fresh look at some of the debated items of rigging and construction. The discovery of the ship procession painting in the West House at Akrotiri in Thera has added a valuable archaeological source, and serves to illustrate some aspects of the Homeric text.<sup>3</sup> As with textual analysis, iconographic analysis must take into account certain conventions.<sup>4</sup> Realism is not to be confused with literalism. However, there are technically imposed limits to the ways in which rigging can logically function. Thus the range of interpretive possibilities is narrowed.

The painting of the sailing ship in the West House is extensively reconstructed. Yet, enough remains of the sail, the mast and the rigging to suggest the original appearance.<sup>5</sup>

Two yards are depicted on the Thera ship. The lower yard is also referred to as a boom. The use of two yards is an important way to manipulate the sail and to change its shape in order to take advantage of varying wind directions.<sup>6</sup>

One may ask how common this rigging was. Both the single yard rig and the double yard are known in the Late Bronze Age.<sup>7</sup> Depictions of ships with single yards are harder to identify. The foot of the sail often

1. Snodgrass 1974, 114-125; Finley 1977; Davies 1984; Hainsworth 1984; Foxhall and Davies (eds) 1984, *passim*; Davies and Foxhall 1984, 177-183; Morris 1986, 81-138 for bibliography.  
 2. Höckmann 1982; Betts 1973; Kenna 1960; Marinatos 1933; Casson 1971; Bass *et al.* 1989; Morgan 1988; Barber 1987.  
 3. Morgan 1988; Marinatos 1974, pls. 7-9.  
 4. Morgan 1988, 121-137; Davis 1983.  
 5. See note 3 *supra*.  
 6. Casson 1971, 277; Georgiou 1990. According to Faulkner 1940, 6-9, the lower yard is an innovation of the Middle

Kingdom and the mast is stepped exactly amidships on Hatchepsut's boats. It is not until the period of Ramses III that the lower yard is abandoned in Egypt.

7. For single yard see Evans 1928, 244, fig. 141b and 140 (MM III?); CMS VII: 254 (MM II a); Marinatos 1933, pl. XIII, 16 (LH III). For double yard, see Evans 1921, 254, fig. 190c (LM?); Kenna 1960, 107; Evans 1928, 243, fig. 139 (LM I); CMS VII, 104 (LM II); Marinatos 1933, pl. XVI, 52 (LM); CMS II (j) 287 (MM I-II); Evans 1935, 828, fig. 807 (LM I); CMS VIII, 106 (LM Ib).

terminates directly on or behind the gunwale and is thus not differentiated.

Ships with two yards occur in Minoan glyptic as early as the MM II period.<sup>8</sup> In the case of rigging with two yards, the archaeological and textual sources differ from each other. There is no reference to this system in Homer. A single yard is described.<sup>9</sup> The single yard is preferred during and subsequent to the Bronze Age.

Some observations about the sailing ship are possible despite the lacunae in the painting.<sup>10</sup> The lines are insufficient to handle the rigging needed for a sailing ship with two yards. At least this aspect of the painting is representative rather than literal.<sup>11</sup> Anywhere from two to seven or eight lines are seen on various examples in glyptic and on other ships of the Thera painting. Five loops for sheets to pass through are reconstructed on either side of the mast above the yard. This is based on the rigging of two other masted ships in the same painting. Thus, up to ten lines can be accommodated on this type of mast. On the sailing ship, four halyards are clearly marked: two on either side of the mast. They are for hoisting the sail on the yards.

We will now compare the painting and rigging described in Homer. The rigging or any part of it is referred to as ὄπλων.<sup>12</sup> The use of two headstays is mentioned in the *Odyssey*.<sup>13</sup> The backstay is the heaviest line<sup>14</sup> and it is made of ox hide because it supports most of the weight of the rigging, especially in a square sail rig, and because it regulates the angle of the mast.<sup>15</sup> Ox hide halyards are also mentioned.<sup>16</sup> Other lines are made of papyrus<sup>17</sup> and rushes.<sup>18</sup>

Braces control the upper yard and its lateral adjustment.<sup>19</sup> Sheets control the lower yard, or boom.<sup>20</sup>

Two topping lifts on either side connect the upper yard with the mast.<sup>21</sup> The mast is set<sup>22</sup> in the central thwart.<sup>23</sup> The sail is hoisted<sup>24</sup> and spread.<sup>25</sup> It is furled<sup>26</sup> or gathered<sup>27</sup> by lowering to the lower yard if there are two. To lower or let out the sail<sup>28</sup> one releases the back stay. The running rigging is lowered<sup>29</sup> into crutches.<sup>30</sup> All of these lines and functions can be seen on the sailing ship and the other ships in the painting.

Permanent stays to hold the stepped mast are not depicted in the painting or mentioned in the Homeric poems but may be shown on seals. Shrouds do not appear to have been used. The lack of standing rigging raises interesting questions about the way that ships traveled. Morgan believes that it shows that voyages (or the specific voyage in the Thera fresco) were of short duration.<sup>31</sup> I think that fore and aft stays were rigged at the same time as the mast and tightened before the sails were hoisted. Keeping any organic rope or cable under permanent pressure might weaken it or cause it to snap. For instance, Agamemnon's rigging, which is made from rushes, is out of commission, presumably from lack of replacement and exposure.<sup>32</sup>

Many different types of boats are described in the *Odyssey* and depicted on the Thera painting. Clearly, the many oared light weight ships used for war or pirating expeditions cannot have had the same hull construction as merchant ships which required a completely different capacity.<sup>33</sup> Thus, all boats cannot be maneuvered or used in the same way.

The boat described as having a hold large enough to contain several crew members<sup>34</sup> is different from the boat in which a person can fall from the deck into the bilges,<sup>35</sup> or the boat in which Odysseus binds his companions under the thwarts lacking space in the

8. See note 6 supra.

9. ἐπίκριον, *Od.* V.254 and elsewhere. Terms are transcribed directly from the text and will not necessarily be in the nominative or infinitive.

10. Morgan 1988, 121-137 *passim*.

11. Davis 1983.

12. *Od.* II. 23, 426, XII. 410, XIV.346, XXI.390.

13. προτόνοι, *Od.* II.425.

14. ἐπίτονος, *Od.* XII.423.

15. *Od.* V. 260.

16. *Od.* XV. 291.

17. βύβλινον, *Od.* XXI.391.

18. σπάρτα, rushes *Il.* II.135.

19. κάλους, *Od.* V.260.

20. πόδας, *Od.* V.260.

21. ὑπέρας, *Od.* V.260.

22. ἰστόν ... στήσαν ἀείραντες, *Od.* II.422-428.

23. μεσόδημη, *Od.* II.424, VI.289, XV.289.

24. ἀνά... ἐρύσαντες, *Od.* IX. 77; ἔλκον ἴστια, *Od.* XV.291.

25. ἀνά πέτασσαν, *Il.* I. 480.

26. ἰστία μηρύσαντο, *Od.* XII.170.

27. ἰστία στείλαντο, *Il.* I.433; *Od.* III.10-11.

28. λίον ἰστία, *Od.* XV.496.

29. κάθεμεν, *Od.* IX.72, or καθείλομεν, *Od.* IX.149.

30. ἰστοδόκη, *Il.* I.434; ἰστοπέδη, *Od.* XII.51.

31. Morgan 1988, 126.

32. *Il.* II.135.

33. Bass *et al.* 1989, 1-29, fig. 2.

34. ἐντός, *Od.* XII.225.

35. ἄντλω δ' ἐνδούπησε, *Od.* XV.749; ἄντλου also occurs in *Od.* XII.411.

hold.<sup>36</sup> Thus, one should not expect to find all these features on one boat, nor should one expect the features to be the same size, even though they can have the same name. Some boats can have shallower, others deeper holds, depending on their purpose. Merchant ships needed to have a completely different construction in order to accommodate cargo and crew over long periods of time.

The larger Theran boats are characterised by the following features: absence of keels; relatively shallow draft and low freeboard; small sail area; square sails; oars to compensate for lack of maneuverability and for power when needed.<sup>37</sup> Two steering oars are depicted to starboard. One of these could have been moved to port.<sup>38</sup> Decks are depicted and canopies typically positioned aft.<sup>39</sup> Masted boats have long, narrow hulls with a curved bow and a mast set just forward of the center. The mast is stepped and set up through the main thwart.<sup>40</sup> The mast position on the Theran ships is an innovation. In depictions of Egyptian ships<sup>41</sup> and Minoan ships on seals, the masts are centered. Thus the placement of the mast at Thera is new and worthy of note. It has been changed deliberately in response to experimentation.<sup>42</sup>

A landing plank or ladder is referred to only once.<sup>43</sup> It is made of polished wood and dragged astern. This problematical piece of equipment may be the controversial stern ornament figured in the Thera ships.<sup>44</sup> This object is likely to have had another use besides being an aide for boarding.<sup>45</sup>

On the North wall in the depiction of the shipwreck, a man holding a long pole stands in the bow of an oared boat near the shore.<sup>46</sup> The pole is held ver-

tically and at arm's length. The gesture does not suggest attacking. It may be a pole used as a boat hook or for punting.<sup>47</sup> Three other long poles are placed on the forward deck. Two different words are used in Homer for long poles in boating contexts. The *κοντός* is used for shoving off.<sup>48</sup> The *ξυστόν* is a long pole tipped with bronze used for fighting in sea battles.<sup>49</sup>

## II. Beaching, Mooring, Harbours

The frequent references to the beaching of boats in the Homeric texts have led scholars to assume that this was a common practice for all types of boats. It is commonly thought that a smooth beach was the only installation needed and that all types of ships were regularly pulled up on to the beach for loading, unloading and protection from the weather. The boat that delivers Odysseus, presumably not heavily laden, is beached only for the amount of time it takes to disembark him.<sup>50</sup> But the custom of beaching light weight boats or skiffs can most certainly not be applied universally.

War ships, favoured for speed, are relatively light and shallow and can be easily hauled on to land and propped.<sup>51</sup> Merchant ships with deep rounded hulls travelling with full loads of cargo were surely not beached.<sup>52</sup> Two good examples are the Cape Geli-donya<sup>53</sup> and the Ulu Burun wrecks.<sup>54</sup> These vessels were so heavily laden that beaching would have resulted in serious damage to the hull, even if their weight permitted them to be hauled on to land in the first place. Merchant vessels could only be beached when empty. Otherwise, they needed a decent an-

36. ὑπὸ ζυγὰ, *Od.* IX.99.

37. See Morgan 1988 for bibliography.

38. Morgan 1988, 126.

39. ἵκρια (ικριόφιν), *Od.* XIII.74.

40. μεσόδη, *Od.* II.424.

41. Faulkner 1940.

42. Different angles to the wind can be achieved as well as more stability in sailing downwind. Although it is mostly reconstructed, the sail area on the sailing ship appears to be considerably smaller than that of contemporary Egyptian merchantmen, and the hull is probably proportionately shorter. Reduction of the sail area indicates a preference for greater maneuverability over speed.

43. ἐφόλκαιον, *Od.* XIV.350; ἄφλαστον =stern ornament? *Il.* XV.717.

44. Morgan 1988, 135.

45. See Morgan 1988, 135-137 for a synopsis of the various opinions.

46. Morgan (1988, 152) compares this to a scene from the Mycenae siege rhyton and a fragment from Epidauros.

47. Similar poles are depicted on Egyptian paintings. These can be straight or hooked as in Newberry 1894, pl. 18. There is no mention in Homer of the use of a pole or any other instrument for making soundings.

48. On departing from the Cyclops' island, *Od.* IX.487-488.

49. *Il.* XV.388, 677.

50. *Od.* XIII.113-125.

51. Warships carry few provisions (*Od.* II.354, 349, V.266, IX.165, IV.359) and availability of fresh water in harbours is important (*Od.* IX. 85, 140, X.56, XIII.109).

52. The distinction between the two types of ships exists in Homer.

53. Bass 1967.

54. Bass 1987: 693-733. Hull length is approximately 50 feet. The cargo included several stone anchors and about six tons of copper. Bass *et al.* 1989.

chorage or mooring which would allow for safe loading and unloading.<sup>55</sup> A beach alone would not suffice. Amnissos has a good beach yet is considered a difficult harbour, probably because it has no protection from the North wind.<sup>56</sup> In the *Odyssey*, one of the best harbours is considered to be Vathy (Phorcys) in Ithaca described lovingly and in great detail with its multiple types of anchorages.<sup>57</sup>

### III. Night Sailing

Importance has been placed on the need to define routes by the measure of a day's sail. But travelling time obviously depends on the weather and not on the skipper's wishes. Although arrival before night-fall may be preferable, there is absolutely no guarantee that this will occur. A master or a pilot of a ship had to know the stars.

In Homer, a method of computing time by the stars is used. Three night watches are mentioned and a fourth is inferred.<sup>58</sup> The watches are timed by the sequence of a designated group of first and second magnitude stars near the ecliptic known as the decan stars or clock stars. They vary according to the season. Star time increases by four minutes each day.<sup>59</sup> Each star or group rises heliacally with a difference of plus

or minus ten days in relation to the adjacent group thus giving the name "decade" to the group and "decan star" to the first star in each decade.<sup>60</sup> Every 40 minutes one star in the sequence crosses the celestial north-south meridian line which divides the night sky into eastern and western halves. Each day the series of stars observed is diminished by one at sunset and increased by one at dawn. A designated star's zenith or meridian crossing was observed at midnight. The third watch is when the current decan star and those stars in front of it have all passed the meridian and are descending.

These simple navigational aids are also attested in other seagoing and preliterate cultures.<sup>61</sup> Unless ocean voyages are involved, the star clock would not pose too much of a problem in calculating time. Seventeen days is the longest recorded time in the Homeric texts for a passage without landfall.<sup>62</sup> The ability to understand and apply the decanal system suggests some measure of navigational sophistication.

Indeed, the *Odyssey* is the earliest text in Greek to mention celestial navigation and provide information about night sailing.<sup>63</sup> The Dog Star is known.<sup>64</sup> The morning and evening stars marking the East and the West are mentioned but do not appear to be equated.<sup>65</sup>

55. The war ships are relatively shallow and can be easily hauled on to land and set on props, ἔχματα, *Il.* I.486, II.154, and ἔρματα, *Il.* XIV. 410. Rollers may be used to lower the craft of Odysseus to the water, *Od.* V.261. They are more common in later texts.

56. *Od.* XIX.185-200.

57. *Od.* XIII.96 ff. See also Shaw 1989 on suitable harbours.

58. *Od.* XII.312, XIV.483; and especially *Il.* X.251-253 although the passage is of problematical date.

59. Cotter 1968, 36.

60. Cotter 1968, 35-36. Leach 1954, 115, 123-124; Neugebauer 1954, 796: In the Egyptian civil calendar the month consisted of three 10 day intervals or "decades" linked to heliacal risings of certain stars. The stars themselves were called "decans" by the Greeks. The consecutive risings of the decans were used at least as early as 2500 BC as a star clock to indicate the "hours of the night". Approximately 12 of these decans covered the interval of darkness between dusk and dawn. According to Neugebauer (1954, 797 and 1957, 82-86) time reckoning by decans was later replaced by an improved method of observing transits of stars. On Middle Kingdom coffin lids the decanal constellations are arranged in 10 day intervals throughout the year forming 36 columns with 12 lines each for the 12 hours of the night. The year has 360 days or 36 decans.

The name of the specific decan moves up one line from column to column creating a diagonal pattern. This is a star clock. The "hour" of the night is determined by the rising of the decan which is listed in the proper decade of the month. The system was decimal for daylight, duodecimal for darkness. During or before the New Kingdom, decanal clocks were replaced by a system based on observing the culmination of stars for decans. Neugebauer 1957, 88-89 (tombs of Senmut, Seti I, Ramses VI, VII, IX). It would appear that both systems are known in the Homeric texts, and both certainly predate the 8<sup>th</sup> c. BC. See Leitz 1989 for the tomb of Senmut and more recent research on Egyptian astronomy.

61. Thomas 1987, 73-115 for Micronesian navigation. It was also known to the Egyptians (Cotter 1968, 36). Orion, the Pleiades and Sirius are amongst the few decan stars which can be identified with any certainty (Leach 1954, 115; Neugebauer 1957, 83; Leitz 1989).

62. Calypso's island may belong to the realm of fantasy, but a trip of seventeen days duration is not inconceivable.

63. For examples see *Od.* II.413 ff., II.434, III.1-5, III.177-178, V.33-35, V.269-282, IX.82, XII.279 ff., XIII.29ff., XIII.70-95, XV.296.

64. *Il.* XXII.27-29, V.5, and possibly XI.62.

65. *Il.* XXIII.226 and II. XXII.318 respectively.



On leaving Calypso at night, Odysseus sets a course to the East by keeping Bootes (Arcturus) and the Bear or Wain (Ursa Major) to his left for 17 days.<sup>66</sup> Orion is described together with Ursa Major, a phenomenon of the winter sky.<sup>67</sup>

Thus, ancient Greek seafarers as described in Homer were surely prepared for night travel and that includes not only navigation by the stars but also the knowledge of harbours and the ability to find landfall at night. They were evidently prepared to sail in winter, despite the advice of Hesiod who was an unadventurous and overly cautious soul and in any case not much of a sailor.

#### IV. Professional sailors

The Homeric evidence suggests that these sailors were well taught. Many authors have argued that a lack of a seamanship is shown in the Homeric descriptions. I believe that their abilities have been underestimated. Given the types of boats and the technology available at the time of Homer and earlier, it is quite logical that caution was essential. In fact, the fear and caution about the seas vividly expressed in the *Odyssey* shows a great knowledge of the Aegean and respect for its unpredictability in all seasons. The fact that so many deities are attributed with control of the winds emphasises precisely this unpredictability of the weather. The Aegean is one of the most treacherous bodies of water in the world. Even today, sailors with experience of this sea are wary of such points as Cape Malea and Cavo Doro.

Navigating was undoubtedly a specialised occupation. Professional sailors are mentioned in the *Odyssey*.<sup>68</sup> Traders are distinguished from pirates.<sup>69</sup> In addition to Noëmon who lent Telemachus a boat,<sup>70</sup>

the Phaeacians figure prominently as a people whose existence is linked with the sea.<sup>71</sup>

Navigating may have been an inherited occupation. It requires not only experience in handling boats and rigging, but also knowledge of the seas, the landmarks and the skies both by day and night which can only be acquired gradually through experience to be effective, and is likely to have been learned over more than one generation by word of mouth as well as by practice. Lest we forget, Odysseus is the son of an Argonaut.

The island and coastal populations of the Aegean, the pirates, the raiders and the traders were surely the most innovative and experimental boat designers. Ship building as a skill or as a profession is linked with mastery in the use of ships: although an experienced sailor may not necessarily become a ship builder, the reverse is inconceivable. In Linear B, ship building is a specialised occupation.<sup>72</sup> There are references to this craft in the Homeric texts.<sup>73</sup> The description of the raft of Odysseus includes many details about shipbuilding methods and materials.<sup>74</sup>

#### V. Conclusions

Today there are more images from the Bronze Age and the early Iron Age to supplement words and descriptions. Our vision of material culture has been significantly enriched in the last twenty years. Yet the marriage of word with image to evoke an object must continue to be approached with caution. More surprises may await us on the unexcavated walls of Akrotiri.

In conclusion, many of the nautical terms in the *Odyssey* and the *Iliad* have been made more vivid by the Thera depictions. There are more coincidences

66. *Od.* V.269-282.

67. On the shield of Achilles, *Il.* XVIII. 486-489 and *Od.* V.271-275. The Pleiades are mentioned in both passages. The Pleiades and the Hyades in Taurus and Arcturus in Bootes differ nearly eleven hours in night ascension, occurring together (as in *Od.* V) in the winter months. The Pleiades or Arcturus would be visible at all times of the year although Arcturus is dominant in the summer. At the latitude of the Aegean, these constellations are in the northern quarter and circle around the pole. When the "Bear watches Orion", Orion is in the southern quarter. The Homeric texts indicate knowledge of seasonal changes in the night sky. These simple observations are essential to celestial navigation. The Bear is no longer a non-setting circumpolar constellation in the Mediterranean and the

nearest star to the pole was probably Kochab, a second magnitude star in Ursa Minor which was not identified as a constellation until a later date.

68. ἀλιεῦσι, *Od.* XXIV.419; πορθηῆες, *Od.* XX.187; ναῦται, *Od.* XV.435.

69. For traders, see *Od.* I.184, XIV.452, XV.415. For piracy, see *Il.* IX.138-140, 278-282, XVIII.326-7; *Od.* IX.39-42, XIV.229-234, XV.427 and 449-453, XVI.426-430.

70. *Od.* IV.634.

71. *Od.* VIII.557.

72. na-u-do-mo, PY 189. Ventris and Chadwick 1973.

73. *Il.* V.59-63, XV.410-412.

74. *Od.* V. *passim* for the building of the raft, V. 269-282; IX. 384.

than differences. The nautical terms themselves are etymologically evocative. It would seem that much of the naval technology of the *Odyssey* can be applied to boats of the Late Bronze Age such as those in the Thera painting and the excavated wrecks. Certainly, we do not find in the texts items that appear to be any more sophisticated technically than those shown in Late Bronze Age depictions. The navigational systems and the knowledge of astronomy attested in the Homeric texts are based on Egyptian systems of the Middle and Late Bronze Age. The introduction of this knowledge into the Aegean area can most certainly have occurred before the 8<sup>th</sup> c. BC.

The ships of the Late Bronze Age may have differed in some respects from those of Homer's day (8<sup>th</sup> c. BC or later), but the tradition of the sea and navigational knowledge is not likely to have changed much. Moreover, whether two yards or one, we are dealing with a square sail that will have determined how close hauled the ship could sail.

Construction and the rigging determine the handling and function of a boat. By comparing the routes and sailing practices described in the *Odyssey* to the-

oretical routes based on artifact distribution we can begin to reconstruct ways in which sea communication was undertaken. The similarity of artifacts at a number of sites will not by itself, however, give an accurate picture of the routes followed or the harbours used. The type of ship, the effects of the wind, currents, and geography, all must be taken into consideration.<sup>75</sup>

Geomorphological studies at present under way may well alter our picture of a good many coastlines.<sup>76</sup> A reevaluation of some approaches by sail may be required if it is shown that a different coastline might have caused changes in local winds or currents. Yet the prevailing winds and wind systems, as well as the preferred routes and approaches to land will have been much as they are for the modern sailor. In this sense, Homer's descriptions of seas, winds, and routes are valid even today, and both Homer and the modern sailor's experience can be used to help reconstruct that of antiquity, despite the introduction since then of different and more efficient rigging, allowing close-hauled sailing.

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75. Georgiou 1993.

76. Davidson and Tasker 1982, 82-94; Kraft *et al.* 1980, 776-82;

Kraft *et al.* in this volume; Mendoni and Mourtzas 1989.

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