

BIRDSHEAD REVISITED: THE BOW MORPHOLOGY OF THE EARLY GREEK GALLEY*

Introduction

Since times immemorial the builders of watercraft have paid particular attention to the shape and the decoration of the extremities, the one for hydrodynamic reasons, the other out of cultic and ceremonial concerns. Ethnography, archaeology and art provide a plethora of examples, concepts that appear, spread, and disappear, often taking the reasons for their specific form with them into their oblivion. While the religious aspect remains obscure, the morphological offers valuable data towards the study of design strands and traditions. Due to their exposed position, ancient bow and stern devices are most often documented by imagery, rather than wrecks, which rarely are conserved to such heights.

To study bow and stern devices — in the present case those of the early Greek galley — from representations requires accepting imagery as a mirror of reality. While it is true that the artist depicting the ship is fallible, masking the true object behind simplification, compression, distortion, technical ignorance, even error, the scholar can rarely point out individual depictions as being — by definition — misleadingly defective.¹ This does not stem from intrinsic inability, but from the frequent absence of a large enough control group against which the suspicious single depiction stands out.² Despite affirmations to the contrary, the modern beholder is obliged to work with the images as they have come down through the ages, rather than attempt a correction of the database often according to no more than an unformulated appeal to “connaissanceurship”.³ The confrontation with imagery is, to a large extent, a dialogue with the visible. Narratives are constructed from the available evidence in its typologically ordered form. Yet familiarity with the database inexorably leads to the realization of massive absences, so obvious that either they become reconstructable, or they require bridging arguments. A comprehensive account ensues only after a parallel questioning of the invisible. It is, thus, question, primarily, of a methodological, rather than an evidential, issue.

The early Greek galley, from Late Mycenaean times down to the end of the Geometric period, offers a coherent and large enough material to constitute a test case for a focus on the decorative devices of bow and stern in morphological terms, as well as on the method(s) to be applied in their study. An additional advantage is provided by the fact that the problem has recently been examined by a prominent scholar, whose results constitute a departure point.

The birdhead device

At the *Fourth International Symposium on Ship Construction in Antiquity* Dr Shelley Wachsmann presented the first extensive examination of bow and stern devices to pay particular attention to the Bronze and Iron Age material.⁴ Through the application of a unitarian approach all stem- and sternpost terminals/decorations — from the Late Bronze Age down to Roman times — are shown to depict the head of a bird. Recurrent progressions from naturalism to abstraction and back again are postulated to explain how the Mycenaean birdhead stempost becomes the Geometric continuous curve (usually understood as a horn), and how birdhead sternposts metamorphose into the volute and the *aphlaston* — the latter from an abstract birdhead device with multiple beaks. Such a reading⁵ possesses an undeniable attractiveness: its economy as an explanatory model allows it to be formulated in a single sentence with no exceptions. In addition, it would furnish support for an argument in favor of seeing a fundamental continuity in Greek galley architecture from the Bronze Age down through the Classical and Hellenistic periods. It does, however, present a number of problems, essentially of a methodological nature, but also concerning the interpretation of specific images⁶

Although not stated explicitly by Wachsmann, his hypothesis generates the impression that the shipbuilding of the Eastern and Central Mediterranean from ca. 1400 BC onwards constitutes a single tradition as symbolized by the exclusive use of the birdhead as a naturalistic or abstract bow and stern decorative device. While it is true that a certain leveling is inherent in two-dimensional representations of ships through the tyranny of particularly strong artistic traditions, it is emphatically not the case for the period 1400-700 BC, which figures prominently in Wachsmann's reconstruction.⁷ Even if it is clear — on the currently available evidence — that the oared galley is a Mycenaean invention, it cannot be argued that in its early form, to which must be counted its Iron Age progeniture due to the irrefutable continuity of galley construction through the so-called Dark Age, it found a single expression in terms of all constructional and decorative/symbolic details. No single Mycenaean settlement can be designated as the birthplace of the galley, nor can it be affirmed that all galleys evolved from the putative "first instance". It is far more likely that the concept found multiple expressions, in which not only shipwrights but also local leaders and strong tribal/kinship groups had a voice (the latter for the decorative/symbolic elements).⁸

Further objections may be raised. That post terminals may take naturalistic or abstract forms cannot be denied, but what must be

questioned is whether a naturalistic for'ard-gazing bird head metamorphosed into a aft-looking variant so abstracted that it takes the shape of a continuous curve, craftily imitating what looks like a horn. It is necessary to scan a larger timeframe since the most eloquent expression may not necessarily be found early on in the series. The large Dipylon *diereis* carry obvious horns on the forecastle, suggesting a derivation in pictorial terms from the earlier pre-Late Geometric galleys with the "continuous curve".⁹ Moreover, it is important to note that there is frequently a morphological difference between a bow carrying a birdhead device and one with a horn: the former appears on posts that are not, or only partially, integrated into the bow structure, the latter frequently on the massive bows associated with the later Iron Age. Finally, it may be surmised that the symbolic force invested in the post terminal was sufficient to render its shape – and placement – of crucial importance: although the bird does have a special connection with Bronze Age Aegean vessels, it cannot be argued that it provided the sole model for all terminals.¹⁰

An excursus on methodology

An alternative reading to that proposed by Wachsmann takes purchase on the observation that there exist discrete morphological similarities between various Bronze and Iron Age galley depictions that cut across typological boundaries. By classifying the galley representations of ca. 1400 to 750 BC into four groups, Type V, Type VI, unassignable Bronze Age, and Proto- to Middle Geometric, a false sense of unity is created, as if a single uniform process led to the development of the hull type.¹¹ This is a necessary evil of typological classification so as to render a cluster numerically significant and so as to move away from narratives based on references to single instances. A typology constitutes an act of structuring imposed upon the data, and as such involves a series of decisions on the part of the scholar, decisions that impact, either immediately or eventually, on the interpretation. Beyond the speculative nature of any analytical "system" into which archaeological evidence is placed, these decisions revolve around three major issues:

- (1) the minimum population necessary for a group of images to be consecrated as a type;
- (2) the extent of morphological uniformity displayed by the individuals within a type, that is: questions of artistic idiom and/or regional variability;¹²
- (3) the attitude taken to morphological variants, as part of a typological cluster, although marginal, or as members of a separate, although related,

perhaps as yet only nascent, type, as opposed to regional variations within a type.

Behind the type designations or crude groupings noted above, there lie a number of thin design threads, insufficiently well attested to warrant consecration as separate types, but of interest as possible indicators of future classification.

Since the aim is to complement the typology with an analysis capable of illustrating the suggested existence of several strands, it is methodologically defensible to fall back upon examination of the bow morphology: the imagery attests to only a limited evolution of the stern over time, while the bow sees substantial change. Late Helladic III to Middle Geometric II ship images exhibit individually conceived bows with much particularizing detail, as if the artists are echoing a degree of variation no longer manifest in the Late Geometric and following periods. In addition, the two presence/absence matrices which governed the diagnostic Bronze Age typology, decked/undecked and with/without bow projection, are ignored so as to avoid – as far as possible – extremely small groups. Two approaches are necessary; the first concentrates on general outlines: bow profiles and mass; the second turns to decorative aspects: the stempost terminal.

Early bow morphology

Instead of two well-established types, plus the non-assignable Mycenaean group and the catch-all Early Iron Age group, a total of six new groupings result. They take into account the following features:

- (1) the manner in which the stempost is depicted;
- (2) the degree of integration of the post into the overall bow morphology;
- (3) the shape and volume of the bow in relationship to the overall hull length.¹³

Group 1 has a vertical non-integrated post without a forecastle and a very short bow projection. In pictorial terms this frequently translates into a stem traced by a single line with the brush. The non-integration is indicated by the right angle at which this line meets the keelline or the hull in general. When extant, or reconstructable, the bow decoration consists of a birdhead device.¹⁴ It is a common approach, present on possibly as many as eleven documents. In time it is restricted to the Bronze Age.

Group 2 has a vertical post with lattice work and may have a forecastle.¹⁵ When this is the case, as on the Tragana ship (B7), it is tacked on in a manner that betrays its origin in the removable fenced fighting platform depicted on the Akrotiri Miniature Wall Painting battle scene.¹⁶ This

bow morphology reappears on the Middle Geometric I Toumba ship from Lefkandi (E5) and on the late Middle Geometric Khaniale Tekke ship A (E10). In this latter case the bow is concave, rising from a substantial projection, out over which extend two *proemvolia* with emphatic buffers, that is, a morphology which one would expect to be depicted with a massive bow.¹⁷ The temporal and spatial spread of the three members argues against this bow morphology resulting from one artist's idiosyncracies.¹⁸ While the Tragana ship has a birdhead device, the Toumba vessel has the typical Geometric horn.¹⁹

Group 3 shows that the bow to post integration began already in the Bronze Age. The post is semi-integrated and the bow may be equipped with a forecastle, an element which plays a major role in the evolution of the bow morphology of the galley. In pictorial terms the semi-integration translates into an oblique transition from gunwale to stem (Late Helladic IIIB-C) or the beginnings of an integrated forecastle (Middle Geometric). Seven individuals exhibit this trait, mainly Late Bronze III in date,²⁰ with the notable exception of the Lefkandi-Skoubris (E3) and the Eleusis 741 (E9) ships, in Attic terms both Middle Geometric in date.

Group 4 exhibits a massive triangular bow with no birdhead device and an embryonic – if present – to short bow projection. The five Bronze Age instances are clay models, four of them rhyta from Cyprus, the two Iron Age documents being the ship on the krater from Halikarnassos/Dirmil ([E4] 950-900 BC) and the clay model from Cyprus of Cypro-Achaic date (750-600 BC).²¹ Three of the rhyta (D2-4) and the Athens Akropolis model (B9) are damaged at the extremity of the post, while the rhyton in the Kunsthistorisches Museum in Vienna (D5) does not have the birdhead device, but a horn. It is probable that the missing terminals are to be reconstructed as horns, not birdhead devices.²² The krater image (E4) cannot be read as having a birdhead device since it lacks neck and head.²³

Group 5 has a massive square bow with a vertical post. It occurs three times, on the Late Helladic III Amphiareion model²⁴ and on the two ships on the Protogeometric Fortetsa krater.²⁵ The hole at the summit of the Amphiareion bow indicates that a horn is to be reconstructed since a birdhead device cannot be reconciled with the bow morphology.

Group 6 has a massive square bow but with a stem that curves down to the projection. All elements of the bow morphology have been integrated into a single structure. It is characteristic of six Middle Geometric ships, including the two on the Metropolitan Museum krater. This design strand forms the basis for further developments in Late Geometric I and later periods. The decorative device is a horn.

Design strands and traditions

The arrangement of the data in Groups 1-6 is tentative and leaves room for debate as to individual assignments. The approach is designed to emphasize the four parameters that play a decisive role in the evolution of the bow morphology of early Greek galleys:

- (1) the integration of the post into the bow structure;
- (2) the integration of the forecastle into the bow structure;
- (3) the integration of the projection into the bow structure;
- (4) the role of the stem decorative device as a marker of different strands.

The first three parameters evolved at an unequal rate, while the fourth exhibits an interesting caesura. Three trends are manifest across the chronological range of the groups:

- (1) a greater integration of the post into the bow; this is achieved by three means: an oblique junction between stem and hull, an integrated forecastle, and a curving line between stem and projection;
- (2) the generalization of the bow projection on the standard galley, whereas the vertical bow is retained on the hybrid cargo-galleys particularly visible in the early seventh to late sixth and later centuries;²⁶
- (3) the replacement in Groups 4-6 of the birdheaded post by a horned bow.

The analysis suggests that the birdhead device is to be associated with stemposts that are either not or only partially integrated into the bow structure, as in Groups 1-3. Once the forecastle becomes a regular bulwark,²⁷ the decorative/symbolic function is taken over by the horn, which in its first incarnation appears to have been single, before becoming double, spreading out from the post and attached to the bulwark as on the Late Geometric I Dipylon ships, where the reading as a horn is supported by the hatch-pattern, inspired by the rings visible on horns. These two approaches can be read as separate traditions, the earliest appearance of the birdheaded bow securely dated at least as early as Late Helladic IIIB, while the horned bow may have begun a little later, Late Helladic IIIC, unless the Amphiareion model can be placed in IIIB.²⁸ As yet the evidence is not sufficient to allow localizing the two traditions geographically, beyond a very tentative suggestion that the early horned vessels point towards a region outside the Peloponnesian heartland of Mycenaean civilization.²⁹

The historical context, the final phases of the Late Bronze Age and the transition to the Iron Age, through the so-called Dark Age, provides an explanation for the changes over time observed in the early galley bow morphology. The Mycenaean bird-headed stempost terminal is a sculpture in wood,³⁰ no doubt intricately carved on such vessels as the Skyros, Pyrgos Livanaton, Gazi and Tragana ships. The horn in its postulated initial form is

a much simpler decorative/symbolic device, which does not require a master woodcarver for its execution. While the birdhead does not entirely disappear,³¹ it is the horn that is prevalent through the transitional period, during which galley construction and evolution continues unabated, despite the destruction of the palaces. Most of the Proto- to Middle Geometric galleys are smaller in size than the *pentekontoroi* of Late Helladic IIIB and C.³² It may thus be tentatively suggested that shipwrights built smaller, less intricately decorated galleys, not only because of the straightened conditions after the collapse of the Mycenaean economic system, but also due to the smaller crews available to the men who had become the leaders of society.³³ The development of the enclosed, integrated forecastle is also to be placed in this line of thought: the unsettled conditions imposed new solutions upon the builders, leading to the development of decked hulls and the second level of rowers.³⁴

Two further traditions fall outside the groups considered above.³⁵ Both are related to the Mycenaean and early Greek galleys, and appear at their earliest in the final phases of the Bronze Age. The first is a craft with as stempost terminal a horned animal head. It appears on a Subminoan bowl sherd from Gortyn, engaged in battle with a second vessel, possibly with a birdheaded post.³⁶ The terminal reappears in an Archaic bronze boat model from Isthmia,³⁷ and is common on the bronze models of the Nuaraghi in Sardinia.³⁸ The second tradition is represented by the ships of the Sea Peoples as illustrated at Ramesses III's funerary temple at Medinet Habu, but also by the krater sherd from Tiryns, earlier in date, and later on by a large series of representations from the Urnfield cultures of Europe.³⁹ As depicted by the Egyptian artists, and on the basis of what is known about Aegean craft, these ships are not Mycenaean galleys since they are double-ended, if not functionally, then at least in terms of their identical bow and stern morphology.⁴⁰ This is not an Aegean trait.⁴¹ The representation from Tiryns is the sole existence in the Aegean Bronze Age corpus of a clearly double-ended vessel.⁴² The problems raised by the Sea People go well beyond the present limits, but since a distinct possibility exists that they were largely made up of Mycenaeans and other tribes from Greece, it would be inappropriate to reject out of hand any connection of the foreign ships depicted at Medinet Habu with the Greek Late Bronze Age.⁴³ The shape is simply not attested in sufficient quantities to permit a type designation.

In addition to these two strands, there exist in the Iron Age a further two approaches to the decoration of the posts, the for'ard-looking birdhead device on the sternpost (with an undecorated, or non-animal/bird-headed stem), and the animal/bird-headed stem- and sternposts, both facing for'ard. The former is represented by such depictions as a pair of Late Geometric

bronze firedogs from Argos,⁴⁴ the Karatepe relief,⁴⁵ and two Cypriote jugs of Cypro-Archaic I date.⁴⁶ In the Aegean this configuration goes back to a group of cultic vessels of the early Late Bronze Age.⁴⁷ The latter is illustrated by the relief from Assurbanipal's palace at Kuyundjik.⁴⁸ These approaches to the post terminals illustrate the existence of numerous traditions, making it less likely that a single reading can be applied to a great range of depictions.

Conclusions

The main issue is not whether all bow decorative devices depict the head of a bird, whether naturalistically or abstractly rendered. It is the attempt to reconstruct early ship architecture from imagery, and thereby identify possible traditions. If one opts for a reading which champions the birdhead device, then a complete horned tradition is obscured — and without providing adequate reasoning for ignoring instances where a horn is undoubtedly depicted, as on the Dipylon ships. The scattered Aegean representations, spatially from Northern Greece to Cyprus over Messenia, Euboea, Attika, Ionia, Rhodos and Crete, and temporally from 1400 to 750 BC, indicate that these design strands constitute more than artistic idiosyncracies: too many artists in too many localities employed similar approaches. It thus becomes legitimate to conclude that — before the great leveling of the database which occurs when it becomes almost exclusively Attikocentric in Late Geometric I and onwards to Athenian Black Figure depictions — a number of galley designs were plying the winedark waters of the Aegean Sea. And beyond: an aspect untouched upon here due to the absence of compelling evidence is the role played by the Cypriote and Levantine ship building traditions, to date devoid of a database comparable to that of early Greece.

One vital issue remains untouched. In the imagery, the early oared galley evolves against a backdrop of a data-vacuum. After a short time of parallel existence in Late Helladic IIIB with the Minoan sailing ship, the galley and its derivatives constitute virtually the sole types of watercraft depicted by artists down to the sixth century. The merchantman — which many scholars assume existed throughout — is not depicted. Small craft — the ubiquitous working boats — are not depicted. The absence of information concerning small craft constitutes a major handicap in any attempt to reconstruct the history of ship building from the Bronze Age down to the Archaic period. Post terminals need not have found their form on large vessels, as is hinted at by a number of Minoan cultic craft with for'ard-looking animal-headed sternposts, dating to a time when Minoan (and Cycladic) sailing vessels did not carry decorated posts, but rather a decorated bowsprit.⁴⁹ It is quite

possible that small craft played a significant role in the development of the merchantman. The key aspects are as follows.

- Prior to the invention of the oared galley there can be no distinction between ship types according to use: the dominant Minoan sailing ship was employed to carry both cargo and troops.
- The invention of the galley results in a ship rapid under oars, adequate under sail, and of reduced cargo capacity.
- Up until the end of the palatial economy in Late Helladic IIIB, the Minoan sailing ship remains in use — as attested by the imagery — but does not survive into IIIC and beyond.
- The few Aegean Bronze Age small craft that can be identified reproduce the lines of the Minoan sailing vessels: a crescent-shaped hull with pointed extremities of more or less equal height.⁵⁰
- When the first certain merchantman is depicted (circa 510 BC — although clearly not the date of invention), the hull is manifestly not derivative of the crescent-shaped lines of the Minoan sailing ship: both bow and stern rise close to vertically and the bow describes a concave curve.

Three origins for the merchantman are possible.

- (1) A wholly independent origin which cannot be placed chronologically due to its total invisibility prior to the sixth century BC.
- (2) An enlargement of a small craft design which remains to date invisible.
- (3) A development out of the hybrid cargo galley, from which it would have adopted the near-vertical post to keel scarfs.⁵¹

Although explanations (1) and (2) cannot be excluded, their invisibility stymies attempts at elaboration. Explanation (3) can be examined more fruitfully as it suggests one possible narrative.

It may be argued that the Minoan Neopalatial sailing ship illustrated by sealstones and the Akrotiri Miniature Wall Painting, still depicted in Late Minoan IIIA and B, disappears in IIIC, because it was no longer adapted to the political, social and economic situation. The galley comes to dominate completely in a more hostile, less ordered environment. The distinction between Types V and VI suggests that even as early as Late Helladic IIIB a need was felt for a galley capable of carrying cargo — out of which develops a hybrid design illustrated by the pictorial documentation from the eighth century onwards. It is likely that galleys of this type were smaller than the *triakontoros* and the *pentekontoros*,⁵² and that eventually the accent was placed increasingly on the cargo-carrying capacity to the extent of creating a merchantman — with the vertical or near-vertical bow of the first galleys. Speculative as this reconstruction is, and incapable of calibrating the contribution of small craft, it nonetheless attempts to integrate a number of observations made on extant material:

- the absence of non-galley designs in the pictorial record during the Iron Age;
- the presence of a hybrid cargo galley design at the dawn of the Archaic age;
- the late appearance of the merchantman in the imagery.

It may also be added that the Aegean — and the Eastern Mediterranean — was a haven for pirates at any period in time devoid of a strong naval power capable of suppressing it. A defenceless merchantman would be unsuitable for such an environment — in which it constitutes the prime target since piracy is, in economic terms, subsistence: foodstuffs are as desirable as treasures to nourish the sea-borne brigand.

Much more could be said of the bird-headed Mycenaean galley and its progeniture. If a single point is to be retained it may be formulated thus: the invention of the oared galley — to be assigned on currently available evidence to the Mycenaeans — constitutes an answer to political, social and economic forces which had repercussions well into the historical period. It forms the nexus around which cluster potential answers to a number of questions regarding the early history of ship building in the Aegean. It led to the creation of hybrid hull types previously unknown. It may, in turn, have impacted on the development of the true merchantman, which would, due to the limited but protected cargo-carrying capacity of the original galley designs, and the subsequent evolution into the hybrid cargo-galley, have ensued fairly late, perhaps as late as the sixth century. It may also — due to its versatility and due to economic factors beyond its influence — have delayed the appearance of the first true warship, the *trieres*, until the sixth century. Finally, the continued depiction of oared galleys through what is habitually called the “Dark Age of Greece” indicates that this darkness is greater in modern perception than it may have been in reality.

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NOTES

- 1 Cf. Köster 1923:84-85, Basch 1987:35-38 for a different view.
- 2 For greater detail, cf. Wedde 2000:Chap. One, esp. Section 1.9.
- 3 Lest a misunderstanding be created: "connaissanceurship" as extensive knowledge of the database cannot be criticized, but well the abuse thereof when it serves to eliminate images that do not conform to a preconceived notion.
- 4 Wachsmann 1996. *Idem* 1998:177-197 reprises the text with few changes. *Idem* 1981:210-211 contains in a nutshell the ideas expressed in the later contributions. Svoronos 1914 treats various bow and stern devices but did not have the early material at his disposal.
- 5 Here presented with an economy of words: the reader is referred to Wachsmann's publications.
- 6 A number of errors of perception have crept into Wachsmann's account.
 - (1) The image on the pithos sherd from Aigina does not depict a man standing on the birdhead device of a galley (Wachsmann 1981:198 with 199 fig. 14B; 1996: 541 with 565 fig. 21; 1998:77, 80 with 82 fig. 5.25). Reference to the decoration of such Aiginetan matt-painted pithoi (cf. Wünsche 1977, Siedentopf 1991) indicates that the male figure is standing inside one of the typical metopes, of which the double vertical lines form the right border, the horizontal lines with suspended cross-hatched triangles the upper border. Neither set of lines can be associated with a ship's mast or rigging, and there can be no continuity of the "ship" to the right.
 - (2) The birds seen perched on the bow and/or stern of some Late Bronze Age (Enkomi krater [A1 – cf. the appended analytical listing], Tragana pyxis [B7]) and Iron Age (Toumba pyxis [E5], Metropolitan krater [E7-8], Eleusis skyphos [E9], and elsewhere in the Late Geometric period) ships are not decorative devices (as claimed by Wachsmann 1996:541-542 and 565 fig.22; 1998:184-185 with fig.8.42) but depictions of live birds acting as narrative devices or fillers; in this latter role they are particularly frequent in Geometric vase painting. Cf. Ahlberg 1971:figs 4e (=Basch 1987:172 fig.353), 7d (upper fragment), 16c, 22e, 24a-b, 25a, b, d, e, 27a-b, 29a, c, etc. Basch 1987:192 figs 405-406, 193 figs 407-410, 412, 195 fig.415. On the bird in connection with ships, cf. Lenz 1995.
 - (3) The Maroni-Tsaroukkas Tomb 17 vase fragment British Museum 9812-I 146 (Wachsmann 1996:567 fig. 29; 1998:187 fig. 8.48) does not depict a birdhead device but the foot of a ship-shaped vessel; cf. Wedde 2000:cat. nr 324 with references.
 - (4) It is incorrect to compare the treatment of the head and eye on the birdhead device of the Pyrgos Livanaton stempost and warrior fragment (A4) with the hatched lines on the Late Geometric horns (Wachsmann 1996:543 with 568 fig.31B, 569 fig.33C, 571 fig.42D; 1998:186 with 188 fig.8.50B, 189 fig.8.52C, 193 fig.8.61D). A fill pattern cannot serve as the basis for a comparison when the morphology is wholly different.
 - (5) The excerpted detail from the stern of the ship on the Sounion plaque is misleading (Wachsmann 1996:569 fig.35; 1998:190 fig.8.54): the stern itself ends rather abruptly, while the screen around the quarterdeck rises in over the stern in a pointed extremity. For a clear color image of the plaque cf. Spathari 1995:80 fig.88 (in black and white cf. also Basch 1987:202 fig.421A).
 - (6) It is questionable whether the protrusions on the outer side of the curving sternpost terminal on Geometric galleys should be understood as strakes springing from the post (Wachsmann 1996:544 with 565 fig.22D, 568 fig.31B-C, 569 fig.33B; 1998:190-191 with 184 fig.8.42D, 188 fig.8.50B, 189 fig.8.52B) since the strakes will have terminated against the post lower down. These protrusions cannot serve as a step in the evolution towards Wachsmann's "multiple-beaked bird-head device".
 - (7) The protruberances on the stempost and bird-head device of Late Helladic III ships (Enkomi [A1], Pyrgos Livanaton [A5-6], Gazi [B1], Tragana [B7]; to which are added the

- Tiryns model [B3] and the Vienna rhyton [D5] due to perpendicular lines on the terminal) are irrelevant to a discussion concerning multiple beaks or the *aphlaston* (Wachsmann 1996:544; 1998:190-191), since they should primarily be related to Mycenaean bird depictions such as Furumark 1941:253 fig. 30 FM 7.22, 24-25 (all LH III A:2), where the protruberances appear on the beak. Mycenaean fishes also have similar protruberances as teeth (Furumark 1941:303 fig.48 FM 20.3-5, 7, 11). They are part of the Mycenaean vasepainter's repertoire, having no obvious continuity sufficiently extensive to argue for an influence on the Classical *aphlaston*.
- 7 For the view that the succession of single types in the Aegean Bronze Age is a workshop effect and not evidence for an absence of competing hull morphologies, *cf.* Wedde 1996A, 1996C, 2000.
 - 8 It may be surmised that the *eikosoros/triakontoros/pentekontoros* system evidenced by the literature did not find an immediate expression in the actual hulls built, something which might be reflected in the catch-all use of the term *ploia makra*.
 - 9 Casson 1971:49-60 correctly identifies these vessels as having the rowers on two levels. *Cf.* Wedde 1996B, 2000:160-164. *Contra* Williams 1958, Morrison/Williams 1968:12-42, Basch 1987:161-187, and others. Lenz 1995:149 connects the turning inward of the decorative element to become the horn with the ram, which requires a clear space in front of the stempost. It may, however, be questioned whether ramming is employed at so early a date. But contrast Casson 1971:49, Van Doorninck 1982:283-285, and other scholars.
 - 10 Koutsouflakis 1999 treats the bow device across the Aegean Bronze Age, but misreadings weaken the analysis: for example, the fish emblems on the Cycladic "frying pans" *op.cit.* 136 fig. 1 with 135 are incorrectly placed at the bow, 137 fig. 2 uncritically lumps bow and stern devices and reads them as bow emblems, 141 fig. 5.6-8 erroneously treats the bird as an emblem and not as a fill motif, etc.
 - 11 For Types V and VI, *cf.* Wedde 1991:86-87; 1996A:131, 143-144; 1996C:50-52; 1999A:466-468; 2000:54-56. The unassignable Bronze Age images are collected in List C in 1999A:473-734 and on pl.XC. The Early Iron Age galleys are discussed in 1996A:132-134, 144; 1996C:52-54; 1999A:471-472 with 474 List E and pls XCI-XCII; 2000:168-171. It should be stressed that the "unassignable Bronze Age" and "Proto- to Middle Geometric" groups are not considered types. For the time being it is not possible to distinguish types in the post-Bronze Age, pre-Late Geometric material due to its small size.
 - 12 *Cf.* Wedde 1991 on the difficulties of identifying regionalism in the Bronze Age.
 - 13 Group members are listed in Appendix 1 (where the letter+number combination refers to the lists and illustrations in Wedde 1999A; an alternative source for an illustration is provided, usually Basch 1987). Figure 1 provides a synoptic table and representative image (bow only) for each group. For the dates of E9 and E7-8, *cf.* Wedde 1996B:588nn75-76, for E12, E13-14, *cf.* Wedde 1996A:134nn48-50 (following J.N. Coldstream in placing them before Late Geometric I, instead of in Late Geometric II as other scholars have done).
 - 14 The ship on the miniature stirrup jar from Asine (B6) forms an apparent exception in that the extremity of the post does not curve into a birdhead, despite the presence of the protruberances associated with this device on the Enkomi (A1-2), Pyrgos Livanaton (A4-6), Gazi (B1), and Tragana (B7) ships. One would be tempted to argue in favor of an artist's tweak since the shape of the bow itself falls within the permissible variation for a Late Bronze III galley – compare the Asine ship with the Athens Akropolis terracotta bow fragment (B9) and the Cypriote rhyta D2, D3 and D5.
 - 15 Lattice work also appears on the Cypriote clay models of Group 4, as noted by Wachsmann 1981:206, 1998:151.
 - 16 Doumas 1992:58 fig. 26, 62-63 fig. 29.
 - 17 It would be possible to argue that the artist extended the X-ray approach of the hull itself to the interior structure of the forecastle. Be that as it may, the Khaniala Tekke ship A is an

- extraordinary rendition due to the exaggerated projection and the buffers (*cf.* Basch 1987:159-161 for a discussion) – together with Khaniale Tekke ship B, upon which the concave bow rises from the tip of the projection, the only early galley so equipped. A particularizing reading would suggest that Khaniale Tekke ship A represents an early attempt to employ the bow projection as a ram, which lead to the invention of the buffers to limit penetration. It was obviously not a success since a true ramming capacity appears only later. For an earlier (ca. 850 BC) *proemvliion*, but without the buffer, *cf.* also the Kerameikos fibula (E6).
- 18 The non-integration of the forecastle appears on the ships depicted on two Cypro-Archaic I oinochoai, Metropolitan Museum 74.51.511 and British Museum 1926.6-28.9, the former dating to 750-600, the latter to around 700 BC (Basch 1987:261 figs 567 and 564). In these two cases it is argued that the ships depict merchant/cargo galleys, *cf.* Wedde 2001: the forecastle may have been added (the Metropolitan ship also has a sterncastle) as additional protection.
 - 19 This portion of Khaniale Tekke ship A is lost, although the departure of the horn may be extant in the line rising above the upper *proemvliion* – which appears incorrectly placed since to function it must distribute the impact to be absorbed into the hull and not into the post. Whether the two lines that run parallel to it towards the forecastle serve to support the latter cannot be ascertained. Khaniale Tekke ship B (E11) also has lost the stempost terminal, and has its upper *proemvliion* placed on the post.
 - 20 The birdhead device and warrior fragment from Pyrgos Livanaton (A4) is included since it has been shown that it belongs to the same krater as the large galley representation (A6): *cf.* Dakoronia 2001 (see editors note in Tzalas 2001 p. 13).
 - 21 The clay model Nikosia Mus. 1935 C.57: Basch 1987:251 fig.529; Westerberg 1983:19-20 nr 19, 91 fig.19. Not included in Wedde 1999. Its date places it outside the pre-750 BC cut-off date of the present paper, but it is clearly related to the earlier craft, *cf.* especially the treatment of the bow and stempost device on the Halikarnassos/Dirmil vessel.
 - 22 The Nikosia rhyton D4, on its own, could sustain a reading as bird-headed, but the general tenor of the group favors an interpretation as a horn for the missing bow terminal.
 - 23 Van Doorninck 1982:277-281 remains the basic discussion of this ship. He sees “a small, lunate ‘horn’” at the summit of the stempost. Basch 1987:190 stresses the thickness of the bow projection as opposed to the thinner variants on early galleys and suggests that it is a *taillemer*; he therefore reads the image as that of a merchantman.
 - 24 The date of the Amphiareion model is disputed, from Middle or Late Helladic (Touchais 1978:655-666) to Geometric (Petraikos 1974:99). A down-dating to Protogeometric or slightly later would better account for the massive bow – which on currently available evidence does not appear to adhere to a typically Bronze Age morphology. Nonetheless, the author has accepted it as of Late Helladic III date in earlier writings, *cf.* Wedde 1991:86n55 (LH IIIB), 1996A:131n34, 1999A:473 B4 (LH IIIC), 2000:cat.nr 320 – the addition of a B or a C to LH III amounts to an excess of optimism.
 - 25 The author joins Morrison/Williams 1968:12, Van Doorninck 1982:282 in placing the bow to the right, *contra* Kirk 1949:118-119, Casson 1971:fig.60 (caption), Basch 1987:159, who all interpret the vessels as merchantmen. The horn at the stern remains a curiosity until further instances have come to light.
 - 26 *Cf.* Wedde 2001.
 - 27 The bulwark bow is not new to the post-Bronze Age period as it appears already on the ships of the Sea People as reconstructed by Wachsmann 1981:197 fig. 12, 1998:173 fig. 8.18.
 - 28 *Cf. supra* n. 24.
 - 29 The extensive abandonment of large parts of the Peloponnesos at the end of LH IIIC, and the distribution pattern of ship images in the Early Iron Age argue for an eastern Aegean,

- Cretan, Cypriote connection in the continued development of the galley.
- 30 A comparison with the dragon-headed posts of the Vikings is not entirely misplaced.
 - 31 Later galleys with a birdhead device as stempost terminal include:
 - (1) Bichrome oinochoë from Karpas (Cyprus), British Museum 1926.6-28.9 (Basch 1987:261 fig.564);
 - (2) Seal of Oniyahu (Avigad 1982:59 fig.1);
 - (3) Relief from palace of Sennacherib (Basch 1987:314 figs 660-661; for the reading *cf.* Wedde 2001:613, 615).
 - 32 The Lefkandi Toumba pyxis (E5), Metropolitan Museum krater (E7-8) and the Khaniala Tekke pithos (E10-11) are the obvious exceptions, providing one accepts that the number of tholes and/or ribs depicted offer means towards a size approximation (on this method, *cf.* Wedde 2000:104-106). The Fortetsa (E1-2), Lefkandi Skoubris (E3), Halikarnassos/Dirmil (E4), Eleusis (E9), and Anavyssos (E12-14) ships create the (admittedly subjective) impression of being smaller galleys.
 - 33 There is no obvious technological or hydrodynamical reason why a ship should seat 20, 30 or 50 rowers, other than the question of bow wave formation, *cf.* Foley/Soedel 1981:116-118, 121. These multiples probably resulted from Mycenaean man-power units, imposed by either economic or military considerations. This is a subject which bears further study. *Cf.* Wedde 1996B on two-level craft, 1999B on decked vessels.
 - 35 In discussing the next four design strands no attempt is made to provide a complete catalogue of all possibly relevant images.
 - 36 Rizza/Santa Maria Scrinari 1968:12 text to fig.18.5 and 13 fig.18.5. Mentioned in Vermeule/Karageorghis 1982:145, 179. Brought to the author's attention by Prof. Stefan Hiller.
 - 37 Göttlicher 1978:pl. 26.350; Broneer 1959:328 nr 8 fig.5.
 - 38 Göttlicher 1978:pls 30-33; Thimme 1980:cat. nrs 174, 176-197.
 - 39 The subject is well treated by Wachsmann 1981, 1982, 1998:163-177. The doubling of bird-headed terminals also appears on the Elishama seal, *cf.* Basch 1987:305 fig.641; Wachsmann 1996:563 fig.13B; 1998:181 fig.8.34B.
 - 40 For this reason the Hama ship cannot be considered a vessel of the Sea People on typological grounds, *contra* Wachsmann 1981:205-206; 1996: 540; 1998:175-176 with 174 fig.8.19. This does not exclude it having been used by Sea People tribes. Morphologically, the Hama ship continues the lineage of the Type VI Mycenaean galley, with which it is contemporary (ca. 1200-1075, more or less coterminous with LH IIIC). It appears more appropriate to speak of a galley in the Mycenaean tradition, than to append a "Sea People" label, as if it is a question of a separate type. Too little is known about the Sea People and the ships they used to allow such terminological legerdemain.
 - 41 As indicated by the most detailed representations, the Akrotiri Miniature Wall Painting, Minoan vessels of Type IV have a distinctive stern as opposed to the bow: the stern rises slightly more abruptly, which in a plan view translates into the widest point of the beam being aft of amidship (*cf.* Gillmer 1985:404-405). Therefore the functional double-endedness proposed by Raban 1984 and Guttandin 2000 cannot be accepted, especially since it is associated with a purported ramming-capacity, something for which neither hull nor stern appendage are designed. It is probable that Type III, which is closely related to Type IV, has a similar plan. On these types, *cf.* Wedde 1991:84-86; 1996A:129-130, 142-143; 1996C:48-50; 2000:41-45, 52-54.
 - 42 Reinhard Jung (pers. comm.), on the basis of Matthäus 1980:319-320 and Lenz 1995:125, questions a reading as a ship for the Tiryns krater fragment. If it is merely the decorative terminals of a whorl shell design, the connection of the ships of the Sea People with Mycenaean ships becomes tenuous, regardless of the arguments in Wachsmann 1997.
 - 43 Lenz 1995:130 is incorrect in claiming all Late Helladic vase representations of ships with

a birdheaded bow as “ships of the Sea Peoples” on the basis of a date for these images in LH IIIC:1. This ignores the fact that both the Enkomi (A1-2) and the Gazi (B1) ships belong to LH IIIB, and that the unpublished Tanagra model in the Thebes Museum (Demakopoulou/Konsola 1981:87 Case 8 Bottom shelf) comes from a LH IIIA-B tomb. The Pylos gold plaque with rudimentary birdheaded ship (Blegen *et al.* 1973:16, fig.108a-d) derives from an undatable context, but the destruction of the palace at the end of LH IIIB provides a probable *post quem non*.

- 44 Wachsmann 1996:568 fig.31A; Göttlicher 1978:pl. 25.338-339.
- 45 Basch 1987:249 fig.526.
- 46 Basch 1987:260 fig.563, 261 fig.567; Wachsmann 1996:565 fig.20A-B; 1998:183 fig.8.41A-B; Wedde 2001: 633 figs 1-2.
- 47 Cf. Wedde 1997:pl. XXI.5-9. These craft may have been influenced by the Sokar barque, cf. *idem* pl. XXII. In other words, the concept is of appreciable antiquity.
- 48 Basch 1987:319 fig.672.
- 49 As illustrated on the Akrotiri Miniature Wall Painting. This bowsprit, frequently carrying a bird in flight, was detachable, as were the lion and the falcon-/griffin-headed device that look out over the stern on the large ships in the Procession. Cf. Wedde 2000:119-122 for the bowsprit. On the cultic craft, cf. *supra* n. 47.
- 50 Double-ended hulls are a rarity in the Aegean Bronze Age as they do not correspond to a functional requirement of maritime navigation (as opposed to certain types of fluvial navigation). Even nominally identical extremities provide means for identifying a travel direction. Cf. the Tanagra tomb 19 model in the Thebes Archaeological Museum (Basch 1987:141 fig.293.1). A small series of Middle to Late Minoan seals could suggest a similar conception of bow and stern, but the size of the images, and larger depictions of hulls of the same type argue against founding an argument upon them. The Mirabello carnelian HM 149 (CMS II.3 Nr 298; Basch 1987:101 C7) has both ends damaged, and a very rudimentary hull. The Lyttos carnelian Ashmolean 1938.960 (Kenna 1960 K188; Basch 1987:100 C4), the Geneva carnelian (CMS X Nr 227; Basch 1987:101 C5), and the former Erlenmeyr jasper (CMS X Nr 100; Basch 1987:101 C8) exhibit the bow/stern differentiation manifest on the Akrotiri ships (cf. Gillmer 1985). Only the Giamalakis chalcedony HM Giamalakis coll. 3071 (Xenaki-Sakellariou 1958:pl.XIII.341; Basch 1987:101 C6) and the Colville carnelian (burnt sard?; CMS VIII Nr 106; Basch 1987:100 C3) appear superficially double-ended, an impression strengthened by the repetition of the bird symbol at the stern on the Giamalakis ship, but both belong to Type IV (cf. Wedde 2000:52-54). The Ashmolean steatite Ashmolean 1938.958 (Kenna 1960:K106; Basch 1987:101 C11) has two steering-oars at the stern.
- 51 On this tradition, cf. Wedde 2001. It is conceivable that the hybrid form illustrated by such Cypriote images as the White-painted IV oinochoë from Ormidia, Metropolitan Museum 74.51.511 (Basch 1987:261 fig.567) and the Bichrome IV oinochoë from Karpas, British Museum 1926.6-28.9 (*idem*: 261 fig.564) prefigure the Late Archaic merchantman with vertical posts.
- 52 The *eikosoros* may be a possible derivative.

Mycenaean to early Iron Age oared galleys: analytical groupings**Group 1**

A1	Enkomi krater, ship A	LH IIIB
A2	Enkomi krater, ship B	LH IIIB
A3	Skyros stirrup jar	LH IIIC:1b
A5	Pyrgos Livanaton small galley	LH IIIC middle
B1	Gazi larnax	LM IIIB
B2	Dramesi <i>graffito</i>	LH IIIB
B5	Phaistos cup sherd	LM IIIC
B6	Asine miniature stirrup jar	LH IIIC
C1	Phylakopi kalathos sherd	LH IIIC middle
C8	Pyrgos Livanaton model	LH IIIC middle
D1	Enkomi <i>graffito</i>	LH IIIC

Group 2

B7	Tragana pyxis	LH IIIC
E5	Lefkandi Toumba pyxis	MG I
E10	Khaniale Tekke pithos, ship A	end MG
E11 ?	Khaniale Tekke pithos, ship B	end MG

Group 3

A4	Pyrgos Livanaton stempost	LH IIIC middle
A6	Pyrgos Livanaton large galley	LH IIIC middle
A7	Pyrgos Livanaton model	LH IIIC middle
B3	Tiryns model	LH IIIB-Entwickelt
B8	Kastana krater sherd	LH IIIC or PG
E3	Lefkandi Skoubris krater sherd	early SPG III
E9	Eleusis 741 skyphos	MG II

Group 4

B9	Athens Akropolis model	LH IIIC
D2	Lapithos rhyton	1150-1050 (LC III)
D3	Lapithos rhyton	1150-1050 (LC III)
D4	Nikosia Mus. rhyton	1150-1050 (LC III)
D5	Wien Kunsthist. Mus. rhyton	1150-1050 (LC III)
E4	Halikarnassos krater	EG
—	Nikosia Mus. model	Cypro-Achaic (750-600)

Group 5

B4	Amphiareion model	LH III
E1	Fortetsa krater	PG
E2	Fortetsa krater	PG

Group 6

E6	Kerameikos fibula	MG I
E7	Metropolitan Mus. krater, ship A	MG II
E8	Metropolitan Mus. krater, ship B	MG II
E12	Anavyssos cup, ship A	transitional MG II-LG I
E13	Anavyssos cup, ship B	transitional MG II-LG I
E14	Anavyssos hydriskos, ship A	transitional MG II-LG I
E15	Anavyssos hydriskos, ship B	transitional MG II-LG I

Wedde 1999A: 473 provides bibliographical details, pls LXXXVIII-XCII the illustrations (except for the unnumbered Cypriote model in Group 4 – cf. n.21).

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Early Greek oared galley analytical groupings Synoptic table

Group	Description	Dating	Attrib.s
1	Vertical, non-integrated post without forecastle	LH IIIB-LH IIIC	11
2	Vertical, non-integrated post with lattice work, forecastle possible	LH IIIC, MG I, end MG	3 (4 ?)
3	Vertical, semi-integrated post, forecastle possible	LH IIIB-LH IIIC, possibly PG, early SPG III, MG II	7
4	Massive triangular bow	LH IIIC/LC III, EG	6
5	Massive square bow with vertical post	LH IIIC, PG	3
6	Massive square bow with concave post	MG I-transitional MG II-LG I	7



Group 1



Group 2



Group 3



Group 4



Group 5



Group 6