

## **BOW AND STERN IN EARLY AEGEAN BRONZE AGE SHIP IMAGERY A RE-ANALYSIS**

Knowledge of Aegean Bronze Age ship architecture depends almost exclusively on the pictorial record. To decode this system, a rigorous application of methodological principles is imperative to compensate for vital information lost in the artistic execution and the subsequent transmission across the centuries. Although at times implicitly, and imperfectly, present in the analytic process evidenced by various scholars' writings, such rules have not previously been formulated. The task this paper has set itself is to sketch the theoretical standpoint, suggest a method towards identifying bow and stern in the earlier Bronze Age, and test this against the available data.<sup>1</sup>

There can be no claims to absolute knowledge : all statements offered in this paper are to be understood in terms of probability. It will be suggested that groups of data argue for a specific interpretation and do so more coherently than a counterargument. All that can be hoped for is a tentative reconstruction, open to revision when a future data assemblage warrants this. For the sake of clarity, and brevity, the discussion will be limited to documents admitting to inclusion in a group, leaving aside statistically insignificant exceptions, as well as most fragmentary representations.

The text will employ a number of terms demanding definition. The terms to be defined are cluster, master-type, type, group, and internal indicator. Typological studies show that objects of a similar kind tend to be restricted in shape to a limited number of possibilities. Objects behaving in such a manner may be said to form a cluster, that is, to gather around a common form. There may be observed a certain amount of variation between any two members, but the cluster as a whole may be said to conform to a single master-type, the ideal shape shared, to varying

degrees, by all the individuals. This shape is the idealized form present in the mind of the artist as he creates an image according to his temperament. As such, it may be called an Urbild. The cluster must subsequently be tested against the data: the appurtenance of each member must be scrutinized and falsely included individuals eliminated; the independence of the cluster must be established through contrasting with other clusters, and with unclustered representations. If shown not to partake as a subdivision of any other cluster, it may be called a type and be supplied with a name or number, according to the system employed. The word group is a more general term, and does not carry the semantic weight of either cluster or type. It is used in the nonspecific sense of "a group of ...", to permit reference to documents of a yet to specified nature. Thus these four terms stand in a hierarchical relationship to one another: group, cluster, type, master-type, in ascending order. At each subsequent level there is greater specification of content, and a higher hermeneutical resolution.

The final term, internal indicator, used, in this text exclusively, in the expression "internal stern indicator", refers to an element within the image under consideration permitting the identification of the stern. Although a number of elements would, theoretically, warrant such a designation, the size of the documents and the resulting lack of detail restrict the range. The present paper will accept only one such indicator. The major effect of adopting this concept as a rigid principle is the exclusion of all other arguments, such as those generated from considerations regarding trends observed in ethnographic material, functional aspects, and general ship building practice. As draconic as this might seem, it has the advantage of focusing the analysis, and in reality, only the first-mentioned may deviate from results obtained by this approach, whereas the latter two, not to be treated here, tend to support the conclusions arrived at in this paper.

A single principle, applicable to all imagery, is advocated: typological clustering. The concept is by no means new, since virtually all major relevant discussions have made use of it to some degree.<sup>2</sup> The implications involved, however, have been disregarded with the ensuing breakdown in the logical structure of the arguments. If typological clustering is employed, it must follow that:

1. all statements are made on the basis of several cognate documents, not on single items;
2. analogies are drawn with temporally and spatially related objects;
3. all analogies drawn must be based on primary features, not on secondary traits.

Cognate documents are defined as representations clustering around a master-type, all sharing a number of major structural features. To constitute a valid cluster, they must be dated and provenanced in close proximity to each other, that is, they must belong to a single time period or the immediately preceding or following phase, and be of Aegean origin.<sup>3</sup> Since images are not cut from templates, a certain amount of variability is to be expected. Quantification of differences observed cannot yield the results that have been obtained with ceramics, spearheads and stonetools, for instance, but similar phenomena of clear-cut types, borderline cases and midfield scatter between clusters are to be expected. A maximum of individuals should be accounted for if the typology is to be assigned any validity - with allowance made for the state of conservation and degree of schematization exhibited by certain documents.

The most obvious consequence inherent in accepting this approach is the complete rejection of the "single item solution fallacy", which attempts to solve the bow/stern problem by reference to single representations or to unrelated documents scattered in time and space.<sup>4</sup> All statements must be buttressed by reference to a type, not to a single entity, to a credible pattern rather than to a possible exception. A further consequence is the critical relationship entertained with the various levels of analogy. The greatest number of analogs will be found within a type, confirming the attribution of each member. From the nucleus of the master-type extend three axes, time, space, and form, and the further a comparandum distances itself from point zero on any or all three axes, the less relevant is the purported parallelism.

Intercultural analogy is thereby not rejected, but must be placed at a proper level within a hierarchy of comparanda. This ordering of the sources for comparative material may possess the following strata, each representing an accumulative loss of verisimilitude as it moves away from the first, and uppermost level:

1. internal correlations within a type;
2. data from separate but temporally and spatially contiguous or near-contiguous types;
3. comparanda from contemporary cultures/areas shown to be in sufficient contact;
4. later developments within the cultural sphere under study;
5. arguments from plausibility and from hypothetical isomorphisms based on later foreign, as well as ethnographical, evidence.

In each case, the suggested comparandum must be shown to partake in a type. The major consequence envisaged is the rejection of analogies drawn from a lower level in the hierarchy if sufficient parallels can be established with an upper level. The approach does not exclude diffusion from external areas, but tempers it if there is cause for postulating an internal development.<sup>5</sup>

The primary features alluded to above are hull shape, bow and stern morphology, and relative differences in the height of the extremities. To identify bow and stern, reliable means are necessary: such means can only be provided by the individual ship representation. It must be contained within the image and be readily recognizable as exclusively associated with the one or the other extremity. It is here argued that the steering-oar constitutes the only acceptable internal indicator, and that all other elements customarily linked with either extremity depend on it for their identification.<sup>6</sup>

A definition of the steering-oar in pictorial terms may include all or some of the following statements:

1. a line crossing, or descending from, the hull at one extremity, not repeated at the other;
2. a line, as in (1), with a thickening at the lower end;
3. an oblique line, orientated at about 90° to a collection of oblique parallel lines below the hull, understood to depict oars;
4. two, possibly three, lines answering to (1), (2), or (3).

The definition leans heavily on a limited number of representations and remains, therefore, open to modification. The database may be widened if a "best fit" approach is employed: certain documents gain in clarity when analyzed in conjunction with more eloquent individuals. To avoid a circular argument, these latter comparanda must not depend on the former for their interpretation. The "best fit" approach also enters the analysis when individuals lacking in representational clarity are assigned to clusters: certain images, incapable of yielding to decisive statements, can be clustered when interpreted as "best understood to represent X". As was stressed above, no single image suffices to prove or disprove any given point, and this applies particularly to the bow/stern question.

In statistical terms, steering-oars are rare. The corpus of Aegean Bronze Age ship representations, the 284 individuals upon whom the research here reported is based, may be classified in three categories:

1. complete representations admitting to clustering;
2. incomplete representations permitting tentative clustering;
3. complete and incomplete representations falling without the limits established by the various clusters.

The final category, comprising 29% of the material, will not be discussed here. The remaining 71% can, with an acceptable degree of probability, be assigned a type affiliation. Steering-oars are presented in 25 complete and 14 fragmentary cases, being 14% of the total.<sup>7</sup> Due to their rarity, greater hermeneutical stress must be concentrated on them.

Within the present limits, all 39 cases exhibiting a steering-oar will not be passed on review. It may be affirmed that there are, among the 25 complete documents, no instances of steering-oars at both extremities, nor of steering-oars associated, on separate but typologically related individuals, with either the one or the other end. It will be assumed that the same obtains for all the fragmentary cases, as the contrary cannot be shown to be in force. Arguments for bidirectionality will be considered unsupported by the evidence currently available and/or inapplicable to Aegean navigational conditions.<sup>8</sup>

The analysis will have three stages:

1. steering-oars define a restricted range of bow and stern morphology variants;
2. each thus defined variant is contrasted with the corpus in the aim of establishing a cluster around it;
3. typological variants are analysed in the hope of directionally determining clusters devoid of members with a steering-oar.

Before commencing the analysis, a final terminological problem remains to be discussed: the nomenclature of the types. The ideal situation would be to apply names derived from the most eloquent member or members of the cluster constituting the type, thus creating a "handle" susceptible to immediate recall. The material under consideration here does not easily admit to such an approach. For although three types may be named after the Syros "frying pans", the Akrotiri Miniature Fresco, and the Tragana pyxis respectively, a further two cannot be so readily associated with any one document. Even if the one could answer to a name chosen after the Kolonna pithos, several of its members come from Malia, the site most appropriate to the baptism of the other type.

Similar problems are encountered when attempting to name the types after the chronological period in which they are prevalent: an Early Minoan type continues, in actual fact, into the Middle Minoan period, while the type dated to Late Minoan times appears already in Middle Minoan III. Only the Early Cycladic and the Late Mycenaean types allow an unproblematic use of a nomenclature based on the temporal extension for each type. Thus, in choosing Roman numerals, a compromise is adopted. For greater clarity, the most typical member is cited in brackets when each term is introduced, or conversely, the numeral, if the geographical terminology is used.

An illustration is included for reference (Fig. 1). Thereby it is hoped that the formlessness of Type I, II, III and so on, is compensated for, while retaining its neutrality, and thereby avoiding the problems alluded to above.

Steering-oars are essentially associated with three different hull-shapes. Two, those best associated with the Akrotiri Miniature Fresco and the Tragana pyxis respectively, are well established and directionally determined by several cases with a steering-oar. A definition of these two types, IV and VI, will therefore not be undertaken here. The third is less familiar and less well documented. Its main interest lies in the position it occupies in the development of Minoan ship architecture and in the light it appears to shed on the problem involved in identifying bow and stern on the earliest Aegean vessels.

This Early Cycladic cluster, the "frying pan" boats from Syros, and related craft from Naxos, Orchomenos and Palaikastro (Fig. 2a-d), the earliest tangible evidence for ship-building in the Bronze Age Aegean, numbers at least 18 individuals, and holds pride of place in the bow/stern controversy, despite the fact that it cannot be directionally determined on internal criteria. A designation as type, here Type I, is assured by the coherency of the cluster and by the confrontation with the corpus.

The main argument in favor of a high bow interpretation has been formulated around the fish ensign, present on 14 members. The parallel drawn with the Naqada II craft is erroneous on two counts.<sup>9</sup> Firstly, the key formal characteristics of the Syros hull shape is the relationship between the extremities: the raised part extends at an angle of c. 70° upwards and attains a height equal to 35 to 60% of the overall length, unmatched by the opposite end.<sup>10</sup> Cluster analysis, as understood here, stipulates that any comparanda must duplicate the significant difference in height as well as the general shape. The Naqada II craft brook no comparison with the Syros vessels. Secondly, it can be shown, using the same method as is

advocated here (Fig. 3), that the fish ensign on the single Naqada craft thus equipped (Fig. 3d) is affixed aft of amidship and thus in clear association with the stern. It may also be noted that the appeals to ethnographic parallels have not been accompanied by arguments justifying their use.

A comparable misuse of evidence becomes apparent when the well-known putative parallels adduced to favor a high-bow interpretation are confronted with the Syros type (Type I). Whether it be the Naxos lead boat, the Mitsotakis model, the Akrotiri or the Dramesi ships, or the graffito from Enkomi (Fig. 4a-e), the evidence falls on its total irrelevance to this question.<sup>11</sup> If all but the last mentioned representation can be directionally determined in a satisfactory manner, either due to the presence of a steering-oar (Akrotiri), to arguments from hullshape as viewed in plan (Naxos, Mitsotakis), or to clustering (Dramesi), none duplicate the shape, and only the first can be said to respect the hierarchy of comparanda. If a final "parallel", the Hal Tarxien graffito (Fig. 4f), constitutes a good approximation of the Syros shape, its connection with the Aegean craft has yet to be convincingly argued on archaeological grounds.<sup>12</sup> That the representation is devoid of any means to a bow/stern identification has been overlooked.<sup>13</sup>

These examples illustrate an insufficient grasp of the theoretical and practical implications involved in comparative formal analysis. An improved database and a carefully reasoned methodology renders it possible to propose a directional determination based on typological clustering and on the steering-oar as internal indicator. It will be argued that clusters containing one, or more, individual with a steering-oar can be directionally determined on its testimony, provided the supposed members do in fact constitute a coherent cluster congruent with a designation as a type. As will be seen, the two clusters to be analysed below conform to this criterium as well as to those stipulated above concerning spatial and temporal contiguity.

Three of the four earliest completely conserved representations with a steering-oar date to the Middle Bronze Age: the pithos from Kolonna,<sup>14</sup> the sealing from Hieroglyphic Deposit at Knossos,<sup>15</sup> and a seal in the Philadelphia University Museum<sup>16</sup> (Fig. 5a-c). In unison, they designate a bifurcated extremity as the stern. Based on the criteria employed here, no contradictory data can be found in the corpus. Around these three documents, a further four ships on seals cluster, all sharing the cleft stern and pointed bow (Fig. 5d-g)<sup>17</sup>. A further seven members, albeit of less consequence to the argument presented here due to the loss of the stern through breakage or schematization, can be assigned to the cluster on the

basis of the arrow-headed extremity.<sup>18</sup> This hull-shape is here described as having extremities of equal height, the stern being bifurcated, the bow either pointed or equipped with an arrow-head device. Its relationship to the Akrotiri type (Type IV) is obvious, particularly apparent in the ship on the Kolonna pithos.

The bifurcated extremity is also found on three members (Fig. 6a-c) of a group dated somewhat earlier, essentially Early Minoan III to Middle Minoan I, as opposed to Middle Minoan I to Middle Minoan II/III. This cluster numbers eleven individuals (Fig.6), exhibiting a greater variability than the previous cluster, but the discrepancies in hull shape and in bow and stern morphology may be adequately explained if the former are seen as advances in construction techniques within an evolutionary vision of Aegean Bronze Age ship architecture, the latter as variants, later to be standardized into the bifurcated form. A global interpretation, consonant with typological clustering, identifies the raised, variously furcated extremity as the stern. The seal in the Haifa Maritime Museum (Fig.6k), depicting a ship having, it is argued here, three steering-oars, supports this view.<sup>19</sup>

At this point a test against the corpus of Aegean Bronze Age ship representations will reveal that the documents discussed do, in fact, belong to the clusters to which they have been assigned. Internal variations do not appear sufficient to warrant fragmentation into smaller units. The differences are primarily located in the secondary traits, such as the three possible variants in bow morphology exhibited by the later cluster, pointed, pointed with arrow-head, pointed with auxiliary elements interpreted as a bowsprit (Fig. 5b, c and a respectively). These variations concern only the bow decoration, not the structure of the bow itself. Concerning the earlier cluster, there is no evidence favoring an interpretation of the bi-, tri-, or quadri-furcated end as the bow. A designation as type may now be employed: Type II being the early Minoan shape, Type III being the "Kolonna group".

The postulated affiliation between these two types is based on an argument from "best fit": the presence of angular and rounded hulls within the earlier cluster (Type II) suggests both whence the type came and where it is heading. It cannot be denied that chronological scatter within the cluster, and the appearance of hypothetical earlier variants at late stages, and equally hypothetical later variants at the inception of the type, detract from the clarity of the argument. Three alternatives may go some way towards an explanation:

1. the later type (Type III) developed out of the earlier (Type II) which continued to evolve parallel to its offspring;

2. the later type is an independent, locally developed hull shape, possibly connected with Malia;
3. the latter type is of extra-Aegean derivation, unrelated to the earlier type, and the foreunner to the Akrotiri type (Type IV).

For the third possibility, while the relationship to the Akrotiri type is to be regarded as probable, there is little evidence for a foreign involvement due to the almost total lack of ship representation from the crucial area of the Syro-Palestinian coast, as well as the absence of suitable parallels from Egypt.

Concerning the first possibility, the basis for the common directional determination is the secondary trait of stern decoration, and as such not sufficient to tie the later to the earlier type in terms of generic affinity, although shown by the Haifa seal to be congruent with a common bow/stern identification. If the bow morphology of the chronologically early ship from Malia (Fig.6g) and the appreciably later one on the stamp seal from Mochlos Grave III (Fig.6j) do not constitute the necessary formal links to the later type, then the corpus is not forthcoming in providing the missing link.

A single representation, on a clay nodule from Malia (Fig.7a), combines the elements to be expected of such a putative transitional type. Yet without further examples to form a cluster, the combination of curved, bifurcated stern, and curved bow, related to the earlier but manifestedly pointing to the later type, remains too ephemeral to carry convincing argumentative force. Thus the first alternative remains based on the secondary similarity and an evolutionary view of Aegean Bronze ship architecture.

If the second possibility, an independent Maliate (?) development, is to be adopted, it must be recognized for what it is: speculation. The presence of almost 60% of the members of this type in Malia (plus one in Knossos) must be weighed against 30% being of unknown, Cretan, provenance, as well as against the particular find circumstances at Malia, where a stonecutter-workshop has been excavated.<sup>20</sup> An independent, spatially unspecified, development would divorce Type III from earlier Minoan shapes, and render it necessary to postulate either an ex nihilo creation or an unknown prototype. Although the question cannot be laid to rest, this paper advocates an evolutionary view and derives Type III from Type II.

The master-type implicit in all the members belonging to the early Minoan Type II, and the directional determination which the above analysis has suggested as the most likely, is of particular interest when attention returns to the starting

point, the cluster baptized Type I (the Syros type). Type II may be seen as a significant isomorphism to Type I. By identifying the raised extremity on a Cycladic vessels as the stern, the Syros type is firmly placed in an Aegean ship-building tradition which culminates in the Akrotiri ships (Type IV).

Testing for verisimilitude against the entire corpus generates no counterarguments. Among the fragmentary representations with steering-oar, on the other hand, appears a sherd from Phylakopi I (Fig. 7b), contemporary with the Syros boats, depicting a craft with a raised stern drawn in the same technique as the "frying pan" vessels, incision, and employing the same pictorial means to invoke the crew, many short parallel strokes representing paddles, in a similar opposed manner as on five of the "frying pans", although, on the image from Melos, the upper row points forward, the lower aft, not the converse as is the case on Syros. The bow is completely lost, making the parallel drawn tentative.

A further, equally fragmentary, representation appears to argue in a related sense. On a seal-stone, of which half is extant, from the stonecutter-workshop in Malia, a ship is depicted, having a post rising obliquely from a flat keel-line (Fig. 7c). The post is crowned by a device which resembles the fish-ensigns on the Syros craft. If this document may be related to the earliest Minoan type (Type II) - the loss of the opposite extremity demands circumspection - then an interpretation as stern is plausible. How this stern (?) - device is to be compared with that observed on the Phaistos Disc ship representation remains unclear (Fig. 7d).<sup>21</sup>

An argument against the clusters presented in this paper, and raised to the status of type after testing, on grounds of statistical inadequacy may be conceded in absolute terms, but once they are compared with the populations of the various types into which the available data can be organized, this objection loses its validity. Abstraction made of two exceptionally large constellations numbering over forty individuals each, and of the four Naxos lead models, for the time being placed in a group of their own, the mean for the remaining six types is fourteen representations. The calculations do, it must be noted, include some fragmentary cases, and reject some ninety as unclassifiable (the 29% referred to above).

The conclusions reached in this paper may be summarized as follows. A lattice of interpretational statements, being:

1. an internal stern indicator,
2. a comparison of general hull shapes,
3. secondary typological similarities, and
4. a speculative argument from evolution,

is brought to bear on the problem of bow and stern identification in the earlier Aegean Bronze Age ship imagery. When a significant difference in the relative height of the extremities is detected, the data briefly discussed agree to designate the higher end as the stern.

These results are only applicable to the representations discussed and illustrated, or mentioned in this paper. They cannot be transferred to documents that have not been analysed in the above manner. A blanket interpretation of all data as equipped with either a high bow or a high stern is rejected. Each individual must be separately studied in the company of its immediate typological relatives. The corpus indicates the presence, in the Bronze Age Aegean, of craft with a higher bow, but these constitute a minority<sup>22</sup> that cannot be employed, as has previously been attempted, to impose a high bow interpretation as a diagnostic feature of all vessels presenting a significant difference in relative bow/stern height in ignorance of the methodological fallacies involved.<sup>23</sup>

Loutropyrgos  
31 December 1989

Michael Wedde,  
Seminar für klassische Archäologie  
Universität Mannheim  
D 6800 Mannheim 1, Schloss

## **NOTES**

---

1. Space precludes an exhaustive treatment and restricts bibliographical references to a strict minimum. The author's doctoral dissertation, in progress at the Universität Mannheim under the supervision of Prof. Wolfgang Schiering, contains a detailed analysis. An earlier statement concerning the method employed here can be found in *Hydra. Working Papers in Middle Bronze Age Studies* Nr. 7 (1990). Perceptive criticism by Prof. Schiering and Mrs Ethel Wedde has been most useful in improving on the text. Faults and errors remain the responsibility of the author. Abbreviations used:

*AJA* American Journal of Archaeology

*CMS* Corpus der minoischen und mykenischen Siegel

*IJNA* International Journal of Nautical Archaeology and Underwater Exploration

*LMM* Laviosa, Clelia, "La marina micenea", *Annuario della Scuola Archaeologica di Atene* 47-48, 1969-1970, 7-34.

*MCM* Marinatos, Spyridon, "La marine créto-mycénienne", *Bulletin de Correspondance Hellénique* 57, 1933, 170-235.

*MIMA* Basch, Lucien, *Le musée imaginaire de la marine antique*, Athens, 1987.

*SSAW* Casson, Lionel, *Ships and Seamanship in the Ancient World*, Princeton, 1971.

2. *MCM* 212ff, although not in conjunction with the bow/stern question; most recently *MIMA* 94-140, with major differences to the typology employed here, see diss. (n.1).
3. The present paper does not take issue with the established Aegean Bronze Age chronological system, despite its deficiencies. All dates employed are the conventional relative dates used in ceramic and glyptic studies. Their relationship of mutual relativity will not alter significantly, whatever their true absolute dates may be.
4. The "single item solution fallacy" receives detailed treatment in the above-mentioned dissertation (n.1). The major items thus employed are listed in nn.11-12.
5. Subsequent to this paper's completion, it was noted that M.A.S. Cameron called for a similar hierarchy of comparative pictorial analogy in the restoration of frescoes. See his "On Theoretical Principles in Aegean Bronze Age Mural Restoration", *Temple University Aegean Symposium* 1, 1976, 20-41, on p.29.
6. These include figure heads, decorative elements, bow projections, stern appendages, elements of the superstructure etc.
7. Due to breakage, models generally constitute an inadequate data base for analytical statements. No such individual can aid in defining a type, exception made of the Naxos lead boats, which are tentatively classed as a type in their own right. In many cases stem and stern posts are damaged, all additions rising above the gunwale are lost, and steering-oars appear not to have been indicated.
8. The major statement in favour of bidirectionality (Raban, Avner, "The Thera Ships. Another Interpretation", *AJA* 88, 1984, 11-19) is based on the misconception that the stern appendage on the Akrotiri ships is a ram, and a vision of riverine navigation alien to the Aegean. The ram is not an Aegean Bronze Age invention, nor does it appear elsewhere in the contemporary Eastern Mediterranean. As the stern appendage is confined to the Akrotiri ships and a sealstone in the Stathatos Collection (*CMS* I. Suppl. 167) - contra *MIMA* 102-103, 127-130 - and since these cases show ships in exceptional situations, this view has little universal validity.
9. Tsountas, Christos, "Kykladika II", *Ephemeris Archaologike* 1899, cols. 91-92; Evans, Arthur, *The Palace of Minos II*, London, 1928, 240-242.
10. As calculated by Johnstone, Paul, *IJNA* 2, 1973, 9 and his *The Seacraft of Prehistory*, London, 1980, 64. The mean for a database of 12 cases is 44%. It is significant that far more eloquent parallels, such as the "black ship" on the Hierakonpolis Tomb 100 wall painting, have been ignored.
11. Naxos lead boat: Renfrew, Colin, "Cycladic Metallurgy and the Aegean Early Bronze Age", *AJA* 71, 1967, 1-20, on p.5; *SSAW* 41.  
Mitsotakis model: Davaras, Kostis, "Minoiko kiriophoro ploiario tis Syllogis Mitsotaki", *Archaologike Ephemeris* 1984, 55-95, on pp. 59, 67-72.  
Akrotiri ship: Casson, Lionel, "Bronze Age ships. The evidence of the Thera wall paintings", *IJNA* 4, 1975, 3-10, on pp.7-9.  
Dramesi ship and Enkomi graffito: *SSAW* 31.
12. Hal Tarxien graffito: *SSAW* 31-32.  
The line of thought adducing extensive contact between the Cyclades and the Western Mediterranean in the Early Bronze Age from similarities in fortification techniques, housing, tombs, pottery, figurines, tools etc. is here considered as unproven. Before such widescale diffusionism can be shown to have taken place, the physical aspects of long distance travel at this early stage must be satisfactorily analysed. Cyprian Broadbank ("The Longboat and Society

in the Cyclades in the Keros-Syros Culture”, *AJA* 93, 1989, 319-337, particularly pp. 332-337) suggests that population sizes in the contemporary Cyclades may have precluded large-scale and long-distance travel. Only frequent contact or colonization appear viable explanations for the phenomenon perceived by the pro-diffusionists.

13. The line across the hull at the right extremity of the Hal Tarxien hull (Fig.4f) is not sufficiently defined to permit a designation as steering-oar. If it were then *SSAW*31-32 would stand refuted on this point.
14. The breaks do not hinder a satisfactory reconstruction of the image. The only problem to arise involves the vertical line at the left extremity. An interpretation as a steering-oar/bifurcated extremity is strengthened by a further two sherds from the same pithos, and by the Hieroglyphic Deposit and Philadelphia representations (Figs. 5b-c). A possible explanation may be provided by the Palaikastro and Ashmolean ships (Figs. 6a and e), where a pole appears, as will be argued below, at the bow.
15. *MCM* 176n.1 and pl.XV.39 corrects Evans, Arthur, *Scripta Minoa I*, Oxford, 1909, 161 pl.63a but notes damage to the seal surface at the crucial place where the two steering-oars are depicted. The present interpretation sees no reason to doubt the compound testimony of these two scholars.
16. It is not clear what, exactly, the artist intended to depict at the bow. The treatment suggests more than a mere pointed extremity, but the pictorial means remain as truncated as those employed for the bifurcation at the stern. The interpretation as an arrowhead is not impervious to criticism, but has the support of several members of the cluster.
17. The ships on the Kolonna pithos, the Hieroglyphic Deposit sealing and the Berlin seal are included in the cluster on the strength of their stern morphology. Little is gained by forming a separate group due to secondary differences in bow morphology.
18. Not illustrated here. They are: *MCM* pl.XVI.60 (Knossos) and pl.XV.34 (Olous), *CMS* II.2.100a, 163c and 177b (all Malia), Poursat, Jean-Claude/Godart, Louis/Olivier, Jean-Pierre, *Fouilles exécutées à Mallia. Le Quartier Mu. I. Introduction générale. Écriture hiéroglyphique crétoise (=Etudes crétoises XXIII)*, Paris, 1978, 84 and 88 (both Malia). For a discussion of these individuals, see the forthcoming dissertation (n.1).
19. The above analysis was undertaken without knowledge of the Haifa seal (see the Hydra paper mentioned in n.1).
20. Further thoughts on this subject will be presented in a paper to be read at the “*troisième Rencontre égéenne internationale de l’Université de Liège*” in April 1990.
21. Lucien Basch (*MIMA* 137, 138 fig.286) suggests that the device is at the bow, commenting, as the first scholar to do so, on the similarity in hull shape between this ship, without the device, and the earliest Minoan ships. Such an interpretation does not appear applicable to the Malia fragment (Fig. 7c) due to the lack of projection, common, although variously represented, to all the members of this cluster, at the base of the post. Understanding the Phaistos craft on line with the suggested interpretation of the Malia fragment creates a hull-type otherwise unknown.
22. The individuals in question are the Mitsotakis model (Fig.3b), the Piazzale dei Sacelli model from Agia Triada (*LMM* 28 fig.27a-d, with restoration; unrestored: *MCM* pl.XIV.23) and the marble model from Agia Triada (*LMM* 22 fig.16). It is not to be excluded that further models may have been equipped with a higher bow, now lost. On the aggregate of the entire corpus, however, the higher bow remains rare.
23. The author is grateful to Mr John Coates, Prof. Thomas C. Gillmer, and Dr André W. Sleeswyk for encouraging comments subsequent to the presentation of the oral version of this paper.

## ABBREVIATIONS

CMS, MCM, and MIMA as in n. 1. Further:

EESS Bowen, Richard LeBaron Jnr, "Egypt's Earliest Sailing Ships", *Antiquity* 34, 1960, 117-131.

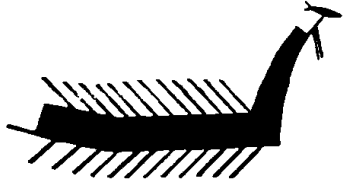
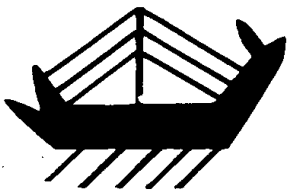
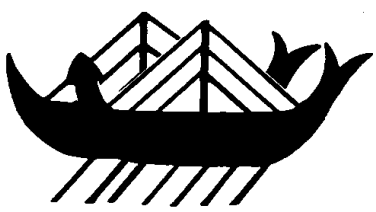
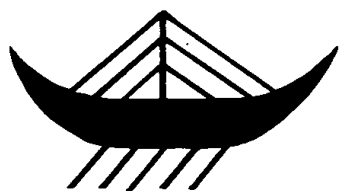
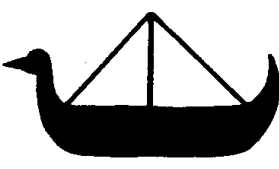
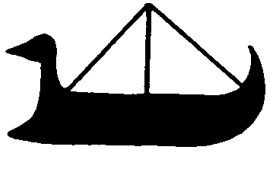
"Naqada" Petrie, W.M.F./Quibell, J.E., Naqada and Ballas, London, 1896.

"Seewesen" Gray, Dorothea, Seewesen. *Archaeologia Homerica*, Band I, Kapitel G, Göttingen, 1974.

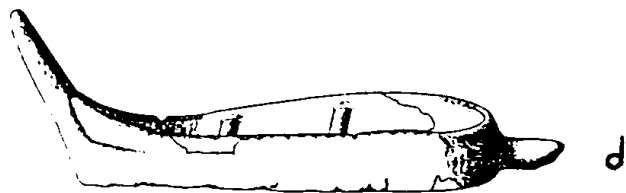
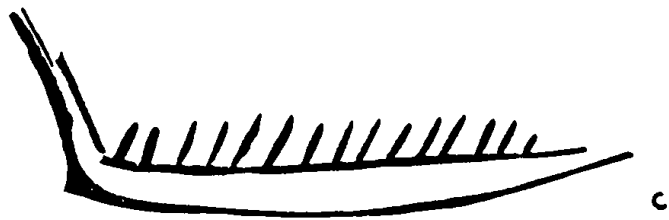
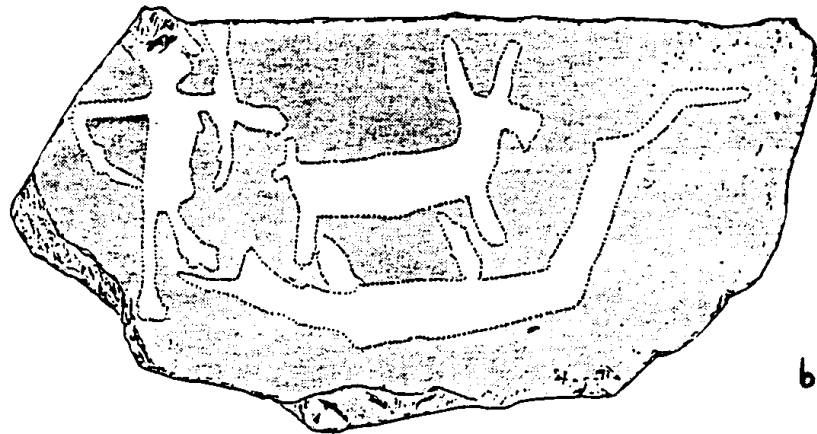
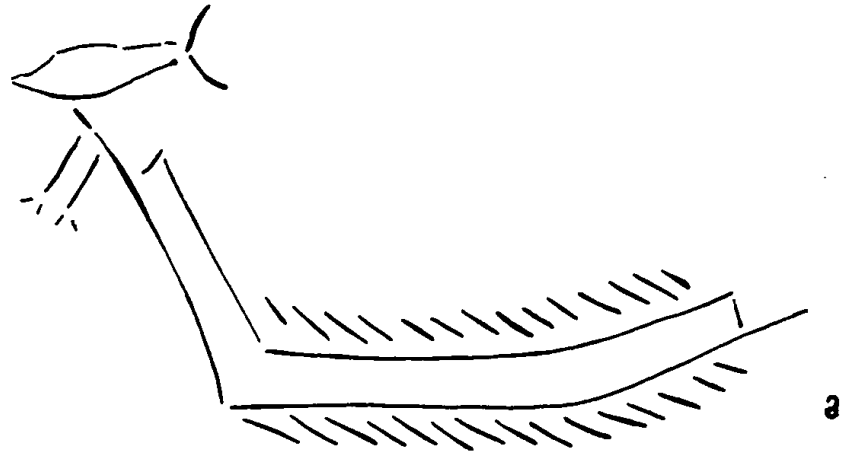
## ILLUSTRATIONS

- Fig. 1 Typological chart, drawings by the author.
- Fig. 2
- a Chalandriani, Syros: clay frying pan, ECyc II; National Museum 4974; drawing by the author from Papathanasopoulos, G., *Neolithika Kykladika*, Athens, 1981, 102-103.
  - b Korphi t' Aroniou, Naxos: marble slab, ECyc II; Apeiranthos Museum, Naxos; Doumas, Christos, "Korphi t' Aroniou: mikra anaskaphiki erevna en Naxos", *Archaologikon Deltion* 20, B, 1965, 49 fig.4.
  - c Orchomenos, Boiotia: sherd, EH II (?); Chaironeia Museum; drawing by author from Kunze, Emil, Orchomenos III. *Die Keramik der frühen Bronzezeit*, München, 1934, pl.29.3.
  - d Palaikastro, Ta Ellenika ossuary: clay model, EM II; Iraklion Museum; Bosanquet., R.C./Dawkins, R.M., *The Unpublished Objects from the Palaikastro Excavations, British School at Athens Suppl. Paper 1*, 1923, 7 fig.4.
- Fig. 3
- a Naqada II vase, Pre-Dynastic; Ashmolean Museum 1895.584; *EESS* 119 fig.3 (right).
  - b Naqada II vase, Pre-Dynastic; British Museum 36326; *EESS* 118 fig.2.
  - c Naqada II vase, Pre-Dynastic; drawing by the author from *Naqada* pl. LXVII.13 (left).
  - d Naqada II vase, Pre-Dynastic; drawing by the author from *Naqada* pl. LXVI.4 (left).
- Fig. 4
- a Naxos: lead model, ECyc III; Ashmolean Museum 1929.26; Renfrew (see n.11) pl. I
  - b Provenance unknown (Crete): clay model, MM; *Mitsotakis Collection* π 50; Davaras, (see n.11) 56 fig.1.
  - c Akrotiri Miniature Fresco, LM Ia; National Museum; Marinatos, Spyridon, in *Seewesen* 140 fig.26.
  - d Dramesi-Hyria, Boiotia: stone stela, LH III; Schimatari Museum; *MIMA* 145 fig.302B.
  - e Enkomi, Cyprus: graffito, LC III; lost; drawing by the author from Westerberg, Karin, *Cypriote Ships from the Bronze Age to C.500 BC*, Gothenburg, 1983, 87 fig.13.
  - f Hal Tarxien, Malta: stone stela, *EBA*; drawing by the author from Woolner, Diana, "Graffiti of Ships at Tarxien, Malta", *Antiquity* 31, 1957, 62 fig.1 nr.9.
- Fig. 5
- a Kolonna, Aigina: clay pithos, MH II; Aigina Museum; drawing by the author from Hiller, Stefan, "Pax Minoica Versus Minoan Thalassocracy. Military Aspects of Minoan Culture" in Hägg, Robin/Marinatos, Nanno (eds), *The Minoan thalassocracy. Myth and Reality*, Stockholm, 1984, 29 fig.2 (reassembled to constitute a single ship).
  - b Knossos, Hieroglyphic Deposit: sealing, MM II or III; Iraklion Museum; *Seewesen* 41 fig.6q.

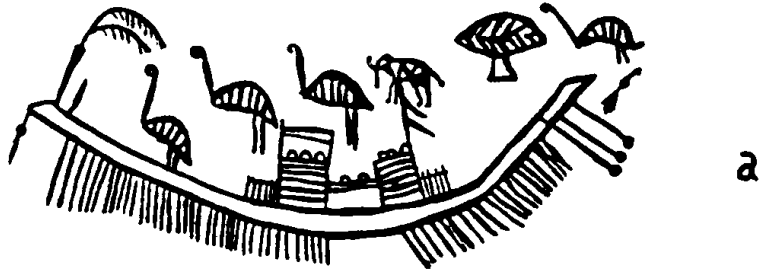
- c Provenance unknown (Crete): sealstone, MM; Philadelphia University Museum MS 4791; CMS XIII.90a.
- d Provenance unknown (Crete): sealstone, MM II or III; Berlin, Staatlichen Museen Preussischer Kulturbesitz, *Antikenabteilung* FG 56; "Seewesen" 41 fig.6o.
- e Provenance unknown (Crete): sealstone, MM I; Ashmolean Museum 1938.760; "Seewesen" 41 fig.6i.
- f Malia: sealstone, MM I; MCM 235 fig. 16.
- g Provenance unknown (Crete): sealstone, MM 11a; Liverpool City Museum 8211; CMS VII.254a.
- Fig. 6 a Palaikastro: sealstone, EM III; Iraklion Museum 566; CMS II.2.261b.
- b "Adromyloi": sealstone, EM III; Iraklion Museum 588; CMS II.2.276b.
- c Malia: sealstone, MM I; Ashmolean Museum 1941.86; MCM pl.XV.36.
- d Provenance unknown (Crete): sealstone, EM III-MM I; "Seewesen" 41 fig.6e (top).
- e as Fig.6d (bottom).
- f Malia: sealstone, EM III-MM I; Ashmolean Museum 1938.761; "Seewesen" 41 fig.6c.
- g Malia: sealstone, EM III or MM I; Giamalakis Collection 3043; "Seewesen" 41 fig.6d.
- h Platanos Tholos B: sealstone, MM I; Iraklion Museum 1079; drawing by the author from "Seewesen" 43 fig. 8b.
- i Provenance unknown (Crete): sealstone, MM II or III; National Museum; "Seewesen" 41 fig.6n.
- j Mochlos Grave III: sealstone, MM III; Iraklion Museum 748; drawing by the author from CMS II.2.249.
- k Provenance unknown: sealstone, MM II; Haifa Maritime Museum; drawing by the author from MIMA 102 D4.
- Fig. 7 a Malia, Quartier Mu: sealing, MM II; Iraklion Museum 1503; Poursat / Godart / Olivier (see n.18) 83.
- b Phylakopi I, Melos: sherd, ECyc II; National Museum 11440; drawing by the author from Atkinson, T.D. et al, Excavations at Phylakopi in Melos, *Journal of Hellenic Studies Suppl.* vol.1, London, 1904, pl. V.8c.
- c Malia: sealstone, MM IIb; Iraklion Museum 2467; CMS II.2.195c.
- d Phaistos Disc sign nr. 25, MM IIb; Iraklion Museum; "Seewesen" 43 fig. 8a.

	Type	Paradigm Case
	I	Syros
	II	Platanos
	III	Kolonna
	IV	Akrotiri
	V	Skyros
	VI	Tragana

J. 1



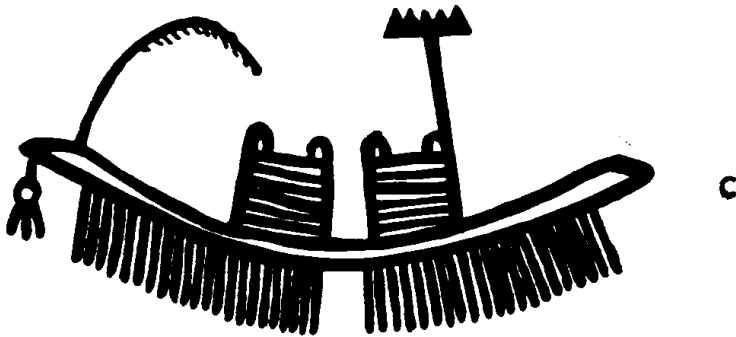
Fig



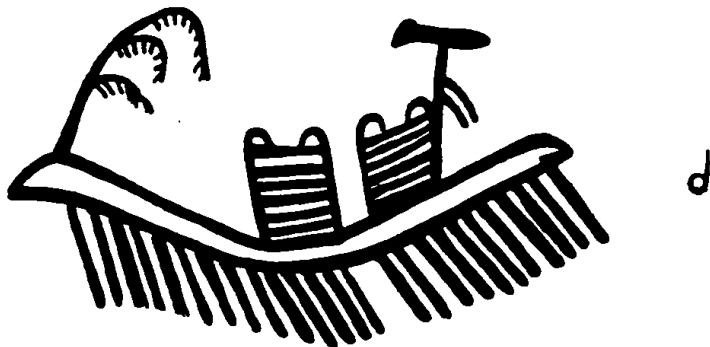
a



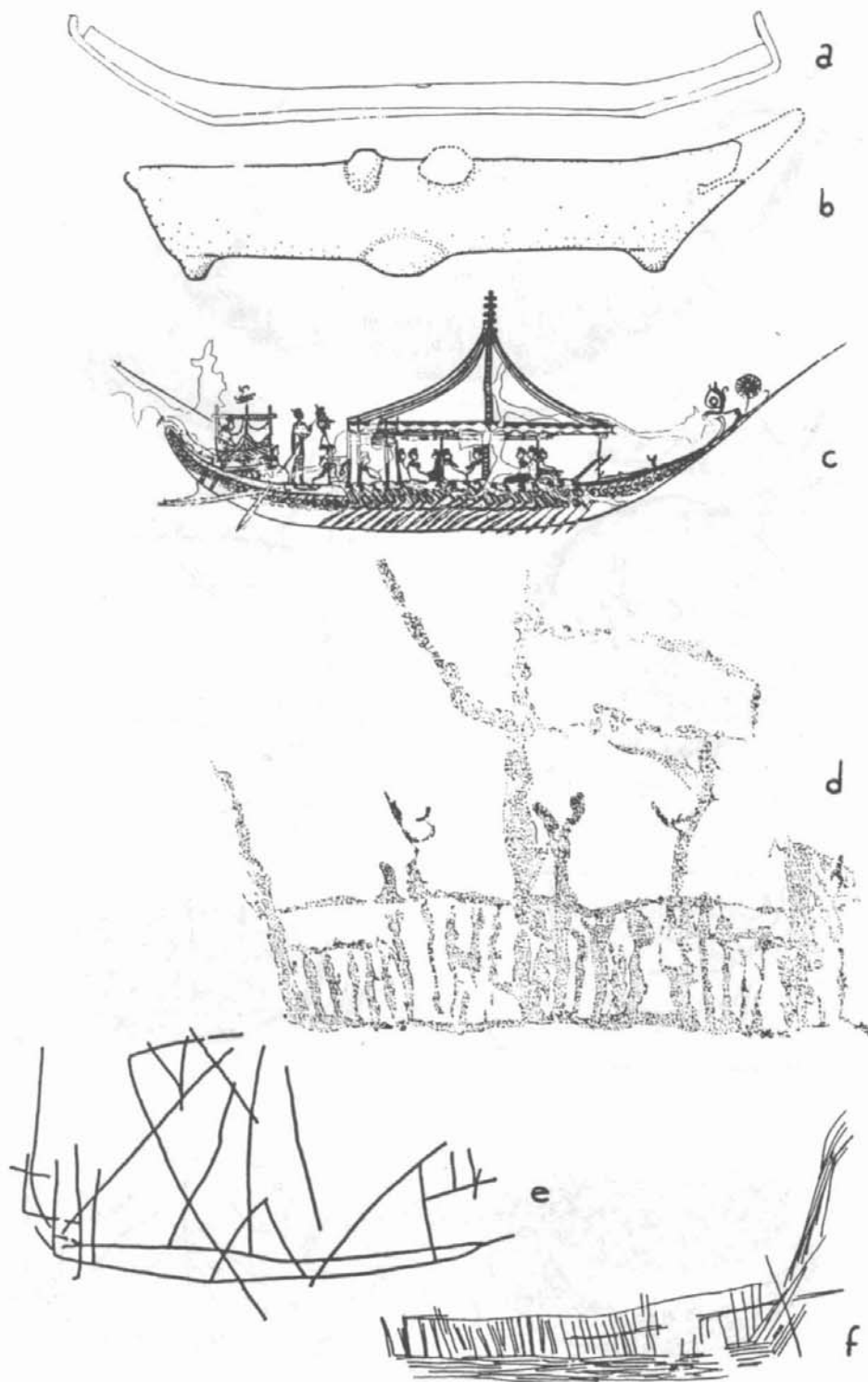
b



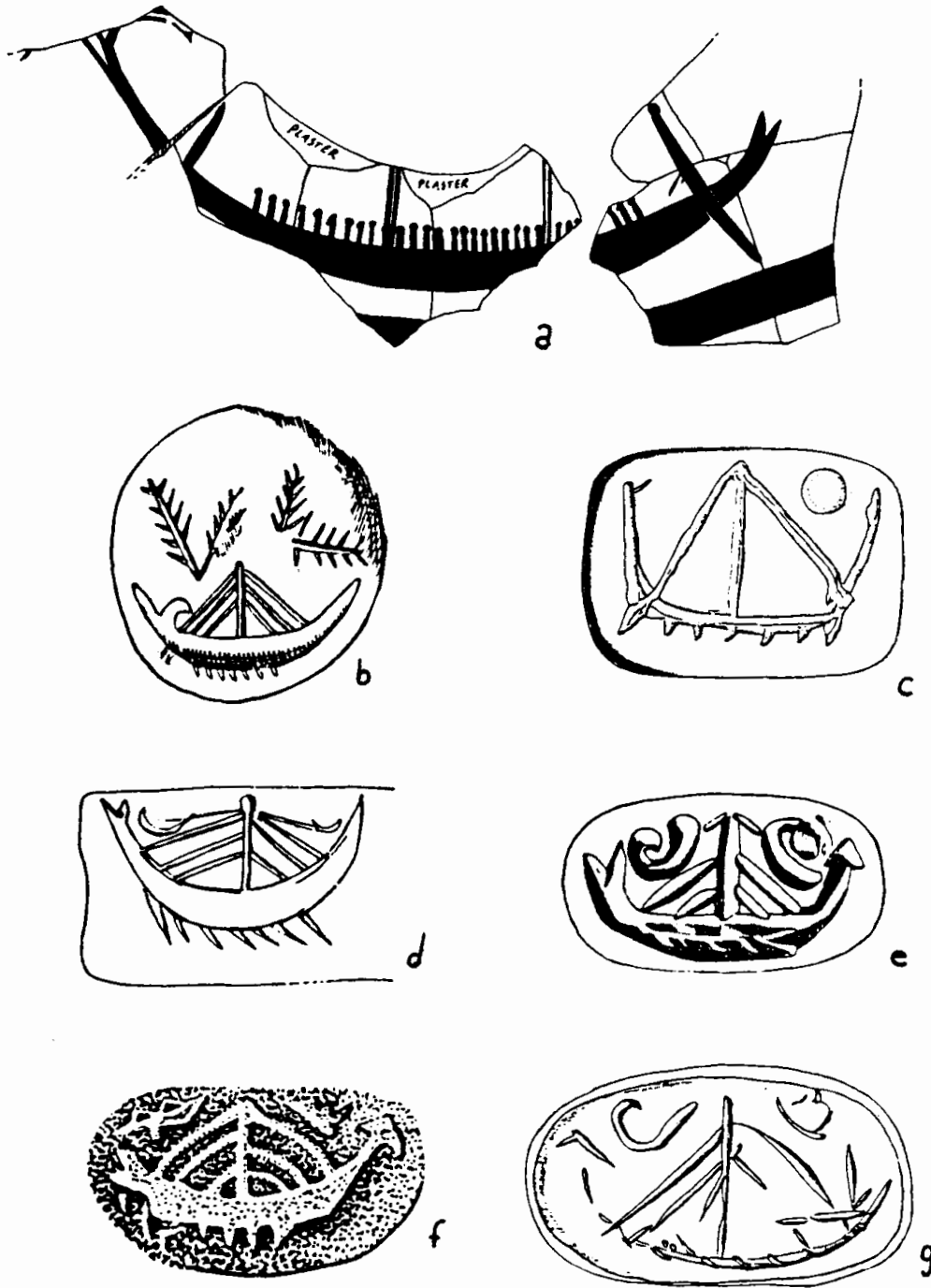
c



d



Fig



5

BOW AND STERN IN EARLY AEGEAN BRONZE AGE SHIP IMAGERY

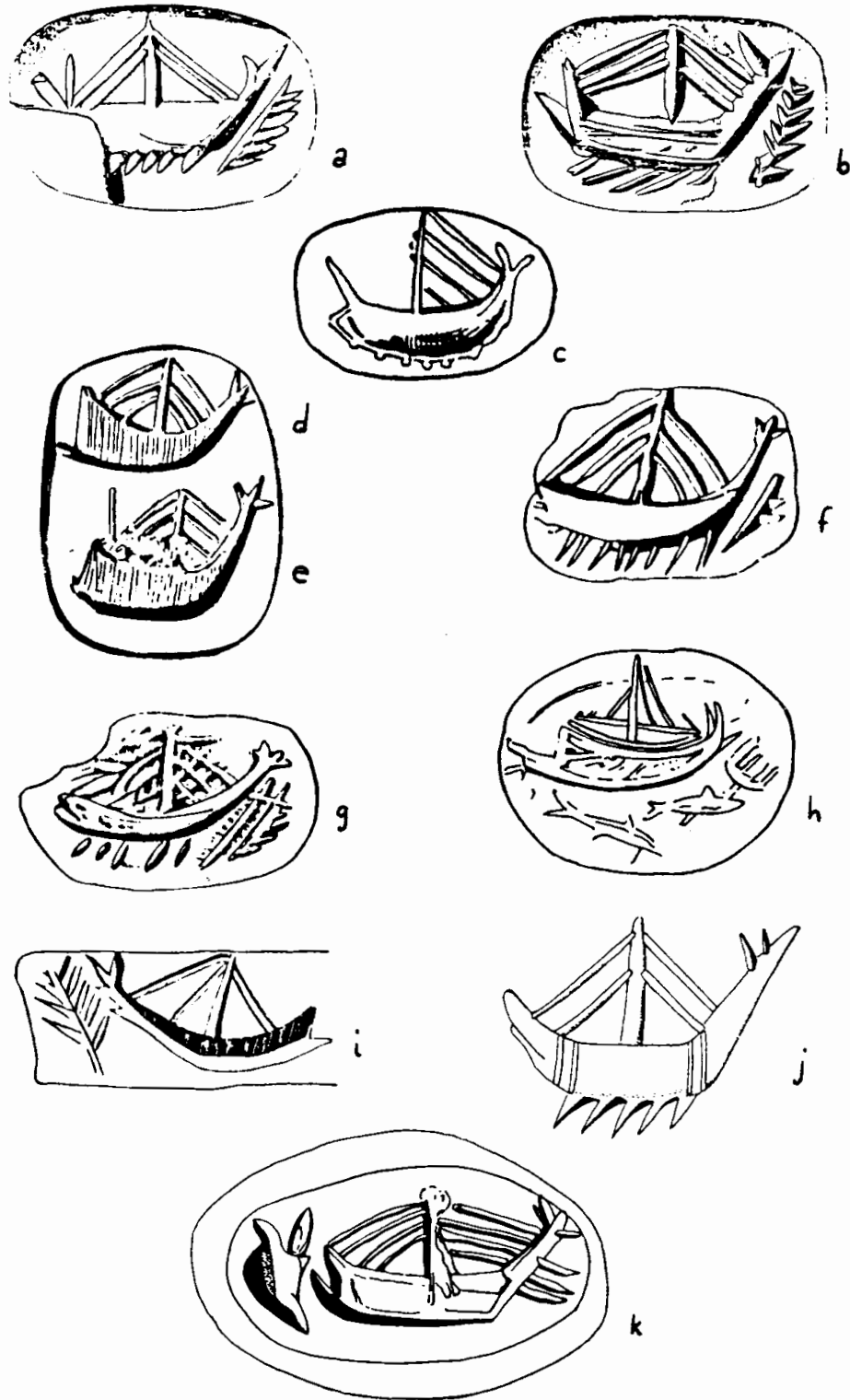
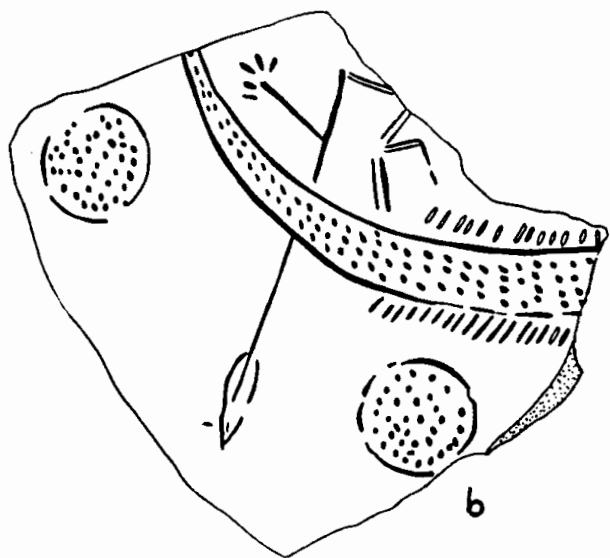


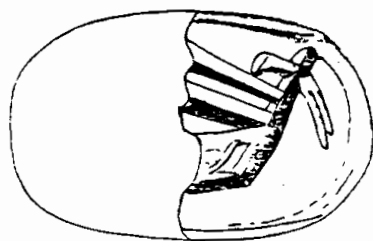
Fig.



a



b



c



d

.7