ROWERS PADDLING SAILING SHIPS IN THE BRONZE AGE AEGEAN

An interesting approach towards a classification of early water transport (mainly boats) has been made by Sean McGrail, based principally on the combination of building techniques (reduction, construction and transformation), as well as on the builder's fundamental concept of the boat[1]. Evidence from the Bronze Age Aegean does not permit though a classification following structural characteristics.We would rather consider shell technique more probable[2], and therefore have a choice among log-, plank-, bark- or hide boats. It seems planked boats would be more probable, even in an earliest form[3], judging from the raw materials available and the Bronze Age Aegeans' technological progress[4]. The mortise and tenons joints of the Kas wreck seem to corroborate these thoughts[5].

Furthermore, if technique rules construction methods as well as environment seems to determine raw material choices, culture can impose certain patterns or designs[6]. At the same time, function has its own prerogatives and, even though shape depends as well on raw materials, it seems plausible to suggest that the shape of a boat has to answer not only to weather and water conditions, but also to a functional necessity: a boat was originally meant as a means of transport.

Boat representations indicating a shape and suggesting propulsion and steering systems provide (with a very few exceptions) our only information about Bronze Age Aegean watercraft and shipping. It should nevertheless be borne in mind that form as well as propulsion and steering systems on their own would not lead us to a totally reliable classification scheme[7]. Moreover, artistic conventions, material or technical restrictions and, finally, the primary or/and secondary functional character of a boat representation are quite confusing. These reserves kept in mind, Aegean boat representations could thus be distinguished and classified according to represented motive power and shape, possible functions could then be suggested.

Regarding boat[8] types (not function), Bronze Age Aegean material could be devided in three categories, according to propulsion systems. From the simplest to the more complex we can distinguish: a) rowboats, b) sailing-ships and c) rowed sailing-ships. We should not forget of course oars might just not be represented *artis causa,* whereas what we interpret as "oars" on or under the hull of an engraved gem-ship could be ribs or merely the swelling of the waves.

As a matter of fact, a rowed sailing vessel could be just a sailing boat fit up with oars used as auxiliary power, either in case there is no rear wind[9], since they could only sail before the wind, or along some coasts because of the lack of water[10], or to carry off manoeuvres: even nowadays the wind changes quite often in the Aegean[11], and actual mechanical power propulsed boats are fit out with subsidiary oars. On the other hand, we can imagine oars were more reliable in a first experimental stage of sailing[12], before trusting entirely the newly invented (or borrowed) sail. The third category would then rather precede the second one from

the chronological point of view. Furthermore, even though sails help to cover quickly a large distance with favourable wind, rowing could have been used on any sailing-ship in those occasions when speed and accuracy were absolutely necessary, even when the wind is not favourable. Even though the speed factor was not essential for ancient economic systems[13], it would be of primary importance in matters of life or death, that is, in case of piratical raids, and that, not only from the victims' point of view: The Ugaritic texts describing small fleets plundering the coastal areas indicate the impact of rapid ships surprising the Bronze Age inhabitans and vanishing immediately afterwards[14].

In the Early Bronze Age, evidence seems to be more or less homogeneous[15]: the exclusively rowed (or paddled) asymmetrical boats arrive up to an approximately 1/12 beam/keel ratio, they have a quite low gunwale (and are therefore easier to get paddled by a seated crew), a mysterious projection almost at waterline at the lower balky end (which I take to be the stern), and an astonishingly high and slender bow, decorated with a fish- and banderole emblem. In this well-known "cycladic" type, attested on the "frying-pans" (fig. 1) and the Naxian lead models, the cretan (Palaikastro) model could be included, even though the small number of thwarts (two) could indicate a small boat; it belongs to a surprisingly similar category.

It has recently been suggested this cycladic longboat represents a development in social organization beyond the level of the nuclear family, because of the necessity to recruit a sufficient number of young paddlers from the contemporary cycladic settlements. Trade control could be a possible function for these longboats[16].

In the following Middle Bronze Age, the first sailing-ships appear on early cretan prisms, dating from the Middle Minoan II onwards (fig. 2 from Platanos). In this period, rowboats and ships represented under sail arrive each at hardly 20% of the existing representations, whereas rowed sailing ships, that is, sailing ships equipped with oars, represent the 60%. The hull shape of the first ships using a sail, at least as an alternative motive power, seems to be the direct descendant of the Early Bronze Age craft, and the forerunner of the Late Bronze Theran vessels.

At the same time, the continuing importance of paddling is attested by the Aegina pithos ships (fig. 3). It is as well attested by a steatite prism (fig. 4) showing three human figures in a crouched attitude - paddlers? - on one face, while two asymmetrical sailing ships are shown on another[17]. According to L. Basch in many cases they could be piratical ships[18]. Differences in population in the Cycladic Early Bronze Age and the fortifications in Middle Bronze Age seem to result from the insecurity reigning during that time[19].

Concerning more or less contemporary Linear A inscribed sealings and roundels from Khania, Brice[20] suggests the boat-prow L 35 sign, appearing in lists in the same context and presumably with the same significance as "human" signs (:L 99) could be related "to some category of personnel". Should we see here records of mariners, rowers for instance? In relation to this, the association of the signs L 35 (boat-prow) and L 87 , the so-called "stepped altar"[21] would seem consequent, if the L 87 sign was in fact a "boat cabin" (cf. fig. 5).

During Late Bronze Age[22], seal-, fresco-, model- ships and ships painted on pottery belong to similarly represented hull types, but their propulsion systems arrive at different percentages: about 10% rowboats (fig. 6), 18% sailing ships (fig. 8) and 24% rowed sailling ships (fig. 7), but we may arrive at 62 or 68% on either sailing ships or rowed sailing ships if we add the "talismanic" seals with engraved "*Kajütenschiffe*"[23] (fig. 9) to the one or the other category.

They constitute in fact 44% approximately of the ships represented during this period. They contrast strongly to the accurate image given[24] by the other contemporary seal-ships. Micheline Van Effenterre[25] considers the part of the ships represented on these talismanic seals to be the forepart (hull, high prow and stern canopy or stayed mast); the hooked prow and cabin depicted on inscribed roundels corroborates this interpretation. Onassoglou[26] on the other hand thinks these "cabin-ships" are a *pars pro toto,* an abreviated ship image, representing only the essential ship elements from the captain's point of view: the cabin (an honour construction) and the prow. These talismanic representations have scarsely been used sphragistically: were then prophylactic[27] talismanic seals in fact captain's seasl?

A totally different picture is given by several fragmentary impressions of the same seal found in a palatial deposit at Knossos, dating of the Middle Minoan III-Late Minoan I date[28], as well as five similar impressions in the contemporary Zakro hoard[29], said to be exact replicas of the Knossian sealings[30]. They represent two series of four crouched men, each separated by means of a horizontal line (fig. 10), which have been taken to be rowers[31], or, more probably, paddlers, as having their typical posture[32], the blades of the oars held are also represented[33].

During Early Bronze Age paddling instead of rowing could have been exclusively practiced, as rowing constitutes a further stage in propulsion technique; since its discovery, rowing is preferred to paddling on large ships[34]. Despite this fact, padding is preferred to rowing in certain cases even later. In the miniature Theran fresco, rowers and paddlers are represented at the same time on different boats (figs. 6 and 11). For some unknown reason some ships are being paddled by men leaning over the gunwale in order to reach the sea. Ordinary seated paddlers, on the contrary, operate in small boats on the same fresco[35]. In addition to this, the above mentioned rowers' sealings represent actually rather paddlers.

There is one further point: the paddled vessels are fit up with the strange "poop-device", reminding the similar "bifurcated" end of quite a lot of Middle Minoan gem-boats, or even the "keel projection" of the Early Bronze rowboats. Although several suggestions have been made, *the raison d'être* of this device remains obscure. Nevertheless, we might attempt to add one more clue possibly leading to some explanation:

On Middle and Late Bronze Age engraved seals two forms of ships seem to predominate: an asymmetrical one having a "bifurcated" end (fig. 7) and a symmetrical "crescent-shaped" one (fig. 8); the latter's rectangular sail is represented unfurled, high on top of the mast[36], and it has no poop-device, just like the only Theran sailing ship which is not paddled. On the contrary, the asymmetrical ships on the seals presumably have a poop-device (that is, a bifurcated lower end), but their sail is brailed up and only the triangular rigging (possibly also the roof of the passengers' cabin) is visible. We could then suggest the possibility they have been represented while rowed or paddled exactly as the correspondent Theran ones.

If this hypothesis is correct, when the sail is not represented, because there is no need to, since it is not being used at the moment, that is, when the ship is being propulsed by rowing or rather paddling, it would have been necessary to fit the stern with the poop device, or the other way round. As a matter of fact, on the second face of the above mentioned prism, on the first face of which three rowers (paddlers) are shown, two ships of the "bifurcated end" type are engraved, the sail brailed up (fig. 4).

It should be added though that some Late Bronze Age examples seem to contradict this

hypothesis: the ship on the Tiryns finger ring[37] has its sail brailed up, but no poop device can be distinguished, unless we admit the ship is not being propulsed at that moment, but moored in the port. Another similar example is given by a cretan lenticular gem[38], unless the double stern oar is in fact the representation of this device, which is quite improbable. In any case, the point needs further study.

Paddling instead of rowing is an unusual practice for large boats. It is attested in the Near East as an additional method of propulsion, for instance on the reliefs dating of the time of the reign of Ashurnasirpal[39] on departure and arrival, but this would rather happen, although occasionally, in older periods[40]. If paddling was practiced occasionally on boats normally under sail, the high boat sides would not be especially suited for rowing, as it would be the case in normal rowboats, but the crew would have to paddle with their oars, too short for this ship, leaning over the gunwale the Theran way.

Little is known about the status of this Late Bronze rowing (paddling) crew from Linear B tablets recording *e-re-ta* lists[41]. On one tablet some female flax workers' and weavers' sons are becoming rowers[42]; the latter could belong to the same group coming to a total of thirty rowers sent to Pleuron according to another tablet. Several hundreds of rowers are recorded on a series of tablet fragments, recruited from various categories of the inhabitants, including (possibly) settlers, new settlers, refugees or immigrants[43], as well as others characterized by place indications, occupational designations or preceded by a personal name (in genitive singular). The latter names apparently belonged to important persons of the kingdom[44], since in most cases their patronymic is written too. These recruits "ought to row" *("ophelontes ereen")*.

Lists of absent rowers are also recorded[45] on a tablet containing on its *recto* a text many times erased and rewritten, and on its *verso* a ship graffito[46] sketched perpendicularly to the direction of the text lines. The big crew numbers on all these tablets would possibly be concerned with "a naval operation, not a peaceful mercantile venture"[47], since another tablet records the watchers who are guarding the costal areas, irregularly distributed[48], devided in local military units *(o-ka)*, under the command of a superior officer and his subordinates, and accompanied by an *e-q^{u}e-ta*[49]. The geographical locations of the rowers fill the gap of the coast watchers' stations guarding the coasts of the Hither and Further Provinces, whereas there is a concentration of sea-forces in the southern part of the Messenian Peninsula[50].

In any case, the crew had different origins, but it is not clear whether they were a temporary personnel[51], a permanent one[52] or both. It has been remarked that a navy based on rowing would recruit naval professionals[53], but would need to use as well other non competent groups of the population. It was anyway the central palace administration which recorded and managed the rowers and *o-ka* groups, as part of the personnel. The corresponding tablets were found in the central archives rooms in Pylos, and not elsewhere in the palace. The registration was probably made after communication with people coming from the outside[54].

The same remark can be made concerning the 45 noduli, all with the same ring impression, "goddess afloat in a boat" (fig. 12). They have not been found with the majority of the sealings (near and about the north-west portico of the villa of A. Triadha), but together in a small room with direct access to the exterior, in the south-west corner[55]. It could be possible that the owner of the ring was an overseer of a specialized activity, then why not mariners - rowers and rowing?[56]

The above mentioned *e-re-ta* constituted the crew of ships similar to the Tragana ship[57], belonging to a new type appearing during Late Bronze Age. To this type also belong the ships painted on the sarcophagus from Gazi[58] and on the Skyros[59], Asine[60] and Phylacopi[61] pottery. The stern is rather curvilinear and there is a kind of "keel-projection" on the bow, sometimes both sides. It would thus be possible to consider it as a structural ancestor of the Geometric ram, in which case an important break should be situated between Middle Bronze and Late Bronze periods in areas under Mycenaean influence.

This Late Bronze Age paddling or rowing crew would have a lower social status comparing to that of the Middle Bronze Aigina paddlers-warriors according to Basch[62]. Whether the ships they are aboard are merchantmen or not is another question. Distinction between cargo- and war-ships is quite difficult. Morisson[63] mentions the papyrus Harris according to which bowmen and soldiers were aboard merchant ships. On the other hand, Shaw[64] thinks painted *ikria* on Late Bronze ships were a naval power and authority symbol, and Laffineur[65] compares the mainland ships decoration of the hull to the pictorial ornaments on weapons, which shows a relationship between ships and warriors. We can of course imagine cargo ships had good reasons for being provided with warriors in case of attack, to protect their precious freight.

Concluding, we may remark an evolution of shipping propulsion techniques[66] during Early. Middle and Late Bronze Age in the Aegean. The long, oared ships of the Early Bronze Age with a possible trade and/or fishing control function adopt the sail from the Middle Bronze Age onwards. Sailing and rowing constitute alternative motive power then. Later, oars seem to be only occasionally used as time and sailing technique progresses. To a probable piratical function of ships during Early and Middle Bronze Age succeeds a possible centralized military use of ships and crews during Late Bronze Age. It seems a different boat type appears then in an area under Mycenaean influence, which could possibly lead to later geometric ship types. Trade would necessarily be a primary ship function, even before the invention of the sails, but it is mostly the variety of ships of different origins sailing in the end of the Bronze Age in the Eastern Mediterranean that attests of flagrant international relationships at the time. In addition to the traditional Theran type and the new Messenian (Tragana) type, cypriote ships -quite similar to the Syrian ones- are represented, for instance on Phaestos pottery[67] or on a decked ship model from Aghia Triadha[68]. We can be led to the conslucion the crew progressively lost its prestige and participation to the ship function (war or trade).

Trading routes, marked by anchors found in the sea[69], profound rounded cypriote models of merchantmen[70]; the "syrian type" shipwrecks from Cape Gelidonya[71] and Kas[72] and the egyptian sea going ships of the New Kingdom seem to corroborate the evidence about flourishing trade attested by the archeological finds in the Late Bronze Age Mediterranean. It is regrettable that the "people who lived in the islands in the middle of the Great Green Sea" put an end to these naval expeditions. Fortunately, these epic adventures survived in the common memory and some story-tellers sang them to the later generations[73].

Christina Marangou

University of Paris
(Panthéon-Sorbonne)
Aegean Protohistory

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ILLUSTRATIONS

Figure 1: Early Cycladic vessels incised on "frying pans" (Evans A. The Palace of Minos I (1921), fig. 138).
Figure 2: Platanos seal-stone (Evans A. The Palace of Minos I (1921), fig. 136 a).
Figure 3: Aigina pithos ship (reconstruction; Basch L. 1986, fig. 10).
Figure 4 a-c: Cretan steatite prism : (Photographs courtesy): Ashmolean museum Oxford, no 1938-577).
Figure 5: Gold ring from Mochlos (Evans A. The Palace of Minos IV (1936), fig. 919).
Figure 6: Theran rowing-boat (after Ernstson, "The ship" Procession Fresco - the pirats, in the international journal of Nautical Archaelogy and Underwater Exploration 14,4 (1985), fig. 2, p. 317).
Figure 7: Middle Bronze Age rowed sailing ship (Gray 1974:41, fig. 6j).
Figure 8: Late Bronze Age sailing ship (Gray 1974:43, fig. 8e).
Figure 9: Late Bronze Age talismanic ship (Corpus Minoischen und Mykenischen Siegeln IX, 117).
Figure 10: Sealing from Knossos representing rowers or paddlers (Evans A. The Palace of Minos IV (1936), fig. 463).
Figure 11: Theran paddled sailing ship (Marinatos 1974 fig. 6, p.51).
Figure 12: Late Minoan ring impression representing "a goddess afloat in a boat" (Evans A. The Palace of Minos IV (1936), fig. 920).
Figure 13: The Asine ship (Frödin O. and Persson A.M.: Asine, Excavation 1922-30, Stockholm 1938, fig. 207, 2).

NOTES

1. According to this scheme, plank-, bark- and hide-boats could be built in shell or skeleton sequence, whereas logboats were shell construction (McGrail 1985:299-300). See also Pomey P. *"Principes et méthodes de construction en architecture navale antique"*, in *3èmes Journées d'archéologie navale*, Paris 1985, about conception and realisation.
2. McGrail 1981:15; see also Bass 1986. The construction of the Kas wreck was similar to the Kyrenia ship (McGrail 1985:275). See Gassend & Cuomo 1983 about alternative construction methods.
3. With sewn planking (Casson 1963).
4. McGrail 1981:15.
5. Pulak & Frey 1985, Bass 1986.
6. McGrail 1985:291-292.
7. McGrail 1981.
8. Small boats have not been included here. Small boat models are difficult to distinguish from ship models, since model sizes vary, not necessarily according to the prototypes dimensions. A preserved mast socket would prove a sailing boat prototype, but usual terracotta models, in most cases summary and fragmentary representations, could just as well represent fishing boats or "oared galleys". Cf. Götticher 1978 and Forsythe Johnston 1985 about classification difficulties of models. Cf. also Betancourt 1985 about what should be called rather boat-shaped vases than boat models and Basch 1981 about votive models.
9. Casson 1965.
10. MacCaslin 1980:102.
11. Torr 1964:1.
12. Marangou 1977:55.
13. Gil-Artagnan 1976:46-55.
14. Wachsmann 1981.
15. The Mochlos symmetrical model is quite exceptional and should be studied separately. Mr L.Basch believes though boat types were already quite differentiated in the Early Bronze Age (oral communication and Basch 1987).
16. Broodbank 1989:336, 337.
17. On the third face an "equine animal" - an ass? Evans 1921, 1:120, fig.89 and *idem* 1936, IV_2:520 and fig. 462.
18. Basch 1986.
19. Bass 1986. See also Renfew 1967.
20. 1982-83:81.
21. Sourvinou-Inwood 1973 gives to this asociation a ritual significance comparing the similar construction on the stolen Mochlos ring boat with eventual egyptian divine boat prototypes.
22. In the Late Bronze Age, a relatively great quantity of seals representing ships comes from the seal engraver's workshop, situated near the administrative buildings of the palace of Mallia. In any case, this shows an interest for the sea-fishing or trade? (Poursat 1984). As a matter of fact, three anchors from a total of five cretan anchors (Shaw and Blitzer 1983) have been discovered at Mallia: one of them in House Ea and the other two near the stone-cutter's workshop or Middle Minoan sanctuary. Quite a lot of votive anchors are known from the ancient Mediterranean; see for instance: Frost 1969, *idem* 1970, Shaw and Biltzer 1983, MacCaslin 1980, Davaras 1980. About amuletic anchors: Mc Caslin 1980:51-52. See also Kapitän 1984 and Frost 1986 for anchor types.
23. Onassoglou 1985.
24. Van Effenterre H. 1986.
25. 1978:596.
26. 1985.
27. Betts 1971.
28. Evans 1936, IV_2:521 and fig. 463.
29. But "none in good condition"; Hogarth 1902:79 and pl.IV,6.
30. The Zakro sealings had been used to seal objects made of leather (cf. "diptera" in Linear B texts): prints of their unsealed surface show marks of strips and cords which tied the documents (Weingarten 1982-83 and *idem* 1983); see also Pini 1983.
31. Evans 1936, IV_2:520.
32. Giesecke 1983.
33. Evans 1936, IV_2:521. In the Near East paddles have usually, but not necessarlily, broad blades; from 2000 BC onwards their blades are rarely seen, and in that case they have the same shape as the oarblades (Degraeve 1981:157).
34. See for example Alexiou 1976:206.

35. Cf. also to the fresco "canoë" the A. Triadha sealings (Levi 1925-26:126, fig. 134).
36. The Marinatos' (1933) "egyptian type". This seems to be a usual practice in the Aegean sea in case of calm (information given by local fishermen in summer 1977 - at the Myrina port, island of Lemmos).
37. Marinatos 1933, pl. XVI, 58.
38. Evans 1928, II_1:243, fig. 139.
39. De Graeve 1981:157, figs. 37 and 38.
40. See Amiet 1961, pl. 13bis E.
41. If the translation as "rower" is correct. Differing views: Deger-Jalkotzy (1978:53) thinks the word is related to the fleet either as rower or *"Kommandant"*. Chadwick (1976:173) notes that in Knossos tablets an e-re-ta is included in a list of local governors and could hardly have been a simple rower. A different interpretation is also given in Camera (1981:36-37), who thinks the tablet records workers and technical experts on occasion of a natural disaster. Göttlicher (1985) is not certain the "rower" etc. interpretation is correct.
42. Ventris & Chadwick 1973:161.
43. Ventris & Chadwick 1973:186.
44. Lindgren 1973:50.
45. Ventris & Chadwick 1973:161.
46. Perpillou 1968.
47. Ventris & Chadwick 1973:183.
48. Chadwick 1976:174.
49. Follower, "king's companion", "count" with probable religious functions (Palmer 1963:152) or charioteer (Chadwick 1958:4).
50. Van Effenterre H. 1985. The danger was to come from the sea. Raw material had been lacking for a long time since seas had become unsafe. Time was early spring, in the month of sailing, Plowistos *("po-ro-wi-to-jo"*; Chadwick 1976:90, 173, 174). The extraordinary rich gold offerings and human sacrifices to the gods written hastily on a tablet (Promponas 1983) didn't help to avoid the final catastrophe.
51. Since they also had other occupations; Lindgren 1973:50.
52. Perpillou 1968.
53. Perpillou 1968: $a_2$rie: "gens de mer".
54. Palaima & Wright 1985:258, t.2.
55. Weingarten 1986:11, 18.
56. Chadwick (1973:77) discusses an interesting text presumably dealing with ships, mentioning origin and two "mariners" (?) *(pontiloi, po-ti-ro)* for every ship(?) recorded.
57. Marinatos 1933, pl.XIII, 17; Marangou 1977:98; Korrès G. 1989. Cf. rowers on a Kos Late Bronge fragment (Benson 1970: Horse, Bird and Man, the origin of Greek painting. Massachusett, Amherst, pl. XXXIX 1).
58. Alexiou 1973, pl. I.
59. Gray D. Seewesen, C_{55}, fig. 15c, p. 53.
60. Frödin O. and Persson A.M. 1938: Asine, Excavation 1922-30, fig. 207, 2.
61. Marinatos 1933, XIII, 16.
62. Basch 1986:428.
63. 1980:10.
64. 1980.
65. 1984.
66. Only presumably of construction methods.
67. Laviosa 1969/70, fig. 3a-d.
68. Marinatos 1933, pl. XIV, 23; Laviosa 1969/70, fig.27.
69. Frost 1970; McCaslin 1980.
70. Westerberg 1983. They were sailing (cargo) ships, but could have been additionally oared; cf. for example ship number 5 in Westerberg (1983:55), where there is a mast-socket, as well as a "row of holes for rowing or fastening stays, sheet lines or lines for securing the cargo".
71. Bass 1967.
72. Bass, Frey & Pulak 1984; Pulak & Frey 1985; Bass 1986.
73. I am grateful to Mr. Lucien Basch for his most helpful comments on an earlier version of this communication. Remaining errors are mine.

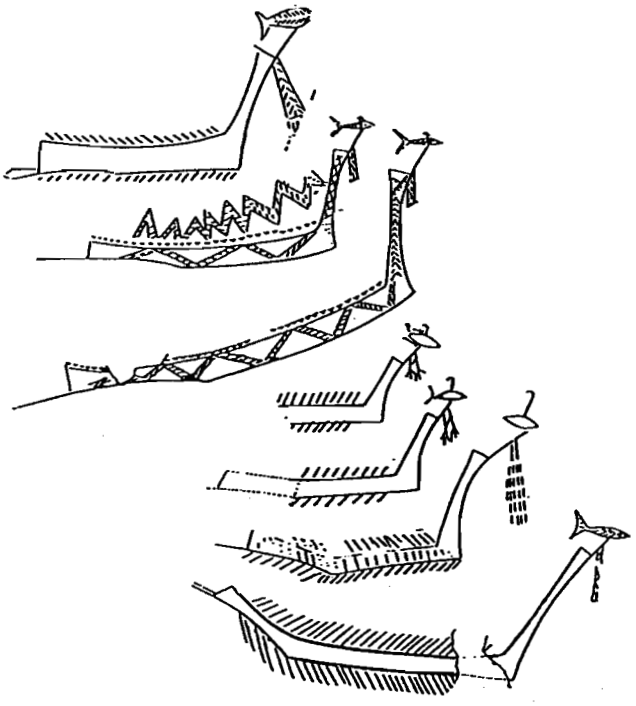


Figure 1

Figure 2

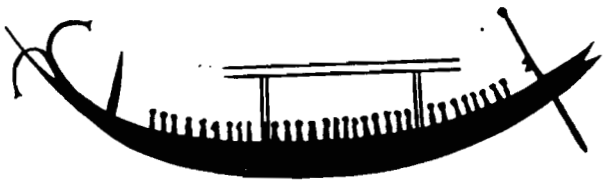
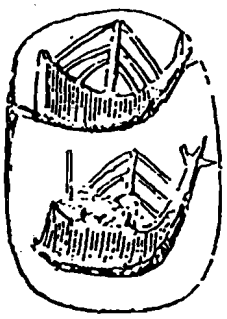


Figure 3



a

b

c

Figure 4

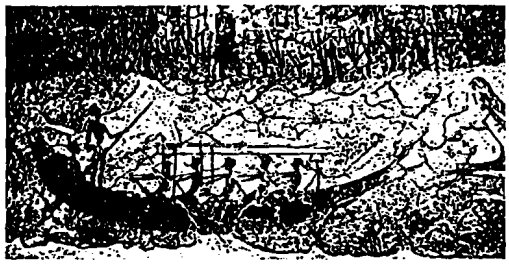


Figure 6

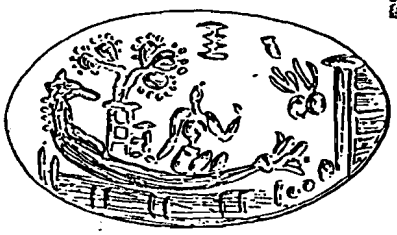


Figure 5

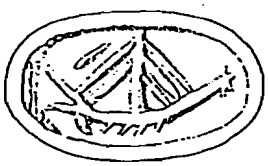


Figure 7

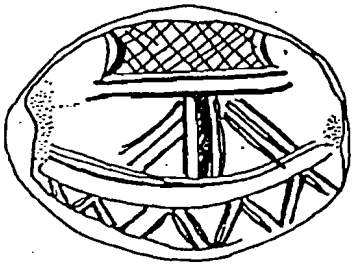


Figure 8

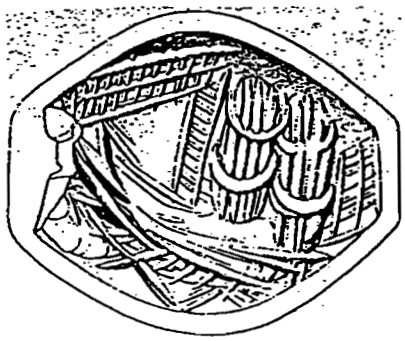


Figure 9

Figure 10

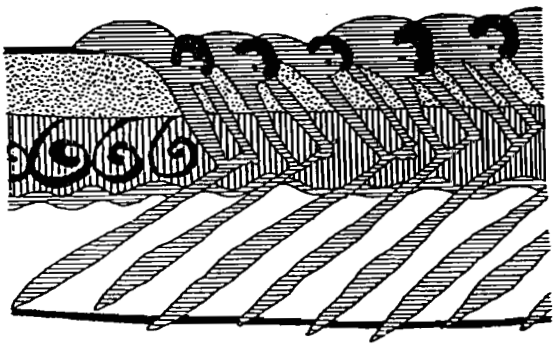


Figure 11

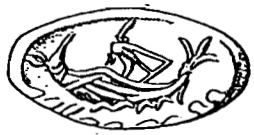


Figure 12

Figure 13