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The Longboat and Society in the Cyclades in the Keros-Syros Culture*

CYPRIAN BROODBANK

Abstract

Recent work on Early Cycladic society and demography enables the role of the longboat in the Keros-Syros culture to be analyzed with a new precision. Considerations of community size are combined with the iconographic evidence for such vessels to support the possibly exclusive association of longboats with a small number of anomalously large settlements; the close link between longboat depictions and the Chalandriani cemetery is explored. It is argued that the context and associations of such depictions, combined with considerations of longboat design and the constraints on available manpower, militate against the likelihood that such vessels fulfilled a primarily trading role. Alternative functions (primarily coercive) are preferred and are integrated into a possible model for the growth of certain sites and the control of exchange during the period of the Keros-Syros culture. Available evidence indicates that the process of social change in the Cyclades during Early Bronze II displays important differences from contemporary processes elsewhere in the Aegean.

The longboat has been seen for many years as one of the most important phenomena in the Cyclades during the middle of the third millennium B.C. Depictions of these craft on "frying pans" of the Keros-

Syros culture, combined with a series of lead models of apparently analogous boats, constitute some of the earliest evidence of specific boat forms known in the Aegean.¹ As a result, the longboat has occupied a place of honor in a wide variety of studies whose emphases range from its use as evidence of ship design, to the wider issue of its importance as a reflection of technological advance, and to its role in the intensification of exchange in the Early Bronze II period.² Here a different approach is adopted. Clearly the longboat must be integrated into the longer history of Aegean navigation and into the wider context of developments during EB II, but it will be argued that its specific importance cannot be understood until an attempt is made to see it from within the framework of Keros-Syros society. In short, the longboat repays consideration as evidence for a unit of social organization.

Our knowledge of Early Cycladic settlement is derived from the evidence available from a small number of excavations, combined with the picture revealed by field survey and the analysis of a large number of excavated cemeteries (fig. 1). Particularly in the second and third areas, the last decade has seen significant

* I would like to thank my research supervisor, John Cherry, for his advice and encouragement throughout the writing of this paper. My thanks are also due to Peter Warren, Jack Davis, George Bass, Jeremy Rutter, Todd Whitlaw, and Jane Cocking, all of whom read earlier drafts and suggested numerous improvements, to David Wilson for invaluable information concerning Early Bronze Age Ayia Irini, as well as to Ann Brown at the Ashmolean Museum, Oxford, and Janine Bourriau and Julie Dawson at the Fitzwilliam Museum, Cambridge, for their generous assistance in tracing the provenance of material. Lastly, I am particularly grateful to Peter Bellwood and John Terrell for their invaluable advice concerning questions of canoe travel and trade in the Pacific.

The following abbreviations are used:

- Coleman 1985 J.E. Coleman, "'Frying Pans' of the Early Bronze Age Aegean," *AJA* 89 (1985) 191-219.
Doumas 1977 C. Doumas, *Early Bronze Age Burial Habits in the Cyclades* (SIMA 48, Göteborg 1977).

Johnston 1985 P.F. Johnston, *Ship and Boat Models in Ancient Greece* (Annapolis 1985).

Renfrew 1972 A.C. Renfrew, *The Emergence of Civilization* (London 1972).

Renfrew and Wagstaff 1982 A.C. Renfrew and M. Wagstaff eds., *An Island Polity* (Cambridge 1982).

¹ For the most recent presentation of the frying pan depictions, see Coleman 1985, 198-99 and Catalogue. A 13th example is in the collection of the Fitzwilliam Museum, Cambridge (GR.18.1963) and is published in *AR* 1965-1966, 44-45. For the lead boat models see C. Renfrew, "Cycladic Metallurgy and the Aegean Early Bronze Age," *AJA* 71 (1967) 5, Catalogue and pl. 3, and Johnston 1985, 5-12.

² Johnston 1985, 7-11 for a summary of the "high bow/high stern controversy" and its application to the Keros-Syros longboat. For discussion of the longboat as a reflection of technological advance and as a carrier of trade, see Renfrew 1972, 356, 358 and 455; also C.N. Runnels, "Trade and the Demand for Millstones," in A.B. Knapp and T. Stech eds., *Prehistoric Production and Exchange* (Los Angeles 1985) 42-43.

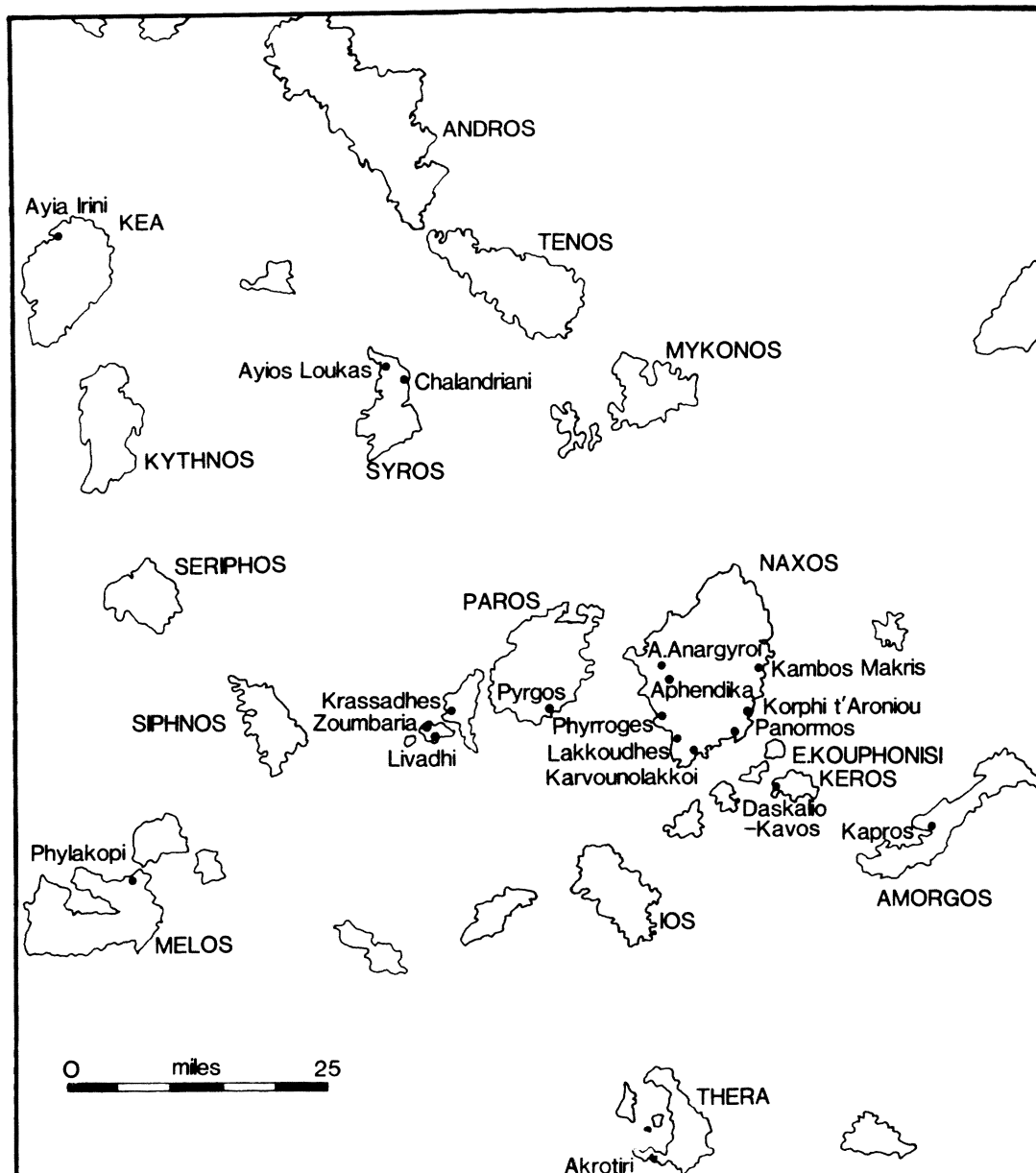


Fig. 1. The Cyclades, showing sites mentioned in the text

advances. Both Doumas's work on the Early Bronze Age cemeteries and the results of an intensive field survey on Melos contribute significantly to an accurate and quantitative assessment of Cycladic society in the third millennium.³ The aim of the present study is to compare some of the implications of these new data with the long established evidence for the existence of many-paddled vessels during the period of the Keros-Syros culture in the islands.

³ For cemeteries Doumas 1977; for the results of the Melos survey, see M. Wagstaff and J.F. Cherry, "Settlement and Population Change," and J.F. Cherry, "A Register of

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In a recent survey of Early Cycladic society, Davis has written that: "The overwhelming majority of Early Cycladic settlements were even smaller than their Neolithic antecedents. Dozens of such sites, probably representing the homesteads of only a couple of families each, have been found widely dispersed across island landscapes."⁴ This opinion is fully borne out by

Archaeological Sites on Melos," in Renfrew and Wagstaff 1982.

⁴ J.L. Davis, "Perspectives on the Prehistoric Cyclades:

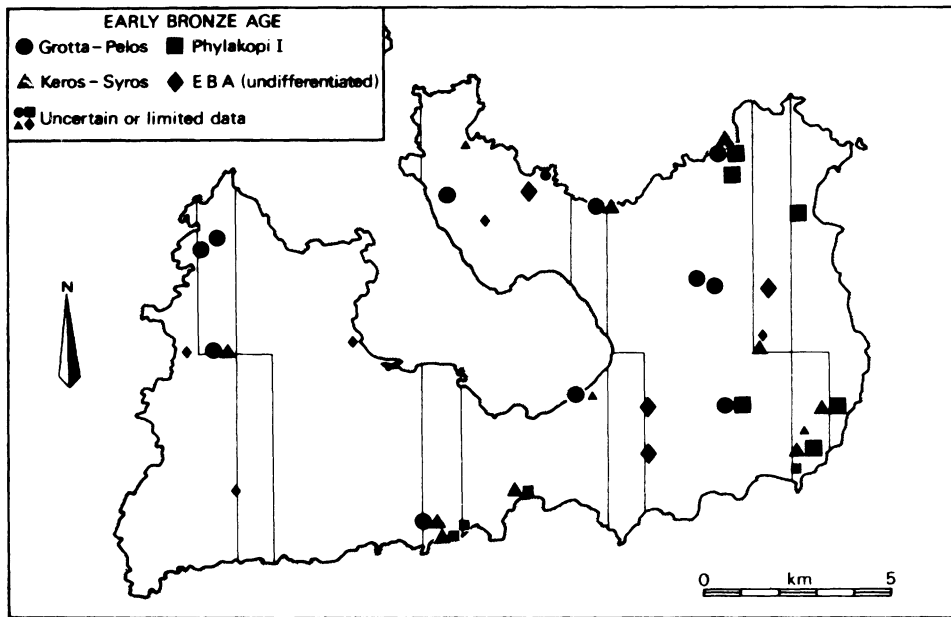


Fig. 2. Settlement pattern on Melos during the Early Bronze Age. (After Renfrew and Wagstaff 1982, 22, fig. 2.3)

the extremely small size of excavated sites such as Korphi t'Arioniou and Panormos on Naxos; it is also supported by the evidence from Cherry's survey of Melos (fig. 2), and from other well-explored islands such as Naxos and Amorgos.⁵ On Melos, despite the persuasive evidence for an increase in the overall population of the island during the Keros-Syros culture, the size of settlements is considered to have been little different from that of the earlier Grotta-Pelos culture.⁶ From this one can infer that the result of population growth seems to have been an increasing number of small settlements, caused by the "budding off" of offspring from the parent settlement to form discrete small settlements of their own. This marked tendency of communities to divide, or fission, well before the carrying capacity of the inhabited area had been reached can be explained as a response to the dangers of localized subsistence crises in a marginal, insular environment, but it also suggests a very low capacity for intracommunal social organization. In such a society, status is likely to have been achieved on

grounds of individual merit or position within the family. Advanced types of social stratification, let alone permanent social and organizational hierarchies, are extremely unlikely.⁷

A third potential category of information concerning community size and longevity is provided by the large number of excavated Early Cycladic cemeteries. Despite the difficulties of deducing demographic results from mortuary data,⁸ there are an encouraging number of correlations between the evidence concerning community size and complexity derived from the evidence of excavation and survey, and that revealed by the cemetery evidence. If it can be shown that the mortuary data are reliable, the evidence of the Early Cycladic cemeteries can significantly extend our understanding of settlement and society during the period in question. Observation within the Cyclades of the relative locations of cemeteries and settlements suggests a one-to-one paired relationship, similar to that indicated by the positions of Early Minoan settlements and tholoi in southern Crete. Several such pairs

An Archaeological Introduction," in P. Getz-Preziosi, *Early Cycladic Art in North American Collections* (Seattle and London 1987) 18.

⁵ For excavated settlements, C. Doumas, "Notes on Early Cycladic Architecture," *AA* 87 (1972) 151-70; for Melos, Wagstaff and Cherry (supra n. 3) 136-39; for Naxos, V. Fotou, "Les sites de l'époque néolithique et de l'âge du bronze à Naxos," in G. Rougemont ed., *Les Cyclades* (Paris 1983) 15-57; for Amorgos, L. Marangou, "Evidence for the Early Cycladic Period on Amorgos," in J.L. Fitton ed., *Cycladica: Studies in Memory of N.P. Goulandris* (London

1984) 99-103.

⁶ Wagstaff and Cherry (supra n. 3) 138-39.

⁷ A. Forge, "Normative Factors in the Settlement Size of Neolithic Cultivators (New Guinea)," in P.J. Ucko, R. Tringham, and D.W. Dimbleby eds., *Man, Settlement and Urbanism* (London 1972) 363-76, for the egalitarian structure of small communities.

⁸ For a recent treatment of the question (and full bibliography) with regard to the Dark Age cemeteries of Attica, see I.M. Morris, *Burial and Ancient Society* (Cambridge 1987).

are known on Naxos and the recent survey of Melos identified no less than six further examples. Therefore it seems reasonable to conclude that the apparent imbalance in the number of settlements and cemeteries noted on several islands is in fact more a reflection of inconsistencies in site detection and of possible site destruction than of any significant variation from the norm of cemetery-settlement pairs.⁹

The size of an Early Cycladic cemetery is usually expressed in terms of the number of graves it contains. Assessments of cemetery size are therefore to some extent easier in the Cyclades than in contemporary Crete, where the Early Minoan custom of communal burial in a single tholos can lead to considerable uncertainty as to the number of bodies originally deposited. In the Cyclades in the Grotta-Pelos culture the deposition of a single body in a single cist grave is almost universal; yet although this regularity breaks down somewhat in the ensuing Keros-Syros culture, it is still the rule in a large number of cemeteries.¹⁰ There are very few cases during the latter period where the total number of depositions rises appreciably above twice the number of graves, and it is noticeable that Keros-Syros examples of the reuse or extension of graves are markedly concentrated in the smaller cemeteries.

The most extreme case of multiple inhumation is the Livadhi cemetery on Dhespotikon, where the remains of 20 burials have been identified in the four graves which preserved clear skeletal evidence. At Ayioi Anargyroi on Naxos the cemetery contained a minimum of 44 burials in 22 graves, producing a ratio similar to that at the Lakkoudhes A site on the same island, where six burials in three graves were noted. An important point is that the rarity of multiple burials in the larger cemeteries was stressed by both Tsountas and Stephanos. For instance Stephanos re-

marks that at Karvounolakkoi "il était rare d'avoir plus d'un mort dans la même tombe; mais dans le cas contraire, le crâne était laissé à sa place initiale alors que les os étaient éparpillés afin de faire place au nouveau mort";¹¹ the fact that a few multiple burials are mentioned is encouraging, as it lessens the probability that the phenomenon of multiple burial was simply being overlooked. At Phyrroges and Apendika there was a similar rarity of multiple burials and, as has already been noted, the practice is virtually unknown in the large cemeteries of Syros.¹² In short, although the prevalence of multiple burials complicates the analysis of cemeteries, it does not render impossible the establishment of approximate figures for the total number of depositions in a given case. For many Keros-Syros cemeteries it is broadly accurate to equate one grave with one inhumation, and there is seldom reason to postulate an average of more than two inhumations per grave among the corpus of cemeteries known to date.

Most importantly, in the case of the Early Cyclades there is evidence to suggest that a large proportion of the community did receive formal burial. The small size of most communities detected by excavation or survey, and the implied absence of advanced social hierarchies, significantly lessens the likelihood that exclusion by rank was widely practiced. The considerable variation in the number and quality of grave goods within a single cemetery, often ranging from a few rich graves to others entirely devoid of non-perishable items, is highly compatible with a small-scale society in which wealth of grave goods might be determined by personal reputation, age, and number of surviving relatives. Nor is there any positive evidence for exclusion by gender or age, though there remains the possibility that casualties in extreme infancy were not interred.¹³ Lastly, there is to date no positive evidence

⁹ For Crete, see K. Branigan, *The Tombs of Mesara* (London 1970), and confirmation of the pattern in D. Blackman and K. Branigan, "An Archaeological Survey of the Lower Catchment of the Ayiofarango Valley," *BSA* 72 (1977) 13–84. For Melos, see Wagstaff and Cherry (supra n. 3) 137–38. For Naxos, see Doulas 1977, 13 fig. 2. Examples of cemetery-settlement imbalance include Antiparos (11 cemeteries and no settlements) and Mykonos (one cemetery and four settlements). Discussed further by J.F. Cherry, "Four Problems in Cycladic Prehistory," in J. Davis and J.F. Cherry eds., *Papers in Cycladic Prehistory* (Los Angeles 1981) 38–39.

¹⁰ Doulas 1977, 55–58 discusses the increase in multiple inhumations and two- or three-story tombs during the Keros-Syros culture. Burial customs varied considerably from island to island and even from cemetery to cemetery, making any attempt to construct a pan-Cycladic index for the average number of burials per tomb extremely difficult.

On Syros, for example, multiple burial is all but unknown (C. Tsountas, "Kykladika II," *ArchEph* 1899, 83) while Doulas cites several examples from the central Cyclades where multiple burial was regularly practiced.

¹¹ Doulas 1977, 43, fig. 26d (Livadhi); 41, fig. 22 (Ayioi Anargyroi); 41, fig. 23 (Lakkoudhes A). Stephanos on Karvounolakkoi quoted by Fotou (supra n. 5) 38.

¹² Fotou (supra n. 5) 28 (Phyrroges); 42 (Apendika). For Syros supra n. 10.

¹³ Due to poor skeletal preservation and sometimes inadequate recording, our knowledge of gender distributions is slight, but both sexes have been identified from the cemetery of Zoumaria on Dhespotikon (Doulas 1977, 55). The existence of tombs that seem extremely small even for a flexed adult burial suggests interment of at least some children (Doulas 1977, 39–44 figs. 19–28). In the very few cases where grave sizes are accurately recorded, the proportion of markedly smaller graves often represents between a

for any form of disposal other than extramural inhumation.¹⁴ Therefore, on the basis of the available evidence, it seems reasonable to conclude that the number of inhumations in a cemetery is a reliable indicator of the approximate size of the relevant settlement.

If these assumptions are accepted, it is possible to assess the approximate synchronous population of a given settlement from its associated cemetery. Adapting the results of Mediaeval demographic statistics to his analysis of the Early Minoan tholoi, Bintliff estimates that the average Early Bronze Age nuclear family of seven would have produced five bodies in a generation of 25 years, or approximately 20 bodies per century. Whitelaw argues that a smaller working figure of five living members per family provides a more realistic reflection of synchronous population, but in shortening the reproductive generation to 20 years he reaches a similar family deposition rate per century to that deduced by Bintliff.¹⁵ As our ability to date a given assemblage within the 300–400 year span of the Keros-Syros culture is slight, we must be aware, in applying this deposition-rate index to Early Cycladic cemeteries, of the need to build a certain elasticity into our interpretation of the results.¹⁶ We have in fact two interdependent variables: 1) inferred population and 2) duration of settlement use. In other words, a given total number of graves in a cemetery can imply a population of X for Y years, a population of 2X for Y/2 years or a population of X/2 for 2Y years, etc. This is

fifth and a quarter of the total. Angel (J.L. Angel, "Human Skeletons," in J.E. Coleman, *Keos I: Kephala* [Princeton 1977] 134–35) reports a similar proportion at the Final Neolithic cemetery of Kephala on Kea, and judges it rather lower than expected for a natural distribution. In the Early Cycladic cases, the discrepancy may be explicable if casualties in extreme infancy were not formally buried, and if some of the older subadult deaths did not require tombs recognizably smaller than those of adults.

¹⁴ No evidence of cremation has been discovered to date, and the Keros-Syros levels at Phylakopi and Ayia Irini contain not a single instance of intramural burial (Doumas 1977, 54).

¹⁵ J. Bintliff, "The Number of Burials in the Messara Tholoi," in Blackman and Branigan (supra n. 9) 83–84, and T.M. Whitelaw, "The Settlement at Fournou Korifi Myrtos and Aspects of Early Minoan Social Organisation," in O. Krzyszkowska and L. Nixon eds., *Minoan Society* (Bristol 1983) 332–33.

¹⁶ For the classic outline of the EBA culture sequence and dating, see Renfrew 1972, table 13.6.

¹⁷ Doumas 1977, 31. In this context it should be stressed that in none of the cemeteries with a high incidence of multiple burial does even the number of recorded *bodies* exceed 50. For Epáno Kouphonisi see, most recently, P. Zaphiropoulou, "Un cimetière du cycladique ancien à Epáno Kouphonisi," in Rougemont ed. (supra n. 5) 81–87. Seventy-two tombs were excavated; at least 20 more had already been

particularly important in the Cyclades, as it will become apparent that the size of many cemeteries suggests that the adjacent settlement was not occupied throughout the period of the Keros-Syros culture.

Among some 80 known Early Cycladic cemeteries, Doumas cites only eight examples containing at least 50 graves; to this total one can now add a ninth example from Epáno Kouphonisi.¹⁷ More doubtless await discovery, but there is no reason to believe that the overall proportion of small to larger cemeteries will change; if anything it could be argued that larger ones are more prone to discovery and may thus be overrepresented in the available data. In other words, using the deposition-rate index introduced above, and allowing for some population-duration elasticity, approximately 89% of all known Early Cycladic cemeteries imply an adjacent settlement consisting of at most one nuclear family over 250 years, two families over 125 years, or just possibly four families over slightly more than 60 years. Even if these estimates are slightly too low, and allowing for the probability that (in most if not all cases) a number of graves may have been overlooked, or destroyed prior to excavation, it is clear that these cemeteries relate to very small settlements indeed. This is entirely compatible with the evidence cited above from excavation and survey in the Cyclades that, with the exception of a very few cases, the size of settlements did not increase beyond levels commensurate with two or three nuclear families.¹⁸

destroyed. It should also be noted that only cemeteries in the environment of the Cycladic island group are treated here. Thus, for instance, the large and important "Cycladic" cemetery at Ayia Photia in eastern Crete (C. Davaras, "Πρωτομινωικόν νεκροταφείον Ἀγίας Φωτιάς Σητίεας," *ΑΑΑ* 4 [1971] 392–97) is not included, as its abnormal size (originally some 300 graves) needs full examination in the light of the *generally* far greater longevity of settlements in the environment of EBA Crete.

¹⁸ Incomplete excavation, and destruction by a variety of agents, may explain the phenomenon of extremely small grave groups and even single graves mentioned in Doumas 1977, 31. A comparison with contemporary Crete illustrates forcefully the small settlement size and/or duration of occupation implied by these Keros-Syros cemeteries. Analysis of the fully excavated Early Minoan II settlement at Myrtos Fournou Korifi reveals a population of five or six families (Whitelaw [supra n. 15]). The cemetery remains undiscovered, but on the basis of the deposition index already cited, the population of the settlement should have produced about 100 to 120 bodies *in a single century*. In fact the second phase at the site lasted about twice this period and, even allowing for the probability that the population of the settlement was not initially as high as at the period of greatest extent, a total body count for the cemetery could be expected to number something in the region of 150–200 depositions (assuming for the sake of argument that most bodies were interred). Yet in *Cretan* terms Fournou Korifi is a small site

Moreover, a closer look at the handful of larger cemeteries casts some doubt on the exceptional nature of several. Table 1 lists the approximate number of graves attributed to each example, with figures for the implied number of nuclear families and resultant synchronous population (based on Whitelaw's figure of five members per family) in each case.¹⁹ In response to the elasticity factor mentioned above, four estimates are given for each cemetery, corresponding to spans of usage between one and four centuries. In fact, in the case of several of these large cemeteries, it will be seen that very approximate assessments of minimum duration of usage *can* be made, as some do contain material from cultures that are known from stratigraphic excavation to be chronologically distinct.

Of the nine large cemeteries it immediately becomes apparent that two barely merit inclusion in this category. Pyrgos and Krassadhes might reflect communities of between two and three families in a single century. In the case of three of the truly larger cemeteries (Phyrroges, Karvounolakkoi, and Ayios Loukas) there is convincing evidence to prefer a longer life span and consequently a smaller estimate of synchronous population. For although all these cemeteries date primarily to the period of the Keros-Syros culture, the first two also contain earlier, and the third later, material, strongly suggesting an extended period of occupation at each of the adjacent settlements.²⁰ The same may well have been true of the poorly recorded cemetery at Aphenhika.²¹ As is shown in Table 1, the populations calculated for each of these sites on the basis of the longer duration of usage makes each hard to differentiate in size *at any given time* from the mass of more transitory settlements. It seems that, in these cases, the larger size of Keros-Syros cemeteries does *not* reflect an increase in settlement size, but instead an increasing locational stability and longevity on the part of several sites. Out of the three remaining large cemeteries, one (Kambos Makris) is of entirely Grotta-Pelos date and thus lies strictly outside the scope of

this study. Concerning Epano Kouphonisi there is some evidence to suggest a short duration of usage, but even the synchronous population estimated on the basis of a one century occupation of the settlement numbers only 20 to 25 individuals.²² In short, the only sustained anomaly within the entire corpus of known cemeteries is the necropolis of some 600 graves discovered on Syros at Chalandriani.

In the case of Chalandriani the settlement area of the Keros-Syros culture community remains unexcavated—the adjacent fortified site of Kastri, once presumed to be contemporary with the main period of use at Chalandriani cemetery, is now dated to a slightly later phase of the Early Bronze Age.²³ Yet it is quite clear that using either a long or short estimate of duration the associated settlement must have stood out as very unusual indeed. The shorter time scale produces levels of population that are entirely without parallel in the mortuary evidence from the Cyclades. The population implied by a duration of four centuries is still large by Cycladic standards; moreover, the implied continuity of occupation at the same site reflects a locational stability that is shared by only a few Keros-Syros sites.

It is nonetheless important to consider which end of the scale of population magnitude is to be preferred in the case of Chalandriani. The presence of a few graves containing Kastri Group material²⁴ suggests a relatively extended period of usage, and superficially this might be taken to support a correspondingly lower estimate of rather over seven nuclear families for the synchronous population (see Table 1). Yet it is in fact unlikely that the *average* number of families is a particularly relevant statistic in the case of Chalandriani, for it supposes that the population of the settlement remained almost constant over a very long period—a proposition that may hold for the majority of small settlements of one or two nuclear families that “budded off” to produce new discrete settlements of an equivalent size, but which could well be inapplicable

indeed, perhaps 1/50 the size of EM II Knossos (Whitelaw [supra n. 15] 339).

¹⁹ Supra ns. 11 and 12 for the rarity of multiple burials in large cemeteries.

²⁰ Renfrew 1972, 514 (Ayios Loukas), and 518 (Phyrroges and Karvounolakkoi). Cf. Davis (supra n. 4) 18: “The larger cemeteries probably represent continuous use for the burials of all members of quite small communities over long periods of time.”

²¹ The dating of Aphenhika rests on a very small number of diagnostic artifacts (Renfrew 1972, 178 and 518). Renfrew suggests the possibility of Grotta-Pelos usage.

²² Material from Epano Kouphonisi belongs primarily to the Kampos Group (Zapheiroupolou [supra n. 17] 82–83),

usually seen as a relatively short transitional period between the Grotta-Pelos and Keros-Syros cultures (see P. Zapheiroupolou, “The Chronology of the Kampos Group,” and A.C. Renfrew, “From Pelos to Syros: Kapros Grave D and the Kampos Group,” both in J.A. MacGillivray and R.L.N. Barber eds., *The Prehistoric Cyclades* (Edinburgh 1984). For Kampos Makris see Renfrew 1972, 519.

²³ J.B. Rutter, *Ceramic Change in the Early Bronze Age Aegean* (Los Angeles 1979) for the chronological position of the Kastri group.

²⁴ Doumas 1977, 26; Rutter (supra n. 23) 4; R.L.N. Barber, *The Cyclades in the Bronze Age* (London 1987) 28 and 54.

Table 1. Nine Large Early Cycladic Cemeteries, with Implied Settlement Populations and Numbers of Nuclear Families Estimated for Durations of Cemetery Usage from One to Four Centuries

CEMETERY	BURIALS (Approx.)	100 YEARS Families Pop.	200 YEARS Families Pop.	300 YEARS Families Pop.	400 YEARS Families Pop.
Krassadhes (Antiparos)	50	2.5 13	1.25 6	0.83 4	0.63 3
Pyrgos (Paros)	58	2.9 15	1.45 7	0.96 5	0.73 4
Karvounolakkoi (Naxos)	82	4.1 21	2.05 10	1.36 7	1.03 4
Kambos Makris (Naxos)	90	4.5 23	2.25 11	1.50 8	1.13 5
Epano Kouphonisi	90	4.5 23	2.25 11	1.50 8	1.13 5
Ayios Loukas (Syros)	94	4.7 24	2.35 12	1.56 8	1.17 5
Phyrroges (Naxos)	100	5.0 25	2.50 13	1.66 8	1.25 6
Aphendika (Naxos)	170	8.5 43	4.25 21	2.83 14	2.13 10
Chalandriani (Syros)	600	30.0 150	15.00 75	10.00 50	7.50 38

to the much larger community at Chalandriani. Indeed it is extremely hard to find a convincing model that would explain how this community could have comprised around seven families from the outset. Syros has not been systematically surveyed, but the current lack of Grotta-Pelos sites on the island, and the fact that at least one other site (Ayios Loukas) contemporary with Chalandriani is known, suggests that Chalandriani is not likely to be the result simply of a process of nucleation from a group of antecedent settlements.²⁵ Perhaps Syros was colonized from elsewhere in the islands at the start of the Keros-Syros culture, but there is a striking absence of earlier settlements whose size would encourage one to accept that Chalandriani was large from the first. It is both simpler and more convincing to assume a small group of original settlers, a relatively high rate of growth toward a peak period, and an incentive not to "bud off" at Chalandriani. Possible reasons for the latter two

phenomena will be considered below, but for the moment it is worth considering whether, despite the probability of an extended period of occupation, the population totals given in Table 1 for between the first and second *shortest* spans (perhaps around 100 individuals) may not come closer to bracketing a very approximate assessment of the population of Chalandriani at the period of its maximum extent.

Chalandriani does not stand entirely alone. A tiny number of anomalously large contemporary sites do appear to have existed in the islands. One is Ayia Irini II on Kea; although no cemetery has been found, settlement material has been recovered from a large area of the later Bronze Age town. The material culture of this settlement is close enough to that of the Attic mainland to preclude its inclusion in the catalogue of true Keros-Syros culture settlements, but as a large insular community in close contact with the islands to the south, it is still of great importance. It is also un-

²⁵ For the lack of Grotta-Pelos sites, see Renfrew 1972, 514.

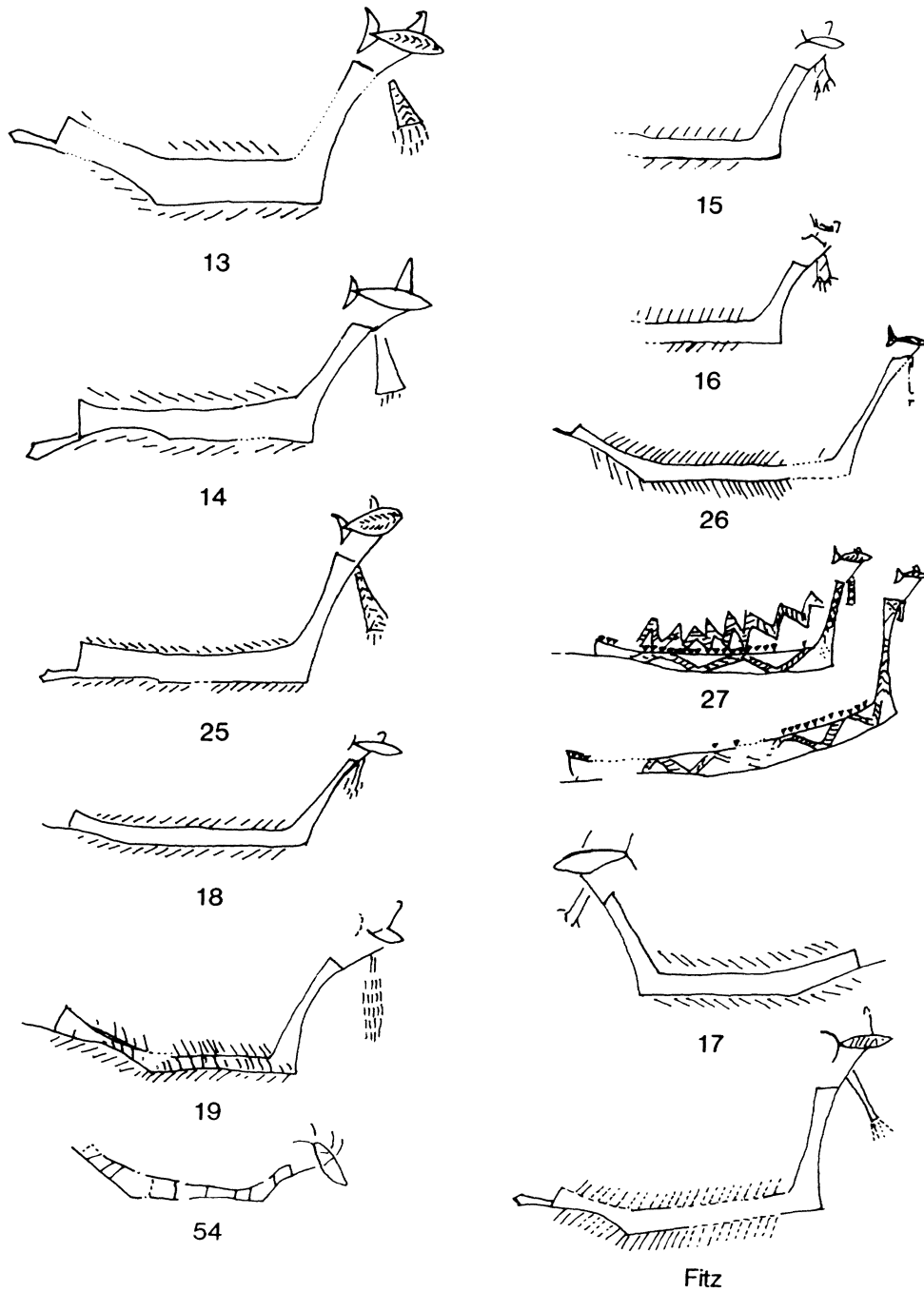


Fig. 3. Longboat depictions on Early Cycladic frying pans. (Numbered examples redrawn after Coleman 1985, 199, fig. 5; **Fitz** [GR.18.1963] courtesy of Fitzwilliam Museum, Cambridge, R.V. Nicholls and N. Rayner)

usual in that intensive field survey of northwest Kea (in other words, the hinterland of Ayia Irini) has produced very little evidence of Early Bronze Age settle-

ment outside the Ayia Irini site itself, an unusual exception to the dispersed pattern prevalent on most islands.²⁶ A third known anomalous site is that of Dhas-

²⁶ I am grateful to David Wilson for information concerning the size and material culture of Ayia Irini. For the EBA

settlement pattern, see J.F. Cherry, J.L. Davis and E. Mantzourani, *The Landscape of Northern Keos in the*

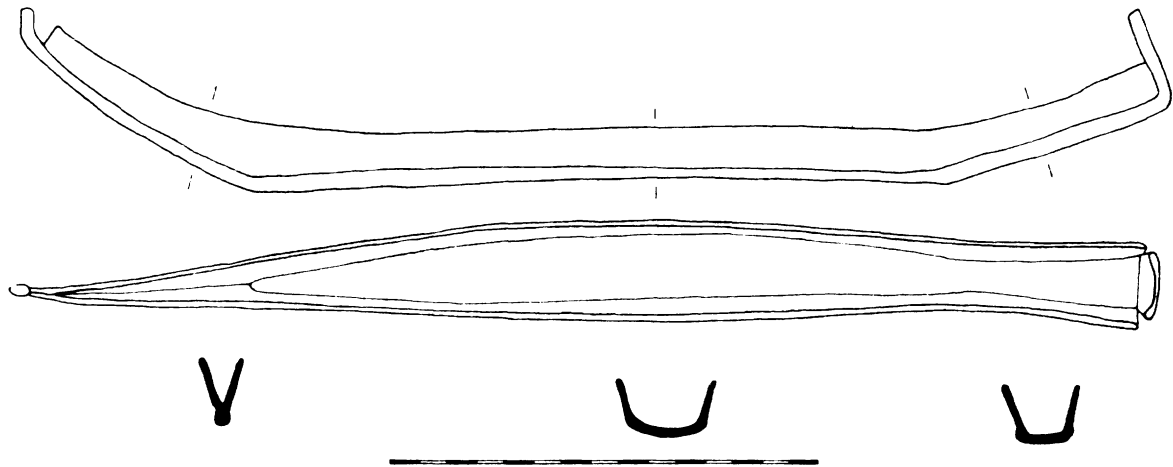


Fig. 4. Example of Early Cycladic lead boat model. (After C. Renfrew, *AJA* 71 [1967] pl. 1)

kalio-Kavos on the small island of Keros, where finds of an immense number of marble figurines and vessels may represent the remains of an exceptionally large and rich cemetery.²⁷

In short, the Keros-Syros culture does *not* seem to have witnessed a generalized increase in settlement size, but rather a bifurcation of settlements into two relatively distinct categories. On the one hand, there is the mass of smaller settlements, perhaps consisting of a very small number of nuclear families, existing in a dispersed pattern. On the other hand, there are a small number of significantly larger anomalous sites. If the proposed population of about 100 individuals at Chalandriani is reasonably accurate and typical of the anomalous sites, it might be inferred that these too were probably not large enough to demand any advanced degree of organizational stratification, though they very probably included lineages of greater or lesser rank and/or individual leaders and “big men” of achieved status.²⁸ The absence to date of seals or sealings at such sites, together with the fact that they are

not located at the center of well-populated island landscapes, argues against the likelihood that such sites represent early regional centers.²⁹ Nor do any have clearly preferential access to arable, lithic, or metallic resources.³⁰ Yet despite these points, at such sites some factor does seem to have overruled the tendency of Early Cycladic communities to fission and disperse across the landscape.

THE KEROS-SYROS LONGBOAT: ICONOGRAPHY AND REALITY

It is in the context of this society and settlement pattern that one must assess the place and role of the longboat in the Cyclades. For the present purpose, the most important point is that the propulsion of such a vessel requires the participation of a considerable number of individuals. It is therefore irrelevant whether the rows of short lines incised at an oblique angle above and below the hull on the frying-pan depictions represent oars or paddles, as either type of blade would be worked by a single man (it is mainly

Cyclades: An Archaeological and Ethnographic Survey from the Earliest Settlement until Modern Times (Los Angeles, forthcoming).

²⁷ Renfrew 1972, 521; for a different interpretation as a possible sanctuary, A.C. Renfrew, “Speculations on the Use of Early Cycladic Sculptures” (and subsequent discussion), in Fitton ed. (supra n. 5) 27–28 and 33–34. See also P. Getz-Preziosi, “The ‘Keros Hoard’: Introduction to an Early Cycladic Enigma,” in D. Metzler and B. Otto eds., *Antidoron: Festschrift für Jürgen Thimme* (Karlsruhe 1983) 37–44. The area is extremely disturbed, and a more definitive interpretation of the function(s) of the site must await further exploration and detailed analysis of the finds already recovered.

²⁸ Cf. Forge (supra n. 7) 373–75 and Morris (supra n. 8) 145–46.

²⁹ The complete absence of sealings from excavated sites, and the complete lack of seals at a large cemetery like Chalandriani is particularly striking. Very few seals are known from the entire archipelago (see Renfrew [supra n. 1] 6, for the cylinder seal from a rich grave in the small cemetery of Kapros on Amorgos).

³⁰ Conversely, those islands that do possess important resources known to have been used in the Early Bronze Age have revealed to date no unequivocal signs of large communities, for instance Melos (obsidian), Siphnos (silver and lead), and Kythnos (copper).

for convenience that they will be henceforth referred to as paddles). Far more important is the degree of accuracy that may be attributed to such a small body of relatively crude iconographical representations. Figure 3 illustrates the corpus of known frying-pan depictions (omitting the very badly damaged example in Berlin).³¹ All frying pans are referred to by the number assigned them by Coleman in his recent catalogue; **Fitz** refers to an additional example in the collection of the Fitzwilliam Museum, Cambridge.³²

It can be observed that on several frying pans, unequal numbers of lines are depicted above and below the hull. On one depiction (**54**) there are no lines at all, while on another (**27**) two boats are shown, and the lines are replaced by rows of stamped triangles and by a zigzag design both on and above the hull. The interpretation of the zigzag is unclear but, although the triangles may be seen to represent paddles, the number depicted is obviously dictated more by the size of the individual stamp, the length of the hull, and the desire to create a continuous pattern than by any considerations of accurate reportage.³³ Several of the boats with a very large number of lines depicted may reflect similar nonrepresentational preoccupations on the part of the artist.

It is perhaps also naive to read the unique appearance of two boats on a single frying pan (**27**) as a *pars pro toto* portrayal of a fleet at sea or of a naval battle; recent work on the iconography of other early societies has suggested that the doubling of motifs may be read not as a numerical duplication but as a doubling of the power and attribute of the image.³⁴ In defense of this

reading of the double boat depiction, it should be noticed that it is in this example only that the lines joining the stamped circles around the central motif are also doubled, and that they are moreover infilled with the same hatching as the zigzag design on the boat hulls, thus linking the doublings of the central motif and of the surrounding pattern.³⁵ The symbolic nature of longboat depictions will be dealt with more fully later, but it is important to note that **27** need not be read as a literal depiction of more than one vessel.

Returning to the numbers of paddles depicted, there is, however, no reason to deny the general accuracy of at least the smaller numbers involved, nor to condemn them as entirely token.³⁶ Indeed, the ever growing body of works on Aegean shipping and navigation is a testimony to the general concurrence that fundamental features and typological distinctions concerning the variety of boats involved *can* be made on the basis of the two- and three-dimensional representations that have survived. Even within the Early Bronze Age, a clear distinction is made between the large vessels incised on ceramics and modeled in lead, and the terracotta models of smaller vessels found at Mochlos and Palaikastro in Crete.³⁷

Furthermore, the form of the frying-pan boats is not only broadly internally consistent within the corpus of known depictions, but also finds close parallels in an incised sherd from Orchomenos and in the group of four lead boats (fig. 4). Concerning the latter, although Johnston³⁸ argues that the models may represent a different boat size or type (on the basis of the more gentle angle of incline at both ends, and the lack

³¹ Figures as illustrated in Coleman 1985, 199 and *AR* (supra n. 1) 44. For the Berlin example, see Zschietzschmann, "Kykladenpflannen," *AA* 50 (1935) fig. 1.3.

³² Coleman 1985, 207–209 and 211, and *AR* (supra n. 1).

³³ *Pace* Coleman 1985, 198. It might be noted also that his implication that the use of oars would halve the complement of each boat seems unlikely in the light of the probable beam of such vessels.

³⁴ For instance T. Taylor, "Flying Stags: Icons and Power in Thracian Art," in I. Hodder ed., *The Archaeology of Contextual Meaning* (Cambridge 1987) 127.

³⁵ See Coleman 1985, pl. 35.18.

³⁶ Cf. L. Casson, *Ships and Seaman'ship in the Ancient World* (Princeton 1983) 31: "Though the drawing is too primitive to inspire faith in the exact number of oars shown, the clear implication is that there was a good number." For a highly skeptical assessment see S. Marinatos, "La marine créto-mycénienne," *BCH* 57 (1933) 192, n. 3. It should be stressed that although Marinatos is right to be cautious concerning the more "myriapodic" vessels, he produces no convincing reason to reject *all* the depictions as entirely untrustworthy.

³⁷ The corpus of EBA boat representations is not large.

Eight models are known, comprising four slender lead examples from the Cyclades, and an additional four from Crete, namely two terracotta small craft of symmetrical form from Mochlos, a small boat with one high end, and a tear-drop form from Palaikastro, and another of tear-drop form but with bow and stern of the same height from a Mesa-sara tholos, which has also been interpreted as a lamp (for full description and bibliography see Johnston 1985, 18–23). Two-dimensional depictions comprise 13 longboats incised on frying pans, a very similar vessel incised somewhat mysteriously on a sherd from Orchomenos (see E. Kunze, *Orchomenos III* [Munich 1934] pl. 29.3; the two so-called masts are almost certainly chance incisions and not to be included in the depiction, and the identification of a second boat [fig. 43k] is extremely dubious), and two depictions of probably smaller craft pecked into stone slabs near the Keros-Syros site of Korphi t'Aroniou on Naxos (see C. Dumas, "Korphi t'Aroniou," *ArchDelt* 20 [1965] figs. 4 and 7). The masted ships depicted on EM III–MM I sealstones postdate the period in question, as also should two depictions on sherds from Phylakopi (illustrated in Renfrew 1972, pl. 28.1–2).

³⁸ Johnston 1985, 6–7.

of paddles, fish emblem, and protruding "spur"), a convincing case can in fact be made for considering the models as representations of the same vessel type as the frying-pan depictions, but rendered in a medium that did not encourage the addition of details.³⁹ Firstly, although the bow/stern angle of the lead boats is both slighter and more even than that of the majority of the frying-pan boats, it is in fact remarkably close to the depiction on the Ashmolean frying pan (54). Secondly, the proportions of the lead models support the equation of the two representational forms. The beam:length ratio of the best preserved model is 1:12.2; translated into meters (a minimum beam of 1.5 m seems reasonable) this should suggest a length of ca. 19 m.⁴⁰ It is hard to imagine a boat of this size and shape being propelled in any manner other than that depicted on the frying pans. Approaching the problem in another way one can estimate the implied length of the frying-pan vessels by postulating a distance of 1 m between paddles—the distance most common among the many-paddled canoes of the Pacific.⁴¹ Allowing for the bow and stern extensions, this "paddlers' *interscalmium*" would produce a minimum overall length of about 15 m for the smallest intact depiction (14). In fact the close correlation between the two- and the three-dimensional representations is one of the most convincing pieces of evidence for the existence of the many-paddled longboat in the islands.

Given the crude nature of the surviving representations, one can only speculate as to the exact constructional design of the longboat, but although a skin-on-frame technique cannot be entirely ruled out, a primarily wooden construction may seem more likely in view of the considerable size of these vessels. There is nothing to suggest that the construction of a large wooden longboat would have been intrinsically beyond the resources of the Cyclades, or of the techno-

logy known to have been available in the Keros-Syros culture. Concerning resources, the exact extent of afforestation in the Early Cycladic period is still unclear, but limited tree cover can be inferred on Melos well into the Late Bronze Age from the presence of bones of the beech marten in Phylakopi III, and the extensive use of beams up to 20 cm in diameter at Late Bronze I Akrotiri may imply certain resources of woodland on Thera too.⁴² The lack of positive evidence for very large trees (consider the relatively rare appearance of columns in Cycladic architecture and iconography in contrast to the situation in Crete) could lead one to prefer the hypothesis of a partially plank-built extended dugout rather than a vessel entirely hollowed out from a single tree, though the influence of the simple dugout form is clear in the overall shape of the vessel. Shaped planks would be well within the capabilities of shipwrights using polished stone or metal adzes; indeed, it is of interest to note by way of comparison that our knowledge of Keros-Syros tool kits shows them to be superior to those of many of the most accomplished boat-building cultures of the Pacific and elsewhere.⁴³

The existence of longboats with large crews can be accepted as a real phenomenon in the islands during the Keros-Syros culture. Exact figures for the complements of such boats escape us. But although the existence of the very large complements suggested by certain depictions cannot be categorically discounted, a figure of half that total will be used henceforth as the notional estimate of a longboat crew. This complement of 25 is that implied by the smallest paddle total recorded on an intact frying pan (14), adding one extra man to navigate; it is also not far from the figure suggested by the dimensions of the lead models assuming a paddling *interscalmium* of 1 m. It should be borne in mind that this estimate is very much a minimum figure.

³⁹ I am grateful to J.B. Rutter for suggesting an alternative solution, namely that the spur be interpreted as a hinged flap or gangplank attached to an otherwise open bow or stern section rising above the water level. In the models this feature is represented in a raised position and forms the vertical end piece, but in the two-dimensional representations the feature could be intelligibly depicted only if shown in the lowered position.

⁴⁰ Johnston 1985, 5, for the proportions of the lead boat models. Renfrew 1972, 357 suggests 20 m as an estimate if oars are used, and rather less if paddles.

⁴¹ See E. Best, *The Maori Canoe* (Dominion Museum Bulletin 7, Wellington 1925) 25, fig.10 for further evidence that a minimum distance of 1 m between blades is all that need be assumed. It might be noticed that the length:beam ratio of many of the Pacific canoes is similar to that of the best preserved lead boat model; beams of 1.5–2 m are the

norm for Maori war canoes (A.C. Haddon and J. Hornell, *Canoes of Oceania* 1 [Honolulu 1936–1938] 200–201), indicating that our reading of the size and form of the Cycladic boats is not intrinsically improbable.

⁴² For Melos, see Renfrew and Wagstaff 1982, 97; for Thera, see O. Rackham, "The Flora and Vegetation of Thera and Crete before and after the Great Eruption," in C. Doumas and H.C. Puchelt eds., *Thera and the Aegean World I* (London 1978) 758–59. In the case of Thera the possibility of some importation cannot be excluded.

⁴³ Keros-Syros metal tools are discussed in Renfrew (supra n. 1) 7–9. Stone and even shell tools produced both dugout and plank-built craft in the Pacific (P. Johnstone, *The Seacraft of Prehistory* [London 1980] 206–10), and polished stone adzes were used to construct the canoes of the Pacific Northwest (illustrated in R. Underhill, *Indians of the Pacific Northwest* [Washington 1944] 78).

THE PLACE OF THE LONGBOAT IN SOCIETY

A curious point begins to emerge. It might well be thought that the constraints on longboat voyaging would be primarily those of available technology and resource investment. But in the light of the above analysis both of Keros-Syros demography and of the longboat itself, it appears that the overwhelming constraint may have been in fact societal. Later in the Bronze Age, when several large nucleated centers existed in the islands, the concept of the large oared sailing ship is not hard to accept.⁴⁴ In the context of the Keros-Syros culture, however, the evidence suggests that in all but a few cases society was in fact singularly ill suited to the kind of communal organization minimally required for longboat usage.

Table 1 shows that of those settlements known primarily from the excavation of their cemetery, in all but one case no single community comprised a permanent social aggregate large enough to crew its own longboat. In later Aegean iconography paddling appears as an almost exclusively male activity, the best examples being found in the wall paintings of the West House at Akrotiri; although women do appear in association with boats, they are depicted either as passengers or as the "punters" of small craft, and their attire does not suggest that they are to be considered as part of a normal crew.⁴⁵ Comparative evidence from Oceania and the Pacific Northwest shows that there longboat paddling is closely associated with the male population, though such a formal analogy does not of course prove that the same was so in the prehistoric Aegean. Furthermore, in any society only a proportion of the population is liable to have been of an age to withstand the physical exertion involved. The community age profile constructed on the basis of skeletal remains from Middle Helladic Lerna (one of the few prehistoric Aegean sites for which detailed evidence exists) suggests that this proportion might be around half the male population, excluding the subadult and the old.⁴⁶ This is encouragingly close to the proportion documented ethnographically from canoe-building societies in the Pacific.⁴⁷ Therefore, if one hypothesizes

⁴⁴ Depictions of such vessels appear on Minoan seal-stones from EM III–MM I onward and become increasingly common in Aegean iconography during the Middle and Late Bronze Age (see P. Yule, *Early Cretan Seals: A Study of Chronology* [Marburger Studien zur Vor- und Frühgeschichte 4, Mainz 1980] and D. Gray, "Seewesen," *ArchHom* [Göttingen 1974] 14–19).

⁴⁵ For example, the gold ring from Mochlos (R. B. Seager, *Explorations in the Island of Mochlos* (Boston and New York 1912) 90, fig. 52) and the "Ring of Minos" (A. J. Evans, *PM IV* [Oxford 1935] 950). The meaning of the en-

that Early Cycladic longboats were crewed by men, one can conclude that of a given total population no more than a quarter are likely to have been potentially available for longboat voyaging.

Moreover, there is some evidence that longboat activity would have been not only significantly beyond the manpower resources of most individual settlements, but might also have stretched those of an entire island. It is worth considering the conclusions of a recent and experimental attempt by Cherry to combine our knowledge of the size of Early Cycladic cemeteries with the number of sites detected on Melos by intensive field survey in order to reach an approximate figure for the total synchronous population of an entire Cycladic island during various stages of the Early Bronze Age.⁴⁸ Taking the number of Keros-Syros sites detected in the survey of a 20% systematic random sample of the island and extrapolating to the island as a whole by multiplying this number by five, Cherry reaches a notional settlement total of 45 sites. Assuming 1) the pairing of settlements and cemeteries, 2) the 20 bodies per century deposition index, 3) an average cemetery count of 20 graves, and 4) a period of 350 years for the Keros-Syros culture, the resultant initial estimate of synchronous population comes to about 90. This Cherry inflates threefold to allow for undetected and destroyed sites, providing a final total of perhaps 270 individuals. In this exercise a degree of uncertainty is caused by the fact that there is a surprising absence of known Keros-Syros cemeteries on Melos. Cherry's estimate of their average size rests therefore on the small size of the known settlement sites and on the assumption—not intrinsically unreasonable—that the cemeteries are analogous to those elsewhere in the islands. Although, as Cherry himself admits, this exercise does involve a number of unknowns, it is at the very least useful in demonstrating the general order of magnitude of population that may be envisaged on an island at this time.

If the complement of our single minimum longboat of 25 paddlers is compared with this estimate of the population of Melos, it transpires that a single boat

graved scenes is a matter of debate, but the style of the hippocamp vessel (possibly a reed boat) combined with the dress of the women and the surrounding symbols suggests that this is no normal maritime scene.

⁴⁶ J. L. Angel, *The People of Lerna* (Princeton 1971).

⁴⁷ See for example T. G. Harding, *Voyagers of the Vitiaz Strait* (Seattle and London 1967) 22. The highly specialized trading community of Mandok in the Siassi island group could only crew five sailing canoes of five to six men each, out of a total population of about 100.

⁴⁸ In Wagstaff and Cherry (supra n. 3) 137–38.

would absorb between a half and a third of the total active male labor force of the entire island. Immediate doubts arise as to whether the subsistence strategies of a series of dispersed nuclear families could sustain this depletion of available manpower; at the very least, the timing and duration of longboat voyaging would be severely circumscribed by the dictates of the agricultural calendar. In addition, longboat activity presupposes a society with sufficient organization to direct the construction, manning, and deployment of the boat. As the majority of Cycladic settlements are far too small to support their own longboat, such activity would require the existence of precisely the kind of intersettlement organization which appears to be strikingly absent from the Keros-Syros Cyclades. In this context one might recall the tendency of Cycladic settlements to fission into a large number of undifferentiated settlements. In the Melian context, there is also the negative evidence concerning the absence of intersettlement cooperation revealed by intensive study of obsidian collection and artifact production during the Early Cycladic period.⁴⁹ This suggests that obsidian was obtained by direct access to the quarries, without any evidence for control by the inhabitants of Melos. Given that obsidian was extremely widely used and traded, and that Melos contains the only usable obsidian fields in the central Aegean, this latter example provides a remarkably striking instance of the *lack* of organized control of an important island resource. While it is just feasible that on an island like Melos there existed personal, non-institutional leaders with an island-wide authority, whose existence is not reflected in the archaeological record, the cumulative evidence cited above supports the absence of any intersettlement hierarchy as a working hypothesis.

An apparent paradox has arisen, for while the existence of the longboat is confirmed, it has been shown to imply a form of communal organization that is incompatible with our current understanding of much of Keros-Syros society. Clearly, it is necessary to abandon the preconceptions that have long attended the vessel, and to begin a reappraisal of its place in the Keros-Syros culture. The idea that the longboat was in any sense a common and normal phenomenon in

the Cyclades should give way to an acknowledgment that it must have been, on the contrary, an unusual and highly specific development. Being itself something of an anomaly, the longboat can best be understood within the context of the tiny number of important anomalies that are known in the field of Keros-Syros society and demography. Of these, it has already been seen that one of the most important examples is the site of Chalandriani. Here we find a site whose population attains an order of magnitude that seems compatible with the use of longboats, and which can therefore be considered as an intrinsically likely center of longboat activity.

At this point the evidence of island demography and of iconography converge. Thirteen depictions of longboats on frying pans are known. Of these seven (Coleman catalogue 13, 15, 16, 17, 19, 26, and 27) can be definitely identified as coming from Tsountas's excavations at Chalandriani on the basis of the evidence of the excavator's own drawings.⁵⁰ Two others in Athens (14 and 25) and a third in Berlin (29) are so similar in terms of the stamp used, the design of the ship, and the form of the handle to 13 from Chalandriani that Coleman proposes the same provenance for all three.⁵¹ **Fitz** comes from the collection of Dr. Winifred Lamb,⁵² but although its provenance is not clear, it can also be observed to possess close similarities with 13. These include 1) the forked handle, 2) the use of two sizes of stamp in the form of concentric circles (in **Fitz** the smaller size is to be seen immediately below the left end of the longboat), and 3) the "dagger" form of the feature protruding beyond the lower end of the longboat, a manner of depicting this feature that is common only to 14 and 25 (13 and 29 are too badly damaged for comparison). Of the remaining two, Coleman considers 18 similar to another Chalandriani frying pan (24) in terms of its form and decoration, although 24 carries no boat depiction, while 54 is without parallels or provenance.⁵³ To summarize, out of 13 known depictions, seven come indisputably from Chalandriani, four more very probably do, one has close affinities with a boatless frying pan from the site, and a final example is without provenance.

Is this a coincidence? It seems unlikely given the

⁴⁹ R. Torrence, *Production and Exchange of Stone Tools: Prehistoric Obsidian in the Aegean* (Cambridge 1986). Reputedly from Melos is the chlorite schist multiple vessel sometimes interpreted as a model of a communal granary (Renfrew 1972, 288 and pl. 15); this interpretation is very far from secure, however, and in isolation cannot be used as a reliable indication of social organization.

⁵⁰ Coleman 1985, 198 n. 22, and 205.

⁵¹ Coleman 1985, 207–209.

⁵² I am grateful to the Keeper and Deputy Keeper of An-

tiquities at the Fitzwilliam Museum for their help in attempting to trace the provenance of this example. It seems, however, that there is no record of the means by which it came into the possession of Dr. Lamb.

⁵³ For 18, Coleman 1985, 208. My thanks to Ann Brown at the Ashmolean Museum for information concerning 54. 54 is from the Bomford Collection and was acquired by the Museum in 1971; nothing is known about the manner in which it arrived in the collection.

large number of excavated cemeteries and the considerable number of frying pans discovered elsewhere in the islands.⁵⁴ Of course, the closeness of the association does not exclude the possibility that other communities may have possessed similar vessels which, for any one of a number of conceivable reasons, were never depicted. It has already been suggested that other anomalously large settlements existed at Ayia Irini on Kea and possibly Dhaskalio-Kavos on Keros, yet no depictions of boats are documented at either site. In addition, the lead boat models should not be forgotten; their lack of secure provenance precludes them from taking a very positive role in the argument, but available information points to Naxos rather than Syros.⁵⁵ Therefore, while it would be unjustified to claim an exclusive relationship between longboats and Chalandriani, it is nonetheless intriguing to note that the entire corpus of securely provenanced representations may indeed come from one of the very few sites where independent considerations of population size and concentration would predict them.

LONGBOATS AS TRADING VESSELS: A REASSESSMENT

If the longboat was indeed a rare phenomenon in the islands, closely associated with a handful of communities unusual in their size and/or longevity, and if the considerable demands made by longboat usage on community manpower are also taken into account, it may be necessary to reappraise certain arguments that have been put forward concerning the functions of these vessels. In particular, several studies have pointed to the longboat as a key element in the proliferation of interregional exchange that distinguishes EB II from the preceding periods in the islands. One of the first and most comprehensive expressions of this hypothesis appears in *The Emergence of Civilisation*; there Renfrew states that “the construction of the sea-going longship very significantly enlarged the environment of the Aegean seafarer” and he suggests that in such vessels Aegeans may have reached the Levant and Egypt for the first time. More recently, Runnels argues in a study of the early trade in Aeginetan andesite millstones that the longboat was “the means of articulating new markets and new producers . . . they permitted the entrepreneurs who operated them to produce wealth through skillful trading.” In the latter example, the longboat is incorporated into a formalist interpretation of the expansion of trade that empha-

sizes the importance of economizing strategies toward production, distribution, and demand, dominated by choice theory.⁵⁶

In part, the initial association between longboats and the rise of trade seems to have sprung from the very fact that the evidence for both appears simultaneously in the archaeological record. But one might well question whether the discovery of traded items and the existence of depictions of a specific boat type should lead to the automatic assumption that the one traveled in the other. It should be stressed that our understanding of early Aegean shipping may well be profoundly biased by the range of vessel types represented in contemporary iconography and modeling.⁵⁷ For example, in the art of the later Bronze Age maritime trade is not among the range of functions explicitly associated with boats, yet there is ample evidence that such trade was fundamental to the prosperity of the society that produced the art. By analogy, there is no intrinsic reason to suppose that trade, or the boats in which trade was conducted, were of primary importance to the Early Bronze Age artist either.

A more rigorous approach to the question of the function of the longboat must involve an analysis of the form of the boat itself. An examination of the design of the longboat and its demands on community manpower indicates that while goods could be transported in such vessels, such a function is highly unlikely to represent the *primary* purpose for which the longboat was built. For the transport of low bulk goods such as obsidian, marble, metals, or fineware ceramics, the size of the longboat is decidedly excessive; if such goods did travel in longboats it might well be argued that their conveyance represented only a part of the purpose of the voyage, and that as a result this form of exchange should be seen as “embedded” in expeditions of a primarily *non-mercantile* nature. On the other hand, given its slender hull and shallow draught, the longboat is hardly ideally designed for the transport of large cargoes, for the space available for paddlers will decrease in direct proportion to the quantity of cargo loaded. One of the rock carvings at Korphi t’Aroniou on Naxos (fig. 5) may show a large quadruped being driven onto a small vessel with only two possible paddles depicted, perhaps indicating that high bulk goods may have been more easily transported in a series of smaller vessels rather than in a single longboat.⁵⁸ In fact this seems extremely plausi-

⁵⁴ Coleman lists around 30 whole and fragmentary examples from (or probably from) a wide variety of locations in the Cyclades, excluding Chalandriani (Coleman 1985, 209–12).

⁵⁵ Renfrew (supra n. 1) 5.

⁵⁶ Renfrew 1972, 358; Runnels (supra n. 2) 43.

⁵⁷ This problem of “visibility” is of course not unique to the Aegean. It is one of the major limitations on the use of iconography to assess prehistoric shipping in general.

⁵⁸ Dumas (supra n. 37), though the depiction is admit-

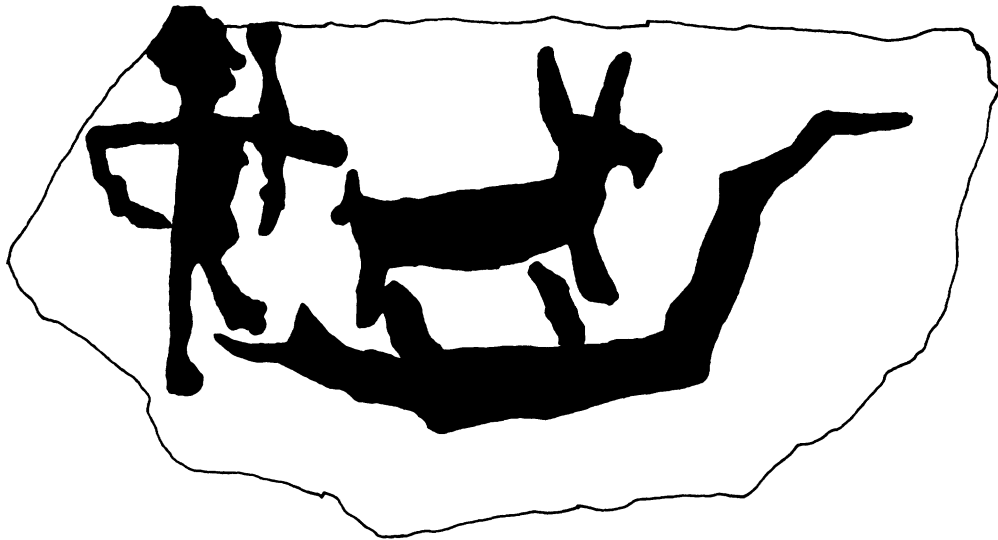


Fig. 5. Rock carving from Korphi t'Aroniou, Naxos. (After C. Dumas, *ArchDelt* 20 [1965] fig. 4)

ble if one considers that most bulk exchange is likely to have consisted of the short range ferrying of animals and grain between neighboring islands to cushion the effects of localized subsistence crises, or in the case of animals possibly for breeding purposes or seasonal grazing. One might also take into account the fact that the limited stability of a longboat would not encourage the transportation of large live cargoes. In short, the longboat's design and manpower requirements are hard to reconcile with the economizing model for the new trading ships of EB II.

Moreover, if we examine the social correlates of longboat voyaging within the context of seasonal constraints, it becomes evident that the potential for long-distance travel in such vessels would have been extremely limited. Given the high proportion of community manpower used as paddlers and the importance of farming to the subsistence of the community itself, long-distance voyaging would only be possible at times when a slack period in the agricultural calendar coincided with the open season for navigation in the Aegean. The periods of coincidence are few. A generous assessment of the Aegean open navigation season would encompass the period from late March to early November. The importance of olive and vine cultiva-

tion in the Early Bronze Age has been challenged recently, but even assuming harvests primarily of barley and legumes, only two periods of sustained agricultural slack can be identified during the navigation season—one of about two weeks around the March–April transition and another of about equal length in late summer.⁵⁹

It is interesting to consider roughly how far a longboat could travel in this time. The closest approximation that we can reach concerning the probable speed of a Cycladic longboat comes from the accounts of early mariners and travelers in the Pacific who observed similar many-paddled vessels at sea. These suggest that, although such boats can attain speeds in excess of 12 miles per hour over a short period, their efficient “cruising speed” averages around six miles per hour.⁶⁰ What is much less well documented is the number of hours and days during which this rate could be sustained; but 60 miles per day must represent something of an ideal maximum, and over an extended period a figure half as great may more accurately reflect the chances of adverse currents and of short spells of prohibitively rough weather. If these assumptions are correct, a voyage lasting two weeks (allowing for the journey out and the return) would have an approxi-

tedly too crude to allow absolute certainty about the relationship between the animal and the boat.

⁵⁹ Renfrew 1972, 280–87 for evidence for the spread of the vine and olive in the Early Bronze Age. This view is criticized by C.N. Runnels and J. Hansen in “The Olive in the Prehistoric Aegean: The Evidence for Domestication in the Early Bronze Age,” *OJA* 5 (1986) 299–308; given the paucity of excavated sites, the case for the Cyclades remains un-

proven. Vine leaf impressions are known from Chalandriani (J.M. Renfrew, “Early Agriculture in Melos,” in Renfrew and Wagstaff 1982, 157–58). See Renfrew and Wagstaff 1982, 121, for agricultural calendar and work hours per month on various crops. I am grateful to Todd Whitelaw for suggesting this line of inquiry.

⁶⁰ For instance, Best (supra n. 41) 189.

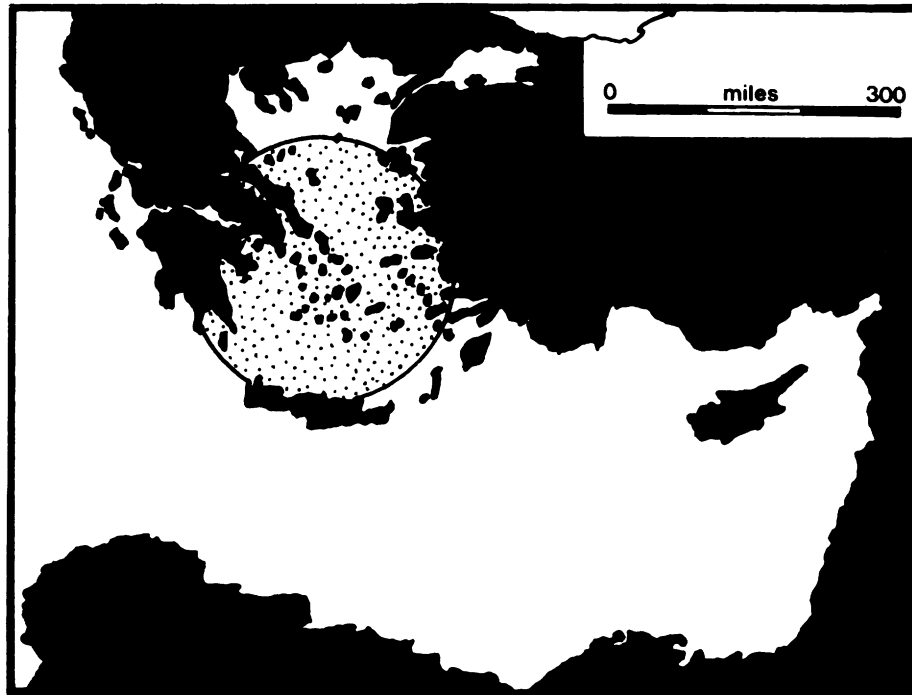


Fig. 6. The Aegean and eastern Mediterranean, showing notional estimate of the range of a longboat voyage of two weeks

mate range as the crow flies of slightly over 200 miles. Reducing this total by a quarter to allow for the need to circumnavigate obstacles such as islands, Figure 6 shows that a longboat starting from Syros could reach most areas of the central and southern Aegean in the time available, but indicates that travel beyond the Aegean should almost certainly be ruled out.

The doubts already expressed concerning the idea of longboats as trading vessels seem amply justified. This is not to deny the potential validity of the hypothesis that new mercantile boat forms may have appeared at this time (perhaps rather more modest in size than the longboats), but it does suggest that, barring the possibility of the discovery of a well-preserved EBA wreck,⁶¹ there is unfortunately no reason to believe that we will ever be better informed about the form of such boats than we are of the elusive craft of the Stone Age, whose existence we know of only from the movement of archaeologically recoverable materials and artifacts.

This point brings one to the central issue as to *why* this particular boat form should have been depicted at this particular time. It has already been suggested that

the longboat should be seen as specifically associated with a small number of communities. The same emphasis on specificity should now be placed on the iconographic context of longboat depictions. There is an increasing body of evidence to suggest a certain mastery of the maritime environment by groups living in and around the Aegean for millennia before the start of the Keros-Syros culture. Voyages of island colonization, fishing expeditions, and the procurement of obsidian from Melos are all amply documented well before the Early Bronze Age; all these ventures imply the use of some type of boat or raft, and yet none are depicted.⁶² Equally, despite the fact that maritime trade does appear to have increased markedly in EB II, it has been shown that the vessels in which this trade was carried were almost certainly not depicted either. Given these facts, and given that the total repertoire of represented forms in the iconography of the Keros-Syros culture is small, it is clearly critical to understand why longboats become iconographically visible at certain sites in EB II, and why these depictions are deposited in graves. The hypothesis that these ships carried the trade of EB II has been seen to be

⁶¹ Finds of EH II pottery at a depth of 22 m off Dhokos in the Saronic Gulf have been interpreted as the cargo of an EBA wreck (G.A. Papathanasopoulos, "Το πρωτοελλαδικό ναυάγιο της Δοκού," *ΑΑΑ* 1976, 17–22). No remains of a ship, however, have been identified.

⁶² J.F. Cherry, "Islands out of the Stream: Isolation and Interaction in Early Mediterranean Prehistory," in Knapp and Stech eds. (supra n. 2) 21–23 for discussion of pre-EBA maritime activity in the Aegean.

unsatisfactory. One must therefore seek other explanations for the remarkable appearance of these vessels in Keros-Syros iconography and for the deposition of this iconography in Keros-Syros graves.

LONGBOATS, POWER, AND THE FUNCTION OF THE ANOMALOUS SITES

From a variety of maritime cultures there is evidence for the symbolic importance of large, many-oared or paddled boats. Oared galleys are depicted on prestige artifacts from Geometric Greece, notably Attic grave marker vases.⁶³ Longboats are prominent in Scandinavian art in the Bronze and Viking Ages, and at least in the latter period they may be connected with status and power.⁶⁴ Ethnographic studies of canoe-building societies in the Pacific provide similar examples; writing of the canoes of Mortlock, Nason remarks that "aside from their pragmatic applications, canoes also serve as the physical manifestations of various ideological and social features," while in Maori society there existed a distinct pattern of ritual observances associated with the construction of large canoes and the voyages undertaken in them.⁶⁵ Obviously it would be naive to transpose wholesale to the Cyclades the belief systems of societies so spatially and/or temporally distant from the Keros-Syros culture. But remembering that the Keros-Syros longboat reflects an exercise in communal organization that must be considered complex in the context of contemporary society, it is at least worth examining whether there is anything to suggest that symbolic values were attached to it too.

This need not imply that the longboat was in any sense a "cult" vessel *per se*, or that its symbolic role need be incompatible with a practical function. It has been convincingly argued that the much later Ship Procession from the West House at Akrotiri depicts the participation of boats in a nautical festival or ceremony connected with the two coastal communities between which the flotilla is moving.⁶⁶ Yet there is no reason to suppose that the boats depicted are special-purpose "religious" vessels; rather, their extreme similarity in terms of basic construction to the boats engaged in decidedly more pragmatic activities on the

opposite wall of the same room suggests that the former are standard craft richly decked out for a specific ceremonial occasion. This argument may be extended to the manner in which the Akrotiri ships are propelled, for the use of paddles is clearly not well suited to the high freeboard of the vessels and seems (in Late Bronze Age terms) both an inefficient and archaic method of propulsion, given the fact that the boats not only carry masts and sails, but are similar to depictions of contemporary boats which are driven by long oars.

The periodic employment of Keros-Syros longboats in social rituals is attractive as an idea, though it remains hypothetical in the absence of contemporary documentation, and alone can hardly explain the existence of such vessels. There is, however, some evidence from the *context* of longboat depictions to suggest that part of the symbolic meaning of the longboat is to be read in terms of status and prestige.

First, where context is known, representations of longboats appear to be associated with unusually rich graves. For instance, the only lead model with even a vaguely secure provenance is said to have been found with two marble folded-arm figurines, and frying pans themselves are largely restricted to the most conspicuously provisioned graves.⁶⁷

Second, there is the question of the function of the frying pans themselves. Though purely practical interpretations have been proposed, including the suggestions that they acted as plates, compasses, or mirrors,⁶⁸ none has so far proved entirely convincing and there still remains the distinct possibility that these objects were themselves a species of symbolic or ceremonial apparatus. Certainly, frying pans are remarkably richly decorated with motifs that find close parallels in other Early Cycladic artifacts with less ambiguously ceremonial or symbolic attributes. The common appearance of the sun or star motif on frying pans, including those from Chalandriani, is comparable to the prominent use of the same motif on an impressive silver diadem from the same site. Similarly, the depiction of the pubic triangle above the handle of several frying pans recalls the emphasis of the same feature on the marble folded-arm figurines. The occasional ap-

⁶³ G. Ahlberg, *Fighting on Land and Sea in Greek Geometric Art* (Stockholm 1971) 26–38.

⁶⁴ Johnstone (*supra* n. 43).

⁶⁵ J.D. Nason, "The Effects of Social Change on Marine Technology in a Pacific Atoll Community," in R.W. Casteel and G.I. Quimby eds., *Marine Adaptations of the Pacific* (Paris 1975) 18. For the Maori canoes see Best (*supra* n. 41) 36–119.

⁶⁶ L. Morgan, *The Miniature Wallpaintings of Thera: A*

Study in Aegean Culture and Iconography (Cambridge 1988) 143–45.

⁶⁷ For the lead models see Renfrew (*supra* n. 1); for frying pans see Coleman 1985, 203; also Renfrew 1972, 375 for the concentration of frying pans in rich graves at Chalandriani.

⁶⁸ For discussion of proposed functions, and bibliography, see Coleman 1985, 203–204.

pearance of the fish motif as the main iconic form on certain frying pans can also be associated with the prominence of the fish as a totem mounted on the high end of the longboats themselves in every extant frying-pan depiction.⁶⁹ Finally, there is the possible interpretation (discussed above) of the double boat depiction (27) as a doubling of the power of the symbol, rather than as a literal portrayal of two boats. The possibility of a symbolic function for the frying pan, combined with the associations among frying pans, longboat depictions and rich burials, does provide some intriguing evidence for a symbolic equation of longboats with status and power.

This association may be in part explained by the extremely probable involvement of the longboat in warfare and raiding, activities for which its large complement and capability of high speed over short distances make it admirably suited. Renfrew includes this among his range of functions of the longboat;⁷⁰ on the basis of our analysis it might now be argued that this was the specific and primary function of these vessels. Classic examples from the Pacific of the aggressive use of such many-paddled boats include the Maori war canoe. In the case of Mortlock society, it is particularly striking that although a wide variety of boat types existed for diverse purposes such as trade, fishing, and human transportation, the many-paddled canoe, or *liegak*, fulfilled a specifically military function.⁷¹ Yet the purpose of such raids may well have involved rather more than casual piracy. Certain ethnographic studies of island clusters have demonstrated in detail that the aggressive deployment of boats can act as a powerful factor in the determination of patterns of regional exchange and of the growth or stagnation of

coastal communities. Trading and raiding can be essentially part of the same system.⁷² However unlikely the longboat may be as a *carrier* of trade, perhaps it could be argued that its coercive potential was not unimportant in the *control* of trade in the early Cyclades.

Although research programs oriented toward a quantitative analysis of the movement of goods between specific islands and settlements within the Cyclades are still in their infancy, some preliminary points can be made that hint at an association between the size and longevity of certain centers and their place in the pattern of trade. At Chalandriani the importance of exchange cannot yet be accurately assessed, but the discovery there of considerable quantities of metal grave goods and also of a theriomorphic vessel extremely similar to others discovered at Ayia Irini and at Kheliotomylos in the Corinthia suggests that the settlement was widely connected.⁷³ At Ayia Irini the large EBA settlement is situated on one of the best natural harbors in the northern Cyclades, and the ceramics from the site testify to its widespread contacts.⁷⁴ Dhaskalio-Kavos is sited at the resource-poor extremity of a small island centrally located between the well-populated areas of southern Naxos and the north coast of Amorgos; the unparalleled wealth of marble artifacts from the site testifies to a high incidence of interaction between it and the marble-producing islands to the north.⁷⁵

Moreover, it is beyond doubt that the slightly later settlement on the Kastri acropolis above Chalandriani had extensive contacts with other areas of the Aegean (notably with the northeast), whether or not it actually represents an incursion of new peoples from Anatolia.⁷⁶ In other words, although Chalandriani and

⁶⁹ Coleman 1985, pls. 33–37, for designs on frying pans. Fish appear on an example from Louros on Naxos (Coleman 1985, 210 [Catalogue 37] and pl. 26.23). See Tsountas (supra n. 10) pl. 10, for the Chalandriani diadem.

⁷⁰ Renfrew 1972, 398; see also S. Wachsmann, "The Thera Waterborne Procession Reconsidered," *IJNA* 9 (1980) 287–95.

⁷¹ Nason (supra n. 65).

⁷² See, for instance, Irwin's analysis of the growth of Mailu at the expense of other Papuan settlements in the region; he stresses that Mailu achieved and maintained a monopoly on large canoes which it used to dominate trade and check the growth of other coastal communities by periodic seaborne raids (G.J. Irwin, "Pots and Entrepôts: Settlement, Trade and the Development of Economic Specialisation in Papuan Prehistory," *World Archaeology* 9 [1977–1978] 299–319). Trading and raiding appear to interact to further the prosperity and growth of a specific maritime community.

⁷³ For metals, Dumas 1977, 61 fig. 48. For theriomorphic vessels see J.L. Caskey, "Investigations in Keos Part II: A

Conspectus of the Pottery," *Hesperia* 41 (1972) 363 and pl. 77, and M.H. Wiencke, "Art and the World of the Early Bronze Age," in G. Cadogan ed., *The End of the Early Bronze Age in the Aegean* (Leiden 1986) 86, n. 43; a cruder and undecorated version of the same type is now displayed in the Naxos Museum (see H.G. Buchholz and V. Karageorghis, *Prehistoric Greece and Cyprus* [London 1973] 99, no. 1187; the reputed provenance is Panormos, Naxos).

⁷⁴ I am grateful to David Wilson for information concerning the ceramic contacts of Ayia Irini.

⁷⁵ The quantity of figurines from the site has prompted the suggestion that Dhaskalio-Kavos was in fact a pan-Cycladic sanctuary (Renfrew et al. in Fitton ed. [supra n. 5] and P. Getz-Preziosi, *Sculptors of the Cyclades: Individual and Tradition in the Third Millennium BC* [Ann Arbor 1987] 131–40); although this suggestion cannot yet be fully evaluated, the accumulation of figurines through trade over an extended period of time seems equally plausible.

⁷⁶ See most recently Z.A. Stos-Gale, N.H. Gale and G.R. Gilmore, "Early Bronze Age Trojan Metal Sources and Anatolians in the Cyclades," *OJA* 3 (1984) 23–43.

Kastri cannot comprise a completely contemporary cemetery-settlement pair, their proximity may have been less than fortuitous if the location had been widely known as a center of voyaging and exchange in the Keros-Syros period. A remarkably similar sequence at Ayia Irini makes pure coincidence seem even less plausible. There, the large settlement of Period II is succeeded without a break in occupation by the important Period III settlement with its Kastri Group elements.⁷⁷

Perhaps it is worth suggesting that what we see happening in the Aegean may not be entirely dissimilar from that which is documented ethnographically in areas of the southern Pacific. We should consider the possibility that in the Early Bronze Age Cyclades different degrees of maritime proficiency may have arisen; the fact that many Keros-Syros settlements are in coastal locations does not automatically prove that they all used the sea to an equal extent or in an identical fashion. This does not mean that all interaction need have been exclusively in the hands of our anomalous sites. There are likely to have been many different types of such activity between the islands.⁷⁸ But it may mean that if a more sophisticated type of interaction—something that might come closer to our idea of trade—did exist in the Keros-Syros Cyclades, it may well have been closely associated with sites such as Chalandriani, Ayia Irini, and Dhaskalio-Kavos. The appearance of such larger communities during the Keros-Syros culture and their apparent continuity of usage well into the later years of the Early Bronze Age are important phenomena from whatever angle one approaches the problems of the Cyclades in the third millennium. We are still far from a comprehensive explanation of these phenomena but, at least in the case of Chalandriani, it could be argued that the community maintained its preferential position and differentiated status in part by the coercive use of longboats against smaller communities that were kept too short on manpower to retaliate in kind. Trade, prestige, and power would be linked in a system in which success bred more success. This would explain the importance of the longboat in the iconographic repertoire from the cemetery of the large settlement at Chalandriani, and

the striking concentration of depictions at that site. If community leadership was indeed of the prestige “big man” type, it might also explain the marked association between these depictions and rich graves.

CONCLUSION

Consideration of the longboat in the light of available information concerning demography, settlement pattern, and settlement size leads to a reassessment of the probable role and distribution of these craft in the early Cyclades. In particular, it suggests important correlations between the appearance of the longboat and the emergence of at least one strikingly large and perhaps long-lived settlement at Chalandriani. The longboat represents something of a development threshold in the evolution of Cycladic society and must be acknowledged as one of the few clear examples we have of social organization beyond the level of the nuclear family in the Keros-Syros culture. The EB II period in the Aegean has long been recognized as a period of widespread change. Yet there is no reason to assume *a priori* that this change was identically expressed in all regions of the Aegean. In the Cyclades there is to date no sign of monumental central buildings comparable to the House of the Tiles at Lerna (with its large collection of clay sealings) or the megara at Troy, nor are there any parallels for the extremely large settlements found in Crete at sites such as Knossos. The evidence from the islands suggests that the pattern of EB II social developments there may have been distinctly different from that of contemporary changes observed elsewhere in the Aegean. As evidence of advancing social complexity, and as an accompaniment to the increasing differentiation in settlement size, the longboat may seem strange beside Lerna, Troy, and Knossos, but it does in fact constitute the strongest evidence available that, in a manner peculiar to the environment of an archipelago, something was indeed afoot in the Cyclades during the middle of the Early Bronze Age.

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⁷⁷ D.E. Wilson and M. Eliot, “Ayia Irini III: The Last Phase of Occupation of the Early Bronze Age Settlement,” in MacGillivray and Barber (supra n. 22) 85–86. A similar transition at an important site beyond the Cyclades is seen at Kolonna on Aegina (H. Walter and F. Felten, *Alt-Ägina* III:1 [Mainz 1981], and reviewed by J.B. Rutter in *AJA* 87 [1983] 106–108).

⁷⁸ Given the very small size of most settlements, much stylistic and artifactual interaction may be explicable in terms of the movement of spouses between a series of almost certainly exogamous communities. It is in fact extremely unlikely that all forms of Early Cycladic interaction can be explained by a single type of exchange.