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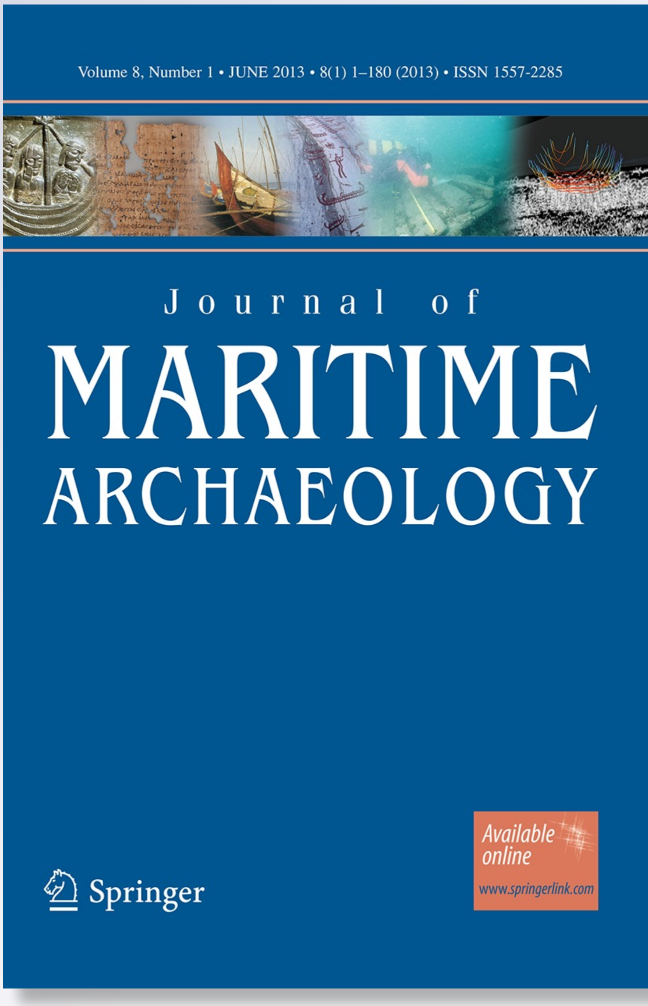

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ORIGINAL PAPER

Marine Creatures and the Sea in Bronze Age Greece: Ambiguities of Meaning

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Abstract Like most cultures, prehistoric Greek communities had an ambiguous relationship with the sea and the creatures that inhabit it. Positive and negative associations always co-existed, though the particular manifestations changed over time. By drawing together evidence of consumption of marine animals, seafaring, fishing, and iconography, this article unites disparate strands of evidence in an attempt to illuminate the relationship prehistoric Greeks had with marine creatures and the sea. Based on the marked reduction in seafood consumption after the Mesolithic and the use of marine creatures in funerary iconography in the post-palatial period, it becomes apparent that the sea—then as now—is an inherently ambiguous medium that captures both positive and negative emotions. On the one hand, the sea and the animals residing in it are strongly associated with death. On the other hand, the sea's positive dimensions, such as fertility and rebirth, are expressed in conspicuous marine consumption events.

Keywords Sea · Death · Marine animals · Diet

Introduction

Scholarly engagement with the world's oceans and seas often favours functionalist interpretations and views this space as a provider of food resources or medium of trade and communication (for summaries see van de Noort 2011; D'Arcy 2006; Haysom 2011). The notion that the sea may be an integral living space essential to a community's identity which allowed people to understand how they fit into their world is considerably less developed. Study of Pacific islanders, for example, has demonstrated that the sea was not merely a space where fishers and sailors earned their living, but was a place embedded into the community's cosmology where gods, spirits, ancestors and mythical creatures co-existed in a time-space continuum. Indeed, the sea is often perceived not as a place, but rather as a living and breathing agent who acts upon humankind through the waves,

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currents and creatures that live within it (D'Arcy 2006: chapter 2). The archaeological and iconographic evidence available to us (e.g. Berg 2011; Bradfer 2000; Haysom 2011; Saunders 2008) indicates that prehistoric Greek communities also had developed a close relationship with the sea, although the precise nature of this human-sea interaction remains uncertain. Cretan peak sanctuaries, for instance, may provide tantilising glimpses of Bronze Age cosmology in their combination of materials and viewsheds which unite mountains, sea, rivers, and agricultural fields (Rutkowski 1986). While the sea may have formed part of the Cretan cosmos, this relationship was probably anything but straightforward.

Most cultures have a distinctly ambiguous relationship with water in general and the sea in particular because it embodies a wide range of contradictory 'emotions'; or—as Kamash has phrased it—"water is life and death". Water as a substance is transmutable, ever-changing, and often deceiving and, as such, defies human understanding (e.g. Barber 2003; Kamash 2008: 22; Lindenlauf 2003; Steinberg 2001; Strang 2004; Tvedt and Oestigaard 2009; Vryonis 1993). These contradictory dimensions are evoked in a quote by Semonides, a Greek poet of the seventh century B.C.:

> "She [the woman] has two characters…just so the sea often stands without a tremor, harmless, a great delight to sailors, in the summer season; but often it raves, tossed about by thundering waves. It is the sea that such a woman most resembles in her temper; like the ocean, she has a changeful nature" (7.27-42) (Lloyd-Jones 1975).

When ancient and Byzantine writers perceive the sea as a positive substance, place or guide to moral behaviour, it is characterised as benevolent, calm, vitalising, and cleansing. It provides a means of income through fishing or trading, encountered trials make men stronger and contact with far-away places makes them wiser. On the other hand, however, the sea has its dangerous side as it is unpredictable, changeable, treacherous, threatening, corrupting, unclean and exposes travellers to greater or lesser discomforts (Lindenlauf 2003; Vryonis 1993).

At first glance, evidence of fish consumption, seafaring capabilities, fishing equipment and marine iconography suggests that prehistoric Greek communities—who lived on islands or close to the sea—had an intimate, knowledgeable and positive relationship with the sea (Fig. 1). On closer inspection of the evidence, however, it becomes apparent that interactions with the sea and marine animals were strained, ambiguous, and bound up in diverse ritual beliefs and practices. As we will see, these attitudes did not remain stable, but underwent dramatic modification as time progresses. At the starting point for our enquiry stands the question of whether marine food was a major contributor to the ancient Greek diet and whether one can detect particular food preferences or food taboos that might shed light on underlying attitudes towards the sea. Two lines of evidence are at our disposal: analysis of fish bone and mollusc assemblages provides indirect evidence of consumption practices while isotope analysis of human bone grants direct insights into the diet of individuals. Both types of evidence indicate a major shift in diet from marine-focused to land-focused between the Mesolithic and Neolithic periods, hinting at a major change in how ancient people conceptualised foodstuff. This relative lack of marine food is particularly puzzling in light of the considerable evidence for long-distance as well as short-distance boat travel and fishing equipment from the Neolithic onwards which would in principle have allowed the capture and trade of large quantities of fish both inshore and offshore. In addition, iconographic depictions of marine animals are frequent and encompass many media. That marine food did not constitute a major component of the Greek Neolithic and Bronze Age diet thus requires investigation.

Fig. 1 Map of Greece. Key sites are indicated with a *dot* whilst major islands are *circled*

The first part of the paper is thus concerned with providing a synthesis of the existing evidence of food preferences. Particular attention will be paid to the marine-focused Mesolithic evidence which serves as a back-drop against which to compare the land-based diet favoured in the subsequent Neolithic and Bronze Age periods. Summaries of sea travel, fishing equipment, and marine iconography contrast this land-based lifestyle with the evident potential and surviving evidence of the exploitation and exploration of the marine world in those periods. The subsequent discussion draws out the ambiguous and fluctuating relationship between people, marine creatures and the sea in Bronze Age Greece before offering an interpretation that unites negative and positive aspects of the sea. Given the great environmental and cultural variability across Greece, this article will focus on the southern Aegean.

Eating the Sea

Archaeozoological and stable isotope evidence are available to us in order to visualise prehistoric Greek dietary habits (for archaeozoology see Davis 1995; Kotjabopoulou et al. 2003; Ungar 2007; Vaughan and Coulson 2000. For stable isotope analysis see Tauber 1981; Chisholm et al. 1983; Sealy 2001; Tykot 2004. For methodological issues comparing the two techniques, see Barbarena and Borrero 2005, Milner et al. 2004). While both archaeozoological and stable isotope evidence have their problems, these can be set aside for the purpose of this investigation as points of dispute revolve around very specific methodological issues but do not challenge the validity of the technique per se, or our understanding of *long-term* changes in food consumption patterns which are of relevance here.[1]

Mesolithic Evidence (ca. 8,300–6,000 B.C.)

Evidence of Greek Mesolithic sites has been comparatively sparse until a few years ago. However, increasing research efforts, improved discovery techniques and the publication of several major sites have begun to flesh out our knowledge of the period over the last decade. In her recent summary, Galanidou lists 12 excavated caves, rock shelters and open-air sites in addition to nine surface surveys with Mesolithic finds (2011: fig. 1). While Mesolithic mobile hunter-gatherer communities made use of both coastal and inland habitats and became knowledgeable seasonal specialist in their respective home environments (Galanidou 2011), those living near the coast or on islands were particularly reliant on marine resources (for a summary of the Mesolithic, see Perlès 2001). Animal bones from the Franchthi Cave in the Argolid, Cave of the Cyclops on the island of Youra and the site of Maroulas on the island of Kythnos clearly demonstrate targeted exploitation of the sea alongside the utilisation of seasonally available land-based resources.

The Mesolithic at Franchthi Cave is characterised by a dramatic increase in fish bones from scarce to 20–40 % of the total bone assemblage in the later phase. While some pelagic tuna bones are present, they were probably not caught in the open sea but caught when approaching the coast. The overall picture remains that of small fish caught in inshore habitats with irregular and infrequent catches of tuna (Payne 1973[2]; Rose 1994, 434–437). The Mesolithic layers at the Cave of the Cyclops (Sampson 1998, 2008, 2011) contain immense numbers of fish bones and marine mollusc remains as well as few monk seal and dolphin bones. Nineteen fish families are present in the Mesolithic, of which the

[1] Being a relatively new technique, some aspects of isotope analysis are still under discussion by specialists. In relation to Greece, four issues are of particular importance: the proportion of C4 pathway plants, the consumption of fresh fish *versus* marine fish, sample sizes and the meaning of 'dominant' dietary contribution. Consumption of C4 pathway plants can be mistaken for marine signals. Millet is the only well-known C4 pathway plant in Greece, but its presence is rarely attested until the Late Bronze Age (Valamoti 2007: 100). While marine foods leave a clear signal, the presence of freshwater fish in a person's diet is difficult to detect. Given the rarity of permanent lakes and rivers on Crete or the Cycladic islands, there should be little or no impact on our interpretation (Hedges and Reynard 2007; Rose 1994: 392–394). Sample sizes are still small, but ever increasing. However, studies have demonstrated that people in small-scale communities have broadly similar long-term dietary patterns; subtler gender, status or age differences often are indicative of the exploitation of specific environments or food types and can often be distinguished from averaged long-term patterns (Schulting and Richards 2002; but see Milner et al. 2004). At the moment, there is no site that has both archaeozoological and human isotope data of good quality. It is hoped that future research will remedy this unsatisfactory state of affairs. Heated debates surrounding the end points of carbon isotope values and our interpretation of 'dominant' dietary practices appear to have come to an understanding that, as end points are not firmly fixed, an ostensibly 100% terrestrial diet may indeed mask up to 20 % of marine food consumption (Milner et al. 2004, 2006; Hedges 2004; Richards and Schulting 2006). First results from 41 isotope measurements for local prehistoric fauna (freshwater, marine and euryhaline fish) at five northern Greek sites show that minor ecological shifts can impact considerably on isotope values, different fish families have different values and that freshwater and marine fish values may not be distinguishable. The authors postulate a theoretical δ_{13}C: -19.5 and δ_{15}N: 6.58 for an individual living on a 90 % terrestrial-10 % marine diet (Vika and Theodoropoulou 2012). More measurements of the local contemporary fauna should eventually provide firmer ranges.

[2] The amount of fish bone was estimated visually as a percentage of the total bulk of bone in each unit.

sea bream family constitute over 50% by count, followed by the scorpionfish/rockfish and sea bass/grouper family. From the evidence it can be concluded that multi-fishery of small- to medium-sized inshore species was clearly an important subsistence activity (Mylona 2003c, 2011; Powell 2003a, b, 2011; Sampson 2008). Fish hooks and fishing gorges provide evidence of specific fishing methods; their rich repertoire is indicative of some degree of specialisation among the fishermen (Moundrea-Agrafioti 2003, 2011). Mussels, molluscs, and limpets were regularly collected from rocks and sandy beds (Karali 2011). Animal bones were limited and showed a preference for caprid, pig, deer and bird remains (Sampson 1998, 2008; Trantalidou 2011). Although this site lies in the northern Aegean, its procurement patterns mirror those of southern Aegean sites. With the exception of land snails, the most numerous food remains at the coastal settlement of Maroulas on Kythnos are fish bones. Fish bones represent 12 identified families of fish that could be caught systematically in inshore waters all year round as well as migratory fish that were caught when approaching the coast seasonally. With a clearly targeted range of taxa and a preference for the medium-weight categories, fishing activities at Maroulas were highly specialised and selective (Mylona 2010). Marine shells, bird, hare, fox, and pig have been recovered in smaller amounts, highlighting the communities focus on the sea within the context of exploiting all food resources available to them (Karali 2010; Sampson et al. 2010; Trantalidou 2008, 2010). Although located outside the geographic scope of this paper, brief mention should also be made of Sidari, a costal site on Corfu, which is well known for the extensive exploitation of marine resources including the specialised gathering of cockle-shells (Sordinas 1969, 1970).

Not unlike Mesolithic coastal communities in Northern Europe, marine foods appear to have been a major contributor to the diet of coastal populations in Greece. However, the marine component is likely to have been considerably lower than the 50–90 % demonstrated for UK and Scandinavian individuals in recent isotope analyses (e.g. Tauber 1981; Richards et al. 2003; Fischer et al. 2007; Schulting and Richards 2002; Richards and Hedges 1999; Richards and Mellars 1998). Comparative isotope data from the Mediterranean are rare and only one sample is currently known from Greece (Theopatra Cave) whose values fall within the Neolithic range indicating a terrestrial diet (Papathanasiou 2011). Recent analyses of individuals from coastal El Collado (Spain) reveal that marine foods made up ca. 25% of the individuals' diet (Guixé et al. 2006). Mesolithic inland populations, on the other hand, such as those individuals living at La Vergne (France), had a strong terrestrial signal (Schulting et al. 2008).

Neolithic Evidence (ca. 6,800–3,000 B.C.)

Based on the rarity of fish at Neolithic sites in Greece, it appears that their consumption had moved into a subsidiary role (Theodoropoulou 2007). The archaeozoological assemblages of Cave of the Cyclops, Franchthi Cave, and Saliagos on Antiparos unequivocally demonstrate a noticeably decreased reliance on marine foods alongside an increase in the consumption of domesticates and cultivated plants. Some scholars postulate that this pattern indicates a transition from a marine to terrestrial lifestyle (Curci and Tagliocozzo 2003; Greenfield and Fowler 2003; Powell 2003b). Others have pointed to an increasing number of experiments which highlight the considerable taphonomic losses among fish bone assemblages—especially when hand-selection was practised instead of water-sieving (Cavanagh 2007; Jones 1986, 1990; Mylona 2003b; Nicholson 1992; Partlow 2006; Rose 1994: 191–195). While fish bone assemblages are clearly impacted by recovery biases, isotope analysis now unequivocally confirms a general lack of fish in the diet.

Table 1 Stable isotope data from Greek Neolithic sites

Country	Site	Date/period	Max $\delta_{13}C$	Min $\delta_{13}C$	Average $\delta_{13}C$	Max $\delta_{15}N$	Min $\delta_{15}N$	Average $\delta_{15}N$	n	Diet	References
Greece	Franchthi Cave	Neolithic	−19.64	−16.96	−18.7 ± 0.8	14.11	7.79	9.2 ± 1.8	16	Terrestrial	Papathanasiou (2003)
Greece	Kephala, Kea	Neolithic	−21.15	−17.94	−19.1 ± 1.2	10.56	7.98	9.2 ± 1.0	18	Terrestrial	Papathanasiou (2003)
Greece	Tharrounia	Neolithic	−20.31	−19.55	−20.0 ± 0.2	9.41	6.77	8.0 ± 0.7	20	Terrestrial	Papathanasiou (2003)
Greece	Theopetra	Neolithic	−20.51	−17.22	−19.8 ± 0.9	8.7	6.71	7.4 ± 1.1	13	Terrestrial	Papathanasiou (2003)
Greece	Kouveleiki	Neolithic	−19.86	−19.81	−19.8 ± 0.1	8.32	7.85	8.1 ± 0.3	2	Terrestrial	Papathanasiou (2003)
Greece	Gerani, Crete	LN I, ca. 3800 B.C.	−19.79	−19.69	−19.7 ± 0.1	8.8	7.92	8.4 ± 0.6	2	Terrestrial	Richards and Hedges (2008)
Greece	Alepotrypa Cave 1	Late to final neolithic, 5000−3200 B.C.	−21.6	−19.3	−20.0 ± 0.4	8.7	4.5	7.2 ± 1.0	26	Terrestrial	Papathanasiou, Larsen and Norr (2000), Papathanasiou (2003)

Carbon isotope values give information on terrestrial versus marine protein. Nitrogen isotope values indicate the average trophic level

Coinciding with an increase in sheep and goat bones from the end of the Early Neolithic, the fish bone assemblage at the Cave of the Cyclops, Youra, highlights the loss of importance of marine foods through a dramatic decline in fish taxa and fish bone frequencies. The fish caught are predominantly inshore (Mylona 2011; Powell 2003a, 2011; Sampson 2008, 2011; Trantalidou 2011). A similar pattern is visible also at Franchthi Cave where fish bones decline dramatically throughout the Neolithic, being reduced to less then 5 % of the total bulk of the bone assemblage by the Late Neolithic. The fish caught inhabited primarily inshore habitats (Payne 1973; Rose 1994, 434–437). The community of Saliagos on Antiparos grew 2-row barley and emmer. Unlike other Neolithic sites, fish bones make up a substantial percentage of the total animal bone count of which the vast majority can be assigned to tunny. It appears that the inhabitants specialised in the targeted exploitation of tuna (Evans and Renfrew 1968; Renfrew et al. 1968; for a revisionist view of the published fish data see Rose 1994: 437–438).

Contemporary isotope data unequivocally indicate a predominantly terrestrial diet for Greek coastal and inland communities alike (Table 1).[3] The availability of a reliable supply of cultivated plants and domesticated animals as well as the cultural value placed upon these new food sources is argued to lie at the heart of this transition (Richards and Hedges 2008; Papathanasiou 2003; Papathanasiou et al. 2000). That small amounts of marine foods continue to be consumed does not detract from the fundamental shift observed. A similar shift is also observed in the central-western Mediterranean and Northern Europe where this pattern often continues into later periods (Guixé et al. 2006; Lai et al. 2007; Richards and Hedges 1999; Richards et al. 2003; Richards et al. 2001; Schulting and Richards 2002; Tauber 1981; Tykot 2004).

Bronze Age (ca. 3,000–1,050 B.C.)

Archaeozoological data unanimously indicate a low percentage of fish remains at Greek Bronze Age sites (e.g. Greenfield and Fowler 2003; Cosmopoulos et al. 2003; Rose 1994; Mylona 2003a, 106). As regards fish consumption preferences, no unified picture is discernible as each site consumed different proportions of different species of fish. However, multi-fishery is commonly observed and an overall predominance for small- to medium-sized fish from inshore or moderately deeper coastal water that could be caught from the coast is apparent at most sites (Table 2). Fish can therefore be considered comparable to other seasonally available foods, such as migrating and resident birds, wild animals and wild plants.

Most marine shells are collected from coastal habitats; the exeption being the Triton shell (*Charonia* sp.). The most common taxa are *Patella* sp., *Hexaplex trunculus/Bolinus brandaris* sp. and *Monodonta sp.* (Table 3; Karali 1999 for a general overview). Most shells seem to have been eaten raw, used as fish bait or as ornaments. Discovery of several substantial *murex* deposits at various sites makes it likely that they were used for dye production (Reese 1987; Ruscillo 2006). While not much evidence survives (e.g. Reese 1998b), we should also assume the consumption of sea urchins, crabs, cuttlefish, octopus, etc.

[3] In Greece, humans with a dominantly (80–100 %) terrestrial diet should display $\delta^{13}C$ values around $-19‰ \pm 1$, while those with a predominant marine diet have values around $-12‰ \pm 1$ (Richards et al. 1998; Petroutsa et al. 2007; Guixé et al. 2006). It is estimated that nitrogen isotope values increase by about 3–5 ‰ each step up the food chain.

Table 2 Fish remains from selected middle and late bronze age sites (for a general overview, see Mylona 2003b)

Fish taxa	Akrotiri	Kommos	Mochlos	Palaikastro	Pseira	Habitat
Period	LC I	MM IB-LM II	LM IB	MM II-LM IIIA	EM III-LM I	
Apogonidae Cardinalfish		*		*		Coastal lagoons
Atherinidae Silverside				*		Shallow, littoral
Blenniidae Blenny			*	*		Demersal, littoral
Carangidae Mackerel	*	*		*		Pelagic; seasonally migratory
Carcharhinidae Shark, ray		*				Epipelagic
Centracanthidae Picarel	*		**	**	**	Inshore
Dasyatidae Stingray				*		Demersal, littoral
Gadidae Shore rockling		*				Demersal, sublittoral
Labridae Wrasse		*				Demersal, littoral
Mullidae Red mullet				*		Demersal, littoral
Pomacentridae Damselfishes				*		Demersal, littoral
Scaridae Parrotfish		*	*			Littoral
Sciaenidae Meagre				*		Demersal, littoral
Scombridae Tunny	*	*				Pelagic; seasonally migratory
Serranidae Sea bass		**	*	**	*	Demersal, inshore
Sparidae Sea bream	*	**	**	**	**	Demersal, off/inshore
Sphyraenidae Barracuda		*	*			Littoral

* Indicates presence of fish taxa in assemblage

** Indicates dominant species in assemblage

Akrotiri: Trantalidou (1990); Gamble (1979), Mylona (2000, 2001, 2008b)

Kommos: Rose (1995a: 204–239), Ruscillo (2006)

Mochlos: Mylona (2004)

Palaikastro: Riley (1999): table 21; Mylona (2007)

Pseira: Rose (1994, 1995b, 1998a, b, 1999) (mixed Minoan-Byzantine deposits not included)

Habitat information is based on www.fishbase.org; Whitehead et al. (1984, 1986)

Stable isotope data from Bronze Age Greece demonstrate the preponderance of a terrestrial diet at both coastal and inland sites (Table 4). The exception to the proverbial rule is the increased marine food consumption observed in several individuals from the Mycenaean shaft graves; this exceptional case will be discussed further below.

Table 3 Major taxa of marine invertebrates at selected Bronze Age sites

Mollusc taxa	Akrotiri	Ayia Triadha	Kom-mos	Mochlos	Nichoria	Palai-kastro	Pseira
Period	LC I	MM-LM	MM-LM IIIA	LM IB	MH-LH II	MM I-LM II	EM III-LM I
Arca noae (Ark shell)		**					
Cardiiae (Cockles)					*		
Charonia sp. (Triton shell)	*	*		*		*	*
Dentalium (Tooth shell)					**		
Euthria corneum (Spindle Euthria)							
Glycymeris sp. (Dog-cockle)	*	**	*				
Monodonta sp. (Topshell)	*		*	**			*
Murex trunculus/Brandaris (Murex shell)	**		**	*	*	**	*
Patella sp. (Limpet)	**	*	**	**			**

** Dominant taxa

* Taxa present in moderate amounts

Other taxa are present only in smaller numbers

Akrotiri: Karali-Yannacopoulou (1990) (erroneous percentages re-calculated)

Ayia Triadha: Wilkens (1996)

Kommos: Reese (1995a), Ruscillo (2006)

Mochlos: Reese (2004)

Nichoria: Reese (1992)

Palaikastro: Reese (1987, 2007)

Pseira: Reese (1995b, 1998a, b, 1999) (mixed Minoan-Byzantine deposits not included)

Traversing the Sea

Although marine foods made up only a minor part of the human diet, evidence of boats and the presence of imported artefacts indicate that communities had the necessary equipment and skill to cross the sea, and explore and exploit marine resources in principle. Prior to the introduction of sailing boats towards the end of the Early Bronze Age, paddled or rowed boats were the only means of transport. While most of these boats were used for coastal journeys and island-hopping, Cycladic longboats were designed to travel long distances (Broodbank 1989, 2000; Tzala 1989; Wachsmann 1998). Iconographic evidence indicates the existence of a large variety of boat types from the Middle Bronze Age onwards which can be classified into two broad functional categories: smaller boats for coastal journeys or short crossings (e.g. Doumas 1965, fig. 4; Evans 1926, fig. 137; Morgan 1988, pl. 160) and larger sailing merchant boats or galleys. The latter category of boats are characterised by an estimated length of 10–30 m and large cargo space, fast travelling speed and a large travelling range for long-distance sea voyages (Casson 1995; Morgan 1988; Wachsmann

Table 4 Stable isotope data from Greek Bronze Age sites

Country	Site	Date/Period	Max $\delta_{13}C$	Min $\delta_{13}C$	Average $\delta_{13}C$	Max $\delta_{15}N$	Min $\delta_{15}N$	Average $\delta_{15}N$	n	Diet	References
Greece	Perachora, Korinth	Early Helladic	−19.7	−18.4	−19.3	9.8	7.2	9.1	19	Terrestrial with possible small marine contribution for some individuals	Petroutsa, Richards and Manolis (2007)
Greece	Armenoi, Crete	Late Minoan III	−20.6	−19.2	−19.77 ± 0.3	9.2	6.8	7.8 ± 0.5	39	Terrestrial with little or no marine contribution	Richards and Hedges (2008)
Greece	Shaft Grave A, Mycenae	LHI-LH IIA	−19.7	−17.8	−18.6 ± 0.5	11.5	7.8	10.5 ± 1.1	9	Terrestrial with significant marine contribution	Richards and Hedges (2008)
Greece	Shaft Grave B, Mycenae	MH late—LH I	−20.1	−18.2	−19.4 ± 0.6	10.7	5.6	8.6 ± 1.9	9	Terrestrial; 2 individuals with significant marine contribution	Richards and Hedges (2008)
Greece	Chamber tombs, Mycenae	Late Helladic I-III	−19.6	−19.1	− 19.3 ± 0.2	9.4	6.5	8.0 ± 1.0	11	Terrestrial	Richards and Hedges (2008)
Greece	Sykia	Late Helladic IIB-IIIC1	−19.8	−19.1	−19.4 ± 0.3	9.6	7.6	8.3 ± 0.7	6	Terrestrial	Richards and Vika (2008)
Greece	Kalamaki	Early and Late Helladic	−20.7	−18.0	−19.4 ± 0.6	11.1	6.4	8.1 ± 0.8	31	Terrestrial	Richards and Vika (2008)
Greece	Spaliareika	Late Helladic	−20.4	−19.7	−20.1 ± 0.2	9.4	7.1	7.9 ± 0.8	8	Terrestrial	Richards and Vika (2008)

Carbon isotope values give information on terrestrial versus marine protein. Nitrogen isotope values indicate the average trophic level

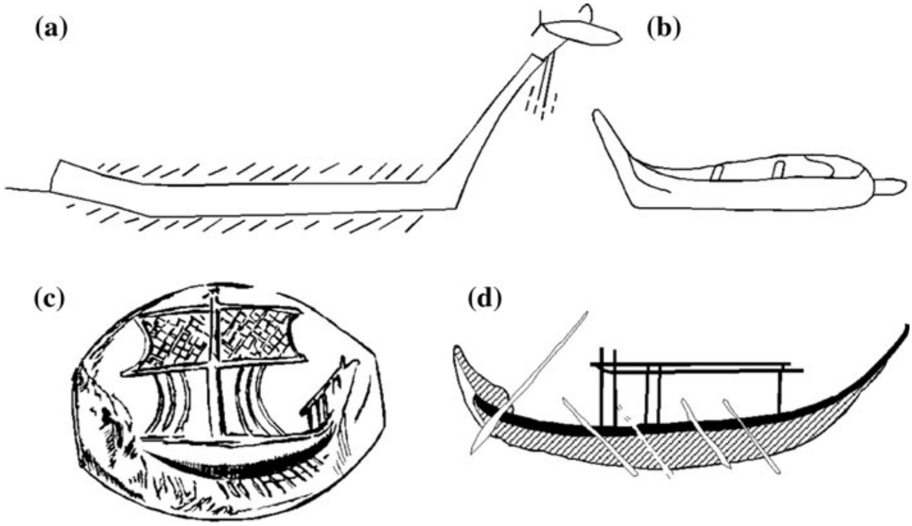

Fig. 2 Depictions of Greek Bronze Age boat types (not to scale). **a** Early Cycladic longboat (after Coleman 1985: fig. 5.18). **b** Early Minoan clay boat model from Palaikastro, Crete (after Bosanquet and Dawkins 1923: fig 3k and 4). **c** Late Minoan seal depicting a vessel under sail. The hatches below the boat probably indicate oars (after Casson 1995: fig. 39). **d** Rowed ship in South Miniature Frieze, Akrotiri, Thera (after Doumas 1983: 121, fig. 20). All illustrations redrawn by the author

1998) (Fig. 2). Linear B tablets as well as contemporary shipwrecks pay witness to the use of boats for transporting livestock, people and commodities (Bass 1987; Palaima 1991: 276–279; Pulak 1998; Hadjidaki 2011). While coastal fishing can be done either directly from the shore or from a small paddled boat or raft, the existence of seaworthy ships is a prerequisite for a targeted exploitation of the sea. As both types of vessels existed, an exploitation of both coastal waters and offshore was possible in principle.

Exploiting the Sea

While the Mediterranean's wealth of marine life has been a hotly debated topic for several decades with opinions varying from 'negligible' to 'substantial' (e.g. Bekker-Nielsen 2005; Gallant 1985; Jacobsen 2005; Powell 1996), there has been surprising little work on and synthesis of the actual prehistoric fishing equipment. Neither are there references in the Linear B tablets to fish or fishermen (Palaima 1991). The most thorough analysis of these objects during prehistory therefore remains that by Powell (1996). Based on excavated small finds, bone remains and iconography, Powell has been able to identify four methods for which evidence exists that they had been employed by prehistoric fishers in the Aegean (1996; see also Buchholz et al. 1973): (1) Collecting, diving and spearing (minimal equipment requirements; targeting primarily littoral species); (2) Fishing with traps (probably temporary traps only; targeting primarily littoral species); (3) Fishing with nets (most labour- and equipment-intensive method; potential for use inshore and offshore), and (4) Fishing with hook and line (undertaken both from shore and offshore) (Fig. 3). Comparable to evidence from seafaring, the fishing equipment discovered and the fishing techniques extrapolated from them indicate the potential of fishing activity both inshore

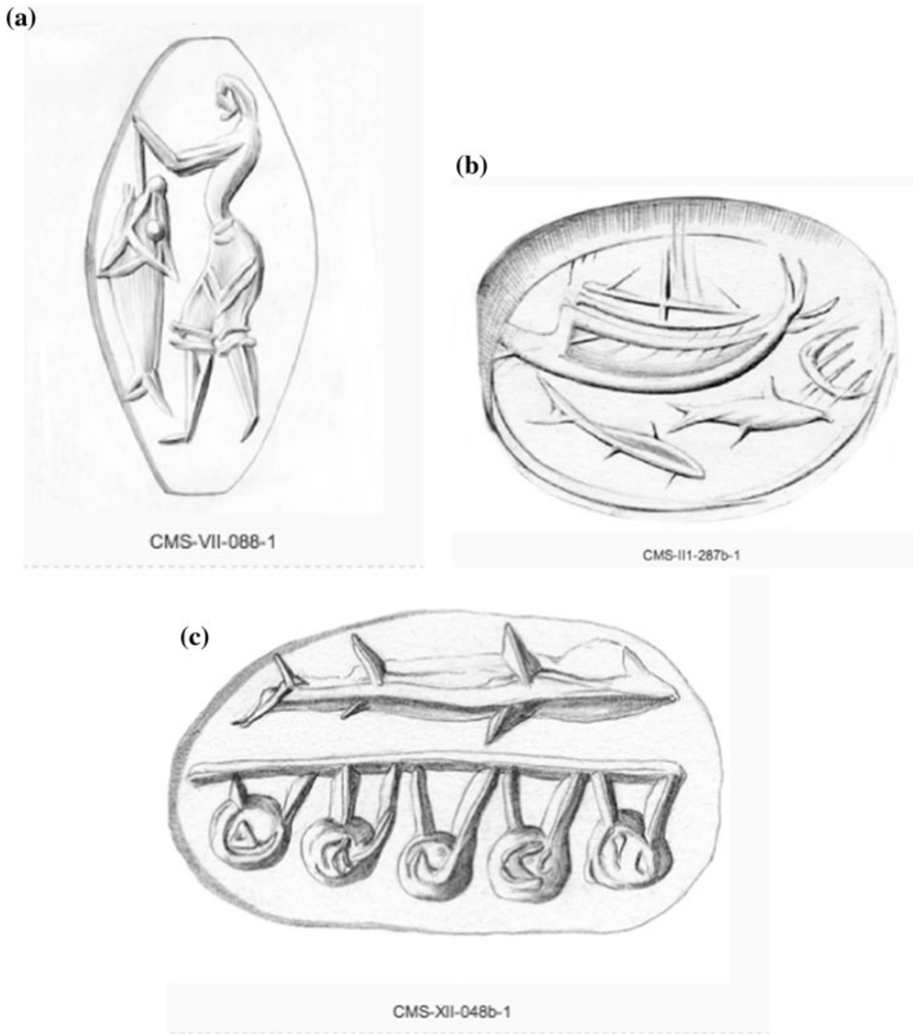

Fig. 3 Depictions of fishing methods (not to scale). **a** Line-fishing, CMS VII 88. http://arachne.uni-koeln.de/item/marbilder/4398183; **b** Fishing with nets? CMS II,1 287b. http://arachne.uni-koeln.de/item/marbilder/4371064; **c** Fishing with traps? CMS XII 48b. http://arachne.uni-koeln.de/item/marbilder/4407166

and offshore: while collecting and trapping are techniques employed near the shore, netting and line fishing equipment could also be used for catching pelagic species. Regardless of the technique employed, a good understanding of fish habitat and behaviour was essential for fishermen to be successful (Powell 1996). Not unlike evidence for seafaring, fishing equipment indicates the versatility of methods utilised by prehistoric communities. Despite the potential for both inshore and offshore fishing, the archaeozoological record does not document the existence of offshore fishing; the isotope evidence highlights the relative infrequency of fish consumption in general.

Knowing the Sea

With the exception of decorative motifs, Bronze Age evidence of marine creatures in other media or material forms is sparse: a fish symbol is recognised in Linear A (Powell 1996). Linear B tablets refer to domesticated animals, cereals, fruits and spices with regular frequency, but are silent on marine animals. Shells and, possibly, octopuses are mentioned on Linear B tablets only indirectly as furniture adornments and vase decorations, though the deities Poseidon and Posidaeia are referenced directly (Fischer 2003; Neumann 2006; see also Palaima 1991 for maritime matters in Linear B more generally). In contrast to the written evidence are the plentiful uses of marine creatures as decorative objects and motifs. Recalling directly the natural sea world are stone, terracotta and faience triton shells which are predominantly found on Crete; the best known example is the stone triton shell-rhyton from Malia (Darcque and Baurain 1983). In addition, considerable numbers of individual examples and caches of real triton shells are known from Crete, the Cyclades and Kythera from the Early Bronze Age onwards (Karali 1999; Reese 1990). Depictions of marine life have been part of Minoan iconography since the Middle Minoan period and have been found on seals, pottery, reliefs, stone vases, metal work, faience and wall paintings (Furumark 1941; Hiller 1995; Morgan 1988; Niemeier 1985; Saunders 2008). They became particularly prevalent in the LM IB period with the so-called Marine Style which concerns itself exclusively with marine motifs (Betancourt 1977a, b, 1985; Mountjoy 1974a, b, 1983, 1984; Müller 1997; Bradfer 2000). The most frequent motives are octopuses, argonauts (*Argonauta argo*) and triton shells; fish are extremely rare (Fig. 4a). Intriguing local ideosyncracies and diachronic changes can nevertheless be detected across the Aegean and hint at an underlying complexity in relationships to the sea: for example, eight out of 37 representational wall paintings from four Aegean island sites have marine depictions. In contrast, only three Cretan wall paintings (out of 71) depict marine imagery, and all of these could be argued to be dated to the post-LM IB destruction (Haysom 2011). The presence of marine iconography on Cretan naturalistic seals is equally complex with their numbers declining in the Neopalatial period while they become a very popular motif on talismanic sealstones (Haysom 2011).

Analysis of the Marine Style imagery (Berg 2011) demonstrates that, if painters had any true knowledge of these species, their habitat and behaviour, they chose not to depict it. While the painted octopus bears some resemblance to the wild creature, argonauts are depicted upside-down with no apparent knowledge of the octopus inhabiting the shell. The same applies to the painted triton shell that is also depicted upside-down without the snail that inhabits it. While these depictions can conveniently be explained in terms of pictorial stylisation, the apparent lack of knowledge—especially in relation to the pelagic species (i.e. argonaut and triton shell)—may also indicate a real lack of understanding of these species. As the patterning of the shells is depicted with some accuracy, but without any knowledge of the animal inhabiting them, it is likely that painters gained their knowledge from shells washed up onto the beaches. With regard to the painting style, the animals are being portrayed (e)motionless in a purely stylised fashion that does not show any evidence of gender classification, human-animal interactions, nor animal-animal interaction. The choice of animal appears to be based on how well it complements the vessel shape (octopus are utilised for globular vases, upside-down triton shells for lower sections of narrow or conical shapes and star fish for upper sections) (Fig. 4b). With their selection being determined by shape rather than any particular meaning specific to individual motifs, one has to wonder whether the importance of these images lay not in the choice of motives (which appear to be interchangeable in principle) but in their reference to the one element they all shared: the sea.

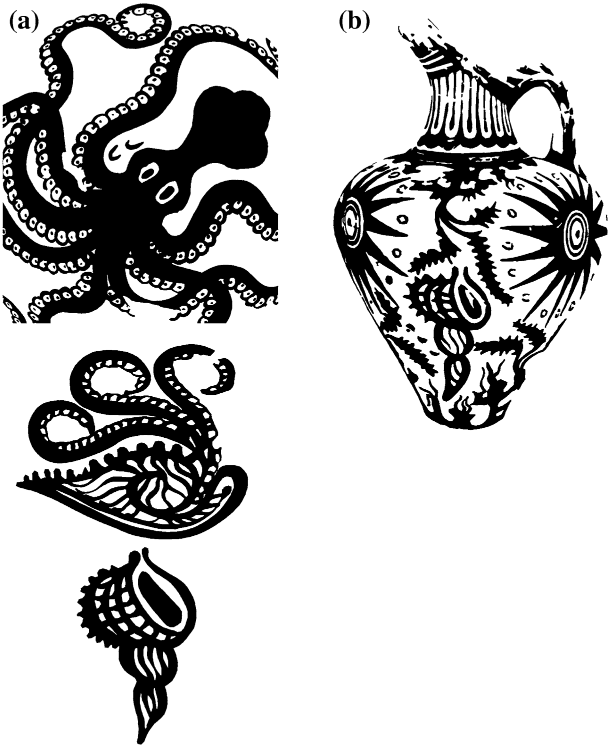

Fig. 4 Marine Style imagery. **a** *Top* to *bottom* octopus, argonaut, triton (after Betancourt 1985, pl. 20G and Pendlebury 1939, 206, fig. 37). **b** Beaked Marine Style jug. Three starfish with spray and tritons between. Mallia. House Zb (after Mountjoy 1984: pl. 17a, no. Mallia 4). All illustrations redrawn by the author

The Sea is Death and Life

Drawing on Semonidis' quote, most of us acknowledge that the sea has a changeful nature that oscillates between negative and positive emotions—with life and death signifying the two extremes. The archaeological, scientific and iconographic evidence presented above indicates that prehistoric communities shared an unease about the sea: on one hand, people traverse the sea with smaller and larger boats, consume marine food and utilise sea creatures as prominent decorative motives. On the other hand, people turn their back on the sea by following a predominantly terrestrial diet, and display limited knowledge about marine animals, their habitat and behaviours. This section provides concrete examples from the Greek Bronze Age where the two contrasting dimensions of the sea are expressed through patterning in the archaeological record. Literary sources from historic periods are juxtaposed with the material evidence as general comparanda in order to stimulate imagination and discussion, and evoke and provoke a range of possible interpretations.

The Tossing and Raving Sea

The tossing and raving sea represents the daily dangers that sailors, fishermen and travellers encounter; the ease with which the sea changes its mood and the profound uncertainty we experience when gazing into its depths accentuate our uncertainty about this medium. It is therefore hardly surprising that sea is frequently associated with death.

There is sufficiently strong evidence from the Post-palatial period (ca. 1480–1050 B.C.) to suggest that an association of the sea with death—and the marine creatures that inhabit it—is also visible in the Bronze Age Aegean (Watrous 1991). In this period, octopuses, argonauts, dolphins, boats and marine vegetation appear prominently on burial larnakes (Fig. 5). Larnakes have not yet received the scholarly attention that they deserve and estimates vary between 200 and 500 for Crete and the mainland between LM II and LM IIIC. Based on her own research Saunders (2008) has been able to identify 167 Minoan and Mycenaean complete or largely complete LM III larnakes of which 125 carry marine imagery as the primary motif (Table 5). Being the most popular motif type, the symbolic meaning of marine creatures (and indeed the sea in general) has been argued to reference beliefs about life after death and may indicate the journey across the sea to the Afterworld or a belief in regeneration—as indicated by an octopus's ability to re-grow limbs (Watrous 1991; Hiller 1995; Saunders 2008). As Petrakis (2011) has argued, the use of marine motifs (dolphin, octopus, fish) in *floor* decorations at LM III Knossos and Ayia Triadha as well as LH III Pylos, Mycenae and Tiryns beautifully portrays the symbolic depth of the sea and hence the animals' distance from the living (also Koehl 1986; Shaw 1997, 488 with references) and can be distguished from human maritime activities which are portrayed on walls. These examples raise the interpretative possibility that the sea was perceived as powerful liminal place; one that separates life and death and has to be crossed by the deceased before they can reach their final resting place.

The association of the sea with death is a common theme in many cultures from the Pacific and Caribbean to the Atlantic and the Mediterranean Sea (e.g. D'Arcy 2006; van de Noort 2011; Westerdahl 2006). This remarkably cohesive perception of the sea is no doubt rooted in the realities of living by and on the sea. Calamities in the world's oceans and the Mediterranean Sea have contributed to our perception of the sea as a truly dangerous place. Even nowadays, trawlermen have the highest death-rate of any profession in Britain. In

Fig. 5 Postpalatial larnax with marine imagery at the Archaeological Museum at Rethymnon, Crete (after Mavriyannaki 1972, n. 6, plate 17)

Table 5 Motif choices for LM III painted larnakes (based on Saunders 2008: Appendix 3)

Motif	Quantity
Representational marine imagery	
Octopus	54
Tentacles	23
Fish	21
Argonaut	14
Seaweed	6
Water-bird	3
Boat	2
Urchin/anemone?	2
Seal?	1
Turtle	1
Crab	1
Shell	2
Abstract marine imagery	
Wavy line/border	12
Tricurved arch	7
Spiral	15
Zigzag	5
Other	
Marine motifs as secondary motifs only	5
Non-marine motifs	37

N = 167 of which 125 with marine imagery as primary and 5 as secondary motifs. Multiple motif choices possible

1998 alone, there were 366 accidents, 26 vessels lost at sea and 26 fatalities (O'Hanlon 2004).

Drawing on a wide variety of literary, iconographic and archaeological evidence, Dölger (1922) summarises the available evidence of fish as a prominent symbol of death in Greece and the western Mediterranean. Plutarch, for example, states that fish are unsuitable for sacrifices to deities and should not be used by seers because they inhabit the same realm as the godless titans, lack rational thought and appear to be more dead than alive (*De Sollertia Animalium,* 22). In Homer, fish, eels and seals are intimately associated with death, either by causing harm to other sea creatures and humans (*Odyssey* V 420–422; XII 91–95), or by feasting on the dead (*Iliad* XXI, 120–128, 200–203; *Odyssey* XV 480–481; cf. Buchholz et al. 1973). Outside Greece, sacrificing fish to the dead is well documented in the literature, inscriptions and monuments of the Near East, Macedonia, North Africa, Gaul, Italy and the Balkans from 2000 B.C. into the Christian era (Dölger 1922, 447). Marine creatures, as inhabitants of the sea, are thus associated with the menacing dimension of the sea and, separate from it, appear to have their own funerary message to convey. Because of these negative associations, consumption of fish was governed by dietary taboos, leading to some or all species becoming 'inedible' (Purcell 1995; Mylona 2008a, 107—see the example of dolphins; Malainey et al. 2001).

The fact that fish were virtually absent among the Late Minoan IB Marine Style motifs may provide a first tentative indication that Bronze Age communities did not conceptualise the sea as a monolithic unified element but rather as a place where octopus, argonaut and triton shell inhabited one realm while fish lived in another. Since we know that Marine

Style images depict both littoral and pelagic species and since we can assume with some certainty that fish, molluscs and shellfish were all eaten, the only apparent difference between fish and other marine creatures lies in the proximity of octopuses, tritons and argonauts to the sea floor—a space further removed or, at least, different from the realm inhabited by fish.[4]

A division of the sea into different activity zones, symbolic spaces and spiritual worlds is a commonly recurring phenomenon across all oceans with different animals, ancestors, gods or mythical creatures associated with each zone or layer (D'Arcy 2006; Steinberg 2001). A synthesis of existing literary evidence for the Mediterranean indicates that separation is often visible between those animals able to rise to the surface (fish) and those living on the sea floor (octopus, polyp, eel) (Dölger 1922). This is reflected in dietary taboos which stretched to all sea creatures, but were much more stringent for the latter group as they were perceived as morally unclean (Barnabas, *ep.* 10.5). Unable to rise to the surface and breathe the air, they were unfree spirits (Origines, *In Leviticum Homilia* VII, 7; Philo, *De Specialibus Legibus* IV I §§ 110–112). Able to change colour to ensnare their prey, the polyp, octopus, jellyfish, nautilus, and argonaut became symbols of deviousness and deceitfulness (Aristoteles, *De Animalibus* IX 37; Artemidoros, *Oneirokritika* II 14). A division of the sea and its inhabitants is also well known from Homer who lists eels and seals as a separate category from fish (*Odyssey* XII, 95; XV 480; *Iliad* XXI 203, 353). Other examples are provided by the philosopher Philo of Alexandria (*De Specialibus Legibus* IV 7 §§ 110–112) and the early Christian scholar Origenes (*In Leviticum Homilia* VII, 7) who distinguish between fish that have scales and fins and those that do not. A modern Icelandic example of such a cosmological subdivision is described by Pálsson (1990: 124–125). Here, mythical and real sea creatures are subdivided into 'fish' (sea-women, salmon, trout) and 'nonfish' (seals, otter, sea-dogs, mermaids, sea-men, whales).

The Calm and Benevolent Sea

On the other hand, there is also evidence from the Bronze Age of the positive, beneficial connotations of the sea. Our first example concerns the individuals from the Mycenae Shaft Graves whose isotope analysis demonstrates that they regularly consumed marine food—in stark contrast to their contemporaries who all followed a land-based diet. In combination with their more robust bone structure, their better oral health, their greater height, their heavily meat-based diet in comparison to contemporary individuals (Table 6; Angel 1973; Richards and Hedges 2008) and the association of their extraordinarily rich graves with the emerging palatial elite of Mycenae, the increased consumption of marine food by several Shaft Grave individuals appears to indicate an intentional and conspicuous consumption activity (Table 4). Given the general lack of fish in Bronze Age peoples' diet and the distance of Mycenae (ca. 15 km) from the coast—sufficiently distant to make regular and ample provision of freshly caught, unspoilt fish doubtful—it is likely that it was the positive, status-enhancing values that were being drawn on by the Shaft Grave individuals.[5]

The two 'fisherman' frescoes from the West House at Akrotiri, Thera, provide our second example of the more positive associations of the sea (Televantou 1994). Each of the two fresco panels depicts a central male holding several large fish (Fig. 6). The fish have

[4] Strictly speaking, argonauts live near the sea surface, but since they are depicted as octopuses, they apparently were perceived as bottom-dwellers.

[5] A Late Roman example for status-related fish consumption is offered by Richards et al. 1998.

Table 6 Comparison of age of death and height at contemporary Greek mainland sites (Mycenae: Angel 1973, 1982; Asine: Angel 1982; Lerna: Angel 1971)

Site	Time period	Average age of death		Average height (m)	
		Male	Female	Male	Female
Mycenae, Shaft Graves	Middle Helladic–Late Helladic I	35.5	34.3	1.72	1.59
Asine	Middle Helladic	35.4	30.4	1.65	1.54
Lerna	Middle Helladic	37	31	1.66	1.54

been identified as dolphinfish and small-sized tunnies respectively (Economidis 2000; Rose 1994). Recent interpretations view the frescoes in light of the building's overall pictorial scheme and infer the depicted fishermen to be participants in rites of passage rituals (Doumas 1987). The unusual accuracy of the depiction, the identification of the painted fish as pelagic, and the complete lack of pelagic fish in Akrotiri's actual bone assemblages have led Mylona to interpreted the frescoes as unique (2000). Regardless of whether the fish were intended to portray offerings to deities or depict the fishermen's ability to complete ritual tasks successfully, they most likely convey positive associations, such as fertility, display of great skill, and an ability to engage safely with the—potentially harmful—sea.

Positive and beneficial connotations of the sea can be witnessed worldwide and represent the ever-present 'other emotion' of the sea (D'Arcy 2006; Steinberg 2001). This positive emotion is also apparent in later literary sources where the sea is known to be rich in fish (Plutarch, *Quaestiones Convivales* V 10, 4). Homer, for example, frequently uses the expression "fishy sea" or "fishy deep" (*Iliad* IX, 5; XVI, 746; *Odyssey* III, 177; IV, 381; IV, 424; IV, 470; IV, 517; V, 420; IX, 83; X, 458; X, 540). As a result, fish came to be seen as a symbol of fertility (Aristoteles, *Περι ζωων γενεεως* III, 19). Thus, despite their ambiguous status, all fish were edible in some instances (Mylona 2008a; Laderman 1981) and served as a convenient seasonal supplementary food. However, their social value was generally low and fish consumption has been associated with the poorer classes especially when compared with the lifestyle of agriculturalists (e.g. Lukian, *The Cockerel* 22; Purcell 1995, 135–136). Fish is food for the poor also in Homer and is eaten by the heroes only as a last resort when no other food was available (*Odyssey* IV, 360–369; XII, 327–332; Scott 1917, 1923; see also Radcliffe 1921; Rose 1994; Davidson 1998, 11–20). While analysis of the discourse of fish in Attic comedies demonstrates that fish was available to and was eaten by every societal class (Wilkins 2000), unusually rare fish, exceptionally large catches or large freshly caught single individuals turned fish into fitting symbols of wealth and luxury, signifying skill and luck in a broader sense (Horden and Purcell 2000, 194; Purcell 1995; Ervynck et al. 2003; Wilkins 2000).

The Two Faces of the Sea

Despite access to technology and equipment potentially suitable for the exploitation both of the littoral range and the open sea, Neolithic and Bronze Age communities in the Aegean display a marked decline in the consumption of marine foods in comparison to Mesolithic sites. Marine food was no longer a major contributor to the diet. If consumed at

Fig. 6 The 'Fisherman' frescoes from the West House at Akrotiri, Thera (Doumas 1992: pl. 19). Permission granted by the Thera Foundation

all, it became a mere supplementary dietary source—comparable to other seasonally available foods. Fish caught are inshore species only and represent a noticeably reduced range of taxa.

Explanations for the dramatic change from marine-oriented Mesolithic communities to the terrestrial diet of Neolithic people revolve around the great symbolic value of the newly available domesticated and, hence, controllable food sources as a potent indicator of access to prestigious exchange networks (Papathanasiou 2003; Schulting and Richards 2002; Thomas 2003). This consequently led to a deliberate rejection of low-value marine resources. Such food prohibitions have also been observed in comparable scenarios, such as the replacement of deer with domesticated food supplies in the British Neolithic where they have been interpreted as representing an emerging contrast between the tame (new, exotic) and the wild (traditional); with the former being used especially in highly visible social activities (Thomas 2004: 120–121).

If a similar explanation is accepted also for the observed changes between Mesolithic and Neolithic Greece, then one might have expected a loss of prestige for terrestrial foods over time and a resulting re-appraisal of marine resources once the food innovation had spread and had become an accepted way of life in the Bronze Age. However, no such change can be observed and terrestrial foods appear to 'hold their value'. Being comparatively reliable in their annual output, readily available and relatively easy to grow, it is not difficult to appreciate why Bronze Age people continued to value terrestrial food plants and animals greatly and assign positive symbolism to them—long after they had lost their significance as an exotic innovation.[6]

In contrast, then, stand marine resources. Where cereals and pulses represent a new food, fish and molluscs represent a lifestyle of a bygone age, the Mesolithic. Where cultivated plants and domesticated animals make food supplies reliable and predictable, marine foods are outside the control of humans and are thus inherently unreliable as they can vary unpredictably from season to season. Where crops can be grown in large quantities, fish are often available only in smaller quantities. Molluscs may be plentiful, but their nutritional value is low even when consumed in large quantities. Finally, terrestrial plants are easily accessed, planted, maintained and harvested. In contrast, catching deep-sea fish, in particular, requires additional knowledge of boats, navigation and animal behaviour.

Instead of being merely a response to a changing environment, the observed decrease in marine food intake appears to precipitate major shifts in how people made sense of the world around them. It is likely that this symbolic devaluation of marine foods, combined with their more labour-intensive provision, contributed to the observed negative associations, eventually resulting in food taboos. However, taboos surrounding marine animals, argues Purcell, are not inherently about this food source, but rather about the sea which is perceived as an ambiguous and potentially hostile 'other' (1995: 134). The unpredictability of the sea and its food supply go a long way in explaining the ambiguous beliefs and frequent taboos entangled within marine food consumption. Like the sea that is both threatening and life enhancing, marine foods encompassed equally diverse dimensions from flesh-eating monsters to a status-enhancing food sources. The two dimensions of the sea, and our human ambiguity towards it, are thus beautifully illustrated by the general lack of marine food consumption by Greek Neolithic and Bronze Age communities, while, at the same time, being intentionally consumed by the Mycenaean elites and proudly displayed by the Akrotiri fishermen to signal their prowess in overcoming danger and death.

It is very likely that other differentiations and zoning existed, such as a distinction between coastal and deep waters, rocky and sandy costal environments, salt water and fresh water, or calm and turbulent water sections. If they did, their importance to prehistoric communities is certain, though their specific meanings are currently beyond our grasp.

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[6] Cycles of decline and resurgence of marine food consumption can be observed in many periods and regions, such as Classical and Roman Greece (Mylona 2008a), the Iron Age and post-medieval northern Scotland (Schulting and Richards 2002: 166); early and late medieval Germany, Italy, Belgium and the UK (Salamon et al. 2008); Pictish and Viking Age Scotland (Barrett et al. 2001).

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