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PERILOUS WATERS: EARLY MARITIME TRADE ALONG THE WESTERN COAST OF THE BLACK SEA (FIFTH MILLENNIUM BC)

Summary. *A heavy accumulation of exotica and valuables, such as gold, copper, carnelian and Mediterranean shells, distinguishes the Black Sea littoral from other parts of the east Balkans in the fifth millennium BC.*[1] *Recent discoveries shed new light on the trading connections of the coastal communities and indicate that maritime activity was germane to the origin of their extraordinary wealth. This article investigates the involvement of the coastal inhabitants with the sea. It addresses the ecological conditions and the technical parameters of prehistoric seafaring on the west coast of the Black Sea, considers the remains of marine species in the faunal record as an indication of maritime experience, and examines the artefactual record for signs of movement of goods and people between the coastal communities. The combination of these separate lines of evidence points to a maritime trading route joining the resource-poor north with the resource-rich south of the littoral in the Chalcolithic period. Moreover, it implies that sea-borne trade not only enabled the accumulation of material wealth, but also was pivotal for social change.*

INTRODUCTION

> At that time this sea was not navigable, and was called Axine (inhospitable) because of its wintry storms and the ferocity of the tribes that lived around it, and particularly the Scythians, in that they sacrificed strangers, ate their flesh, and used their skulls as drinking-cups; but later it was called 'Euxine' (the hospitable), when the Ionians founded cities on the seaboard.
>
> Strabo, *Geography* 7.3.6

The maritime history of the Black Sea is brief in comparison to the Mediterranean. Organized maritime trade in the Black Sea began with the Greek colonization in the seventh century. However, the western littoral was already dotted with numerous farming villages long before the arrival of the Greeks. The material culture of these early prehistoric communities was

1 All dates are BC.

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remarkably rich in exotica and valuables, such as gold, copper, carnelian and Mediterranean shells. There is still no comprehensive and satisfactory explanation for the extraordinary habits and the anomalous concentration of wealth on the north-west Black Sea coast in the fifth millennium, best illustrated by the spectacular cemetery of Varna (Ivanov 1991). Has a network of maritime trade pre-dating the Greek cities by several millennia escaped our attention?

Researchers have dedicated much effort to studying the social and economic aspects of the archaeological record in the coastlands (Todorova 1978; Renfrew 1986; Chapman 1991; Todorova *et al*. 2002; Chapman *et al*. 2006; Nikolov 2010), but have given little consideration to the sea. The absence of a 'maritime outlook' in the archaeology of the eastern Balkans is a significant gap and it is certainly one of the reasons for the lack of any satisfactory explanations for the 'Varna phenomenon'. Recent provenance studies and fieldwork have provided evidence for a reconsideration of this problem: isotopic research of copper artefacts revealed the importance of the coastal deposits of copper in the Strandzha Mountains, while recently published rescue excavations at sites in the southern part of the Bulgarian coast have added new insights into the material culture of this poorly explored area.

The aim of the present study is to reconsider the maritime context of the Chalcolithic culture on the west coast of the Black Sea and to establish whether maritime trade is a viable explanatory model for its unique character. It focuses on the coastal zone between the delta of the Danube and the Bosporus at the end of the sixth and especially in the fifth millennia.[2] The paper consists of three parts. Firstly, it addresses the environmental and technical conditions of prehistoric seafaring in the Black Sea. Secondly, it considers indirect evidence for maritime activities, such as site location and size, community organization, and the presence of sea-related finds in the habitation deposits (fishing gear, remains of fish and sea mammals, evidence for marine foods in the diet), in order to understand the role of the sea in everyday life. Thirdly, the study explores the archaeological record for the presence of non-local materials and artefacts to demonstrate the movement of goods and people on water on an inter-regional scale. Finally, I discuss the form of such activities, for example colonization, short-distance interaction, and long-distance explorative and trading expeditions, and question their importance for shaping daily social life and notions of prestige and power in Chalcolithic society.

2 For the relative chronology of the Neolithic and Chalcolithic periods in the east Balkans see Todorova 1986, Todorova *et al*. 2002, 39. For radiocarbon dates from well-defined stratified sequences in settlement mounds in the interior of north-east Bulgaria see the work of Boyadziev (Görsdorf and Boyadziev 1996; Boyadziev 2005). New AMS dates from Varna I seem to contradict the traditional chronology of the coast and put this cemetery in the middle of the fifth mill. cal BC (as opposed to its previous date around 4200 cal BC) (Higham *et al*. 2007). However, they are not completely incompatible with previous radiocarbon research. Boyadziev observes an inconsistency in the values of radiocarbon measurements from fifth mill. strata in the east Balkans: the measurements date the MC period around 5800 to 5600 BP, the middle phase of the LC (LCII) between 5500 and 5400 BP, and the final phase of the LC (LCIII) again *c*.5800 to 5600 BP (Boyadziev 2005, 65). Similar contradictory values have been observed in other parts of the Balkans (Bojadžiev 2002, 69), including the Black Sea coast. In the latter region, human bone samples from late LC graves at Durankulak and wood samples from the LC settlement at Poveljanovo also give 'Middle Chalcolithic' values (Bojadžiev 2002; Higham *et al*. 2008, 107). If Boyadziev's observation is correct, an anomaly in atmospheric ^{14}C seems a plausible explanation for the high values of LCIII datings. Thus, no re-dating of Varna I to the middle of the fifth mill. is necessary.

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BACKGROUND AND CONCEPTS

The Chalcolithic period (fifth millennium) witnessed the apogee of the technological and social traditions that came into being with the establishment of the first farming villages in the east Balkans in the late seventh millennium. Metallurgy, lithic technology and painted pottery attained unprecedented sophistication. Among the Chalcolithic sites, the cemeteries on the north-west littoral of the Black Sea have provided the largest concentrations and the most complex expression of material wealth.

It is not only the accumulation of valuables that distinguishes the seaboard from the interior. Ceramic wares in the littoral zone are distinct both in fabric and style (Todorova and Tončeva 1975; Todorova 1978, 138, 140) (Fig. 2). There are also clear differences in the shapes of clay female figurines, lithics and heavy copper tools (Todorova 1986, 149–50; Todorova and Vajsov 1993, 146–7). Most striking, however, is the contrast between the burial customs on the north-west coast and in the interior of the east Balkans. While in the hinterland all the deceased were buried in a flexed position on their left side, the coastal communities practised burial in an extended supine position (initially for both sexes, but in the later fifth millennium only for males) and in a flexed position on the right side (for females) (Todorova 1986, 195).

A plausible explanation for the distinctiveness of the coastal assemblages is the remoteness of this region, its marginality in relation to the core of early farming settlement in the interior of the eastern Balkans and, not least, seafaring. Yet we know hardly anything about the role of the sea in the economy and lifestyle of the prehistoric coastal inhabitants. Researchers tend to overlook the importance of maritime interaction in the west Black Sea during the earlier prehistoric periods. References to the sea are few and very general. For example, in a recent article about the social context of the cemetery of Varna I, Chapman *et al*. explore the role of exchange networks, but do not even mention sea-borne trade (Chapman *et al*. 2006). Similarly, while discussing the trade in salt and valuables around Lake Varna, Nikolov (2010, 490) recently stated that 'the seaway could have hardly played an essential role in the economic prosperity of the lake-near community during the Middle and Late Chalcolithic'. It is furthermore striking that an article dealing with the 'West Pontic maritime interaction sphere' by Price concentrates solely on the comparison of coastal and inland assemblages and questions neither the parameters of prehistoric seafaring in the Black Sea nor the archaeological evidence for maritime contacts (Price 1993).[3] A rare exception among east Balkan researchers is Todorova, who speculates that the faster development of the coastal societies in comparison to those in the interior was the consequence of sea-borne trade in copper; however, the author does not address the form of the assumed maritime activities in any detail (Todorova 1978).

One of the reasons for understating the importance of seafaring in the Chalcolithic period is that the archaeology of the Black Sea littoral is poorly documented and published. Yet a more significant obstacle is the land-based perspective of archaeological research in the east Balkans. Since theoretical approaches for studying coastal societies in the Black Sea are yet to

3 Frey (1991) also addressed the question of water transport; his article is possibly the only one assessing the parameters of seafaring in the prehistoric Black Sea (types of boats, navigation knowledge, personal contacts, security). However, his interpretation of the maritime context of the cemetery at Varna is flawed by the use of unreliable provenance data for copper and gold (based on the chemical composition of copper and gold, he concludes that Varna was a trading port receiving gold from the Caucasus and exporting Thracian copper to the steppes of Eurasia).

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be developed, in this article I employ and adapt approaches established for the prehistoric Aegean, particularly from the work of Broodbank (Broodbank 1989; 2000). In his inspiring study of the prehistoric Cyclades, Broodbank maintains that the most appropriate way to comprehend coastal societies is through a maritime perspective (Broodbank 2000, 2). He argues for the need to build models for 'how the sea was used, by whom, for what objectives, over what distance, at what cost, and how often' (Broodbank 2000, 34). In practice, this means studying subsistence remains as an indication of exploitation of the sea, assessing the evidence for movement of people, objects and raw materials, and using geographical conditions, weather and currents for estimating routes and distances of sea travel. Broodbank also draws extensively on oral histories, testimonies of navigators and ethnographers' accounts, and on archaeological research in other parts of the world to understand the possibilities and limitations of pre-modern seafaring. Broodbank's study is primarily concerned with islands and insularity. Nevertheless, his informed approach is applicable to other prehistoric coastal contexts.

SEAFARING PARAMETERS

This study includes the coastal area stretching from the delta of the Danube to the Bosporus. Since the west Black Sea is nearly devoid of islands, prehistoric sea expeditions necessarily followed the coast. The northern part of the littoral is low, featureless grassland; the coastline is unindented and shows few landmarks. Terraces with steeply falling slopes, shaped by landslides, are the most characteristic feature of the coastal geomorphology. Wide sandy beaches offer convenient landing places for boats, while coastal lakes provide protected harbours. The southern part of the coast is much more diverse, with small bays, headlands, and marshy river mouths. Its southernmost part is backed by the forested slopes of the Strandzha Mountains rising at times up to 400 m directly behind the shore. Alluvial deposition has changed the west Black Sea coast only insignificantly, since no major rivers flow into the sea south of the Danube. In contrast, fluctuation in sea level, caused by global warming in the Early and Middle Holocene, and tectonic movements, must have had a major impact on the shape of the shoreline (Orachev 1990; Filipova-Marinova and Christova 2001). Series of submerged prehistoric sites in the bays and coastal lakes testify that the sea level in the sixth and fifth millennia was lower than it is today.

The Black Sea is notorious for its storms and severe winters. Waves are below 100 cm only during the months of May, June and July. Strong winds and storms are frequent in winter and river mouths and lakes may freeze. Poor land visibility in foggy weather is another problem. The only months free of fog are June, July and the beginning of August (Meteorological Office 1963). Thus, the seafaring season in the Black Sea is shorter than in the Mediterranean.

The large rivers to the north of the Black Sea empty huge water masses into the sea and create a constant surface current along the west coast running from north to south. In the opposite direction, from south to north, there are only temporary and largely unpredictable coastal currents (The Black Sea Pilot 1884). In addition, steady northerly winds blow throughout the year. In late summer the predominant northerlies are replaced by a south wind for a few months, only to reappear in early winter (The Black Sea Pilot 1884, 4). While weather patterns and currents in the Early and Middle Holocene cannot be reconstructed with any certainty, it appears likely that in general terms they did not significantly diverge from present-day conditions.[4]

4 Climate in the sixth and fifth mill. was warmer and winters must have been somewhat milder.

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In summary, meteorological conditions, winds and currents limit the seafaring season for small boats in the Black Sea to several weeks in summer. They greatly facilitate voyages to the south, while travel in a northerly direction may be problematic. The geographical conditions described above suggest that navigation in coastal waters with land in sight was easy, provided the mariners possessed an exact knowledge of weather, currents and landmarks, and the necessary seafaring skills for a rough and unpredictable sea.

There is no direct archaeological evidence for seagoing watercraft from the Chalcolithic period in the Black Sea littoral. Nevertheless, we can deduce some of the characteristics of such crafts from the maritime environment outlined above. Rafts, as emphasized by McGrail (1985, 294), are used for near-shore movement at sea only in the warmer zones; they are not suitable for the Black Sea.[5] In historical times the inhabitants of the Black Sea littoral used boats and this must also have been the case in prehistory.[6] The ethnographic record provides evidence for an impressing diversity of boat shapes, constructions and materials; use of materials and shapes is, however, not completely contingent but seems to correlate approximately with ecological conditions. For example, seagoing skin boats are preferred north of 50°: it is crucial to stay dry in cold waters and therefore to have as little water as possible entering the boat (Johnstone 1988, 36–9, map 4.1), and skins are more suitable for constructing deep hulls than a log or bark. Dugouts and bark boats are preferred in more southern zones, such as the Black Sea and the Mediterranean.

Two types of seagoing logboats have been suggested for the prehistoric Aegean, large canoes and smaller paddled boats (Broodbank 2000, 101–2; McGrail 2001, 105).[7] It is uncertain whether the inhabitants of the Black Sea coast built large slender canoes of 15–30 m in length, comparable to the vessels depicted on Cycladic ceramics of the third millennium (Broodbank interprets the latter as fast canoes for warfare and ritual expeditions, costly to produce and needing abundant manpower to operate). We can, however, assume the use of smaller all-purpose vessels of 4 to 6 m in length, for a crew of one to four people and a possible cargo of up to 150 kg (Broodbank 2000, table 3).

Broodbank (2000, 102) has used accounts of early travellers in the Pacific to estimate the speed and daily range of such small seagoing vessels in prehistory. He suggests a maximum speed of about 5 km per hour, and a realistic daily distance of 20 km. Taking into consideration the meteorological conditions, winds and currents in the west Black Sea outlined above, and scheduling conflicts (with agricultural activities, especially harvesting), between four and six weeks in July and early August remain free for voyaging. If Broodbank's estimates are correct,

5 Between latitudes of 40°N and 40°S. In colder waters wash-through by waves and wind throws water on the raft; clothes and the human body cool down fast making sailing very strenuous and not possible for longer journeys.

6 The earliest finds of models and actual boats in the Black Sea date to the Bronze Age. Porozhanov mentions clay models of boats from Sozopol and Urdoviza (Porozhanov 2003, 315–16); furthermore, near Ezerovo-Boaza in Lake Varna were recovered the remains of a wooden logboat with a length of 3.5 m (Tončeva 1981, 45, fig. 4, 1). These finds date probably to the third mill. In the interior of the eastern Balkans, e.g. at Drama and Osikovo, there are finds of clay boat models dating to the fifth mill. (Frey 1991). However, they represent a river- and not a sea-craft.

7 Simple logboats lack hull depth; such vessels can be used only in calm water and need several modifications for use at sea. Advanced seagoing logboats are designed to withstand wind and waves, e.g. by hull expansion, pairing two logboats side-by-side, or attaching stabilizing timbers at the waterline (McGrail 2001, 172). It is also possible that bark canoes were used in early prehistory. Seagoing plank boats in the periods preceding the Bronze Age are less likely; the first plank boats in the Mediterranean date to the mid-second mill. (McGrail 2001, 105).

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this means a realistic range of 200 km (and a maximum range of 300 km) for the one-way journey, which corresponds roughly to the distance from the coast of Dobrudzha to Strandzha. This inference is very important since it is in accordance with the archaeological evidence for the contacts between the inhabitants of these two regions that will be discussed below.

COASTAL COMMUNITIES

The first coastal farmers

Current evidence suggests that farmers did not settle the west coast of the Black Sea along a sea route. The earliest permanent villages in the littoral date to the last centuries of the sixth millennium (the LN), and are thus significantly later than those in the interior of the east Balkans. Pottery at sites in the south section of the coast indicates that farmers from the interior of Thrace settled the region.[8] The north part of the coast represents a different situation. The LN burial customs, pottery, clay figurines and lithics here diverge significantly from the interior. Some researchers assume that these idiosyncracies emerged from native hunter-gatherer communities adopting farming from their neighbours in the hinterland (Todorova and Vajsov 1993, 146, 224).[9]

Sites of the first half of the fifth millennium

In the EC and MC, coastal villages were situated on the shores of lakes and marshy river mouths. The north part of the coast was densely settled. Small villages, most of them dating to the second quarter and the middle of the fifth millennium (the MC), were documented near Lake Shabla and Lake Durankulak, near a coastal lake north of Cape Kaliakra, and on a terrace about 1 km from the present coast north-east of Varna at Batarejata (Dimov 1992, 23; Todorova *et al*. 2002, 12, 41; Dimov 2003, 462; Slavchev 2004; 2008, 45). Additional information for unidentified sites was provided by graves and surface finds from Balchik, Bozhurets, Sv. Konstantin and from the shore of Lake Varna (Ivanov 1978; Dimov 1992, 26; 2003; Slavchev 2004).

The southern part of the coast was virtually unexplored until recently. Rescue excavations at Akladi Cheiri and Tell Burgas have revealed archaeological strata of the late sixth and fifth millennia. Akladi Cheiri is situated near Chernomorets in the north-west part of the bay of Sozopol. The site lies on a sea terrace *c.*250 m from the present coast and covers about 1 ha (Leshtakov *et al*. 2009; Leshtakov and Klasnakov 2010). Tell Burgas is a settlement mound situated 1.4 km west of Lake Atanasovsko (Klasnakov *et al*. 2009; 2010).

Sites of the second half of the fifth millennium

Settlement sites and cemeteries of the later fifth millennium were documented at Lake Durankulak, near the coast north of Varna at Evksinograd and Kokodiva, and around Lake Varna

8 LN (Karanovo IV, last centuries of the sixth mill.) layers have been excavated at Tell Burgas, Budzhaka in Sozopol, and Akladi Cheiri in Chernomorets (Leshtakov and Klasnakov 2008; Klasnakov *et al*. 2009; Leshtakov 2009; Leshtakov *et al*. 2009; Klasnakov *et al*. 2010; Leshtakov and Samichkova 2010; Leshtakov and Klasnakov 2010).

9 Among the earliest sites are Medgidia-Cocoase in Romania, and Durankulak Nivata and Shabla Novite Lozja in Bulgaria (see Dimov 1992; Slavchev 2008 with references).

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and Lake Beloslav at Varna I, Ezerovo, Morflot, Arsenala, Strashimirivo, Poveljanovo and Devnja (Ivanov 1972, table 5; Todorova and Tončeva 1975; Ivanov 1991; 1993; Todorova *et al*. 2002; Slavchev 2004). South of the Stara Planina range, layers dating to the later fifth millennium were investigated at Tell Burgas and Akladi Cheiri (for references see above). Two further sites, in the present-day bay of Sozopol and at Kableshkovo, provided material from the transition between the fifth and fourth millennia (Dimitrov and Avramova 1994; Draganov 1995; 1998; Georgieva 2003). Finally, at Kashla-dere near Anchialo, a robber trench in a prehistoric tell uncovered Chalcolithic material and a human figure of gold foil (Todorova and Vajsov 2001, 89).

Some of the above-mentioned sites lie below the present sea level and were identified during dredging operations at harbours in the lakes and bays. Apparently, the sea level in the LC was somewhat lower than today.

In summary, in the fifth millennium the west Black Sea littoral was densely populated (Fig. 1). The coastal inhabitants preferred protected locations near coastal lakes and forested river mouths. We have very little evidence about the size and plan of these sites. The village of Phase IV at Durankulak consisted of at least 16 rectangular two-room houses, arranged in rows (Fig. 3). Even if part of the habitation area has been lost to erosion, Durankulak was still a very small village with a possible population of 100 (Todorova *et al*. 2002). The presence of occupation deposits and graves from several periods at some sites, and even of small settlement mounds, suggests the existence of stable social groups in the coastal area; plant and animal remains and isotope investigations of human skeletons show that the sites were occupied by farmers (Manhart 1998; Honch *et al*. 2006; Marinova 2006).

FISHING AND SHELLFISHING

The Black Sea is a marine basin with immense bioproductivity. Among the numerous species of fish, migratory pelagic fish have been highly valued and intensively exploited since antiquity. The large rivers flowing into the sea supply enormous quantities of nutrients. Fish shoals from the Mediterranean enter the Black Sea in spring to feed and spawn during the warm season; with the drop in temperature in autumn, migratory fish move inshore and assemble for return to the south. In October and November huge shoals approach the coasts and fish can be caught in large numbers (Galtsoff 1924).[10] To make a living from the sea by exploiting these seasonal fish migrations, however, fishermen need to employ a sophisticated technology, including the setting of permanent nets with seagoing boats by collaboration in groups.

Is there evidence for specialized exploitation of migratory fish at sites of the fifth millennium? The only large assemblage of fish remains from the west Black Sea littoral was obtained from Durankulak IV–VI, dating to the later fifth millennium (Table 1). Most important among the identified species were catfish and carp, two large freshwater species tolerant of brackish conditions, apparently caught in the lagoon. Also among the best-represented species at Durankulak were solitary marine fish such as seabream and seabass. However, shoals of these fish enter the lagoons in spring for spawning, and this was most likely the context of the catches at Durankulak. In summary, faunal data show that the most important supplier of aquatic food for the inhabitants of Durankulak was the lake.

10 Atlantic mackerel (*Scomber scombrus*), bonito (*Sarda sarda*) and tuna (*Thunnus thunnus*), hamsi (*Engraulis encrasicolus ponticus*) and Black Sea sprat (*Sprattus sprattus*), Black Sea mackerel (*Trahurus mediterraneus ponticus*), common mullet (*Mugil cephalos*).

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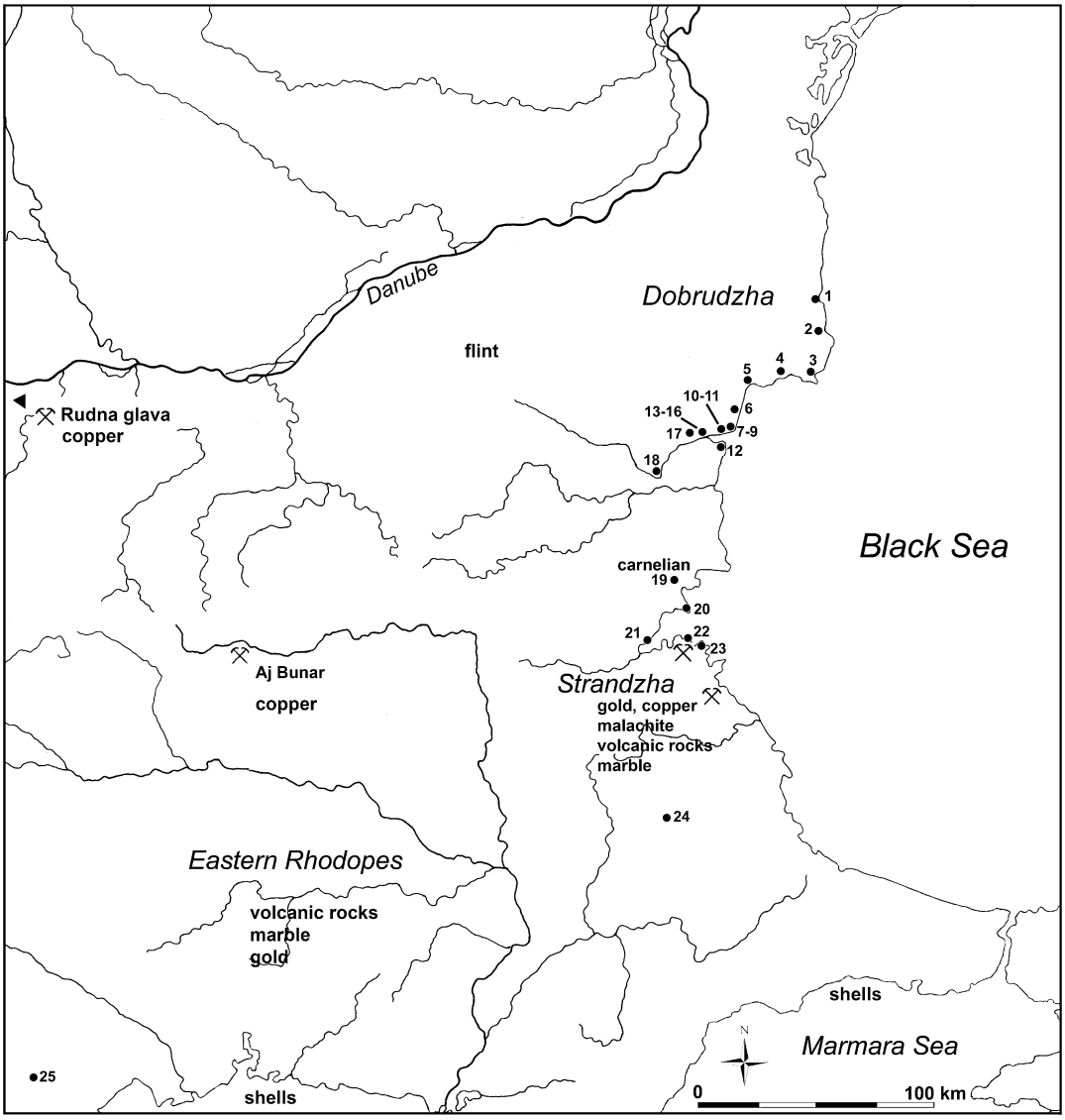

Figure 1
Map of major coastal sites and mineral deposits. 1 Durankulak, 2 Shabla, 3 Kaliakra, 4 Bozhurets, 5 Balchik, 6 Sv. Konstantin, 7 Kokodiva, 8 Evksinograd, 9 Batarejata, 10 Varna I and II, 11 Morflot, 12 Arsenala, 13 Ezerovo, 14 Strashimirovo, 15 Beloslav, 16 Poveljanovo, 17 Devnja, 18 Provadija, 19 Kableshkovo, 20 Akheloj, 21 Tell Burgas, 22 Akladi Cheiri, 23 Sozopol, 24 Aşağı Pınar, 25 Sitagroi.

Nevertheless, there are some indications that fishing and shellfishing on the west Black Sea coast were not limited to the brackish lakes. The turbot, for example, is a marine species living in deep water close to shore, which is caught from boats. Turbot may occasionally enter the lagoons, but the very large individual found at Durankulak was probably caught in the deeper

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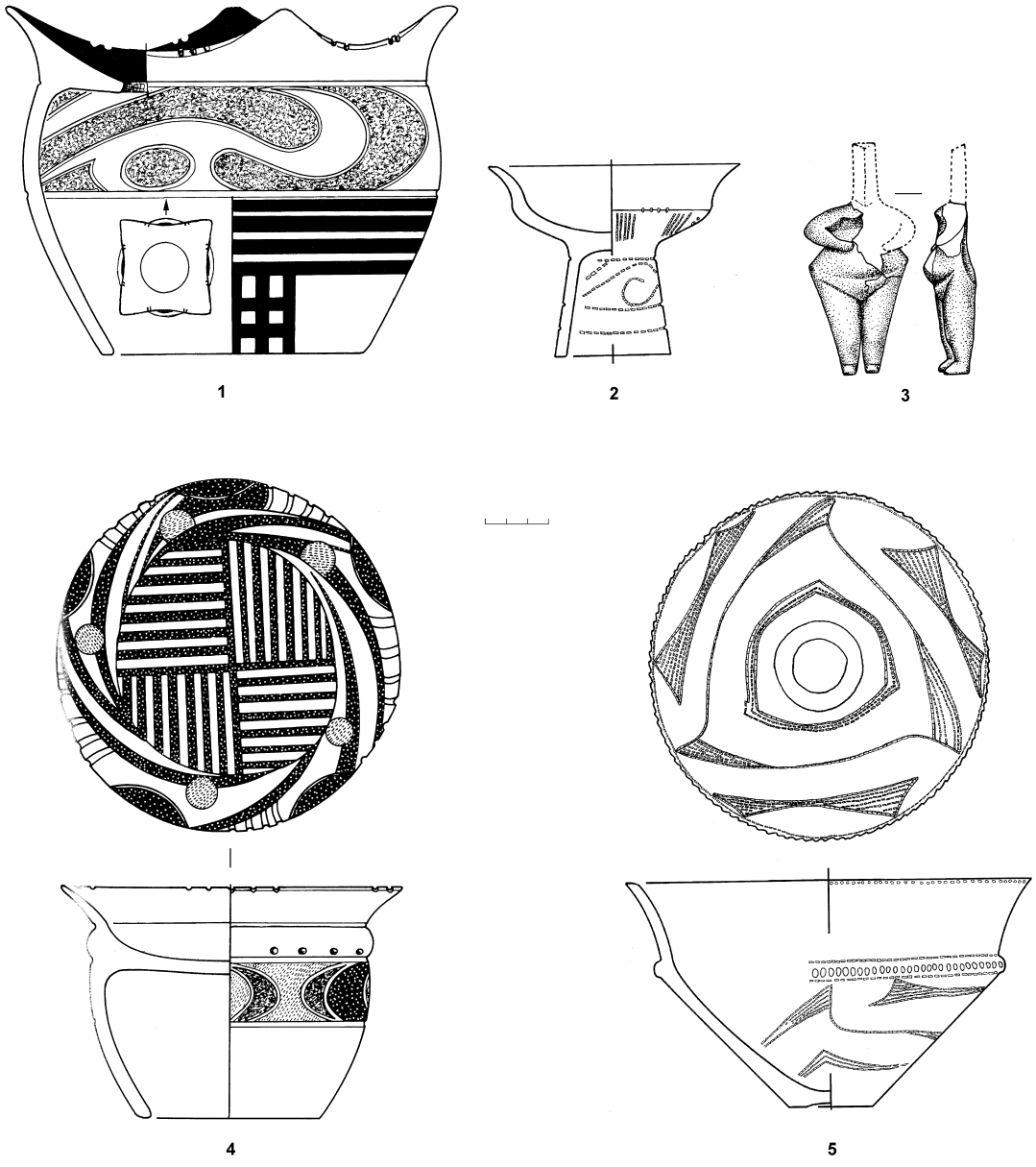

Figure 2
Pottery vessels and a figurine from the cemetery of Durankulak (after Todorova *et al*. 2002). 1, 4 Grave 738, LN; 2, 5 Grave 299, MC; 3 Grave 609, EC.

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Figure 3
Plan of Durankulak IV (Todorova 1986, fig. 33).

shore zone (Heinrich 1998). Moreover, the habitation strata at Durankulak contained numerous shells of edible marine bivalve molluscs such as mussels (*Mytilus galloprovincialis*), oysters (*Ostrea edulis*), and more rarely cockles (*Cerastoderma glaucum*) (Manhart 1998). Another marine species caught on the beach was the monk seal (*Monachus monachus*). Eight bones of this large sea mammal were identified at Durankulak (Manhart 1998, 132–4). Furthermore, the presence of bones of several dolphins (*Delphinus delphis*) and harbour porpoises (*Phocoena phocoena*), as well as a minke whale (*Balaenoptera acutorostra*), at this site speaks for fishing with boats and nets near the shore. The complete absence of small schooling salt-water species such as sprat and anchovy, and of large pelagic schooling fish like tuna, bonito and mackerel, is striking. However, vertebrae of large tuna have been reported from LN and LC sites in the

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TABLE 1
Fish remains at Durankulak IV–VI (after Manhart 1998 and Heinrich 1998)

Species	Ind./No.	Habitat	Max. size and behaviour	Main catching methods
Brackish lagoon				
Gilthead seabream (*Sparus aurata*)	14/48	Marine environments, seagrass beds	70 cm Solitary, in spring enter brackish estuaries and lagoons in shoals	Angling, seasonal catches with nets
Catfish (*Silurus glanis*)	12/68	Freshwater fish, tolerant of brackish environments	600 cm Solitary predator, bottom fish	Angling and netting
Carp (*Cyprinus carpio* and *Rutilus frisii*)	7/12	Freshwater species living in warm slow waters; tolerant of brackish environments, e.g. river mouths and lagoons	120 cm Solitary, bottom scavenger	Angling and netting
Pike (*Esox lucius*)	2/4	Brackish and fresh water	150 cm Solitary predator	Angling
European seabass (*Dicentrarchus labrax*)	1/1	Pelagic fish living close to shore	100 cm Predatory fish, enters estuaries and lagoons in shoals for spawning	Angling
Sturgeon (*Acipenser sturio)*	1/1	Brackish water	350 cm Bottom feeder; migrates in spring upstream for spawning	Seasonal catches with nets
Shallow coastal water				
Mediterranean mussel (*Mytilus galloprovincialis*)	*/11	Marine environments, bays, surf, rocky coast and sandy bottoms	14 cm Aggregative, high fecundity	Hand collecting, rakes
Oyster (*Ostrea edulis*)	*/2	Estuarine and shallow coastal water	11 cm Large beds on muddy sand and rocks	Hand collecting, rakes
Cockle (*Cerastoderma glaucum*)	1/1	Estuaries and sandy bays	5 cm Aggregative on muddy sand	Hand collecting, rakes
Monk seal (*Monachus monachus*)	2/8	Open beaches	80 cm, 300 kg	Hunting
Coastal and offshore zones				
Dolphin (*Delphinus delphis*)	*/7	Coastal and offshore waters	2 m, 200 kg Live in aggregations	Nets, harpoons
Harbour porpoise (*Phocoena phocoena*)	*/4	Close to shore, enters estuaries	2 m, 80 kg Solitary	Nets, harpoons
Minke whale (*Balaenoptera acutorostra)*	1/2	Coastal and offshore waters	7 m, 500 kg Solitary or small groups	Hunting
Turbot (*Psetta maxima*)	1/1	Deep waters close to shore, sandy bottoms	Up to 100 cm Solitary predator, can enter the deeper lagoons	Angling

southern part of the coast, for example from Budzhaka and Sozopol (Leshtakov and Klasnakov 2008, 57). [11]

In conclusion, bones of fish and sea mammals suggest that fishing in the lagoon with line and throwing nets was a major source of aquatic food. Specialized sea fishing and large seasonal catches of migratory fish with semi-permanent nets and boats are not documented in the archaeological record. However, marine molluscs show that communities exploited the shallow coastal waters. Moreover, we can infer from the presence of large tuna, turbot and sea mammals that prehistoric coastal inhabitants ventured into the sea for fishing and hunting, and therefore must have possessed seagoing vessels and relevant experience.

Finally, stable isotope studies of carbon and nitrogen in human bones from the cemeteries at Durankulak and Varna provide some insights into the relative importance of marine and terrestrial foods in the diet of the coastal populations (Honch *et al*. 2006). Humans from both sites consumed mainly terrestrial plant foods. At Varna, however, the individuals studied also had a measurable marine component in their diet, with a minority having enjoyed a diet with a significant contribution of marine protein. Further studies would be necessary to differentiate the freshwater fish input that, according to the faunal remains discussed above, must have been considerable at Durankulak.

SEA-BORNE TRADE

Copper

Copper provides the most reliable evidence for sea trade along the western coast of the Black Sea. Cemeteries in the northern part of the littoral contained an impressive concentration of copper ornaments and tools (Ivanov 1991; Todorova *et al*. 2002).[12] There is also evidence for copper processing in the villages. A clay crucible with a slagged inner surface has been recovered from House 18 of Layer V (Todorova 1999, fig. 8) and a 'pit furnace' has been reported from House 4 of Layer VI at the settlement mound of Durankulak (Todorova 1999, 242, fig. 7.1). Further indications of local copper casting and metalwork on the north-west coast provide some unique tool shapes (Todorova 1986, 149–50).

Since there are no copper deposits in Dobrudzha, copper ores or smelted metal must have been regularly imported from the mountainous regions of the east Balkans. It has often been assumed that copper on the west Black Sea coast originated from the famous mines at Aj Bunar in the interior of northern Thrace.[13] However, lead isotope analyses showed that Aj Bunar provided only 15 per cent of the copper used at Durankulak around the middle of the fifth millennium (the MC). About two-thirds of the copper in this period originated from copper mines near the south-west coast of the Black Sea, mainly from Vurli brjag and Medni rid-Rossen

11 Fishermen's gear can potentially give further clues about the ecological zones exploited and the seagoing skills possessed. Unfortunately, no such evidence has been published. According to a brief mention by Todorova (1986, 143), net-sinkers, harpoons and hooks from bone and copper were found at Durankulak.

12 The earliest malachite beads in Durankulak were found in the LN Grave 626 (Todorova 1999, 237). Larger numbers of copper ornaments (bracelets, rings and beads) appear in the MC period (e.g. at Varna II and Durankulak); heavy copper tools are characteristic of the LC (Varna I, Durankulak, Devnja) (Todorova 1999, 245–6).

13 For a summary of prehistoric mining at Aj Bunar see Ottaway 1994, 55–7 with references.

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in the Strandzha Mountains. In the later fifth millennium about half of the copper at Durankulak and Varna I still came from the Black Sea deposits (Pernicka *et al*. 1997, 132, fig. 27; Gale *et al*. 2000, 116–18; Todorova *et al*. 2002, 127–58, map 5). The most likely route for moving copper regularly from the southern to the northern part of the Bulgarian Black Sea coast is by sea along the shore.

Recent rescue excavations at Akladi Cheiri, a large Chalcolithic site on the south-west coast in the vicinity of the Strandzha copper deposits, provide the first insights into this unexplored maritime trade in copper. The EC stratum at this site contained smelting hearths, pieces of copper ore (azurite and malachite), slagged clay vessels with copper prills adhering to their walls, a crucible and copper awls (Leshtakov *et al*. 2009, fig. 2; Leshtakov and Klasnakov 2010). In all probability, copper reached the communities in Dobrudzha in the form of rods or bangles (Todorova *et al*. 2002, 150).

Common and ornamental stones

The hypothesis of sea-borne trade from south to north along the coast is supported by other materials. While soft stones such as limestone, marl and sandstone are common in Dobrudzha, the region is virtually devoid of deposits of stone varieties suitable for ground stone tools. However, most of the ground stone tools from Varna and Durankulak were manufactured from hard stones. Petrographic analyses identified numerous artefacts of volcanic rocks such as volcanic tuff, basalt, andesite and gabbro, and several objects of marble (Todorova *et al*. 2002, 208–9; Kostov 2007) (Fig. 4, 12).[14] These materials were certainly imported by the communities at Durankulak and Varna and might have originated from Sredna gora and the Rhodopes in the interior of the east Balkans or, alternatively, from the region of Burgas and Strandzha on the south-west coast (Todorova *et al*. 2002, 208–10, fig. 248). In the latter case, supply via the sea route appears likely.

Ornamental stones such as malachite and carnelian are two further non-local materials occurring in numbers at the cemeteries of Varna and Durankulak. About 2000 malachite beads were reported from Varna I and over 1500 from Durankulak (Todorova *et al*. 2002, 198; Nikolov 2010, 490). There is no direct information about the isotopic composition of these beads, but we can assume that the copper and malachite originated from the same sources, namely from the Strandzha Mountains and to a lesser extent from Aj Bunar. Carnelian, a rare ornamental stone unfamiliar to the Chalcolithic communities in the interior of the eastern Balkans, offers further arguments in favour of coastal trade. Graves at Varna I contained over 500 carnelian beads (Nikolov 2010, 489), while excavations at Durankulak provided over 340 beads, 285 of them found in Grave 609 of the EC period (Todorova *et al*. 2002, 201, table 21) (Fig. 4). Deposits of carnelian are situated on the south-west coast of the Black Sea near the mouth of the Akheloj. The chemical composition of the carnelian beads from Varna shows agreement with this source (Kostov *et al*. 2004).

14 At Durankulak: a marble tube (Grave 246 of LN, see Fig. 4, 12) and two marble bracelets (Grave 606 of LN and Grave 298 of LC) (Todorova *et al*. 2002, fig. 246 and pl. 36, 3); at Varna: a figure (Grave 3), a pointed-bottom beaker and a bowl (Grave 41), and a bowl (Grave 36) (Ivanov 1991; Todorova and Vajsov 2001, pl. 48, 582; Die Thraker 2004, no. 103).

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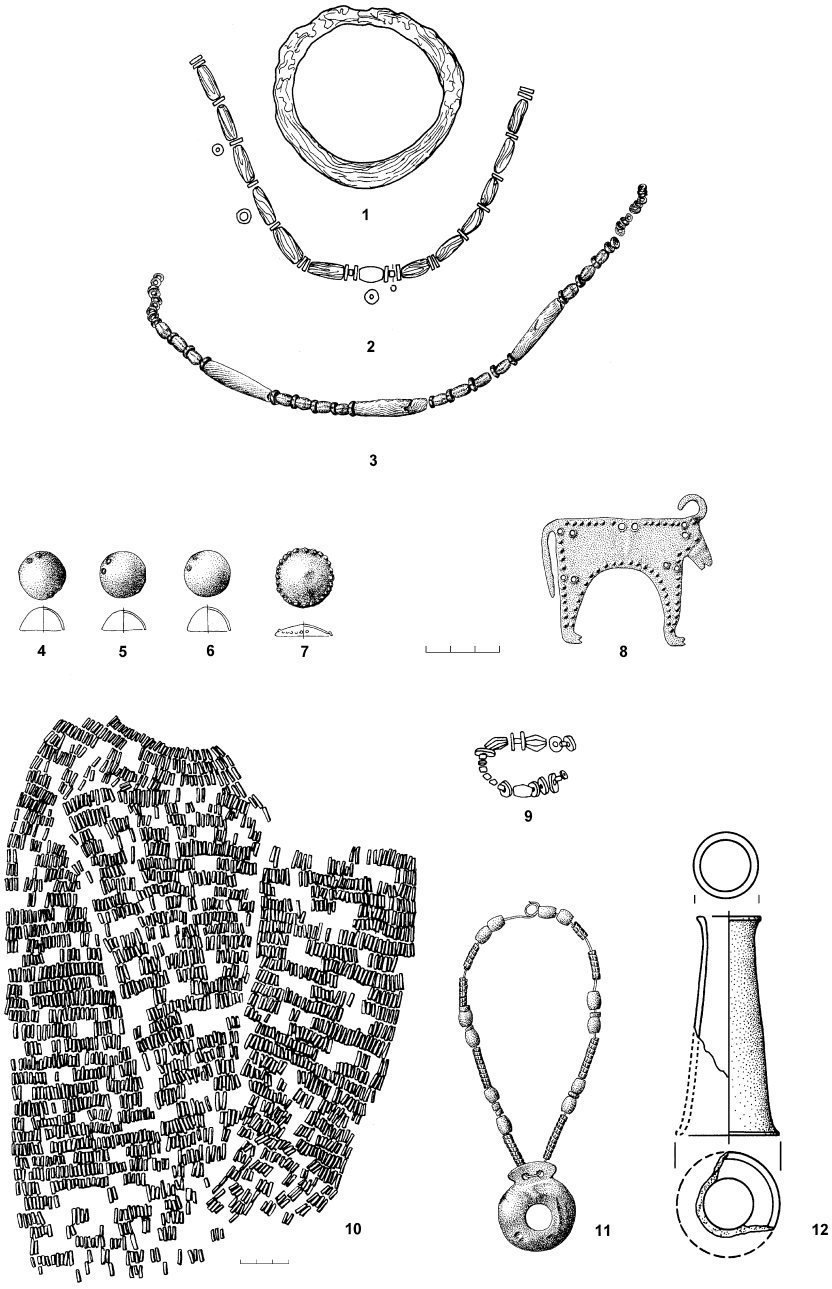

Figure 4
Ornaments from the cemeteries at Varna I and Durankulak (after Todorova and Vajsov 2001). 1, 2 Durankulak Grave 447, LC, spondylus, malachite and carnelian; 3 Durankulak Grave 496, LC, spondylus, malachite and gold; 4–6 Varna I Grave 41, LC, gold; 7–8 Varna I Grave 36, LC, gold; 9 Durankulak Grave 364, MC, spondylus, malachite, carnelian and gold; 10 Durankulak Grave 609, EC, dentalium; 11 Varna I Grave 97, LC, gold and carnelian; 12 Durankulak Grave 607, LN, marble.

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Gold

Gold in Varna and Durankulak was certainly imported, since there are neither primary nor secondary gold deposits on the north-west coast of the Black Sea. The gold artefacts from the two cemeteries were most likely manufactured from placer gold. The raw material is rich in platinum and could have originated from Strandza, the Rhodopes or the Stara Planina Mountains (Todorova and Vajsov 2001, 13–14, pl. 60).[15] We know that gold artefacts are extremely rare in the interior of the east Balkans and, in comparison, very numerous at Durankulak and especially at Varna (Fig. 4, 4–9, 11).[16] Thus, it seems probable that some of the gold objects, like the other exotic materials discussed above, originated from the Strandzha deposits and arrived on the north-west coast by sea. One schematic human figure of gold foil from a robber trench in the Chalcolithic tell at Kashla-dere near Anchialo hints at the possibility of gold processing on the south coast of Bulgaria (Todorova and Vajsov 2001, 89).

Mediterranean shells

Exotic shells are another likely material traded from south to north along the west Black Sea coast. Ornaments made of bivalve marine molluscs such as spondylus (*Spondylus gaederopus*) and glycymeris (*Glycymeris glycymeris*), and of scaphopods such as dentalium (species of the genus *Antalis*), are very common at Durankulak and Varna (Ivanov 1991; Todorova and Vajsov 2001; Todorova *et al*. 2002). Exchange of these shells began in south-east Europe at least as early as the establishment of the first sedentary villages on the Aegean and Adriatic coasts.[17] The turn of the sixth to the fifth millennium, however, witnessed an explosion in the exchange of Mediterranean bivalve molluscs. The interior of the Balkans was supplied with shells by both the Aegean and the Adriatic, and the trade network reached into the interior of Europe.[18] The geographical distribution of artefact types suggests, as Müller has demonstrated, the emergence of two large zones of spondylus trade in the late sixth millennium: the eastern Balkans, which were supplied by the Aegean, and the western Balkans and central Europe, supplied by the Adriatic Sea (Müller 1997).[19]

What about the Black Sea littoral? Spondylus and glycymeris do not inhabit the Black Sea today (Séfériadès 2000, 423). The impressive concentration of spondylus artefacts in the

15 An ongoing research collaboration of the Archaeological Museum at Varna and the University of Tübingen explores the composition of gold artefacts from Varna and from its putative sources. See http://www.ufg.uni-tuebingen.de/index.php?id=672.

16 For gold artefacts in the interior of the east Balkans see Vinitsa (two rings, Raduncheva 1976, 126), Goljamo Delchevo (two rings and a bead, Todorova and Vajsov 2001, pls. 2:30, 6:70, 6:80), Radingrad (a 'ring idol', convex appliqués and two small items, Todorova and Vajsov 2001, pls. 8:93, 22:300, 23:316, 317), Hotnitsa (hoard of numerous rings and 'ring idols', Angelov 1959), Emen, Gorna Kremena and Lovech (three earrings and a 'ring idol', large round appliqué), Ruse and Pazardzhik ('ring idols') (Todorova and Vajsov 2001, 67).

17 The early and middle Neolithic (first half/middle of the sixth mill.), e.g. at Achileion, Sesklo, Tsangli and Halai on the Greek mainland or at Gulubnik in the valley of Struma (Karali 1999, 39; Todorova and Vajsov 2001, 16).

18 On the north Aegean coast and in its vicinity shell bracelets were found at Sitagroi I and II, Dikili Tash, Servia, Nea Nikomedia (Nikolaidou 2003, 337). On the Adriatic coast and in the interior of the west Balkans they also appeared in the late sixth and early fifth mill., at sites of the Danilo, Kakanj, and Vinca A groups (Müller 1997; Dimitrijevic and Tripkovic 2006, 248).

19 Use of spondylus ceased in central Europe around 4800 BC, and exchange to the west was interrupted (Müller 1997, 94); in the second quarter of the fifth mill. spondylus was limited to the Carpathian basin (Séfériadès 2000, 424), and later it disappeared altogether.

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coastal area of Bulgaria has led Todorova to assume that these shells lived in the Black Sea during the Early and Middle Holocene, since climatic conditions in the sixth and fifth millennia were milder and salinity was possibly higher (Todorova 2000).[20] Whether this was the case cannot be proved or rejected conclusively. However, local shellfishing of spondylus on the west Black Sea coast in prehistory seems very unlikely in light of the extremely limited evidence for local processing. Large numbers of finished objects in the graves at Varna and Durankulak contrast with only four complete shells (Fig. 5). The situation in the Aegean is clearly different, with numerous unmodified valves and large quantities of production debris, waste and half-finished products found at fifth millennium sites (Halstead 1993; Nikolaidou 2003, 338–44; Shackleton 2003).[21] It is remarkable that the conspicuous increase in spondylus objects at the cemetery of Durankulak coincided with a boom in spondylus processing at north Aegean sites such as Sitagroi III (Nikolaidou 2003, fig. 9.2).

Artefacts of exotic bivalves might have reached the Black Sea coast by both sea and overland routes. However, spondylus objects occur only infrequently at sites in the interior of the east Balkans. Since interior communities reworked even the smallest pieces of broken bangles, spondylus must have been a very rare and valuable material (Galbenu 1963; Gaydarska *et al*. 2004).[22] It therefore seems improbable that the heavy concentration of Mediterranean shells in the north-west littoral was the result of trade with the interior. More likely, spondylus reached the north-west coast by sea. A find of five spondylus artefacts in the EC stratum at Tell Burgas, associated with flint from the interior of north-east Bulgaria and pottery sherds of Hamangia type (from the north-west Black Sea coast), seems to support this hypothesis (Klasnakov *et al*. 2009; 2010).

Finally, tusk shells (dentalium) found on the north-west coast of Bulgaria deserve special mention. Since dentalium was not traded on a nearly pan-European scale like spondylus, researchers have taken little notice of this exotic and valuable shell. Tusk shells are scaphopod molluscs that live in deep water and are not native to the Black Sea. In archaeological contexts, they appear only in the coastal zones of the north Aegean and the west Black Sea.[23] Over 20,000

20 The earliest finds in the north-west Black Sea coast date to the late sixth mill., and numbers of finds rose significantly in the first half of the fifth mill. (Comşa 1973; Todorova 2000, 416). At Durankulak were found over 1500 pieces of spondylus (Todorova *et al*. 2002, 179), at Varna I over 1100 items (Ivanov 1991, 130). Types of ornaments include bracelets/bangles, long tubular beads, barrel-shaped and small discoid beads, rhomboid beads, rectangular appliqués (Todorova and Vajsov 2001, pls. 37–9), female pendants (Todorova and Vajsov 2001, pl. 19, 200–25), rarely buttons (Todorova and Vajsov 2001, pl. 2, 44, 46), and 'Kettenschieber' (Todorova and Vajsov 2001, pl. 29, 359).

21 For example, at Dimini were found 404 fragments of worked spondylus, including blanks, waste, unfinished objects, unworked shells; types included rings, cylindrical beads, buttons (Tsuneki 1989, 8). At Sitagroi II and III and Dikili Tash spondylus finds, including unworked valves and 'preforms at various stages of manufacture', were also very numerous; types included bangles, discoid and cylinder beads, buttons, pendants (Nikolaidou 2003). Unfinished objects were also found in Dimitra and Makriyalos (Nikolaidou 2003, 339).

22 For example at Targovishte, Omurtag, Goljamo Delchevo, Radingrad, Ovcharovo, Poljanitsa and Ruse in north-east Bulgaria, and Azmak and Karanovo in Thrace (Todorova 1986; Todorova and Vajsov 2001).

23 For dentalium in the Aegean see Karali (1999, 37) and Nikolaidou (2003, 344); ornaments of dentalium were common at sites in northern Greece in the middle and late Neolithic (late sixth and fifth mill.), e.g. Dimitra, Sitagroi II, Vasilika, Paradeisos, Dikili Tash. A special case is the use of fossil dentalium in the western Balkans and the Carpathian basin (Comşa 1973; Siklósi 2004; for Vinca see Dimitrijević, V., 'Dentalium beads and Neogene fossil sites exploitation at the Late Neolithic/Eneolithic site Vinča – Belo Brdo', in BoneCommons, Item #1100, http://www.alexandriaarchive.org/bonecommons/items/show/1100 (accessed 10 November, 2011). However, dentalium finds at Varna and Durankulak are too numerous to be of fossil origin.

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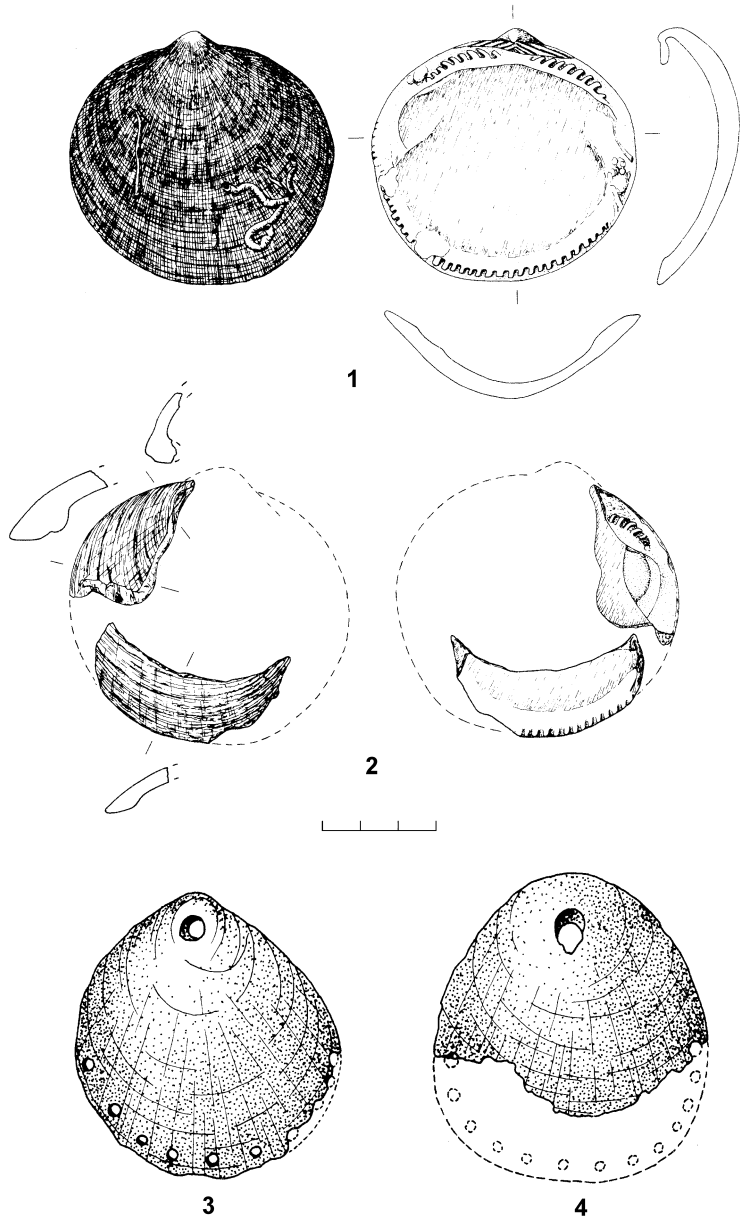

Figure 5
Spondylus and glycymeris shells from Durankulak (after Todorova *et al*. 2002). 1, 2 Glycymeris shells from Tell Durankulak, LC; 3 Spondylus shell from Grave 224, LC; 4 Glycymeris shell from Grave 224, LC.

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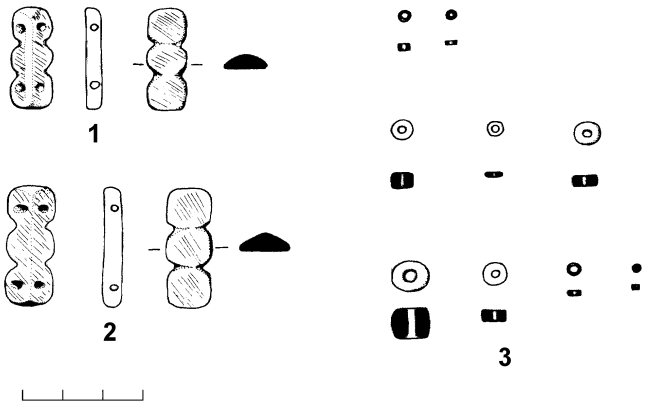

Figure 6
Spondylus and malachite beads from Aşağı Pınar 3 (Özdoğan and Parzinger 2000, fig. 8).

beads of dentalium were found at Varna I, Durankulak provided some 1550 shells; at both sites dentalium shells were concentrated in a few graves (Ivanov 1991, 130; Todorova *et al*. 2002, 185, 199, table 17) (Fig. 4, 10).[24] They were sewn on clothes and found together with ornaments of gold, carnelian and spondylus (Todorova and Vajsov 2001, 18). The association of tusk shells with other exotic items and the lack of such finds in the interior of the east Balkans are yet further indications that such materials arrived by maritime routes.

Recent excavations at Aşağı Pınar, a site of the late sixth millennium situated near the southern slope of Strandzha, provide an indication of the routes through which Aegean shells might have entered the Black Sea. In a house courtyard in Layer 3 (5080–4900 cal BC) excavators revealed *in situ* an intricate necklace of malachite, rock crystal and spondylus beads as well as a concentration of scattered unfinished beads and lumps of malachite (Özdoğan and Parzinger 2000, fig. 1, 3, 4) (Fig. 6). The courtyard belonged to a workshop containing large quantities of unworked malachite, blanks, finished beads and tools for bead making, including flint micro-drills, grinding stones, and bone and antler tips. It appears probable that the community at Aşağı Pınar 3 took advantage of its proximity to both the malachite sources in Strandzha and the sources of shells in the north Aegean and the Sea of Marmara.[25] The Strandzha copper deposits must have acted as a focus of attraction for both the Aegean/Marmara and Black Sea communities and probably as one of the major hubs in the exchange of shell and stone ornaments.

24 At Durankulak over 800 dentalium shells were found in Grave 609 (*c*.500 of them attached to a garment), Grave 648 contained 491 pieces; at Varna I dentalium was concentrated in enormous numbers in a few graves without skeletons.

25 The tripartite spondylus beads with four holes from Aşağı Pınar 3 (Özdoğan and Parzinger 2000, fig. 8) have a peculiar shape that is unknown in Bulgaria or the Aegean; however, identical beads were reported from a grave of the Boian period at Andolina (department Ialomita) in Romania. The grave also contained beads of copper and dentalium (Comşa 1973, fig. 2, 46–9, fig. 3).

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In summary, I argue that a series of associated valuable materials moved from south to north along a sea route in the west Black Sea during the fifth millennium. The north, a resource-poor region, housed the consumers and initiators of the trade connections; the south coast was the resource-rich supplying zone.

If the inhabitants of the north-west littoral imported ornamental stones, volcanic rocks, gold, copper and shells, they must have provided equally valuable commodities in exchange. Flint and ceramics are possibly the only imperishable trade goods that travelled by sea in the opposite direction, from north to south. Communities on the north-west coast of the Black Sea obtained high quality 'chalk' flint from their neighbours in the interior of north-east Bulgaria (the region of Ludogorie). Large nodules of this excellent flint variety were procured by subsurface mining and used for detaching very long regular blades ('super-blades') by an elaborate technique of pressure debitage with a lever (Manolakakis 2008a; 2008b) (Fig. 7). The EC layer at Tell Burgas on the south-west Black Sea coast provided large numbers of tools manufactured from this valuable variety of flint – in fact, the majority of the lithic artefacts were made of this rare material (Klasnakov *et al*. 2009, 79; 2010). Single sherds of 'Hamangia' (a pottery type characteristic of the EC in Dobrudzha) at Tell Burgas provide further evidence for contacts by this community with the northern part of the Bulgarian coast.

A variety of organic materials might have been traded in both directions but remain invisible to archaeologists. Manufactured items like textiles, mats, baskets, nets and bags, special commodities like medicinal plants, drugs and boar tusks, and low-bulk or valuable foodstuffs like cured meat and dried fruits, rendered animal fat, fermented foods and beverages, belong to the group of probable but undocumented perishable commodities.

DISCUSSION

This article has set out to explore the Chalcolithic society on the west coast of the Black Sea in a maritime context. I have shown that, although perilous, coastal voyages with simple paddle boats in the summer were facilitated by currents and winds; that the coast was densely populated; and that its inhabitants ventured into the sea for fishing and thus must have possessed seagoing vessels and skills. The critical assessment of the archaeological record demonstrated that numerous materials were imported to the north-west coast: some arrived from the Mediterranean, while others originated from the mountainous regions of the east Balkans and the south-west Black Sea coast.

Overland versus sea trade

Without doubt, imported goods might have reached the coast by overland routes from the interior of the east Balkans. Indeed, some finds testify to exchange between the communities of Durankulak and Varna and the interior: for example, copper and graphite from Thrace and flint from Ludogorie were brought to the north-west coast, while Black Sea shells and apparently salt were traded back to the inland communities (Manhart 1998, 202; Todorova and Vajsov 2001, 62; Gaydarska *et al*. 2004; Leshtakov 2006; Manolakakis 2008a; Nikolov 2010). But these materials do not tell the whole story of prehistoric trade. The coastal inhabitants of Dobrudzha were extremely successful in amassing very large numbers of gold, copper, malachite, spondylus, dentalium and carnelian ornaments in diverse shapes and sizes. It is difficult to imagine that the inland communities might have supplied the north-west littoral with such large quantities of

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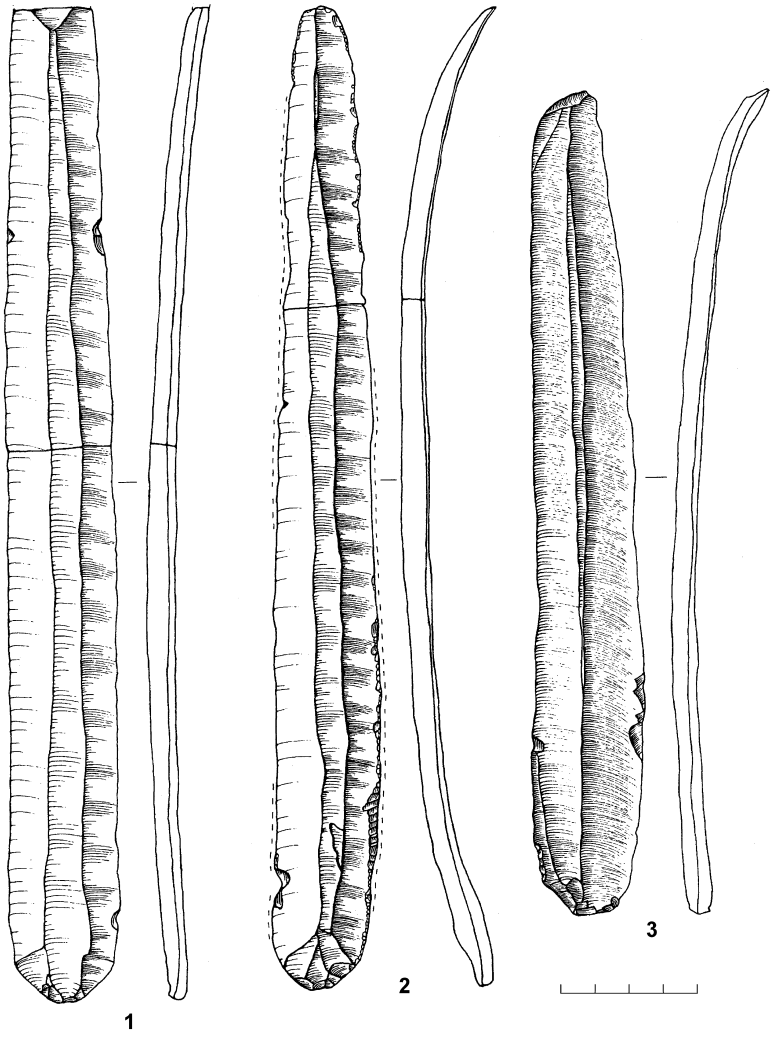

Figure 7
Flint 'super-blades' from the cemetery at Durankulak, LC (Todorova *et al*. 2002, fig. 16).

these materials, since the latter were either absent (dentalium, carnelian) or extremely rare (gold, spondylus) at the archaeological sites of the interior.

In order to explain the wealth of the north-west Black Sea littoral, we have to consider sea-borne trade. Lead isotope studies of copper items from coastal Dobrudzha indicate that a large part of the raw material originated from deposits near the south-west Black Sea coast. All exotic materials at Varna I and Durankulak (except the Mediterranean shells) were also present near the Black Sea copper deposits. It is therefore possible and indeed very likely that the valuables reached the north-west coast by sea. Sea trade, which was certainly not the sole, but probably the most important, source of exotic items for the north-west coast, offers a convincing explanation for the unusual concentration and wide range of such finds at coastal sites. The

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ethnographic record contains numerous examples of a flourishing coastal trade, in contrast to the simpler and smaller exchange connections of the interior (see, for example, Allen 1984, 437).

It is difficult to determine whether exchange took place through long-distance sea expeditions or merely through cabotage between neighbouring coastal villages. The massive concentration of imported items in graves at the cemeteries of Varna and Durankulak speaks rather against the 'down-the-line' model, which usually results in declining numbers of finds with growing distance from the source. Simultaneously, the geographical and meteorological conditions in the west Black Sea and the resource asymmetry between the resource-poor north and the resource-rich south must have facilitated and encouraged long-distance travel in a southerly direction.

Extent of the Chalcolithic maritime connections

Todorova has speculated that the Chalcolithic communities on the shores of Lake Varna acted as middlemen in the copper trade between the east Balkans and the steppe and forest-steppe areas of present-day Romania, Moldau and Ukraine (Todorova 1978, 142). Todorova's model was based on spectrographic analyses, showing that the chemical composition of metal from graves in the north Black Sea grasslands was similar to copper from Aj Bunar (Chernykh 1978, 175–6). However, these old spectrographic studies do not provide unequivocal evidence for the provenance of copper in eastern Europe. The archaeological finds, too, do not support the hypothesis that the coast of Lake Varna maintained contacts with the Ukrainian steppe. The sea contacts of the sites on the present northern Bulgarian coast, as demonstrated above, were rather directed toward the south.

How far southwards did these contacts extend? Given the short seafaring season of the Black Sea, the range of simple paddle boats in the Black Sea would not have significantly exceeded 500 km for a return journey. Thus, an annual summer expedition between the coasts of Dobrudzha and Strandzha was certainly within the capabilities of prehistoric seafarers, but longer voyages, beyond the Bosporus or along the Anatolian coast of the Black Sea, were probably unusual. However, such expeditions cannot be ruled out. A remarkable 'hoard' of decorative items, now part of the Burton Y. Berry collection at the Indiana University Art Museum, was bought on the antiquities market in the 1950s and was said to have originated from the area of Trabzon on the south-east Black Sea coast (Rudolph 1978; Rudolph *et al*. 1995). The hoard consists of a number of artefacts with striking parallels in the fifth millennium jewellery of the western Black Sea coast (Fig. 8). Not merely the shapes and style of the items, but also the specific combination of materials (gold, carnelian, shell) show an unmistakable similarity to Varna (for comparisons see Todorova and Vajsov 2001).[26] Unfortunately, our current state of knowledge about the Anatolian coast of the Black Sea is inadequate to explain these similarities.

The social role of maritime trade

The pattern of distribution of valuables and trade goods in the west Black Sea, with its heavy concentration of such items at a considerable distance from the region of origin, suggests

26 Moreover, a stratified example of a gold 'ring idol' has been reported from the settlement mound at Ikiztepe near Bafra (Bilgi 1983, 88; 2001, fig. 26).

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Figure 8
Jewellery of the 'Trabzon hoard' in the Burton Y. Berry Collection (Rudolph *et al*. 1995).

organized trading expeditions rather than random 'down-the-line' exchange. In ethnographic accounts of maritime trade, seasonal trading expeditions are highly formalized and ritualized affairs (cf. Allen 1984, 428). For the community, the annual departure of the trading boats is an event of special importance. The long-term absence of the most powerful and competent adult members and their possible loss at sea represent a major demographic and social hazard: only large and strong communities are able to handle such risks (cf. also Allen 1984, 427). Moreover, seafaring presupposes special knowledge and skills embedded in oral traditions and learning networks. The prehistoric communities that possessed the demographic capacity and the special knowledge to mount trading expeditions on the sea may have gained a dominant position among their peers. Violence and raiding, indicated by the increasing frequency of weapons in male

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graves during the MC (Ivanova 2007), may at least partly relate to such inequalities and thus indirectly to the development of maritime trade.

For individual participants, the yearly expeditions offered a way of increasing their prestige and power in the village community: not simply by acquiring valuables and exotica, but also by demonstrating social and organizational skills, trading prowess, courage, and daring at sea. Grave goods show that the use of exotic materials and valuables was a common and important practice in the northern part of the west coast and that the inhabitants of this region had unequalled access to such materials. The richest graves, among them the exceptional Grave 43 at Varna I, belonged to healthy adult males.[27] Thus, the archaeological record seems to indicate that male status (acquired rather than hereditary), violence and relations of power were linked to the intensification in seafaring and maritime trade.

CONCLUSIONS

The critical assessment of the archaeological evidence presented in this study confirms the importance of sea trade along the west Black Sea coast in prehistory. It demonstrates that annual long-distance expeditions along the coast would have been facilitated by favourable geographical conditions and encouraged by a significant resource asymmetry between the northern and the southern parts of the littoral. The earliest archaeological evidence for coastal exchange dates to the end of the sixth millennium and is relatively modest. Trade significantly intensified around the middle and third quarter of the fifth millennium; in this period, quantities of copper, gold, malachite, carnelian and exotic shells concentrated in the communities of the north-west coast. Archaeological finds and provenance analyses suggest that a considerable amount of these materials must have arrived by sea. It is important to stress that the expansion of maritime trade did not merely coincide with social changes, such as the rise of status inequalities and wealth accumulation, but it was apparently the very foundation of these phenomena.

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27 At Durankulak, access to valuables was similar for both sexes throughout the fifth mill.; only during the latest phase of the cemetery did the 'rich' graves of males exceed rich female graves by two to one (see Todorova *et al*. 2002, figs. 267–74). In contrast, wealth correlated significantly with age – rich graves contained the skeletons of adults and young adults, rarely of older children; none of the wealthy graves belonged to mature or elderly individuals (Todorova *et al*. 2002, 276). A combination of age and sex criteria demonstrates that the wealthiest graves at Durankulak contained the remains of adult males (Todorova *et al*. 2002, 278).

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ABBREVIATIONS

LN – Late Neolithic
EC – Early Chalcolithic
MC – Middle Chalcolithic
LC – Late Chalcolithic

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