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# Boat remains and maritime trade in the Persian Gulf during the sixth and fifth millennia BC

Robert Carter\*

*Archaeological excavations in Kuwait have revealed the earliest remains anywhere of sea-going boats. The author explains these remains and the distribution of Ubaid pottery as evidence for a system of maritime exchange in the Arabian Neolithic driven by status and ceremony.*

*Keywords:* Persian Gulf, Ubaid ware, boat-building, maritime archaeology

## Introduction

Evidence for early interaction between southern Mesopotamia and the Gulf emerged in the 1960s and 70s, with the identification of sixth/fifth millennium BC pottery from Mesopotamia at scores of sites in the eastern province of Saudi Arabia, Bahrain and Qatar (Figure 1) (Burkholder 1972; Golding 1974; Masry 1974; Oates *et al.* 1977). The predominantly coastal distribution implied that the pottery was transported by sea (Oates *et al.* 1977: 233; Piesinger 1983: 753), though direct evidence for this was absent, and the existence of a trading relationship was explicitly doubted.

Recent research shows that advanced boat-building and sailing technologies were employed at this time, and that a true maritime exchange relationship existed between the Ubaid communities of southern Mesopotamia and the Arabian Neolithic groups of eastern Arabia. The evidence comprises boat remains and representations of boats from the site of H3, As-Sabiyah (Kuwait), and the distribution, function and imitation of Ubaid pottery in the Gulf. Together this shows that Mesopotamian ceramics were an item of trade, which were passed into the Neolithic system and incorporated into the local material culture and symbolic vocabulary. In the following discussion, 'trade' and 'exchange' are used synonymously (Renfrew 1975: 4). Neither carry market connotations, but are used neutrally to mean '*the mutual appropriative movement of goods between hands*' (Polanyi 1957: 266).

## Boat-related finds from H3, As-Sabiyah

The archaeological context of the boat-related finds can only briefly be described (for fuller details on excavations at H3, see Carter *et al.* 1999; Carter & Crawford 2001, 2002, 2003; Carter 2002, 2003). The site is located at the edge of a sheltered bay, now infilled. Its pottery

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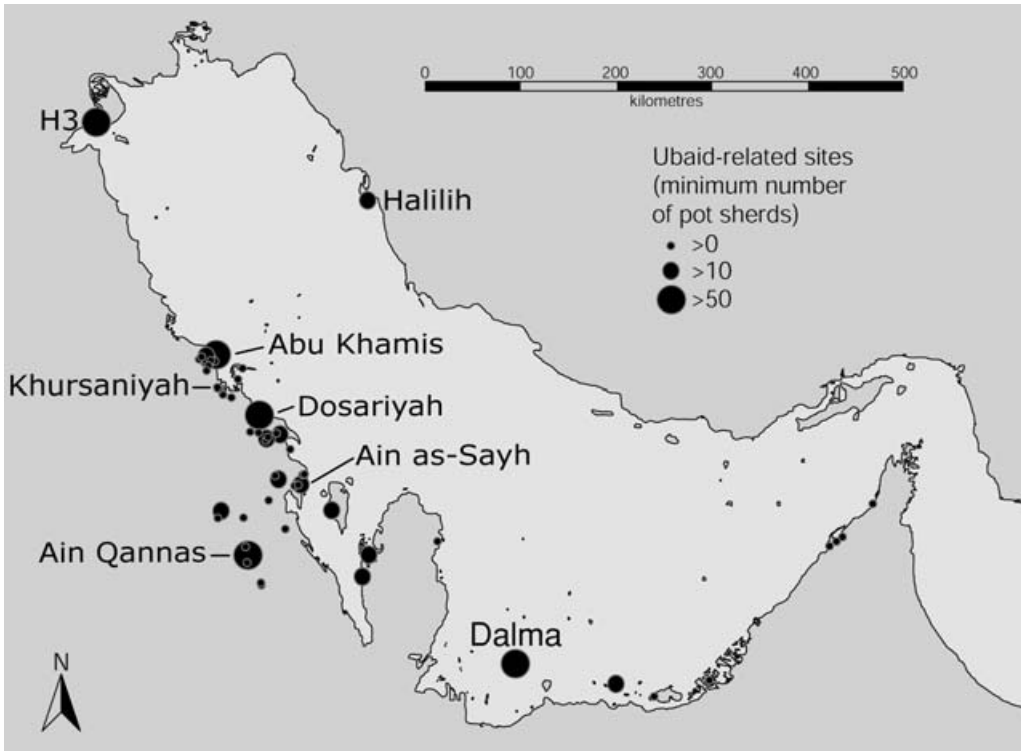


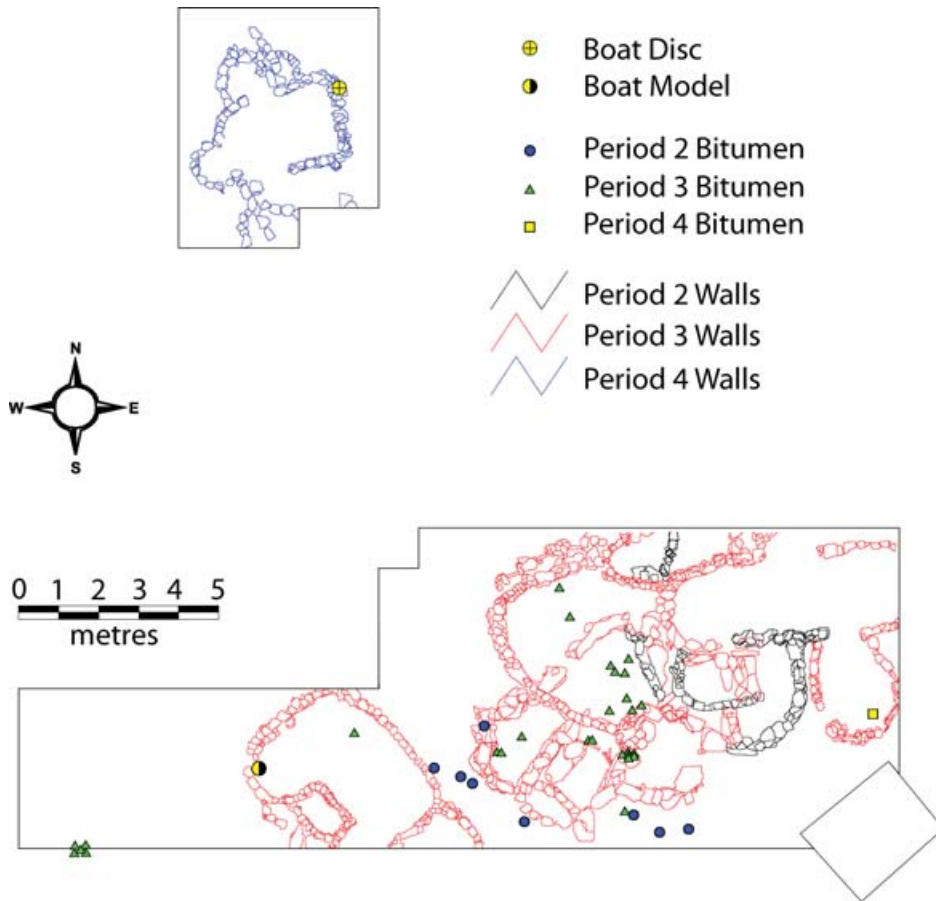
Figure 1. Distribution of Ubaid-related sites in the Gulf.

is of the Ubaid 2/3 period, while radiocarbon dates indicate that occupation began between 5500 and 5000 BC (Carter & Crawford 2003: 84, Figure 4). A cellular complex of stone chambers (Figure 2) is associated with a mixed material culture, combining elements typical of the Arabian Neolithic and the southern Mesopotamian Ubaid.

Boat-related finds consist of a ceramic model of a reed-bundle boat (Figure 3); a painted disc depicting a sailing boat (Figure 4) and over 50 pieces of bituminous amalgam, mostly with reed-impressions and/or barnacle encrustations, which are interpreted as fragments of the waterproof coating of sea-going reed-bundle boats (Figure 5).

The 15cm-long *model of a boat* (Figure 3) was found against the wall of one chamber (Figure 2). It was carefully modelled to give a schematic but detailed three-dimensional depiction of a reed-bundle boat. Other examples are known from Al-Ubaid, Eridu, Oueili, Uruk, Tell Uqair and Mashnaqa (Hall & Woolley 1927: Plate XLVIII; Safar & Lloyd 1981: Figure 111; Breniquet 1987: Plate III; Thuesen 2000: Figure 5; Lloyd & Safar 1943: Plate XVIII: 13; Lenzen 1968 Taf. 23: h; Qualls 1981: 12-13, 14-15), but none shows such detailed constructional features. The H3 model is in a coarse red ware associated with the Central Gulf. Key features include incised parallel lines and modelling which represent the shape of reed bundles. Reconstructions of Bronze Age vessels show bundle-shapes, even after coating with bitumen (Vosmer 2003a: Figures 2-3). Indentations along the tops of the sides may represent locations of cross-beams or thwarts, similar to a model from Eridu (Qualls

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*Figure 2. Distribution of boat-related finds at H3. For clarity, period 4 structures are not shown except for those of area G.*



*Figure 3. Ceramic model boat from H3.*



Figure 4. Painted ceramic disc depicting boat with two-footed mast.

1981: 12). The tips of the H3 model are missing, but on other models they curve round into a loop or tight coil (Hall & Woolley 1927: Plate XLVIII; Safar & Lloyd 1981: Figure 111; Breniquet 1987: Plate III: 1). This is a feature of reed-bundle construction. The model has three piercings, two intact and one present where the tip has broken off. An unpublished model from Eridu and a published example have three and five piercings respectively (Qualls 1981). They may have been used to fasten model steering oars and rigging.

The *image on the ceramic disc* appears to show a masted boat (Figure 4). It is *c.* 7 cm in diameter and was reworked from a sherd of a painted Ubaid bowl, which bore a pattern of spokes radiating out towards a scalloped border. Two spokes remain, resembling a two-footed (bipod) mast, while the outer edge of the painted border has been deliberately abraded away to leave a crescent shape resembling a hull. Bipod masts are well suited to reed vessel construction, being used when the frame of a boat is insufficiently strong to support a socket mast (Vosmer 2000b: 240; Casson 1995: 13). This find suggests that sailing was known by the Ubaid 3 period, and is the earliest known evidence for the use of mast and sail. The oldest undisputed evidence had hitherto been a painted pot from late fourth millennium BC Egypt (Casson 1995: Figure 6), or a disputed Ubaid 4 model from Eridu (Bourriau & Oates 1997).

### Bitumen from boats

*Actual boat remains* were also found, in the form of pieces of bituminous material carrying barnacles (Figure 5). These are fragments of the waterproof coating used to cover a reed-bundle hull, and represent the earliest boat remains in the Middle East, and the oldest known sea-going boat remains yet identified. A detailed account of these items is published

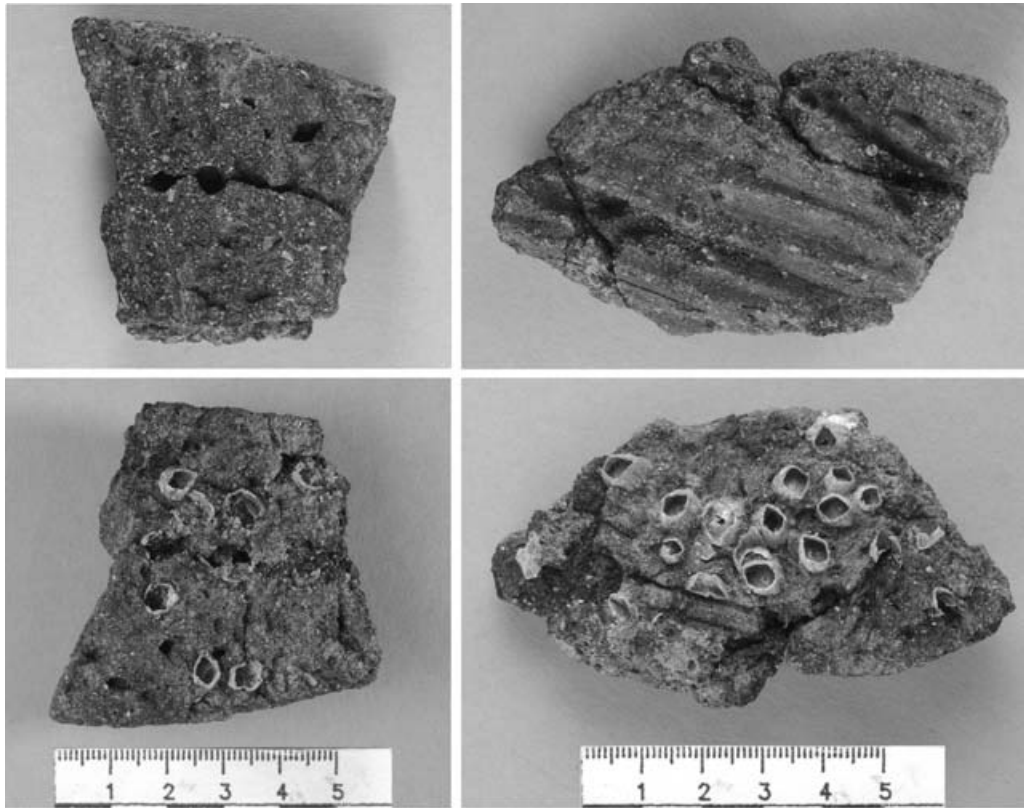


Figure 5. Bitumen with reed impressions and barnacles.

Table 1. Basic characteristics of the bitumen pieces

Bitumen pieces	Quantity
Impressed bitumen	20
String-impressed bitumen	4
Impressed barnacle bitumen	18
Bitumen fragment	9
<b>Total</b>	<b>51</b>

(Connan *et al.* 2005). Most of them (42 out of 51; see Table 1) were impressed, generally with parallel reed impressions from the surface of the reed bundles. Eighteen (35 per cent) also had barnacles on the opposite (external) face (Figure 5). Barnacles never occur on the same side as the impressions, an important fact given evidence elsewhere in the Gulf that local rises in sea level had caused post-occupational submersion (McClure & Al-Shaikh 1993).

The size of the H3 pieces varied. The best-preserved slabs measured 5-8cm across, generally 1-3cm thick. The shapes were, with exceptions, geometric, having approximately straight edges joining to make uneven polygons, usually with four or five sides (Figure 5). This breakage pattern may reflect the underlying structure of the reed-bundle hull: perhaps

a mesh of string or ropes was tied or sewn around the bundles, or the lashings holding the bundles together created such a pattern, and the bituminous coating fractured along the lines of the cords. A fragment of a string impression can be seen along the edge of one of the pieces. In a reconstruction of a Bronze Age boat, a lattice of ropes was stitched over the hull, creating a polygonal pattern (Vosmer 2003b: Figure 6), though in this case it was to fasten matting.

The spatial distribution of the bituminous pieces from H3 suggests that it was removed from boats and stored for reuse. Clusters of slabs are found (Figure 2), including a cache of at least five in a small pit. The bitumen was not laid down in a single event, but in numerous episodes. A concentration is found during the middle phases of the site's occupation (Periods 2-3). The low quantity in the late occupation, Period 4, may relate to a decrease in boat-related activities, though the pottery and other finds indicate that contact with southern Mesopotamia continued to flourish.

The bitumen may have been recovered from boats for recycling and reapplication, either for repairs or for the construction of a new boat. Fragments of barnacles can be seen within the fabric of the H3 amalgam, indicating previous recycling events. The same can be seen in later amalgam fragments from RJ-2, Oman (see below) (Cleuziou & Tosi 2000: 64). Schwartz and Hollander (2001) give a detailed account of how and why bitumen was recycled. There is no clear evidence for boat building or repair at the site, however, and the bitumen may have been recovered for other uses, e.g. for waterproofing or stopping up containers, or as fuel.

The technique of coating with bitumen is known from at least the Bronze Age to the modern era, from ethnographic, historical and archaeological sources (Ochsenschlager 1992: 52; Thesiger 1994: 113-4; Potts 1997: 130-2; Potts 1995: 562; Cleuziou & Tosi 2000: 63; Vosmer 2000b: 235; Frifelt 1995: 76, 99, 117, 226, Figures 133, 341-4; Højlund & Anderson 1994: 409-10, Figure 2047; Schwartz 2002). Ubaid-period bitumen may be present at Ain as-Sayh C and D in the Central Gulf, comprising reed-impressed slabs, though without barnacles (McClure & Al-Shaikh 1993: 114-5, 118, 122, Figures 9-10). Unfortunately, both Ubaid Period and Bronze Age pottery is found at these sites (Hermansen 1993: 141). Eroded reed-impressed bitumen pieces are found at Kosak Shamali, an Ubaid period site on the Syrian Euphrates (Connan *et al.* 2005; Connan & Nishiaki 2003), while at Eridu a clay boat model was covered in 'thick bitumen paint' (Qualls 1981: 12-13). The material from H3 is an amalgam of bitumen, vegetal matter and mineral additives (Connan *et al.* 2005). It provided a coating which could be heated and applied when liquid, which cooled into a hard, tough, flexible and adhesive coating. The vegetal matter, chopped reed and/or chaff, increased its flexibility and tensile strength, and also reduced its specific gravity. The coating waterproofed the reed hull, protected it against mechanical damage and acted as an anti-fouling agent (Vosmer 2000a: 149).

The H3 material is best compared to a later assemblage of over 300 impressed bituminous pieces from RJ-2, Ras al-Jinz, Oman (2500-2300 BC). The amalgams were comparable, neither differing greatly from that used for architectural purposes in Mesopotamia (Connan *et al.* 2005). There are some differences in the impressions found on the H3 and RJ-2 slabs. Wood impressions are found at RJ-2 (Cleuziou & Tosi 2000: 64), but not in the smaller H3 assemblage. Most reed-impressed RJ-2 slabs showed mat impressions, implying that the hull

was covered with mats, stitched on before the application of the bitumen (Vosmer 2003a: 52; Vosmer 2003b: 155). At H3, just one piece shows a possible mat impression, suggesting that mats were used much less extensively. Four pieces from H3 show impressions of string or rope. These are impressions of the cords which held the reeds into bundles, or which lashed the bundles together to form a hull.

Analyses conducted by Dr Jacques Connan reveal that the H3 bitumen was from Kuwait. All other archaeological bitumens so far analysed in the Gulf have a Mesopotamian or Iranian origin, including the pieces from Ras al-Jinz (Connan *et al.* 2005). The geochemical and isotopic signatures of the H3 material indicate an origin at Burgan, an inland oil field c. 70km to the south of H3. Surface bitumen seeps at Burgan are known from historical sources (Lorimer 1908: 1066; Dickson 1956). There is other evidence that the Neolithic inhabitants of Kuwait visited Burgan: good quality flint sources are also found nearby at Qurayn, and Neolithic tools have been found at Burgan itself (Carter & Crawford 2003: 85, 88).

### **Ubaid pottery in an Arabian Neolithic context**

H3 is only one of over 60 Arabian Neolithic sites around the Gulf which display evidence for contact with Mesopotamia during the sixth and fifth millennia BC (Figure 1). Almost invariably, this is indicated only by the presence of Ubaid pottery. The ceramics indicate longevity and stability in the relationship. Almost all relevant assemblages have Ubaid 2/3 (early Ubaid 3) and/or Ubaid 3 pottery. Two sites in the Central Gulf, Dosariyah and Abu Khamis, also have appreciable quantities of Ubaid 4 pottery, while the material of DA11 (Dalma) is probably Ubaid 4 (Carter 2002: 27, Note 5; Carter forthcoming; Carter & Crawford 2003: 84). By the Ubaid 5 (terminal Ubaid) contact had all but ceased, though there is evidence from Qatar and Bahrain of continuing low-level connections (Oates 1983: 255). According to Forest's chronological scheme (Forest 1996: 387), an Ubaid 3 and 4 time span would give a maximum range of c. 5300-4300 BC, i.e. as much as 1000 years. If connections broke down in the early Ubaid 4 (i.e. soon after 4800 BC), then the relationship would have lasted at least 500 years.

Some have assigned an active role to the inhabitants of the Gulf in the distribution of pottery (Masry 1997; Piesinger 1983), while others believe it was left incidentally, with no significant exchange (Oates 1993; Potts 1990: 57; Oates *et al.* 1977). Two points need to be made. Firstly, all Ubaid-related sites in the Gulf are Arabian Neolithic (De Cardi 1986: 93; Uerpmann & Uerpmann 1996: 131). The Ubaid pottery is an intrusive element, and other aspects of material culture and economy are Arabian. Secondly, to define the pottery as the detritus of Mesopotamian expeditions entirely denies any agency to its recipients, assuming a unidirectional relationship, and disregarding the internal processes of Neolithic society (Stein 2002: 903-4).

There are three excellent strands of evidence that the pottery was actively sought by the inhabitants of the Gulf, and that it was incorporated into their ideological and social schemata. These are matters concerning its distribution, value and function.

Although the distribution is predominantly coastal, significant quantities of pottery travelled inland in the Central Gulf region (Figure 1). While some quantities are published



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(Hermansen 1993; Masry 1997; Potts 1990), exact quantities from many sites are unknown. Dosariyah had ‘thousands’ of sherds, while Khursaniyah had ‘a fairly large quantity’. The furthest inland sites are located 60-70km from the sea, around Ain Dar, Abqaiq and the al-Hasa oasis, where Ain Qannas is found. There is nothing to indicate that these inland sites were ever significantly closer to the sea. On average, the al-Hasa plain is 110m above modern sea level (Masry 1997).

Pottery is concentrated at the larger sites (Dosariyah, Abu Khamis, Ain Qannas, Khursaniyah, Ain as-Sayh D), but is also found at smaller shell middens and lithic scatters. This distribution is not characteristic of visiting expeditions. Ubaid pottery was distributed horizontally throughout the local settlement pattern, and vertically through the local settlement hierarchy. The distribution reflects the dynamics of local Neolithic economy and society, and strongly implies that the pottery was circulated and used locally.

Imitations of Ubaid pottery were made in areas of limited circulation, implying that it was a highly desirable commodity. It is argued that in the context of the Gulf, Ubaid pottery carried connotations of wealth and/or high status, and should be regarded as an exotic good, comparable to Dalton’s ‘primitive valuables’ (Dalton 1977: 197-200). The lower Gulf is considerably poorer in Ubaid-related sites and pottery than the Central Gulf. This is a product of distance from source, and the geographical intervention of the Qatar peninsula. At DA11, Dalma island (UAE), gypsum-plaster bowls with black-painted decoration were made in clear imitation of Ubaid pottery, which is also present at the site in small quantities (Beech *et al.* 2000, Carter forthcoming). Comparable plaster sherds have now been found at MR11, an Ubaid-related site on the island of Marawah, 100km further to the east (<http://www.adias-uae.com/mr11.html>).

The functional profile of the ceramic assemblages in the Gulf is not that of a Mesopotamian fishing or resource-gathering expedition, but reflects the social needs of the Neolithic population. Figure 6 gives a typological breakdown of the Ubaid pottery from H3, and shows a strong bias towards serving vessels, namely bowls and cups (81 per cent). Vessels suitable for storage of food or water (jars) are noticeably rare (16 per cent). Many bowls are extremely delicate and fragile, with large diameters and very thin walls (as little as 2-3mm thick). Most assemblages in the Gulf are too small to make meaningful comparisons, but the pottery of Dosariyah, Abu Khamis and Ain Qannas shows strong qualitative parallels with the H3 material: the same types of bowls and cups are present in quantity, while jars are rare or absent. For parallels between the assemblages of H3 and the

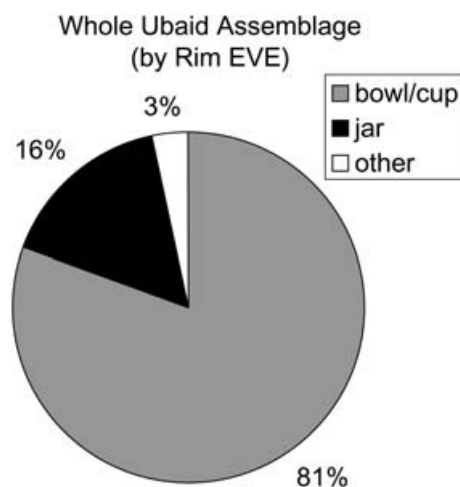


Figure 6. Percentage of vessel types at H3.

major Central Gulf sites, see relevant sections in preliminary reports (Carter & Crawford 2001: 11, 2002: 5-6). At Dalma, of the 1156 Ubaid-related pot and plaster sherds, all but

three appeared to have come from bowls or cups, when it could be ascertained (Carter forthcoming).

## **Interpretation of the Arabian–Ubaid interaction**

The assemblages are oriented towards serving and display, both of the ceramics themselves and of the food served. It is proposed that Ubaid pottery was not only used to present food, but was also redistributed in acts of ceremonial gift-giving or exchange at communal events, perhaps in feasting contexts. This was the mechanism of distribution within Arabian Neolithic society, leading to a pattern of dispersed ownership and a wide geographical distribution throughout the Central Gulf and into the lower Gulf.

A variety of social enactments may accompany ceremonial exchange, including the public display of wealth, the negotiation of status and power within and between groups, the consolidation of alliances, the resolution of rivalries and the simultaneous promotion of communal cohesion and social boundaries (Dietler 2001: 66-90; Hayden 2001: 29-30). In the ethnographic record, the adoption of foreign ceramics sometimes occurred through the agency of communal feasting, which incorporated ritualised hospitality and gift-giving (Junker 2001; Marshall & Maas 1997: 286). Such exchange transactions are a leitmotif in archaeological, historical and ethnographic case studies within innumerable social contexts, ranging from stateless societies through to fully urbanised and stratified states. The ethnographic cases usually invoked for stateless societies include *potlatch* in the Pacific north-west, the *kula* cycle in Melanesia and *moka* and *tee* in New Guinea, and a variety of aboriginal ceremonial exchange cycles in Australia (Dalton 1977; Malinowski 1984; Strathern 1971; Weissner 2001; Berndt 1951). These examples show that small-scale, decentralised societies are capable of maintaining stable and elaborate cycles of long-distance exchange, usually in high-value goods, within a ceremonial context.

Such a scenario would explain the demand for and distribution of pottery within the Neolithic sphere. The movement of pottery from Ubaid manufacturing communities to Arabian recipients may have followed a similar rationale, and it is hypothesised that customary ceremonial exchange relationships developed between certain Arabian and Mesopotamian individuals or groups, which persisted from generation to generation (cf. *kula*). It follows that something was exchanged for the pottery. This remains unidentified, but several authors have suggested pearls (Oates *et al.* 1977: 233; Uerpmann & Uerpmann 1996: 135; Carter & Crawford 2001: 18; Carter 2003: 25). Pearl finds are increasingly common at Neolithic sites (Carter 2002; Kiesewetter *et al.* 2000; Phillips 2002), though none has yet been identified in Mesopotamian Ubaid contexts. Other goods may have been exchanged, including stone (e.g. flint, obsidian), mother-of-pearl and shell jewellery, ochre and a wide range of perishable goods (e.g. hides, fish, livestock). Cattle may have been traded by Neolithic herdsmen (Kallweit 2003: 63). A variety of ‘invisible exports’ may have passed both ways: the preciosities at the heart of most ceremonial exchange relationships are frequently accompanied by prosaic exchanges of staples and low-value goods. The Ubaid pottery found in the Gulf may be the visible tip of a more inclusive set of transactions.

## Conclusion

By the late sixth millennium, a long-distance maritime exchange relationship linked southern Mesopotamia and the Gulf. It is not the earliest known seaborne trading network: obsidian exchanges were occurring by boat in the Aegean as early as the seventh millennium BC (Renfrew 1975: 37). Its existence is therefore not unprecedented, but the quality of evidence certainly is. Future work comparing this phenomenon with the apparent spread of Ubaid-related material culture northwards and westwards will advance the analysis of long-distance interaction in the centuries preceding the emergence of state-level complex societies.

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