Arab. arch. epig. 2008: 19: 15–21 (2008)

Arabian archaeology and epigraphy

First evidence of shell fish-hook technology in the Gulf

The technology of shell fish-hooks and line fishing is well attested in the coastal areas of the Indian Ocean during the Neolithic period (fifth–fourth millennium BC). Their presence in the coastal area of the Arabian Gulf is now confirmed by new findings from Akab (Umm al-Qaiwain) and Shimal (Ra's al-Khaimah) in the United Arab Emirates.

Keywords: fishing, fish-hooks, Neolithic, Arabian Gulf, Akab, Sultanate of Oman, United Arab Emirates

Sophie Méry[1], Vincent Charpentier[1] and Mark Beech[2]
[1]CNRS, UMR 7041-ArScan, Maison de l'Archéologie et de l'Ethnologie, 21 allée de l'Université, 92023 Nanterre cedex, France
e-mail:
sophie.mery@mae.u.paris10.fr,
vincent.charpentier@mae.u-paris10.fr,
vincent.charpentier@inrap.fr

[2]Historic Environment Department, Abu Dhabi Authority for Culture and Heritage (ADACH), P.O. Box 2380, Abu Dhabi, U.A.E.
email: mark.beech@cultural.org.ae

Introduction

Research on Neolithic societies in Arabia has largely concentrated on coastal regions. A number of research projects have focused on the coastal areas of the Arabian Gulf and the Indian Ocean, and have revealed specific details concerning past communities, notably the development of navigation and specialised maritime exploitation and subsistence practices (Tosi 1986; Uerpmann & Uerpmann 2003: Beech 2004: 65–68; Carter & Crawford 2003: 77–90).

One of the original features of these coastal communities is the harvesting and consumption of shellfish, which for certain groups constituted a resource used in long-distance trade networks. The majority of shellfish were, however, destined for local consumption.

Another conspicuous local feature is the working of marine shells, as fish-hooks and fishing equipment played an important role in the material culture of this time. This technology reached its peak during the sixth–fourth millennia BC. Products made from large pearl oysters (*Pinctada margaritifera*) are good chronological markers for this period (for example, laurel-leaf-shaped shell pendants). In addition there are a variety of other standardised objects that reflect the range of shellfish species gathered from different biotopes.

For a long time it was thought that fish-hooks were absent from the material culture of the Arabian Gulf and a number of archaeologists have repeatedly questioned their absence. However, the results of new archaeological excavations at Akab on the coast of the Arabian Gulf show that shell fish-hooks were a part of the material culture of these communities during the fifth–fourth millennia BC, and that they occurred not only among the populations living along the coastline of the Omani and Arabian Seas.

Fish-hooks of the Indian Ocean

Since the first discovery of a large fish-hook in 1981 at Khor Milkh, south of Muscat in the Sultanate of Oman, by Carl Phillips and Tony Wilkinson (1979: 107–112), the majority of shell middens dating to the sixth–fourth millennia BC distributed along the coast of Oman have produced this type of object (Fig. 1).

Sites located along the coast of the Gulf of Oman such as Khor Milkh KM1-2, Wadi Shab GAS-1, Ra's al Hadd HD-2 and especially Ra's al-Hamra (i.e. RH-4-5-6, 10) have all furnished a great number, sometimes in various stages of elaboration. The case is the same for the Arabian Sea coastline. Further examples are known from Ra's al-Hadd HD-2-5-6 and 99, Ra's al Jinz RJ-2 (period I) and RJ-40, Khabbah KHB-1, Ruwayz RWY-1, Suwayh SWY-1, 2 and 4 (Durante & Tosi 1977; Biagi & Travers 1985; Uerpmann 1992; Charpentier & Méry 1997; Méry & Charpentier 2002; Tosi & Usai 2003). The settlement of Ra's Jibsh, located farther to the south and less intensively studied, has not yet produced any such finds but it may be reasonably presumed that the Neolithic fisheries of the Arabian Sea continued as far as the Red Sea.

First indications of shell fish-hooks in the Gulf

Al-Buhais

Site BHS-18 at Jebel al-Buhais is a large site located in the interior of Sharjah emirate, equidistant between the shores of the Arabian Gulf and the Gulf of Oman. Its pastoral economy was largely

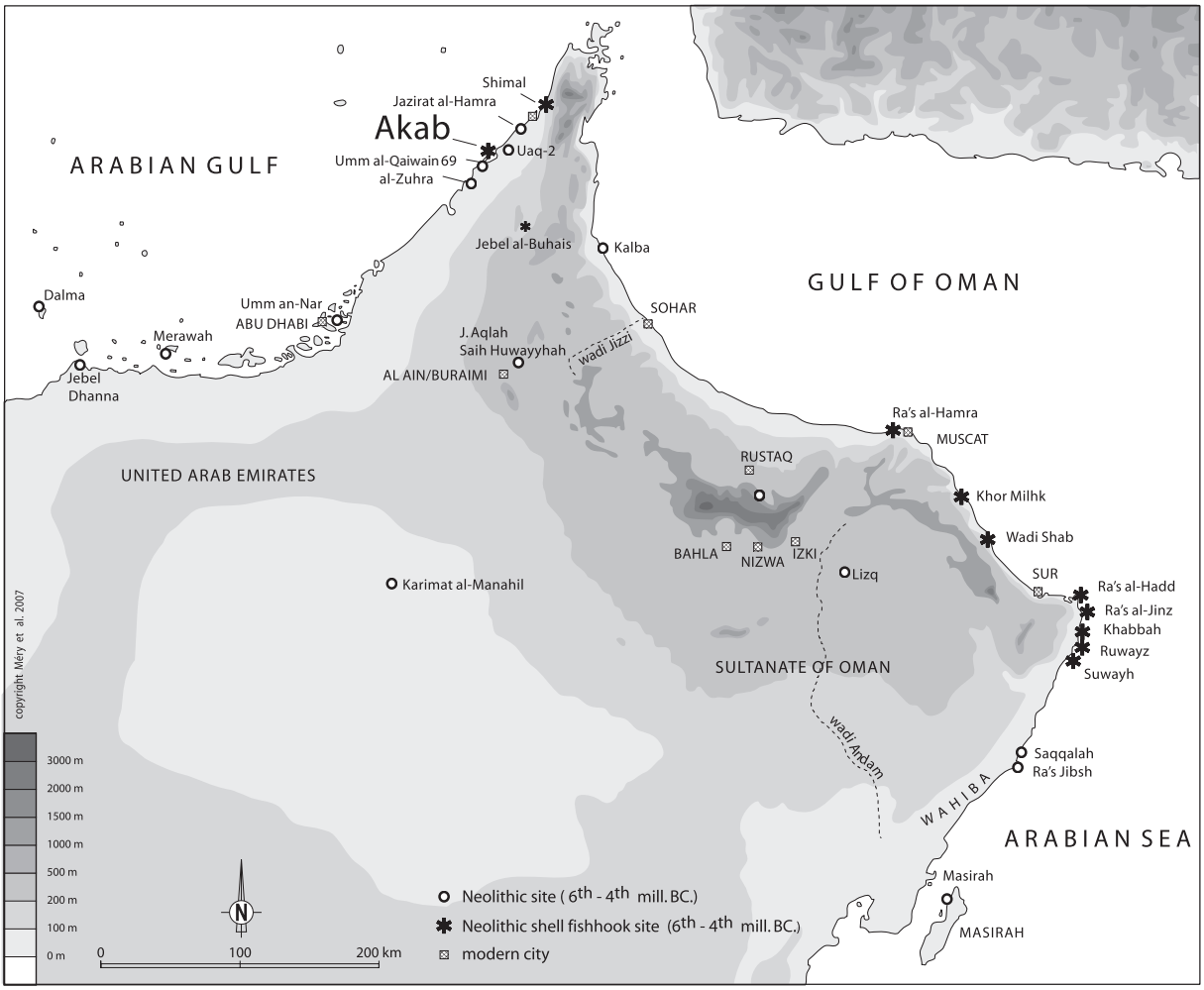

Fig. 1.
Distribution map of Neolithic mother-of-pearl fish-hooks between the sixth and fourth millennia BC.

based on the exploitation of sheep and goat, although cattle were also present. The local fifth-millennium BC (5100–4300 BC) community also exploited marine resources as part of a seasonal cycle[1], and analysis of δ13C values from two individuals buried within the cemetery indicate the important contribution of marine products in the food chain (Uerpmann, Uerpmann & Jasim 2000).

The discovery of two shell fish-hooks in BHS-18 is a good indication that such technology may have been employed in the waters of the Arabian Gulf (Kiesewetter, Uerpmann & Jasim 2000: 137–146, figs 2.13 and 6). Both of the examples are fragmented and of modest dimensions. The first item is just a small point fragment.

The second is better preserved, just slightly burnt at its extremities. Its system for attaching the line is particularly interesting since it is composed of two eyelets (making a perforated hole), a procedure known from examples found in the Sultanate of Oman (Khor Milkh KM-1-2, Wadi Shab GAS-1, Ra's al-Hadd HD-2-5, Jinz RJ-2, Khabbah KHB-1 and Ra's al-Hamra RH-5) (Phillips & Wilkinson 1979; Uerpmann & Uerpmann 2003; Charpentier & Méry 1997; Scaruffi 2004; Gaultier *et al.* 2005). In Oman, this method was exclusively used for the largest fish-hooks, which are generally dated to the fourth millennium BC, fish-hooks intended for capturing large fish such as carangids and scombrids (usually *Thunnus albacares*), but probably also for sharks (Charpentier & Méry 1997; Uerpmann & Uerpmann 2003: 198–199).

Marawah Island

A possible blank (preform) has been recently collected from the surface of site MR1 on Marawah Island (Abu Dhabi emirate) (Beech 2004). This is a rather tenuous find since we cannot actually confirm whether it is part of a real artefact. Future excavations at this site may, however, provide more substantial evidence to deepen our understanding of its significance.

[1] It is presupposed here that marine resources were predominantly exploited during the winter, but we know that the Gulf was also occupied during the summer months, see Beech 2004.

First fish-hooks from the Gulf

Akab Island

Best known for its remains of *Dugong dugong* (Jousse *et al.* 2002), the Neolithic site located on Akab Island in the Emirate of Umm al-Qaiwain (4700–3050 BC) is now the subject of new archaeological investigations[2]. The resumption of the excavations at Akab (in 2002, 2006 and 2007) led to the discovery of shell fish-hooks in well-stratified contexts. The majority of the fish-hooks come from fifth-millennium levels of Sector 1, the base of which is dated to 5900 ± 50 BP (1σ 4303–4135 BC, 2σ 4331–4033 BC: site details) (Pa 2356; Ak. S.5 L.6: sample numbers).

Seven fish-hooks, in different stages of elaboration, were discovered in the settlement of Akab, as well as vestiges of fish-hook fabrication.

Blanks.

Two blanks (preforms) were discovered so far at Akab. The first is a small oval blank worked using a stone hammer (Fig. 2.1). The second (not illustrated) is a spearhead blank worked in the same way. The same working procedure is evident in the presence of knapping waste on archaeological floors, which generally consists of small fragments from very large pieces of mother-of-pearl (8.2 to 20 mm) with bulbs and butts.

Rough forms.

A large rough form, which has distinctive traces of working probably made by a stone abrader (Charpentier & Méry 1997) comes from level 2 of trial trench 3 of 2002 (Fig. 2.2). It is the largest fish-hook discovered in the Gulf. Judging from its curvature, it appears to belong to an already known type, such as that from Khor Milkh KM-1 (Uerpmann & Uerpmann 2003: fig. 7.4.9).

Finished objects.

The group of finished fish-hooks consists of fragmentary objects: two curved pieces (Fig. 2.3–4), an

[2] The French Archaeological Mission in the U.A.E. resumed the excavation of Akab in 2002, under the auspices of H.H. Sheikh Mohammed b. Rashid al Mualla, Sheikh Khalid b. Humaid al Mualla, (General Director, Dept. of Antiquities and Heritage, Emirate of Umm al-Qaiwain) and Ms Alyaa Al Ghafli (Director, Museum of Umm al-Qaiwain. Excavations were done in collaboration with the Museum of Umm al Qaiwain.

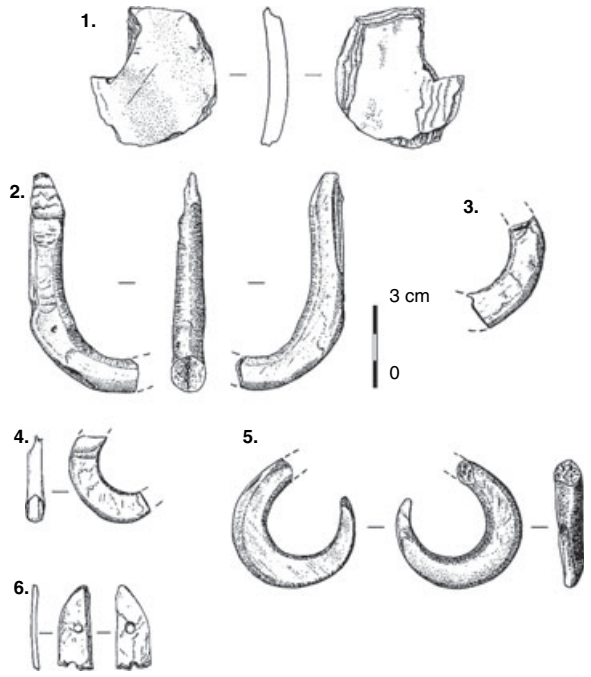

Fig. 2.
Drawings of fish-hooks found on the site of Akab (United Arab Emirates) in levels dated to the fifth and fourth millennia. **1.** blank. **2.** rough form. **3 and 4.** curves. **5.** curved fish-hook with head missing. **6.** head of a fish-hook with two eyelets.

example with no head (Figs 2.5 and 3) and a small head with two eyelets for attachment. Two curves of fish-hooks and also several fragments of pearl oysters have many perforations caused by marine organisms. Certain *P. margaritifera* could simply have been collected on the shore rather than taken directly from the oyster banks.

Fig. 3.
Photo of the curved fish-hook with head missing (Akab, United Arab Emirates).

The blanks, waste and rough forms confirm that fish-hooks were produced within the settlement, probably piece by piece and possibly in small 'workshops'. Similar examples are known from Suwayh SWY-1 and Ra's al-Hamra RH-6 for the fifth millennium BC, Suwayh SWY-2, Ra's al-Hadd HD-5, Ra's al-Hamra RH-5 and Wadi Shab GAS-1 for the fourth millennium BC (Biagi 1987: 15–19; Charpentier, Blin & Tosi 1998: 21–38; Biagi & Nisbet 1999: 31–47; Méry & Charpentier 2002; Tosi & Usai 2003).

The variety in size which characterises this series of fish-hooks is indicative of diversity in the types of prey captured, confirmed by the range of bone material found at Akab, which is very well preserved because of high mineralisation. Fish represent most of the faunal remains on the site other than the shellfish, confirmed by a preliminary study made by one of us (M.B.) in October 2005 (Beech 2005). At least nine families of fish are present at the Akab site including sharks (Chondrichthyes, indet.), marine catfish (Ariidae), needlefish (Belonidae), groupers (Serranidae), jacks/trevallies (Carangidae), sea bream (Sparidae), emperors (Lethrinidae), barracudas (Sphyraenidae) and tuna (Scombridae: Thunninae).

A single large shark vertebra was identified. This came from a requiem shark (Carcharhinidae). Judging from the relative size of the vertebra, the shark must have measured at least 2 m or more in size. Marine catfish (Ariidae) were represented by neurocranial (skull) fragments as well as by otoliths. Needlefish (Belonidae) were identified in six levels by teeth, premaxillae and vertebrae fragments. Groupers (Serranidae) occurred in three levels. These all belong to the genus *Epinephelus*. Jacks/trevallies (Carangidae) were quite common in the material, occurring in nine levels. Some of these remains belonged to the golden trevally (*Gnathanodon speciosus*). Sea breams (Sparidae) were represented in five levels by the genus *Rhabdosargus*, identified on the basis of its characteristic oval rear molar. Emperors (Lethrinidae) were represented by a single otolith from the genus *Lethrinus*. A single tooth from a barracuda (Sphyraenidae) was noted. Bones from tuna (Scombridae: Thunninae) occurred in no less than eight levels at the site. These all consisted of vertebrae that, judging from their relative size probably belonged to fish of about 1 m or less in size.

It is clear from an examination of the types of fish caught at Akab that fishing took place largely in shallow water habitats. A study of the modern fish present within the Umm al-Qaiwain lagoon reported an average abundance of requiem shark, *Carcharhinus dussumieri* and marine catfish, *Arius thalassinus* (Anonymous 1984). At least three species of grouper were noted, *Epinephelus areolatus*, *E. coioides* and *E. polylepis*, although only *E. coioides* occurred in abundant quantities. A number of jacks/trevallies were commonly found within the lagoon, *Gnathanodon speciosus* being particularly abundant. The sea bream species *Rhabdosargus sarba*, emperors (*Lethrinus* spp.) and barracudas (*Sphyraena* sp.), were all reported as being abundant within the lagoon. Thus, the majority of the species represented in the archaeological material are still present in the lagoon today. Such fish could have been caught using various techniques, including tidal traps (known locally as *hadrah*), nets, basket traps, as well as the use of hook and line occasionally. Similar evidence that much fishing was carried out in local shallow waters was obtained from other fifth-millennium BC excavations in the vicinity of Umm al-Qaiwain, as well as the nearby later site of ed-Dur (Beech 2004; Uerpmann & Uerpmann 1996; Van Neer & Gautier 2003: 110–118).

Although the majority of the fish could have been caught in the neighbouring Umm al-Qaiwain lagoon, tuna (Scombridae: Thunninae) were probably caught outside the lagoon in open water. Their presence was not noted in the study of present-day fish caught within the lagoon. An important point to bear in mind is that although small quantities of tuna can be caught all year round, they are far more abundant at certain times of the year in the Gulf waters of the northern emirates. For example, in 1982 in the waters of Ras al-Khaimah, most of the annual tuna catch was made during the months of April and May. Tuna fishing may therefore have been a seasonal activity for Akab's inhabitants.

Shimal

The collections at the National Museum of Ras al-Khaimah include an intact Neolithic fish-hook found at Shimal (Kästner 1991: 27, pl. 11C)[3]. It was discovered near a Wadi Suq tomb (SH501) dating to the second millennium BC. However, the fish-hook was manufactured during the fifth–fourth millennia BC and had been picked up and moved during the Bronze Age, then deposited in the horizons lying outside the construction of the tomb. The morphology of this fish-hook is similar to, and its dimensions are nearly as big as, some of the examples from Ra's al-Khabbah, KHB-1. Like other examples from Suwayh, or Ra's al-Hamra, this example did not have a specific means of attachment.

[3] We cordially thank Christian Velde of the National Museum of Ra's al-Khaimah for access to this document.

Discussion

The fact that the waters of the Arabian Gulf are largely shallow and edged by sandy shores has led some archaeologists to the hypothesis that shell fish-hooks were not employed in this part of Arabia at the beginning of this period. The situation in the Gulf meant that it was more effective to use fishing technology such as traps, rather than to fish in the deeper waters of the Indian Ocean where line fishing and the use of shell fish-hooks could more effectively be used to capture tuna at the limits of the pelagic zone. When did fixed barrier traps, known locally as *hadrah* or *sikar*, begin to be used in the Gulf? From Kuwait to the U.A.E. such barrier traps are well documented by recent ethnographic sources (Serjeant 1968; Taki 1970; Desse-Berset 1995; Beech 2004). Even though their presence is not in evidence on archaeological sites in the Gulf, it cannot be excluded that they were used in the Neolithic or the Bronze Age.

The new evidence at Akab and certain other sites of the U.A.E. clearly demonstrates that the technology of shell fish-hooks dates back to the fifth millennium BC in the Gulf, and it is quite remarkable that such items were employed by the early Neolithic communities in such an effective manner. A line with a vertical fish-hook, and sometimes small bone points and two distal points (bipoints), were successfully used to catch the predominantly carnivorous fish that were being targeted.

It was formerly believed that most coastal Neolithic sites in the Gulf concentrated on fishing in shallow inshore waters (Desse 1988: 157–165, 225–226; Uerpmann & Uerpmann 1996; Driesch & Manhart 2000: 50–67). However, a recent and comprehensive study of fish bones from a number of coastal

sites in the Gulf provides us with new information on the types of fish captured using these tools (Beech 2002, 2003, 2004, 2005; in press a; in press b; Beech & Al-Hussaini 2005). It appears that the early Neolithic fishing communities of the Gulf were capable of fishing in deep offshore waters where they targeted ocean fish such as tuna. The bone remains at Akab indicate that fishing largely took place in the shallow water habitats of the lagoon, but that tuna were probably caught outside the lagoon in open water. Evidence for such activities has also been found at DA11 on Dalma Island in the United Arab Emirates, and at As Sabiyah H3 in Kuwait. Thus, other coastal areas in the Gulf must have used shell fish-hooks, and their rarity may be simply related to poor preservation at certain sites. New data and information will probably result from further archaeological excavations in the region.

Whilst it is possible that some artefacts, such as those from Buhais, may be interpreted as jewellery, we consider that it is more likely that they represent fish-hooks. The deliberate deposition of tools (utilitarian objects) in graves is in itself a deeply symbolic act that is well attested in the prehistory of the region. These items were likely to be the personal belongings of occasional/seasonal fishermen who frequented the shores of the East Arabian seaboard.

Conclusion

Sixth- to fourth-millennia BC shell fish-hooks are now documented along the coast of a vast geographical area: the south-eastern part of the Gulf, the Arabian Sea and the Gulf of Oman. This is not the first time that archaeologists have observed a very large-scale distribution of a certain category of Neolithic artefacts (e.g. *Engina mendicaria* beads) or technology in Arabia, but it strongly indicates that certain cultural traits were shared throughout the Oman peninsula during the Neolithic period. Shell fish-hooks disappear locally when the first metal curved fish-hooks, made from small copper rods, appeared in the first phase of the Early Bronze Age (or Hafit period, *c.* 3000 BC).

References

Anonymous. 1984. Studies on the mariculture environment of Umm al Quwain lagoon and the experimental rearing of shrimp, rabbitfish and mullet. *Department of Fisheries, United Arab Emirates, Ministry of Agriculture and Fisheries, Technical Report* 8: 1–72.

Beech, M. 2002. Fishing in the 'Ubaid: A review of fish-bone assemblages from early prehistoric coastal settlements in the Arabian Gulf. *JOS* 12: 25–40.

Beech, M. 2003. The development of fishing in the United Arab Emirates: a zooarchaeological perspective. Pages 289–308 in Potts, D.T., Naboodah, H. & Hellyer, P. (eds), *Archaeology of the United Arab Emirates: Proceedings of the First International Conference on the Archaeology of the UAE* (London, Trident).

Beech, M. 2004. *In the Land of the Ichthyophagi. Modelling fish exploitation in the Arabian Gulf and Gulf of Oman from the 5th millennium BC to the Late Islamic period*. (Abu Dhabi Islands Archaeological Survey Monograph 1). Oxford: BAR Int. Ser. 1217.

Beech, M. 2005. *Preliminary report on the shells, crabs, fish and mammal bones from the 2002 excavations on Akab island, Umm al-Qaiwain, United Arab Emirates*. Unpublished manuscript.

Beech, M. in press a. In Search of the Ichthyophagoi: Neolithic fishing communities of the Arabian Gulf and Gulf of Oman. *Journal of Magan Studies*.

Beech, M. in press b. The Animal Bones. In Carter, R. & Crawford, H. (eds), *Early settlement and seafaring in the Persian Gulf: The view from an Ubaid-related Neolithic site in As-Sabiyah, Kuwait (6th–5th millennium BCE)* (Boston and Leiden, Brill).

Beech, M. & Al-Husaini, M. 2005. Preliminary report on the vertebrate fauna from site H3, Sabiyah: An Arabian Neolithic/'Ubaid site in Kuwait. Pages 124–138 in Buitenhuis, H., Choyke, A.M., Martin, L., Bartosiewicz, L. & Mashkour, M. (eds), *Archaeozoology of the Near East VI — Proceedings of the sixth international symposium on the archaeozoology of southwestern Asia and adjacent areas* (Groningen, ARC Publicatie 123).

Biagi, P. 1987. The prehistoric fishermen settlements of RH5 and RH6 at Qurm, Sultanate of Oman. *PSAS* 17: 15–19.

Biagi, P. & Nisbet, R. 1999. The shell-middens sites of RH-5 and RH-6 (Muscat, Sultanate of Oman) in their environmental setting. *Archaeologia Polona* 37: 31–47.

Biagi, P. & Travers, R.A. 1985. Non-Mammalian osteological remains and fishing implements at RH-5 and RH-6, Muscat. *EW* 35: 407–410.

Carter, R. & Crawford, H.E.W. 2003. The Kuwait-British Archaeological Expedition to as-Sabiyah: report on the fourth season's work. *Iraq* 65: 77–90.

Charpentier, V. & Méry, S. 1997. Hameçons en nacre et limes en pierre d'Océanie et d'Océan Indien: Analyse d'une tendance. *Journal de la société des Océanistes* 2: 147–156.

Charpentier, V., Blin, O. & Tosi, M. 1998. Un village de pêcheurs néolithiques de la péninsule d'Oman: Suwayh 2 (SWY-2), première campagne de fouille. *PSAS* 28: 21–38.

Desse, J. 1988. Khor 'P', Khor 'F.B.' et 'Shagra'. Les faunes. Le rôle de la

pêche — Fish remains and micro-mammalian fauna from Khor and Shagra. Methodology and preliminary results. Pages 157–165 and 225–226 in Inizan, M-L. (ed.), *Préhistoire à Qatar. Mission Archéologique française à Qatar — vol. 2*. (Paris, Éditions Recherche sur les Civilisations).

Desse-Berset, N. 1995. La pêche est au bout du jardin… deux îles, hier et aujourd'hui. *Anthropozoologica* 21: 7–19.

Driesch, A. von den & Manhart, H. 2000. Fish bones from Al Markh, Bahrain. Pages 50–67 in Mashkour, M., Choyke, A.M., Buitenhuis, H. & Poplin, F. (eds), *Archaeozoology of the Near East IVB — Proceedings of the fourth international symposium on the archaeozoology of southwestern Asia and adjacent areas* (Groningen, ARC Publicatie 32).

Durante, S. and Tosi, M. 1977. The aceramic shell middens of Ra's al-Hamra: A preliminary note. *JOS* 3/2: 137–162.

Gaultier, M., Guy, H., Munoz, O., Tosi, M. & Usai, D. 2005. Settlement structures and cemetery at Wadi Shab-GAS1, Sultanate of Oman: Report on the 2002 and 2003 field seasons. *AAE* 16: 1–20.

Jousse, H., Faure, M., Guérin, C. & Prieur, A. 2002. Exploitation des ressources marines au cours des Ve–IVe millénaires: le site à dugongs de l'île d'Akab (Umm al-Qaiwain, Émirats Arabes Unis). *Paléorient* 28/1: 43–60.

Kästner, J-M. 1991. *Interim report on the 6th campaign of the German Archaeological Mission to Ra's al-Khaimah 1990*. Unpublished manuscript.

Kiesewetter, H., Uerpmann, H-P. & Jasim, S.A. 2000. Neolithic jewellery from Jebel Al-Buhais 18. *PSAS* 30: 137–146.

Méry, S. & Charpentier, V. 2002. Around Suwayh (Ja'alan): A summary of some recent discoveries from coastal shell-middens of Eastern Arabia. *JOS* 12: 181–195.

Phillips, C.S. & Wilkinson, T.J. 1979. Recently discovered shell middens near Quriyât. *JOS* 5: 107–112.

Scaruffi, S. 2004. *Il popolamento medio olocenico nelle regioni orientali des Sultanato dell'Oman*. Bologna: Universita di Bologna, Tesi di Laurea Alama Mater Studiorum.

Serjeant, R.B. 1968. Fisher-folk and fish-traps in al-Bahrain. *BSOAS* 31: 486–514.

Taki, A.H. 1970. *L'évolution de la société du Bahrein*. 3 vols. Paris, University of Paris-EPHE, Doctoral thesis.

Tosi, M. 1986. Early maritime cultures of the Arabian Gulf and the Indian Ocean. Pages 94–107 in Al-Khalifa, S.H. & Rice, M. (eds), Bahrain through the ages: the Archaeology (London, KPI).

Tosi, M. & Usai, D. 2003. Preliminary report on the excavations at Wadi Shab, Area 1, Sultanate of Oman. *AAE* 14: 8–23.

Uerpmann, M. 1992. Structuring the Late Stone Age of southeastern Arabia. *AAE* 3: 65–109.

Uerpmann, H-P. & Uerpmann, M. 2003. *Stone Age sites and their natural environment, the Capital Area of Northern Oman*. (Part 3, Beihefte zum Tübinger Atlas des vorderen Orients, Reihe A Nr. 31/3). Wiesbaden: Franz Steiner.

Uerpmann, M. & Uerpmann, H-P. 1996. 'Ubaid pottery in the eastern Gulf — new evidence from Umm al-Qaiwain (U.A.E.). *AAE* 7: 125–139.

Uerpmann, M., Uerpmann, H-P. & Jasim, S.A. 2000. Stone Age nomadism in SE-Arabia — palaeo-economic considerations on the Neolithic of al-Buhais 18 in the Emirate of Sharjah, U.A.E. *PSAS* 30: 229–234.

Van Neer, W. & Gautier, A. 1993. Preliminary Report on the Faunal Remains from the Coastal Site of ed-Dur, 1st–4th Century AD, Umm al-Quwain, UAE. Pages 110–118 in Buitenhuis, H. & Clason, A.T. (eds), *Archaeozoology of the Near East: Proceedings of the First International Symposium on the Archaeozoology of Southwestern Asia and Adjacent Areas* (Leiden, Universal Book Services).