# Proceedings of the Seminar for Arabian Studies

Volume 38 2008

MBI Foundation

Archaeopress

# Proceedings
## of the
# Seminar for Arabian Studies

## Volume 38
## 2008

Papers from the forty-first meeting of the
Seminar for Arabian Studies
held in London, 19-21 July 2007

Seminar for Arabian Studies

Archaeopress
Oxford

Orders for copies of this volume of the *Proceedings* and of all back numbers should be sent to
Archaeopress, Gordon House, 276 Banbury Road, Oxford OX2 7ED, UK.
Tel/Fax +44-(0)1865-311914.
*e-mail* bar@archaeopress.com
http://www.archaeopress.com
For the availability of back issues see the Seminar's web site: www.arabianseminar.org.uk



Seminar for Arabian Studies
c/o the Department of the Middle East, The British Museum
London, WC1B 3DG, United Kingdom
*e-mail* seminar.arab@durham.ac.uk

**Opinions expressed in papers published in the *Proceedings* are those of the authors and are not necessarily shared by the Editorial Committee.**

Typesetting, Layout and Production: David Milson

The *Proceedings* is produced in the Times Semitic font, which was designed by Paul Bibire for the Seminar for Arabian Studies.


ISSN 0308-8421
ISBN 0-9539923-4-9

*Proceedings of the Seminar for Arabian Studies* 38 (2008): 117–136

# A Neolithic settlement near the Strait of Hormuz: Akab Island, United Arab Emirates

**V. Charpentier & S. Méry**

**Summary**
Three excavation campaigns on the island of Akab have brought to light a large Neolithic settlement dating to 4700–3600 BC cal. The Neolithic populations largely exploited the resources of the surrounding lagoon, but also fished for tuna in the open ocean. Structures built on posts were revealed. The material culture of Akab includes Mesopotamian pottery (Ubaid) and several types of characteristic beads. In particular the occupants of Akab produced discoid beads in *Spondylus sp.*, to the extent that this site may be termed one of specialized production.

**Résumé**
Trois campagnes de fouille sur l'île d'Akab viennent de mettre au jour un important habitat néolithique daté de 4700–3800 BC cal. Les populations néolithiques ont largement exploité les ressources de la lagune environnante, mais ont aussi pratiqué la pêche au thon en haute mer. Une architecture sur poteaux porteurs a été mise en évidence. La culture matérielle d'Akab comprend de la poterie mésopotamienne (Obeid) et plusieurs types de perles caractéristiques. Les occupants d'Akab ont notamment produit des perles discoïdes en *Spondylus sp.*, au point que l'on peut parler d'un site de production spécialisé.

**Keywords:** Neolithic, Arabian Gulf, United Arab Emirates, Akab, settlement, fifth millennium BC, fishing

## Introduction

For geomorphologists, climatologists, and prehistorians, the study of the lagoon of Umm al-Qaiwain serves as a reference for the Arabo-Persian Gulf. Its wild mangrove, although reduced today, is one of the last surviving between Ra's al-Khaimah and Abu Dhabi (Fig. 1). Akab, Tell Abraq, ed-Dur, al-Madar, and numerous other archaeological sites border this vast lagoon, which includes several islands. The site of Akab faces the city of Umm al-Qaiwain, capital of the Emirate that occupies the great lagoonal bar west of the lagoon (Fig. 2).

Edged with mangrove trees (*Avicenna marina*), the island of Akab is today deserted and includes in its south-west part a hillock of wind-blown sand of Pleistocene origin, on which Neolithic populations settled 6500 years ago. In 1989 a team of the French Archaeological Mission to Umm al-Qaiwain discovered an important concentration of dugong bones (*Dugong dugon*) along with objects characteristic of the fifth and fourth millennia BC. This concentration of dugong bones was partially excavated in the early 1990s, and Akab was interpreted as a site for slaughtering or butchering (Prieur & Guérin 1991; Jousse *et al.* 2002). However, archaeological understanding of the site was limited, as only the concentration of dugongs was investigated, without seeking to verify whether it was part of a larger and more complex site. The chronological range revealed by radiocarbon dating (4700–3050 BC) was very wide, without any phases being differentiated on the site.

The French Archaeological Mission to the UAE resumed excavation at Akab in 2002 with the following hypothesis: the exceptional concentration of marine mammal bones found on the site must represent a specialized area which was part of a settlement. The latter was still to be identified and defined. It was also necessary to verify whether distinct levels, dated to the fifth and fourth millennia BC, were preserved in the stratigraphy, as well as to seek traces of Neolithic dwelling structures. This had not been carried out during earlier excavations at Akab. The aim was to establish the actual presence of Neolithic occupations *in situ* as well as to determine the extent, stratigraphy, and chronology of the site.

## Test trenches and excavation

The island of Akab was subjected to a landscaping project several decades ago. Its shores were remodelled and its

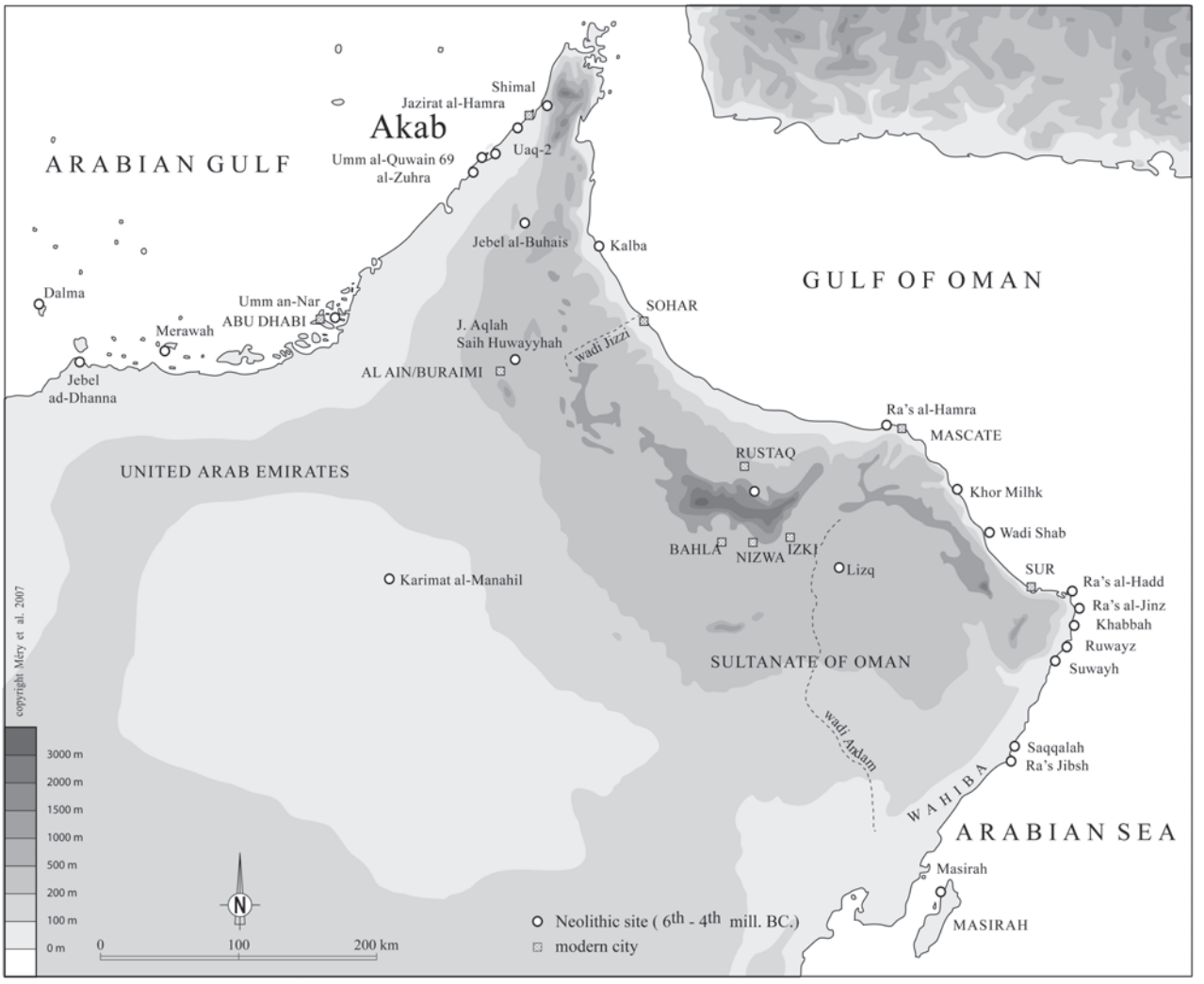


**Figure 1**. *A map of Neolithic sites in the United Arab Emirates and the Sultanate of Oman. Drawing by H. David.*

surface levelled using machinery, but a hillock of wind-blown sand of Pleistocene origin was preserved intact in the south-west part of the island. It is on this low hillock that the Neolithic site is located. The vestiges of human occupation are spread over a surface of about 1 ha and cover a sterile dune.

In 2002, a series of six 2×4 m test trenches were dug to the south and the north of the dugong mound (Fig. 3). Test trenches TT.4 and TT.6, which are sterile, enabled definition of the extent of the ancient site. Test trenches TT.1 and TT.3, which produced human occupation levels at 10 cm and 30 cm respectively below the present surface, were enlarged in order to acquire a better spatial insight into the organization of the archaeological material. The upper levels of TT.1, which are poorly preserved, date to the fourth millennium.

Test trenches TT.2 and TT.5 revealed levels dated to the fifth millennium. In TT.2, a layer of wind-blown sand 1.2 m thick covers the human occupation levels, at the base of which post holes and a basin-shaped hearth were discovered. The lower level, dated to 6275 ± 50 BP (calibrated to 4748–4441 BC at 2 sigma — see below), represents the oldest occupation of Akab, not found elsewhere on the site. Test trench TT.5, situated north of the mound of dugongs, produce well-stratified horizons, sealed by a wind-blown deposit which is less thick than

**Figure 2.** *An aerial photograph of the site of Akab and its mangrove. (© T. Sagory, French archaeological mission in the UAE).*

that of TT.2. Excavation was opened in 2006 based on this test trench (Sector 1), with two new extensions in 2007 (Sectors 2 and 4). The surface of Sectors 1, 2, and 4 cover a total of 72 $m^2$, and only Sector 4 has not yet been excavated down to virgin soil. The soil removed was sieved entirely with a mesh of 2–3 mm; tests were carried out with a 0.4 mm mesh to recover the smallest elements.

## Stratigraphy of Sectors 1 and 2

Sectors 1 and 2, which cover a surface of 48 $m^2$, were excavated down to virgin soil. The archaeological levels developed to a thickness of 25 to 35 cm, directly on a deposit of Pleistocene wind-blown sand. They are very homogenous, made up of grey-brown sandy sediments rich in organic materials (shell, fish bones, etc.). The levels of occupation contain a succession of floors characterized by an abundant spread of *Marcia hiantina*, concentrations of oysters (*Saccostrea cucculata*) and murexes (*Murex kusterianus*), articulated fish skeletons and crab carapaces, as well as various burnt or trampled materials, and also empty spaces (Figs 4–6). No wind-blown fine sandy horizon is present between the archaeological levels, which suggest the absence of lengthy phases of abandonment. Finally, at the base of all the horizons, the negatives of post holes are visible in the contact zone between the last archaeological level and the sterile sediment.

The top of the archaeological levels is disturbed by the tunnelling of foxes and the nests of seagull colonies which occupied the site after its abandonment. The eggs are

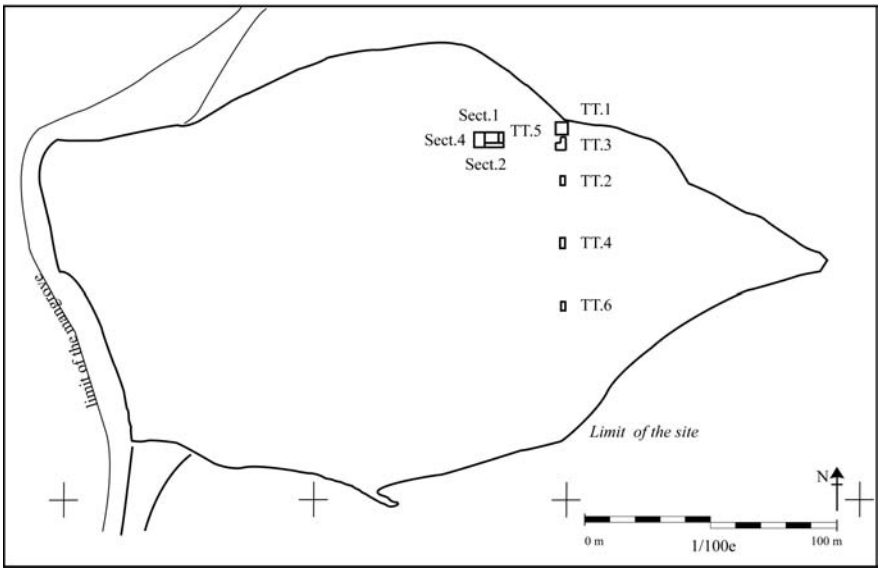


**Figure 3**. *A sketch of the location of the test trenches and the excavations 222-2007. (© French archaeological mission in the UAE).*

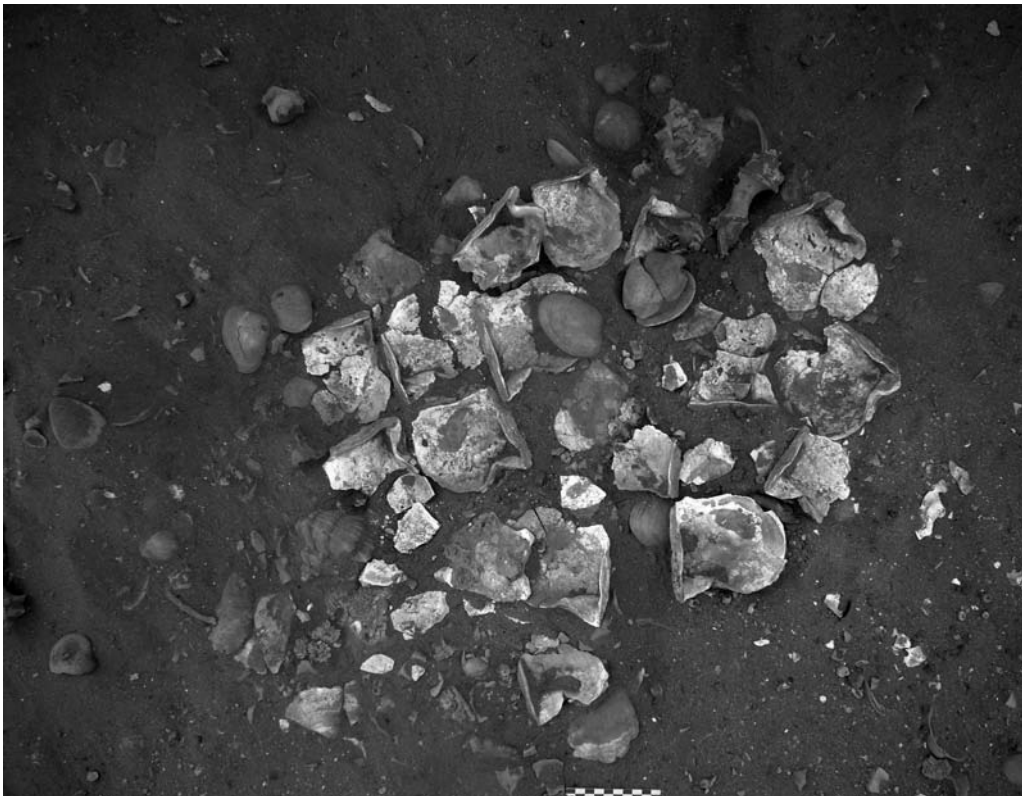

**Figure 4**. *Concentration of food waste (*Saccostrea cucullata*). (© French archaeological mission in the UAE).*

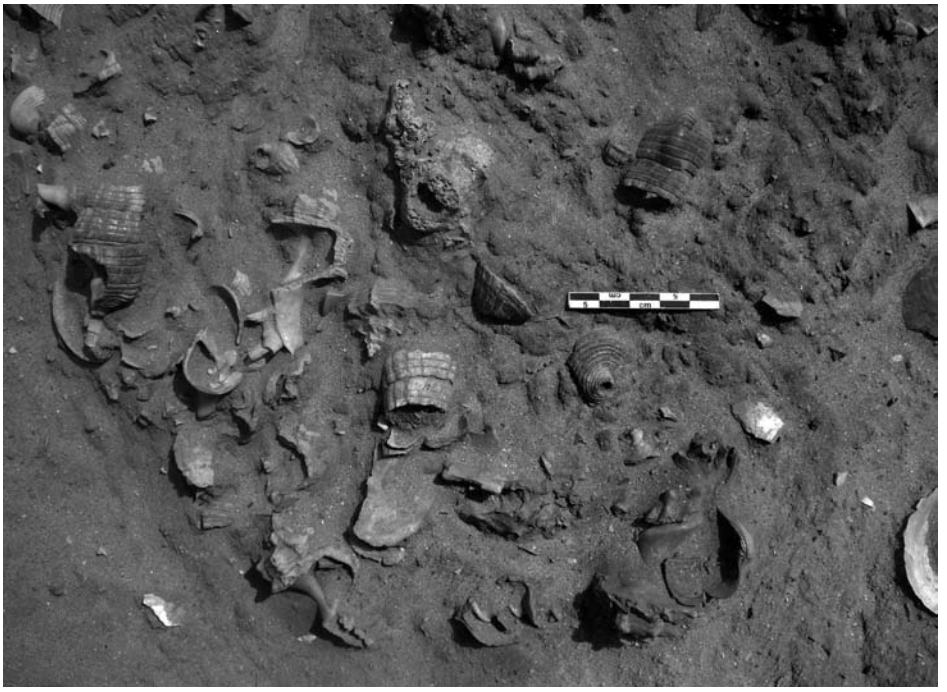

**Figure 5**. *Concentration of food waste (broken* Terebralia palustris*).*
*(© French archaeological mission in the UAE).*

**Figure 6**. *Concentration of broken crab pincers, thrown away in pairs. Settlement of Akab, fifth-millennium levels. (© French archaeological mission in the UAE).*

generally very little broken and belong to brown seagulls. Such remains have also been discovered at Marawah MR11 where they are probably evidence of reoccupation by marine birds of isolated or insular archaeological sites. The levels are sealed by a deposit of wind-blown sand 65 cm thick. This layer is sterile or only very slightly affected by human activity, and corresponds to a phase of unfavourable climatic conditions which brought on aridification.

## The dating of the early levels: Akab in its local context

| AKAB | Lab. no. | Spec. | BP | 1ŋ BC | 2ŋ BC | ΛR |
|---|---|---|---|---|---|---|
| S2 L6 | Pa 2355 | Marcia | 6275 ± 50 | 4674-4516 | 4748-4441 | 163 ± 40 BP |
| Sect 1 base | Pa 2440 | Marcia | 5970 ± 35 | 4320-4246 | 4357-4198 | 163 ± 15 BP |
| S5 L6 | Pa 2356 | Marcia | 5900 ± 50 | 4303-4135 | 4331-4033 | 163 ± 40 BP |
| A/B/C/21 | Pa 2439 | Marcia | 5710 ± 30 | 4019-3945 | 4081-3906 | 163 ± 15 BP |

**Table 1.** *Radiocarbon dates of marine shells from Akab settlement. Calibration program: M. Stuiver and P.J. Reimer (1986-2005). ΛR is the marine reservoir effect in Qatar (Saliège et al. 2005: fig. 1).*

The early occupation of Akab, which is the subject of this article, covers the last seven centuries of the fifth millennium and the first two centuries of the fourth millennium BC (4748–3906). The earliest level of the site was identified at the base of test trench 2 (level 6) and dates to 6275 ± 50 BP (4748–4441 cal. BC, 2 sigma) (Table 1). This level has not been found elsewhere on the site. The occupation of sector 1 is a little later according to the three dates established: 5970 ± 35 BP (4357–4198 cal. BC); 5900 ± 50 BP (4331–4033 cal. BC); 5710 ± 30 BP (4081–3906 cal. BC).

Comparison with the uncalibrated dates of other regional sites shows that the early levels of test trench 2 are slightly earlier than the levels at Al Ramlah 6 (6181 ± 50 BP), and contemporary or a little later than those of Dalma DA-11 (6395 ± 60; 6220 ± 45; 6165 ± 55; 5830 ± 55). The levels of Sector 1 are contemporary to those of Al Qassimimiya (5960 ± 120/5800 ± 110 BP), of Jazirat al-Hamra 1 (5955 ± 100 BP) and 2 (5845 ± 105), of Al Madar S69 (5890 ± 170 BP), and of Al Ramlah 6 (5713 ± 50 BP), but earlier than the latest levels at Marawah 11 (5630 ± 50 BP) or those of Al Ramlah 3 (Beech 2004; Boucharlat *et al.* 1991; Uerpmann & Uerpmann 1996: 132).

## Settlement structures of Sectors 1 and 2

Sectors 1 and 2 were excavated in a total of six units to virgin soil. The thickness of these units was defined according to the main archaeological floors, indicated in particular by the presence of *Marcia*.

Post-hole negatives were discovered in section and during the course of the excavation of the grey-brown levels of Sectors 1 and 2, but they were especially clear in the level of sterile sand in contact with the earliest horizons in this zone. In March 2007, 175 post-hole negatives were excavated over a surface of about 40 $m^2$. They are located for the most part in the western part of the excavated zone (Fig. 7). These post holes have various diameters and depths and their fill consists of materials from the horizon with which they are associated (black-brown sediments, remains of fish, crabs, and especially shells). Determination of the architecture based on the analysis of these post holes is a complex operation, and is in progress at the present time, but we can already stress the extensive and recurrent setting-up of successive structures in this zone of the site. We also observe that very dense zones contrast with others that are nearly empty (north-east angle of Sector 1).

It should be kept in mind that no circular structure identical to that of Dalma or the late levels of Suwayh 1 (Sultanate of Oman) was immediately apparent during excavation, the only evidence that appears to indicate the location of architecture of this type being post holes of varying depth and diameter. This evidence is found in the south-east part of the excavation, in a zone which is not very dense in post holes.

On the other hand, several groups composed of four or five identical post holes (i.e. with similar diameter, depth, and fill) are clearly visible and could be hypothetically interpreted as awnings, a type of structure which has not so far been found on a Neolithic site in Arabia. Akab is thus, with Dalma, the only Neolithic site in this part of the Gulf which has produced architecture with carrier posts. Its excavation emphasizes the essential fact that the Neolithic shell middens of eastern Arabia are stratified and structured features in which structures in the negative are perceptible if they are excavated with this in mind.

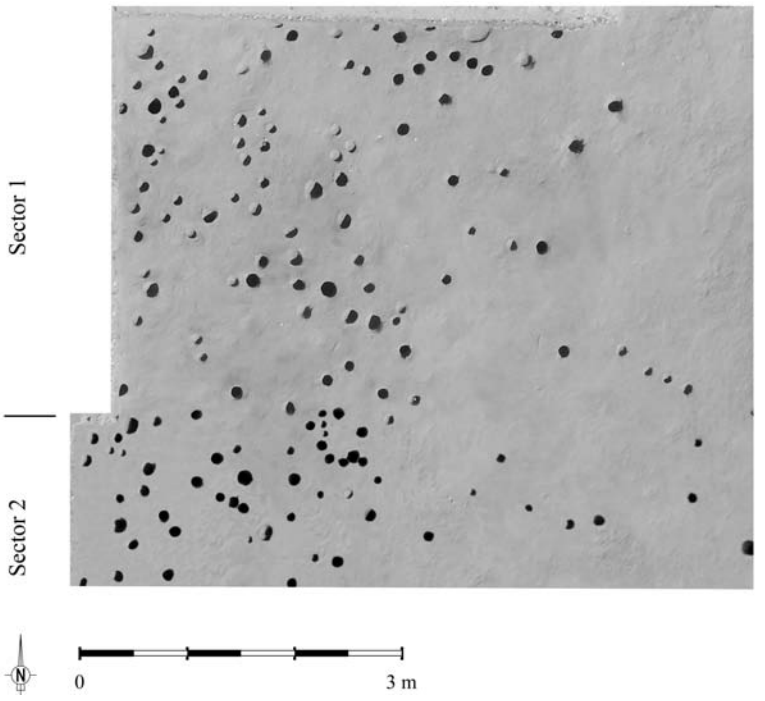


**Figure 7**. *An aerial view of post holes of Sectors 1 and 2. Settlement of Akab, base of fifth-millennium levels. (© M. Pons and T. Sagory, French archaeological mission in the UAE).*

## The hearths

Several ashy zones were excavated in the settlement of Akab (TT.2; Sectors 1, 2, and 4), but proper hearths are difficult to discern and probably correspond to non-constructed flat zones. They differ from hearths of the same period in the Sultanate of Oman where several types of structures are in evidence, always well constructed and easily found in the excavation. It should be pointed out that rock materials are absent in the environment of Akab.

## Material culture

### Fishing equipment

At Akab, net sinkers are made from hard rocks that do not come from the site itself but from the shores of the lagoon or beyond. All are worked by notching or picking and correspond to a type of net sinker with a transverse groove, well known in the Gulf and on the shores of the Sea of Oman and the Arabian Sea in the sixth–fifth millennia BC (Fig. 8/1–8). The kind of sinkers found at Akab are not specific to the Gulf, as they are also found in Oman, but conversely, a certain Omani type is not found at Akab or other Gulf sites. This Omani type is characterized by a preferential choice of material (i.e. calcites), working by notching or longitudinal grooving, and a tendency towards uniform size and shape of the objects.

The fish hooks in mother-of-pearl are well represented in the settlement, whether as pre-forms, rough forms, or finished products (Fig. 9/6–9) (see also Méry, Charpentier & Beech 2008: fig. 2). They constitute one of the main discoveries made since 2002 on the site of Akab, and their existence refutes a widespread idea. Several scholars have put forward the hypothesis that mother-of-pearl fish hooks were not used on the Gulf coast during the Neolithic, because the waters are shallow and the shores are sandy (Cleuziou 2005). According to these archaeologists, the Gulf would have been more favourable for fixed traps (net enclosures, of the *ḥaḍrah* or *maskar* type), while the deep waters of the Indian Ocean would be more favourable for line fishing and the mother-of-pearl fish hook, to capture tuna at the edges of the deep-sea zone. The discovery at Akab of the remains of fish hooks in different stages of fabrication shows that this technology is well represented

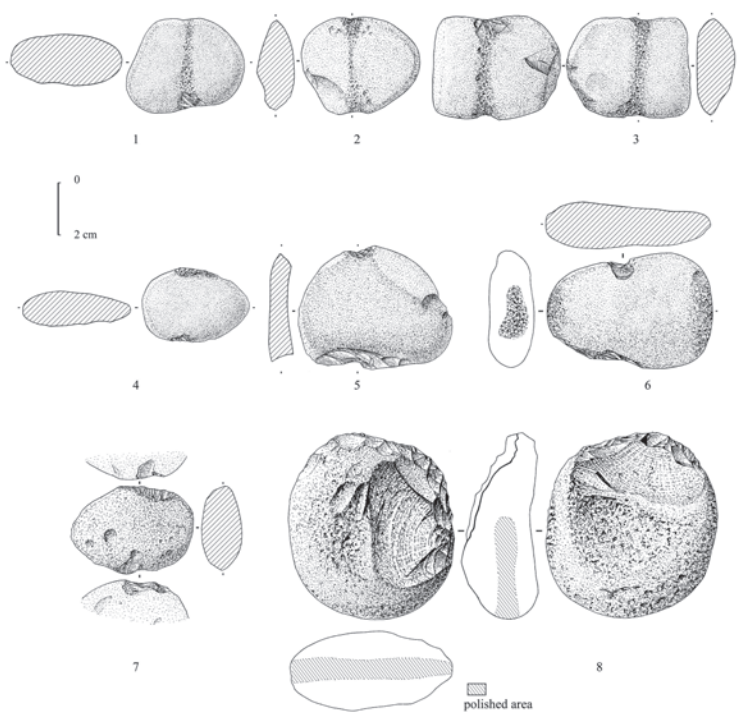


**Figure 8**. *1–8. Net sinkers; 9. crushing stone. Settlement of Akab, fifth-millennium levels. (Drawing by G. Devilder, French archaeological mission in the UAE).*

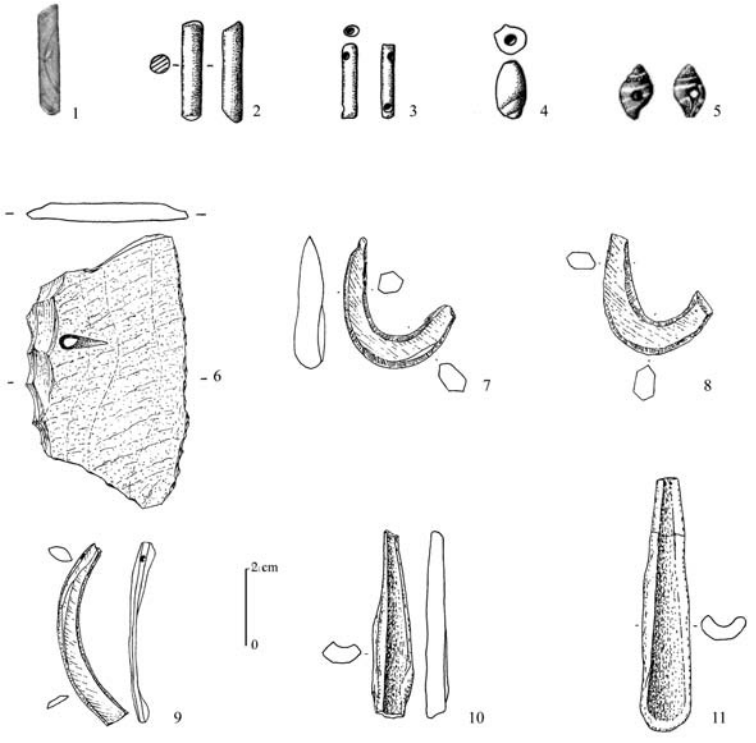


**Figure 9**. *1–3. beads of "Akab type"; 4–5. other shell beads; 6. ébauche of Pinctada margaritifera fish hook; 7–9. fish hooks; 10–11. bone points. Settlement of Akab, fifth-millennium levels. (Drawing by G. Devilder and S. Eliès, French archaeological mission in the UAE).*

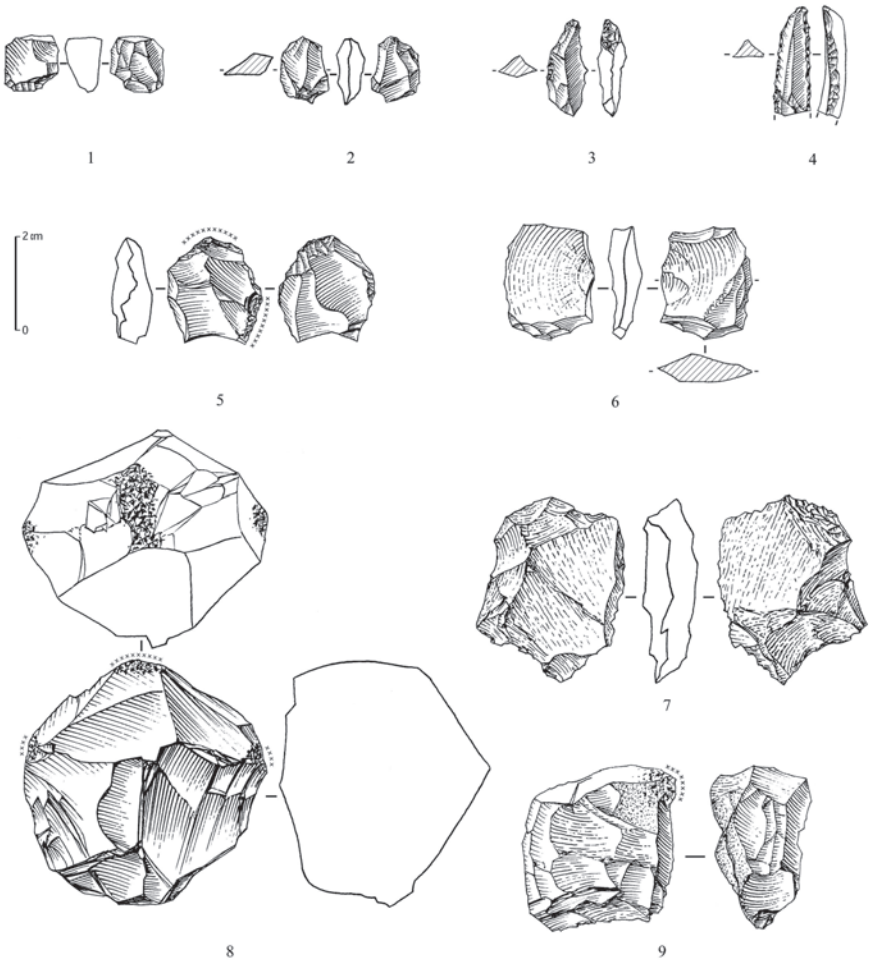


**Figure 10**. *1–2, 5–6, 7, 9. pièces esquillées; 3. borer; 4. double backed bladelet; 8. core. (Drawing by G. Devilder, French archaeological mission in the UAE).*

on the shores of the Gulf. It is thus an element of material culture common to the coastal populations of the Oman peninsula (Méry, Charpentier & Beech 2008).

**Other tools**

Lithic material is generally not abundant on the coastal sites of the UAE, and is particularly lacking at Akab, but the raw materials present are not of such bad quality on the whole. Translucent or opaque brown flints are found in coastal contexts, and it appears that the population of Akab had access, although probably indirectly, to very good material, in particular a black flint present in very small quantities in many coastal settlements of the UAE (Marawah 1, Abu Dhabi airport, etc.) (Hellyer 1998: 28).

Most of the tools are *pièces esquillées* which are sometimes microlithic (Fig. 10/1–2), and a few drills are also present (Fig. 10/3); these two types of tool are used in the local fabrication of beads from *Spondylus* shells. A small bifacial piece shows that pressure working was mastered at Akab, and it would not be surprising to find slender points one day in this settlement, as these are found on contemporary neighbouring sites (al-Madar S69, ar-Ramlah, UAQ-1 and 2, Jezirat al-Hamra, etc.) (Millet 1988; Phillips 2002; Uerpmann & Uerpmann 1996).

A crushing stone dating to the fifth millennium was also discovered at Akab in the upper levels of the excavation. It is a fairly flat discoid pebble, marked by a small depression on each face (Fig. 8/9). The two faces of this object were used as an anvil, and one side as a percussion tool; its edges are straight along the main

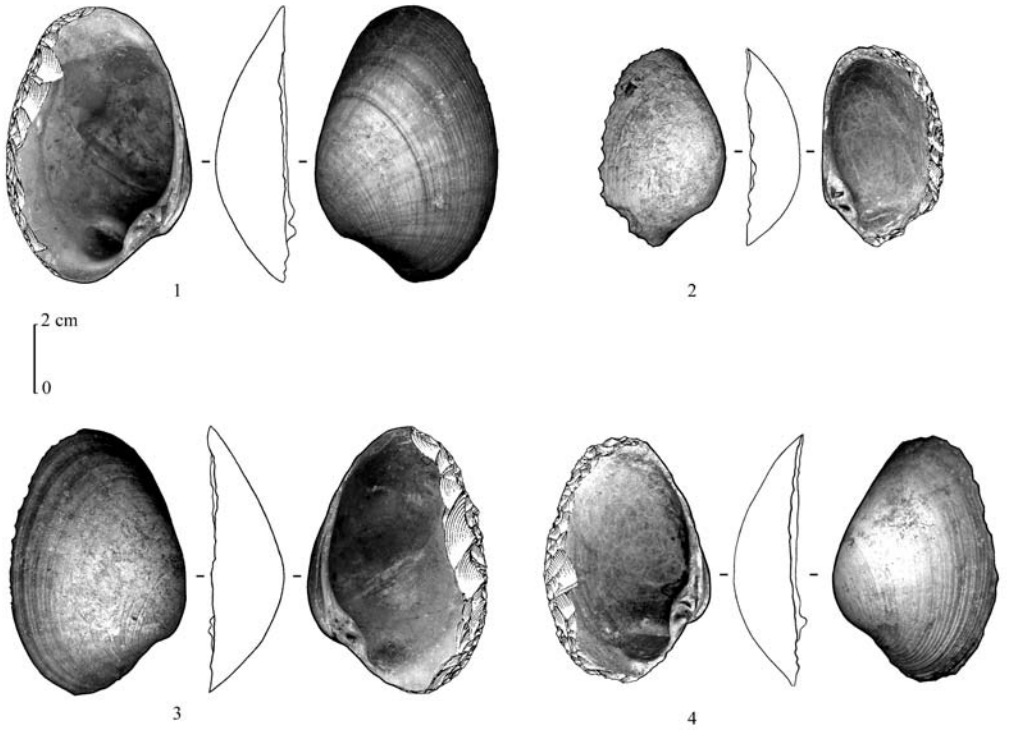


**Figure 11**. *Verenidae side-scrapers. (Drawing/scan by G. Devilder and R. Douaud, French archaeological mission in the UAE).*

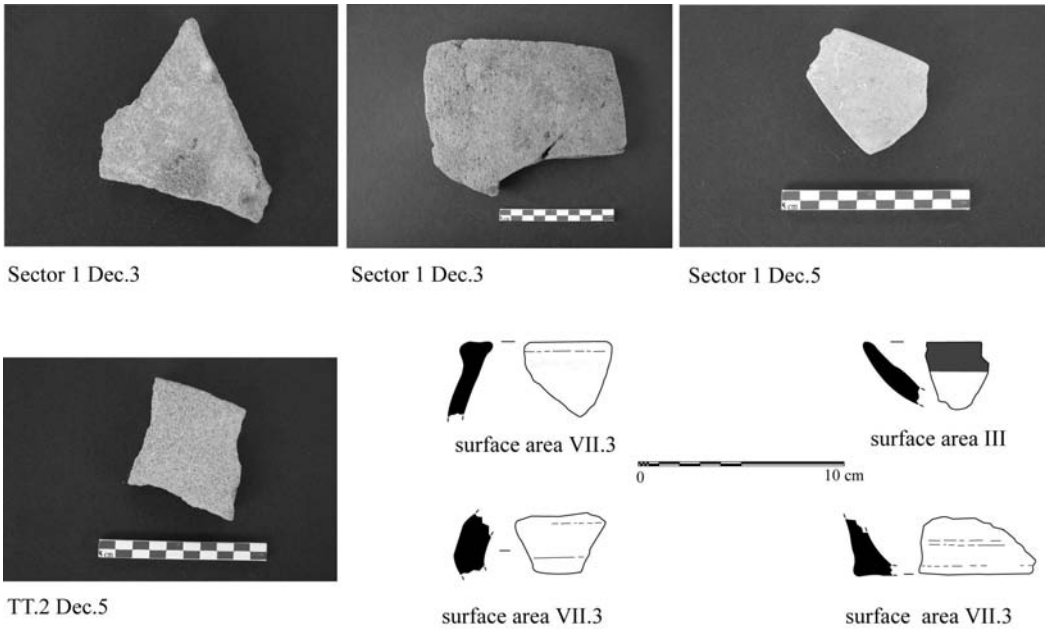


**Figure 12**. *Pottery sherds. Settlement of Akab. (© French archaeological mission in the UAE).*

axis of the stone. This type of tool is generally related to the presence of *Terebralia palustris*, as for example at Umm an-Nar, UAQ-2, and Jezirat al-Hamra in the Gulf (Frifelt 1995: 209, fig. 300; Vogt 1994; C. Phillips, personal communication); it would have been used to break the shells. Crushing stones are also frequent in the assemblages of the Omani coastal sites (Ra's al-Hamra, Ja'alan), especially in Dhofar (Rassek HSK-1 and HBM2; M. Tosi, personal communication) where they can make up the majority of the archaeological objects as at Ad-Dhariz, one of the fossil mangroves of Salalah. This tool is however found in several Neolithic settlements where *T. palustris* is absent, at Shagra (Qatar) for example (Inizan 1988: fig. 55/2). In any case, crushing stones are poor chronological markers, as they persist in the Gulf up to the Iron Age, as at Tell Abraq and Muweilah (Potts 2000; P. Magee, personal communication 2002).

For the mineral materials, ochre is present on the site in the form of small friable nodules, a material already reported in the Gulf and the Oman peninsula for the fifth–fourth millennia (Inizan 1988; Salvatori 2007).

The tools in hard faunal materials consist of bone points (Fig. 9/10–11**)**, but no straight-throated fish hooks, a type known on other contemporary sites in the Oman peninsula. With fifty-four examples, the knives and side-scrapers in Veneridae (*Callista erycina* and *Amiantis umbonella*) constitute the commonest type of tool at Akab. Their shells were used locally in the production of knives made by "inverse" retouch, convex or rectilinear; the removals can include all of the ventral edge of the shell or be limited to a particular area (Fig. 11). The rarity of unworked shells of *C. erycina* and *A. umbonella* in the excavation indicates that the collection of these shells was exclusively intended for the production of tools, as was also the case in Oman (Charpentier, Méry & Phillips 2004).

**The pottery**

Several Neolithic sites in Umm al-Qaiwain have already produced Mesopotamian pottery sherds of the Ubaid 3-4 period: UAQ2, ar-Ramlah 3, and al-Madar S69 (Boucharlat *et al.* 1991; Phillips 2002; Uerpmann & Uerpmann 1996). In Akab, Ubaid pottery (Ubaid 4, when diagnostic) is present in fifth-millennium BC stratified horizons and at the surface of the site (Fig. 12).

**The ornaments**

Beads represent the great majority of the objects found in the settlement of Akab since 2002. They are made from different types of shell, such as *Pinctada margaritifera*, *Ancilla sp.* (Fig. 9/4), and immature *Conus sp.*, but the most highly represented species by far is *Spondylus*. The working of beads in the mother-of-pearl of *P. margaritifera* is attested on the site by outlines and finished products as well as by quantities of related waste bits, and by the fabrication of fish hooks.

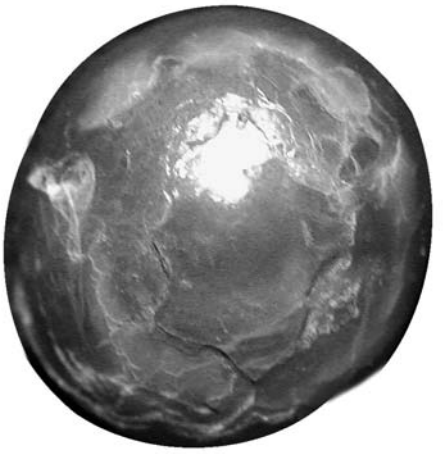

**Figure 13**. *A fine pearl. Settlement of Akab, fifth millennium BC. (© French archaeological mission in the UAE).*

***Pearl***

A small fine non-perforated pearl from *Pinctada radiata* was discovered in Sector 1 (level 2) (Fig. 13). This pearl, which measures 3.42 x 3.26 mm, was very little altered, still retaining a beautiful lustre. It is the oldest pearl bead discovered in the context of a settlement in the Oman peninsula; the fine pearls found previously were discovered in the Neolithic burials of Buhais BHS-18, Umm al-Qaiwan UAQ-2, and Suwayh SWY-1 for the fifth millennium, and also in the later necropolises of Ra's al-Hamra (RH-5, RH-10) (Charpentier, Marquis & Pellé 2003; Phillips 2002; Salvatori, 2007; 1996; Santini 1987). It is rarer to discover a pearl in a settlement, as at Suwayh 1 in levels dating to 4200 BC (unpublished), and at Khor Milkh 1 for the fourth millennium (Shöler 2003; Uerpmann & Uerpmann 2003: 142–162). In the north of the Gulf, a pierced pearl is known from the settlement of As-Sabiyah in Kuwait (Carter & Crawford 2002; forthcoming).

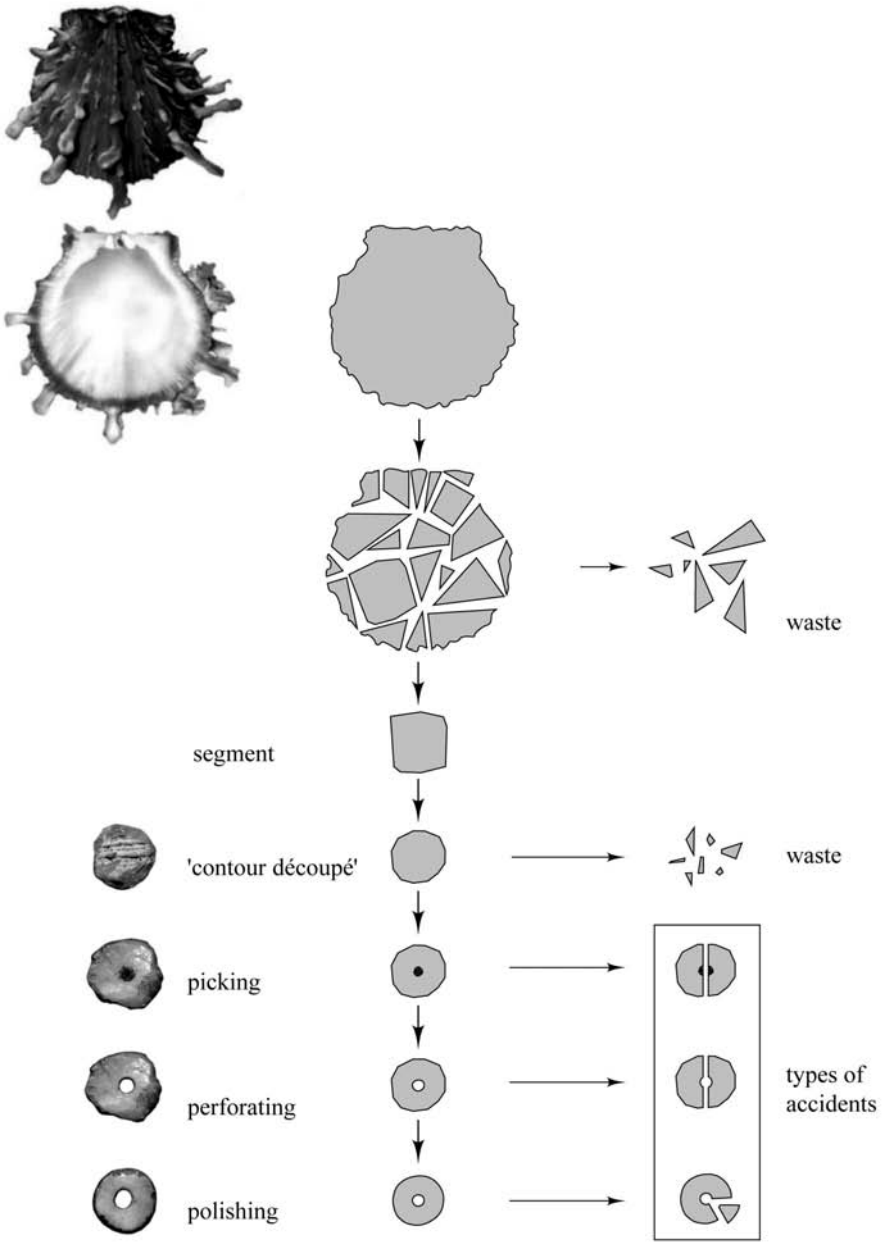


**Figure 14**. *Chaîne opératoire of beads made in Spondylus at Akab, fifth millennium BC. (Drawing by G. Devilder and V. Charpentier, French archaeological mission in the UAE).*

*Engina mendicaria* beads

The discovery of beads made from *E. mendicaria* is certainly of interest (Fig. 9/5) as these shells are not local, but found today on the rocky coast, in particular at the junction of the Gulf with the Sea of Oman. These shells, which have also been identified in a Neolithic context at Dalma, offshore from Abu Dhabi, were most probably traded over moderate to long distances, beginning in the fifth millennium.

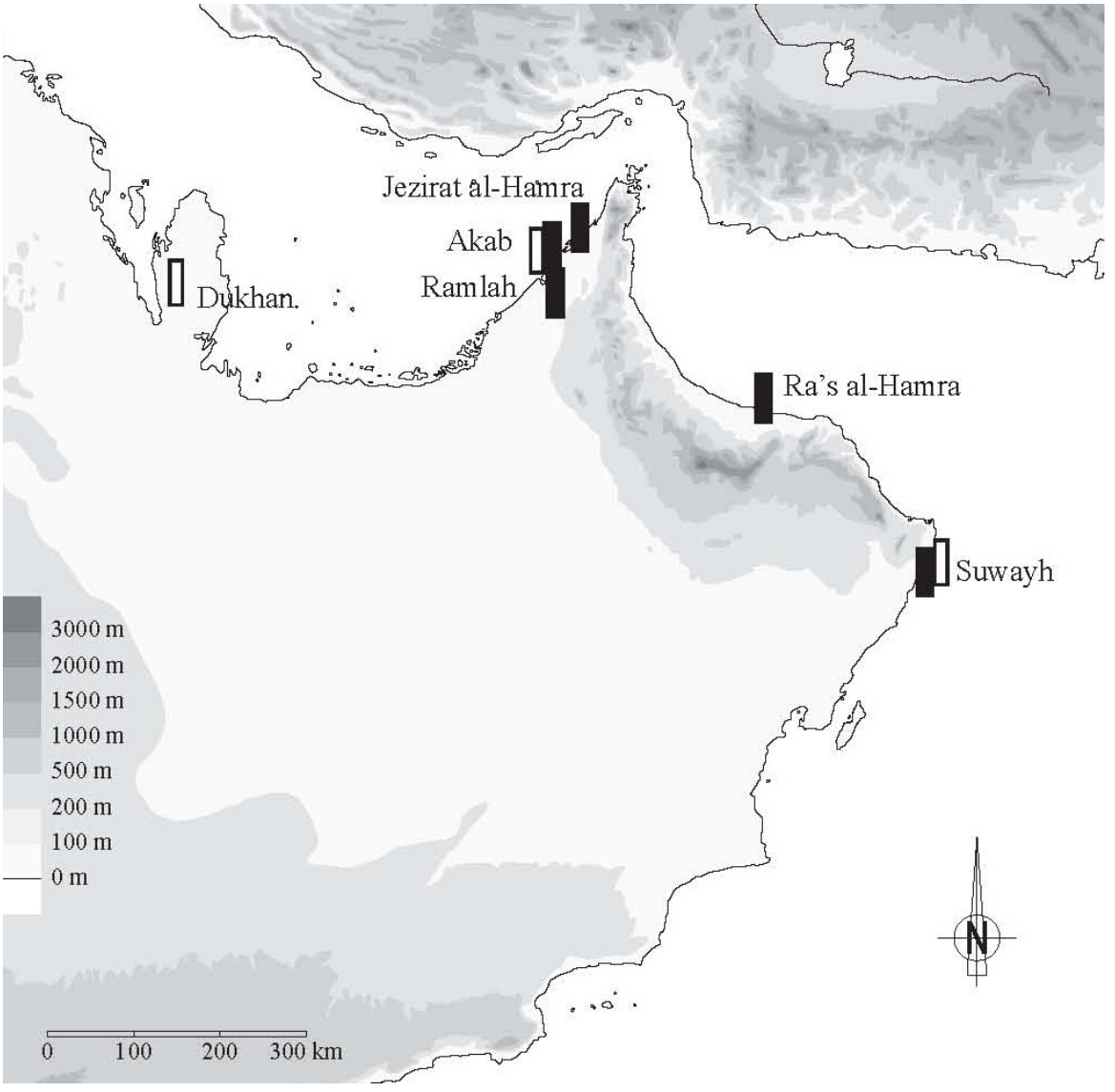


**Figure 15**. *Distribution map of tubular "Akab type" beads in the Gulf and in the north of the Indian Ocean.*

*Spondylus* beads

*Spondylus* shells were locally collected, and hundreds of beads and roughed-out forms as well as much waste from fabrication were found at Akab on habitation floors (Fig. 14). They appear as small concentrations of objects and not in specialized areas devoted to them. The discovery of hundreds of unfinished beads and waste indicates both the importance and the recurrence of this activity, suggesting a certain specialization of the site in the production of this type of ornament.

All the elements in the fabrication sequence were found in place. The shells were first cut into small squares or hexagons using a *pièce esquillée*, and then perforated with a drill; these two types of flint tool were found on the site of Akab. The phase of biconical perforation is one of the most delicate phases of work, and in the excavation many roughed-out forms of beads were found broken at this stage. The last phase of fabrication corresponds to the *calibration* of the beads, i.e. finishing, by polishing to reduce down to a uniform shape and size, e.g. with a limestone polisher. No tool of this type has been found

at Akab or any other Gulf site except H3, As-Sabiyah (Carter & Crawford 2002: 3), but the fourth-millennium settlement of Ra's al-Khabbah in Oman has produced one (excavations by G. Trapani, unpublished).

***Tubular beads of "Akab type"***

These are long tubular beads, which measure 30 x 2 mm and are produced in two different materials. The first is soft rock (steatite or chlorite), which is not native to the Gulf shores but probably originated in the foothills of the Oman mountains. The others, in marine shell, are fashioned in the columella of Murcidae (Madsen 1961: 195; Prieur & Guérin 1991). Two models are differentiated at Akab, as much by the form of the extremities as by their perforation technique. The first, in stone or shell, has a double distal perforation which is angled, the first perforation following the axis of the object and the second following one of its rays, which creates a very original means of attachment and assemblage. Other beads in shell have a single extremity of this type, the other extremity being bevelled with a central biconical perforation. No bead in green rock has this form. One shell bead, which is a non-perforated rough form, has both extremities bevelled.

The fifth-millennium settlement of Akab (Sector 1) has produced three complete examples of these beads in three different levels: two come from the two oldest archaeological levels (AK. 438, removal 5, square F2; AK. 439, removal 6, square E2), the last from an upper level (AK. 437, removal 2, square K1). Two of these beads were made from a murex columella (AK. 437 and AK.438), the third in soft stone (AK. 439). Example AK. 438 (Fig. 9/1 and 2) is a non-perforated rough form measuring 25.5×4.8 mm and the only known bead of "Akab type" whose two extremities are bevelled. Bead AK. 437, of which the two extremities have a double angled distal perforation, measures 25.2 mm x 3.4 mm. Finally, AK. 439 (Fig. 9/3), which measures 19.2 mm x 2.9 mm, has two angled distal perforations, but these are not opposite each other.

Beads of "Akab type" are mostly found in the coastal settlements of the northern UAE, especially Akab, where thirty-four examples were found at the beginning of the 1990s (Prieur & Guérin 1991) (Fig. 15). They are found in the Sultanate of Oman only on the site of Suwayh SWY-2 (Charpentier, Blin & Tosi 1998: figs 9–5). Other beads of the same type come from al-Madar (S69) in the south of the coastal band of Umm al-Qaiwain, and from Ramlah 2 at the far end of its lagoon, and also from Jazirat al-Hamra in the Emirate of Ra's al-Khaimah (Uerpmann M 2003: fig. 3; Vogt 1994). The only bead found outside the Oman peninsula comes from a surface site in Qatar, the site of Dukhan (Madsen 1961: fig. 18).

The association of chlorite and murex tubular beads of "Akab type" is so far found only at Akab in fifth-millennium levels, and at Suwayh 2 in the levels dated to 3360–3240 cal. BC. The other chlorite beads of "Akab type" come from sites generally dated to the end of the fifth or the beginning of the fourth millennium, such as Jazirat al-Hamra or Ramlah-2. The bead in serpentine from Ras al-Hamra RH-6, attributable to the fifth millennium and which has the same type of attachment, is very singular in its form and unusual length (61 mm) (Biagi 1999: fig. 15/3). The bead found at Qatar, of a size equivalent to the Akab beads, is quadrangular in section (Madsen 1961: 195).

The beads of "Akab type" are cultural markers rather than the markers proposed by other authors (Uerpmann & Uerpmann 2003: 258). As these beads are absent in the necropolis of Buhais 18, which dates to the fifth millennium, M. and H-P. Uerpmann proposed that they were chronological markers for the fourth millennium, interpreted as late imitations of the tubular beads with longitudinal perforation from Buhais. The recent discoveries at Akab show that beads of "Akab type" were already present by 4300 BC and that they are a type of bead which is distinct from that known at Buhais, although contemporary. So far identified only in the coastal settlements, they disappear at the end of the fourth millennium. J. Benton and D.T. Potts (1994: fig. 71/30) believed that they had found them in Tomb I at Jabal al-Emalah, dated to the beginning of the third millennium, but the beads from this collective burial have a quadrangular section and biconical distal perforations; this type is very different from that of Akab, highly characteristic of the Hafit period (i.e. the beginning of the local early Bronze Age) and found in abundance at Ra's al-Hadd HD-6 (Zaros 2004).

The discovery at Akab of a tubular bead in bevelled but non-perforated murex moreover enables confirmation of what was observed at the fifth–fourth millennia coastal sites of Ja'alan, Ra's al-Khabbah, and especially Suwayh, namely the possible arrival of semi-finished products on settlement sites (in this case unfinished earrings in soft stone). The discovery of an unfinished bead at Akab is of much interest: determining trade in semi-finished products is especially difficult in the Neolithic as most of the artefacts found in the settlements and particularly the necropolises were used; they are thus worn, broken, and

sometimes repaired. The unfinished bead from Akab may thus be a new indicator of this type of trade in the fifth millennium.

## Fauna

On the whole the animal bones are well preserved at Akab as they are highly mineralized, a frequent natural phenomenon on the Neolithic sites of the Umm al-Qaiwain lagoon and already reported by other researchers. The land animals are particularly well represented in the fifth-millennium levels of the settlement, compared to other coastal sites in the UAE and considering the high aridity of the ancient environment of Akab. According to Dr M. Beech from ADACH-Abu Dhabi and E. Pellé, from CNRS-Paris, the domestic fauna found at Akab includes goat (*Capra hircus*), sheep (*Ovis aries*), cow (*Bos sp.*), and dog (*Canis familiaris*). The hunted fauna are represented by *Gazella gazella* and wild donkey (*Asinus africanus*).

While the green turtle (*Chelonia mydas*) is rare in the settlement, the dugong is represented in all levels in the form of vertebrae and broken ribs. Ribs and vertebrae, with scapulae, also represent the main dugong bones found at other Neolithic settlements of the Gulf, including Marawah 11, Dalma, Jazirat al-Hamra, and Al-Markh (Beech 2000; Beech *et al.* 2005; Beech & Kallweit 2001; Roaf 1974).

Besides the shellfish, fish represent most of the faunal remains: needlefish, grouper, jack/trevally, tuna/mackerel, and catfish. The discovery of many headless fish skeletons indicates local preparation of fish. According to M. Beech (2005), who studied the fish bones found at Akab in 2002, "fishing largely took place in shallow water habitats. Whilst the majority of the fish could have been caught in the neighbouring Umm al-Qaiwain lagoon, tuna were probably caught outside the lagoon in open waters". These results differ from the observations made by other researchers at Ramlah, at the far end of the lagoon of Umm al-Qaiwain, as well as at Akab by the team of C. Guérin. The fishing was described as practised exclusively in shallow water, with "no indication that boats or any refined technology were used for fishing" (Uerpmann & Uerpmann 1996: 134). For the same reasons, the results of the new excavations at Akab do not follow the first conclusions made by J. Desse (2002), based on a small sample of fish remains from earlier excavations of the dugong mound at Akab.

Concentrations of crab remains from consumption were also often recovered *in situ* in the fifth-millennium BC levels of Sectors 1 and 2 at Akab, the crabs' pincers having been clearly broken and thrown away in pairs in certain cases. Several species of crab are represented, *Portunus sp.* first of all, but also mangrove crabs such as *Scylla serrata*. Two fragments of cuttlefish carapace were found in Sector 1; Umm al-Qaiwain 2 has already produced an example (C. Phillips, personal communication).

The large majority of consumed shellfish recovered at Akab are characteristic of a sandy-silty lagoonal environment, but a few species, such as *Lunella coronata*, come from rocky shores. Concentrations of shells whose contents were eaten were often found in situ. The gastropods *T. palustris* and *Murex kuesterianus* were usually found broken and some carried traces of fire. In the shell assemblages, *M. kuesterianus*, *M. hiantina*, and *S. cucculata* are predominant, followed by *Strombus decorus persicus*, *T. palustris*, and *Pinctada radiata*. Other species are rare, even exceptional.

## Conclusion

The three excavation campaigns carried out by our team have shown that the settlement of Akab had multiple occupations beginning in 4750 BC, and that most of the levels excavated so far date to the fifth millennium. It is definitely the site of a settlement, whose surface area covers about 1.5 ha, and which contains archaeological deposits with no trace of major discontinuity for more than half a millennium. The site contains many vestiges of structures on carrier posts, which were implanted successively and repeatedly. The activities of its occupants were largely oriented towards exploitation of the lagoon, but they also practised tuna fishing in the open sea, which demanded sophisticated equipment. The discovery of workshops for the production of beads made from *Spondylus* in all levels of the settlement indicates that certain sites in the Gulf could have already been specialized in the production of craft objects in the fifth millennium. We have no evidence of a local production of tubular beads of "Akab type", but the discoveries made in the settlement of Akab show that they should not be regarded as a chronological marker of the end of the fourth millennium (they appear at about 4600 BC).

Instead, they better represent a cultural marker of the Neolithic populations in the Oman peninsula, together with other types of personal ornaments of the fifth–fourth millennia, e.g. laurel-leaf pendants in *P. margaritifera*, composite bracelets carved from large Conidae, or soft-stone earrings. In the Arabian Peninsula, the distribution of tubular beads of "Akab type" extends from Qatar

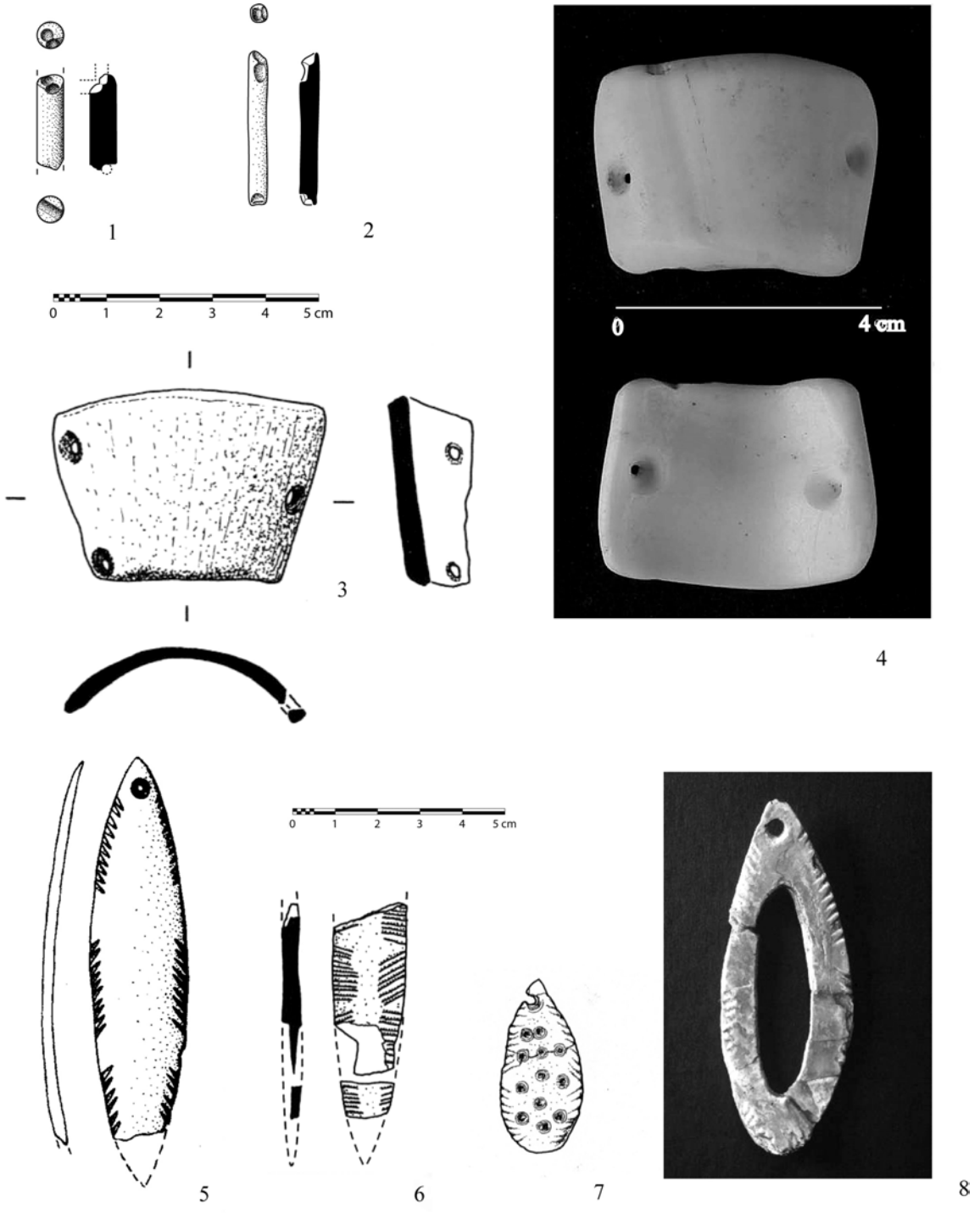


**Figure 16**. *"Akab beads" from Suwayh SWY-2: 1. murex; 2. steatite. Composite bracelets carved from large Conidae: 3. Suwayh SWY-2; 4. Hili 8 surface 2005. Examples of laurel-leaf shapes in P. margaritifera: 5. Ra's al-Hamra RH-5 (after Salvatori 1996); 6. Suwayh SWY-2; 7. Ra's al-Hamra RH-5 (after Salvatori 1996); 8. Ra's al-Hamra RH-10, grave 122 (after Santini 1987).*

to Oman (Fig. 15). It is the first time that such a wide distribution of Neolithic ornamental elements can be observed in the region. Except for Qatar, this distribution is the same as that of laurel-leaf shapes and composite bracelets (Fig. 16). All the elements of ornament under consideration (pendants and bracelets in the UAE and the Sultanate of Oman, earrings in the Sultanate of Oman) share the same types of decoration (indentations, series of rays and chevrons for the earrings; indentations and series of rays for the pendants in the form of a laurel leaf; series of rays for the bracelets) (Kiesewetter, Uerpmann & Jasim 2000; Méry & Charpentier forthcoming; Salvatori 2007). Elements of bracelets in Conidae are frequently found in the settlements and necropolises of the Sultanate of Oman from 4200 BC to the very beginning of the third millennium, and certain tombs of Hafit type still contained them (Santini 1992). They are more rare but known in the UAE, at Umm al Qaiwain 2, and also at Hili 8 (surface find 2005 by S. Méry, unpublished). The pendants in mother-of-pearl, found in the Sultanate of Oman and in the UAE, are of three types: the first type is laurel-leaf-shaped, the second has a convex base and is small in size, the third has a convex base and a hollowed-out central part (Ra's al-Hamra RH-4, 5–10; Suwayh 2 (unpublished), Buhais 18, al-Ain) (Durante & Tosi 1977: fig. 9; Kiesewetter, Uerpmann & Jasim 2000: figs 3 & 6; Salvatori 1996: fig. 6; Santini 1987; Stoel 1990; Uerpmann M 2003: fig. 3).

All these observations support the hypothesis of a recognizable cultural entity spread over the Oman peninsula in the fifth and fourth millennia, as indicated by the common elements of material culture. This hypothesis is not contradicted by the fact that the study of the arrowheads enables the definition of two distinct chronological cultures for the period 6500–3800 BC (Charpentier 2008; this volume).

## Acknowledgements

The excavations of the French Archaeological Mission in the UAE at Akab are organized under the aegis of the Museum of Umm al-Qaiwain. We warmly thank His Highness Mohammed bin Rashid al Muala, Sheikh Khalid bin Humaid al Mualla, General Director of the Department of Antiquities and Heritage in the Emirate of Umm al-Qaiwain, and Ms Alyaa Al Ghafly, Director of the Museum of Umm al-Qaiwain, for their strong support.

We also thank the Sous Direction de l'Archéologie et de la Recherche en sciences sociales du Ministère des Affaires étrangères et européennes (Paris) for their funding as well as the French Embassy in Abu Dhabi for its support. Dr M. Beech (ADACH-Abu Dhabi) kindly gave his agreement to the publication of some preliminary results of the fauna analysis. The French mission is also the beneficiary of generous aid from Gulf Marine Service Abu Dhabi. The authors also wish to thank warmly P. Paoli and R. Chaffort (Ambassade de France), M. Pierre (Ministère des Affaires étrangères), Dr J-F. Jarrige (Président de la Commission des Fouilles), and J. Desplaces (GMS-Abu Dhabi).

## References

Beech M.

2000. Preliminary report on the faunal remains from an 'Ubaid settlement on Dalma island, United Arab Emirates. Pages 68–78 in M. Mashkour, A.M. Choyke, H. Buitenhuis & F. Poplin (eds), *Archaeology of the Near East IV (B). Proceedings of the fourth international symposium on the archaeozoology of southwestern Asia and adjacent areas*. Groningen: ARC Publicatie 32.

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. (British Archaeological Reports, International Series, S1217). Oxford: Archaeopress.

2005. Preliminary report on the shells, crabs, fish and mammal bones from the 2002 excavations on Akab Island, Umm al Qaiwann, United Arab Emirates. Pages 11–22 in V. Charpentier & S. Méry (eds), *Akab island (Umm al-Qaiwain) Archaeological Season 2002, Field Report.* Paris : Mission archéologique Française aux Emirats Arabes Unis.

Beech M. & Kallweit H.
2001. A note on the archaeological and environmental remains from JH57, a 5th–4th Millennium BC shell midden in Jazirat al-Hamra, Ra'as al-Khaimah. *Tribulus* 11/1:17–20.
Beech M., Cuttler R., Moscrop D., Kallweit H. & Martin J.
2005. New evidence for the Neolithic settlement of Marawah Island, Abu Dhabi, United Arab Emirates. *Proceedings of the Seminar for Arabian Studies* 35: 37–56.
Benton J. & Potts D.
1994. Jabal al-Emalah. *Report compiled for the Department of Culture and Information, Government of Sharjah*. [Mimeographed].
Biagi P.
1999. Excavations at the shell-midden of RH-6 1986–1988 (Muscat, Sultanate of Oman). *Al-Râfidân* 20: 57–84.
Boucharlat R., Haerinck E., Phillips C., & Potts D.
1991. Note on an Ubaid-pottery site in the Emirate of Umm al-Qaiwain. *Arabian Archaeology and Epigraphy* 2: 65–71.
Carter R. & Crawford H.
2002. The Kuwait-British Archaeological Expedition to As-Sabiyah: Report on the Fourth Season's Work. *Iraq* 64: 1–13.
(forthcoming). Small finds. In Crawford H. & Carter R. (eds), *Maritime interactions in the Arabian Neolithic, the evidence from H3, an Ubaid-related site in Kuwait.*
Charpentier V.
2008. Hunter-gatherers of the "empty quarter of the early Holocene" to the last Neolithic societies: chronology of the late prehistory of south-eastern Arabia (8000–3100 BC). *Proceedings of the Seminar for Arabian Studies* 38: 93-116.
Charpentier V., Blin O. & Tosi M.
1998. Un village de pêcheurs néolithiques de la péninsule d'Oman: Suwayh 2 (SWY-2), première campagne de fouilles. *Proceedings of the Seminar for Arabian Studies* 28: 21–38.
Charpentier V., Marquis P. & Pellé E.
2003 La nécropole et les derniers horizons Ve millénaire du site de Gorbat al-Mahar (Suwayh, SWY-1, Sultanat d'Oman): premiers résultats. *Proceedings of the Seminar for Arabian Studies* 33: 11–19.
Charpentier V., Méry S. & Phillips C.
2004. Des coquillages … outillages des Ichtyophages? Mise en évidence d'industries sur Veneridae, du Néolithique à l'âge du Fer (Yémen, Oman, EAU). *Arabian Archaeology and Epigraphy* 15: 1–10.
Cleuziou S.
2005 Pourquoi si tard ? Nous avons pris un autre chemin. L'Arabie des chasseurs-cueilleurs de l'Holocène au début de l'Age du Bronze. Pages 123–148 in J. Guilaine (ed.), *Aux marges des grands foyers du Néolithique. Périphéries débitrices ou créatrices?* Paris: Errance.
Desse J.
2002. Note sur l'échantillon d'ichtyofaune de Akab (Emirats arabes unis). *Paléorient* 28/1: 58–60.
Durante S. & Tosi M.
1977. The Aceramic Shell Middens of Ra's al-Hamra: a Preliminary Note. *Journal of Oman Studies* 3/2: 137–162.
Frifelt K.
1995. *The island of Umm an-Nar.* ii. *The third Millennium settlement.* (Jutland Archaeological Society Publications, 26/2). Aarhus: Moesgard.
Hellyer P.
1998. *Hidden Riches, an archaeological introduction to the United Arab Emirates.* Abu Dhabi: Union Natinoal Bank.
Inizan M-L.
1988. *Préhistoire à Qatar, mission archéologique française à Qatar*. ii. Paris: Editions Recherche sur les Civilisations.

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, EAU). *Paléorient* 28/1: 43–58.
Kiesewetter H., Uerpmann H-P. & Jasim S.A.
2000. Neolithic jewellery from Jebel-al Buhais 18. *Proceedings of the Seminar for Arabian Studies* 30: 137–146.
Madsen H.J.
1961. En Flintplads i Qatar. *Kuml*: 185–201.
Méry S. & Charpentier V.
(forthcoming). Rites funéraires du Néolithique et de l'Age du bronze en Arabie orientale. In J. Guilaine (ed.), *Sépultures et sociétés*. Paris: Errance.
Méry S., Charpentier V. & Beech M.
2008. First evidence of shell fish hooks in the Gulf. *Arabian Archaeology and Epigraphy* 19: 15-21.
Millet M.
1988. Survey of the Sharjah Coast. *Sharjah Archaeology* 4: 21–30.
Phillips C.S.
2002. Prehistoric Middens and a Cemetery from the Southern Arabian Gulf. Pages 169–186 in S. Cleuziou, M. Tosi & J. Zarins (eds), *Essays on the Late Prehistory of the Arabian Peninsula.* (Serie Orientale Roma, 93). Rome: Istituto Italiano per l'Africa e l'Oriente.
Potts D.T.
2000. *Ancient Magan, the secrets of Tell Abraq*. London: Trident Press.
Prieur A. & Guérin C.
1991. Découverte d'un site préhistorique d'abattage de dugongs à Umm al-Qaiwain (Emirats Arabes Unis). *Arabian Archaeology and Epigraphy* 2/2: 72–83.
Roaf M.
1974. Excavations at Al Markh, Bahrain: a fish midden of the fourth millenium BC. *Paléorient* 2/2 : 499–501.
Saliège J.-F., Lézine A.-M., Cleuziou S.
2005. Estimation de l'effet reservoir 14C marin en Mer d'Arabie. *Paléorient* 31/1 : 64–69.
Salvatori S.
1996. Death and ritual in a population of coastal food foragers in Oman. Pages 205–222 in G. Afanas'ev, S. Cleuziou, R. Lukacs & M. Tosi (eds), *The Prehistory of Asia and Oceania*. Colloquium XXXII, Trade as a Subsistence Strategy, Post-Pleistocene Adaptations in Arabia and Early Maritime Trade in the Indian Ocean. XIII International Congress of Prehistoric and Protohistoric Sciences. Forli: Abaco.
2007. The Prehistoric graveyard of Ra's al-Hamra 5, Muscat, Sultanate of Oman. *Journal of Oman Studies* 14: 5-353.
Santini G.
1987. Site RH-10 at Qurum and a preliminary analysis of its cemetery: an essay in stratigraphic discontinuity. *Proceedings of the Seminar for Arabian Studies* 17: 179–198.
1992. *Analisi dei caratteri dominanti per la definizione del rituale nelle necropoli preistoriche e protostoriche della Penisola di Oman.* Doctoral thesis, Istituto Universitario Orientale, Naples. [Unpublished].
Shöler S.
2003. Mineralogical and petrological examination of some objects found at Khor Milkh, Sultanate of Oman. Pages 142–162 in H-P. Uerpmann & M. Uerpmann (eds), *Stones Age Sites and their Natural Environment — The Capital Area of Northern Oman Part III*. (Beihefte zum Tübinger Atlas des Vorderen Orients. Reihe A (Naturwissenschaften), 31/3). Wiesbaden: Reichert.
Stoel P.
1990. Al-Hair Archaeological Site Emirates. *Emirates Natural History Group Bulletin* 41: 22–24.

Uerpmann M.
2003. The dark Millennium: remarks on the Final Stone Age in the Emirates and Oman. Pages 73–81 in D.T. Potts, H. al Naboodah & P. Hellyer (eds), *Archaeology of the United Arab Emirates, Proceedings of the First International Conference on the Archaeology of the U.A.E.* London: Trident Press.
Uerpmann H-P. & Uerpmann M.
2003. *Stones Age Sites and their Natural Environment — The Capital Area of Northern Oman Part III.* (Beihefte zum Tübinger Atlas des Vorderen Orients. Reihe A (Naturwissenschaften), 31/3). Wiesbaden: Reichert.
Uerpmann M. & Uerpmann H-P.
1996. Ubaid pottery in the eastern Gulf — new evidence from Umm al-Qaiwain (U.A.E.). *Arabian Archaeology and Epigraphy* 7: 125–139.
Vogt B.
1994. In Search for Coastal Sites in Pre-Historic Makkan: mid-Holocene "shell-eaters" in the coastal desert of Ras al-Khaimah, U.A.E. Pages 113–128 in J.M. Kenoyer (ed.), *From Sumer to Meluhha: Contributions to the Archaeology of South and West Asia in Memory of Georges F. Dales, Jr.* (Wisconsin Archaeological Reports, 3). Madison, WI: Prehistory Press.
Zaros D.
2004. *La produzione artigianale delle perline ornamentali dai contesti di Abitato (HD-6) e di Necropoli (HD-10) a Ra's al Hadd, Sultanato d'Oman.* Degree thesis, Facoltà di conservazione dei beni culturali, University of Bologna. [Unpublished].

*Authors' addresses*
Vincent Charpentier, Inrap, UMR 7041 ArScan du CNRS, Maison de l'Archéologie et de l'Ethnologie, 21 allée de l'Université, 92023 Nanterre cedex, France.
*e-mail* vincent.charpentier@mae.u-paris10.fr, vincent.charpentier@inrap.fr

Sophie Méry, CNRS, UMR 7041 ArScan du CNRS, 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