

---

# Before the Emirates: an Archaeological and Historical Account of Developments in the Region c. 5000 BC to 676 AD

D.T. Potts

## Introduction

In a little more than 40 years the territory of the former Trucial States and modern United Arab Emirates (UAE) has gone from being a blank on the archaeological map of Western Asia to being one of the most intensively studied regions in the entire area. The present chapter seeks to synthesize the data currently available which shed light on the lifestyles, industries and foreign relations of the earliest inhabitants of the UAE.

## Climate and Environment

Within the confines of a relatively narrow area, the UAE straddles five different topographic zones. Moving from west to east, these are (1) the sandy Gulf coast and its intermittent *sabkha*; (2) the desert foreland; (3) the gravel plains of the interior; (4) the Hajar mountain range; and (5) the eastern mountain piedmont and coastal plain which represents the northern extension of the Batinah of Oman. Each of these zones is characterized by a wide range of exploitable natural resources (Table 1) capable of sustaining human groups practising a variety of different subsistence strategies, such as hunting, horticulture, agriculture and pastoralism. Tables 2–6 summarize the chronological distribution of those terrestrial faunal, avifaunal, floral, marine, and molluscan species which we know to have been exploited in antiquity, based on the study of faunal and botanical remains from excavated archaeological sites in the UAE. Unfortunately, at the time of writing the number of sites from which the inventories of faunal and botanical remains have been published remains minimal. Many more archaeological excavations (Fig. 1) have taken place which have yielded biological remains that have not yet been published. Nevertheless, a range of sites with a published floral and faunal record already exists which extends from the late prehistoric era of the fifth/fourth millennium BC to the first few centuries AD, and these leave us in no doubt that the pre-Islamic inhabitants of the region exploited a very wide range of plants, animals, fish and shellfish. So far from being an inhospitable desert, the land and waters of the modern UAE presented its ancient inhabitants with an enormous variety of exploitable, economically important resources.

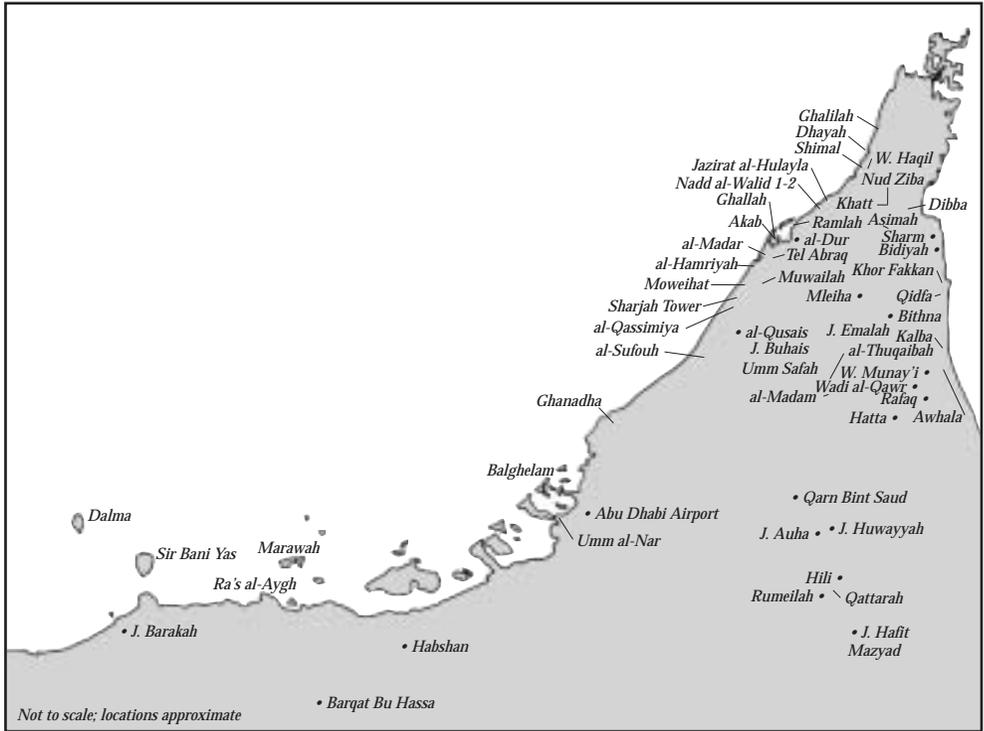


Fig. 1. Map of the UAE, showing the approximate locations of the archaeological sites mentioned in the text.

**Table 1. Environments and resources of significance in the past found in the UAE**

Resource Category	Gulf Coast	Desert	Interior Piedmont	Mountains	Eastern Piedmont
<b>Faunal</b>	fish shellfish dugong cormorant marine turtles whales and dolphins	small mammals gazelle camel	camel	small mammals freshwater fish	fish shellfish marine turtles crabs
<b>Floral</b>	mangrove fodder plants fuel plants medicinal plants	fodder plants fuel plants medicinal plants timber	cultivars fodder plants fuel plants fuel plants medicinal plants	timber cultivars fodder plants fuel plants medicinal plants	grazing plants timber fodder plants
<b>Mineral</b>	sandstone beach rock lime pearls shell	sandstone	well-drained soils	limestone igneous rock copper iron soft-stones	igneous rock limestone shell
<b>Water</b>	brackish	brackish	abundant	abundant	abundant
<b>Resource Utilization</b>	fishing pearling limited gardening pastoralism	pastoralism oasis horticulture	agriculture horticulture pastoralism	horticulture pastoralism hunting	horticulture pastoralism fishing

**Table 2. Mammalian fauna attested on archaeological sites in the UAE**

Species	Late Prehistoric	Umm al-Nar	Wadi Suq	Iron Age	Mleiha/al-Dur
<b>MAMMAL (wild)</b>					
Rodentia		Tell Abraq <sup>1</sup>	Tell Abraq	Tell Abraq	Mleiha <sup>2</sup>
rat ( <i>Rattus rattus</i> )					al-Dur <sup>3</sup>
mouse ( <i>Mus musculus</i> )					Mleiha
mouse ( <i>Mus domesticus</i> )					al-Dur
Rueppell's fox ( <i>Vulpes rueppelis</i> )					al-Dur
Arabian red fox ( <i>Vulpes vulpes</i> )					Mleiha
fox ( <i>Vulpes</i> sp.)			Tell Abraq	Tell Abraq	Mleiha
gazelle ( <i>Gazella subgutturosa</i> )		Tell Abraq Umm al-Nar <sup>4</sup>	Tell Abraq	Tell Abraq	
gazelle indet. ( <i>Gazella gazella</i> ssp.)	Akab <sup>5</sup> Dalma <sup>6</sup>	Tell Abraq	Tell Abraq	Tell Abraq	al-Dur Mleiha
bottlenose dolphin ( <i>Tursiops truncatus</i> )					
dolphin indet. ( <i>Delphinus</i> sp.)	Dalma	Umm al-Nar	Tell Abraq	Tell Abraq	al-Dur
dugong ( <i>Dugong dugon</i> )	Akab Dalma	Tell Abraq Umm al-Nar?	Tell Abraq	Tell Abraq	al-Dur
rorqual ( <i>Balaenoptera</i> )		Umm al-Nar			
Arabian oryx ( <i>Oryx leucoryx</i> )		Tell Abraq Umm al-Nar	Tell Abraq	Tell Abraq	al-Dur Mleiha
tahr ( <i>Hermitragus jayakari</i> )					
camel ( <i>Camelus dromedarius</i> )		Tell Abraq Umm al-Nar	Tell Abraq		
deer ( <i>Dama mesopotamica</i> )					al-Dur
<b>MAMMAL (domestic)</b>					
Zebu ( <i>Bos indicus</i> )		Tell Abraq? Umm al-Nar	Tell Abraq	Tell Abraq	
taurine cattle ( <i>Bos taurus</i> )		Tell Abraq?			al-Dur
sheep ( <i>Ovis aries</i> )	Dalma	Tell Abraq Umm al-Nar	Tell Abraq	Tell Abraq	Mleiha al-Dur
goat ( <i>Capra hircus</i> )	Dalma	Tell Abraq Umm al-Nar	Tell Abraq	Tell Abraq	Mleiha al-Dur
canid indet.					Mleiha
dog ( <i>Canis familiaris</i> )		Shimal	Tell Abraq	Tell Abraq	al-Dur Mleiha
donkey ( <i>Equus</i> sp.)					Mleiha
equid indet.		Tell Abraq	Tell Abraq	Tell Abraq	al-Dur
dromedary camel ( <i>Camelus dromedarius</i> )			Tell Abraq		al-Dur
Bactrian camel ( <i>Camelus ferus</i> f. <i>bactriana</i> )					Mleiha
<i>Camelus bactrianus x dromedarius</i>					Mleiha

<sup>1</sup> Stephan 1995.<sup>2</sup> Gautier 1992, Gautier and Van Neer 1999, Mashkour and Van Neer 1999.<sup>3</sup> Van Neer and Gautier 1993.<sup>4</sup> Hoch sp.1979, 1995.<sup>5</sup> Prieur and Guerin 1991.<sup>6</sup> Beech 2000.<sup>7</sup> Uerpman 1999.**Table 3. Reptiles and birds attested on archaeological sites in the UAE**

Species	Late Prehistoric	Umm al-Nar	Wadi Suq	Iron Age	Mleiha/al-Dur
<b>REPTILE (wild)</b>					
green turtle ( <i>Chelonia mydas</i> )	Akab <sup>1</sup>	Tell Abraq <sup>2</sup>	Tell Abraq?	Tell Abraq?	al-Dur <sup>3</sup>
Cheloniidae indet.	Dalma Dalma <sup>4</sup> Mleiha <sup>5</sup>				
snake indet. ( <i>Serpentes</i> sp.)		Umm al-Nar			Mleiha
<b>BIRD (wild)</b>					
Socotra cormorant ( <i>Phalacrocorax nigrogularis</i> )	Dalma	Tell Abraq Umm al-Nar <sup>6</sup>	Tell Abraq	Tell Abraq	al-Dur Mleiha <sup>7</sup>
ostrich ( <i>Struthio camelus</i> )	Abu Dhabi airport <sup>7</sup>	Tell Abraq Abu Dhabi airport			Mleiha
snake bird ( <i>Anhinga rufa</i> )		Umm al-Nar			
duck ( <i>Anas querquedula</i> )		Umm al-Nar			
flamingo ( <i>Phoenicopterus</i> aff. <i>ruber</i> )		Umm al-Nar			
giant heron? ( <i>Ardea bennuides</i> )		Umm al-Nar			
bird unident.			Tell Abraq	Tell Abraq	
<b>BIRD (domestic)</b>					
chicken ( <i>Gallus gallus</i> f. <i>domestica</i> )					al-Dur

<sup>1</sup> Prieur and Guerin 1991.<sup>2</sup> Stephan 1995.<sup>3</sup> Van Neer and Gautier 1993.<sup>4</sup> Beech 2000<sup>5</sup> Beech 1998.<sup>6</sup> Hoch 1979, 1995.<sup>7</sup> P. Hellyer, pers. comm.<sup>8</sup> Gautier 1992, Gautier and Van Neer 1999.

Table 4. Fish attested on archaeological sites in the UAE

Species	Late Prehistoric	Umm al-Nar	Wadi Suq	Iron Age	Mleiha/al-Dur
<b>FISH (marine)</b>					
<b>Elasmobranchii</b>	Dalma <sup>1</sup>				
<b>Carcharhinidae</b>					
requiem shark ( <i>Carcharhinus</i> sp.)					
<b>Sphyrnidae</b>					al-Dur <sup>2</sup>
hammerhead shark ( <i>Sphyrna</i> sp.)					al-Dur
shark indet.		Umm al-Nar <sup>3</sup>			
<b>Pristidae</b>					
sawfish ( <i>Pristis</i> sp.)		Umm al-Nar			al-Dur
<b>Dasyatidae (Trygonidae)</b>					
stingray ( <i>Dasyatis</i> ?)		Umm al-Nar			al-Dur
<b>Clupeidae</b>					
herring ( <i>Clupeidae</i> indet.)					al-Dur
<b>Chanidae</b>					
milkfish ( <i>Chanos chanos</i> )					al-Dur
<b>Ariidae</b>	Dalma				
sea catfish ( <i>Arius thalassinus</i> )					al-Dur
<b>Belonidae</b>					
needlefish ( <i>Tylosurus crocodilus</i> )	Dalma				al-Dur
<b>Platycephalidae</b>					
flathead ( <i>Platycephalus indicus</i> )					al-Dur
<b>Serranidae</b>					
sea bass/grouper ( <i>Epinephelus</i> sp.)	Dalma				al-Dur
<b>Carangidae</b>					
jacks and pompanos	Dalma				al-Dur
( <i>Scomberoides</i> sp.)					
( <i>Seriola</i> sp.)					
( <i>Megalaspis cordyla</i> )					
( <i>Carangoides chrysophrys</i> )					
( <i>Carangoides</i> sp.)					
( <i>Caranx</i> sp.)					
( <i>Gnathodon speciosus</i> )					
( <i>Alectis indicus</i> )					
( <i>Ulua mentalis</i> )					
Carangidae indet.					
<b>Lutjanidae</b>					
snapper ( <i>Lutjanus</i> sp.)					al-Dur
<b>Gerreidae</b>					
mojarra ( <i>Gerres</i> sp.)					al-Dur
<b>Haemulidae</b>					
grunt ( <i>Pomadasys</i> sp.)					al-Dur
<b>Lethrinidae</b>	Dalma				
emperor ( <i>Lethrinus</i> sp.)	al-Madar?				al-Dur
<b>Sparidae</b>					
porgie	Dalma				al-Dur
( <i>Crenidens crenidens</i> )					al-Dur
( <i>Acanthopagrus berda</i> )					al-Dur
( <i>Acanthopagrus latus</i> )					al-Dur
( <i>Rhabdosargus sarba</i> )					al-Dur
( <i>Rhabdosargus</i> sp.)					Mleiha
( <i>Argyrops spinifer</i> )					al-Dur
Sparidae indet.	al-Madar?				al-Dur
<b>Ephippidae</b>					
spadefish ( <i>Platax</i> sp.)					al-Dur
<b>Mugilidae</b>					
mullet ( <i>Mugilidae</i> indet.)					al-Dur
<b>Sphyraenidae</b>	Dalma				
barracuda ( <i>Sphyraena</i> sp.)					al-Dur
<b>Scaridae</b>	Dalma				
parrotfish ( <i>Scarus</i> sp.)					al-Dur
<b>Siganidae</b>					
rabbitfish ( <i>Siganus</i> sp.)					al-Dur
<b>Scombridae</b>	Dalma				
bonito/tuna ( <i>Euthynnus affinus</i> )	Dalma				al-Dur
tuna ( <i>Thunnus</i> sp.)					al-Dur
<b>Tetraodontidae</b>					
puffer (Tetraodontidae indet.)					al-Dur
fish indet. (still under study)		Tell Abraq <sup>5</sup>	Tell Abraq	Tell Abraq	
<b>FISH (freshwater)</b>					
<b>Cyprinidae</b>					
barbel ( <i>Barbus</i> sp.)					al-Dur
<b>Crustaceans</b>					
crab et al. (still under study)	al-Madar	Tell Abraq	Tell Abraq	Tell Abraq	al-Dur
	Dalma				Mleiha

<sup>1</sup> Beech 2000.<sup>2</sup> Van Neer and Gautier 1993.<sup>3</sup> Hoch 1979, 1995.<sup>4</sup> Uerpmann and Uerpmann 1996.<sup>5</sup> Stephan 1995.

**Table 5. Plants and cultivars attested on archaeological sites in the UAE**

Species	Late Prehistoric	Umm al-Nar	Wadi Suq	Iron Age	Mleiha/al-Dur
<b>FLORA (wild)</b>					
<b>Apocynaceae</b>					
oleander ( <i>Nerium oleander</i> )					Mleiha <sup>1</sup>
<b>Asclepiadaceae</b>					
Sodom's apple ( <i>Calotropis procera</i> )					Mleiha al-Dur
<b>Avenaceae</b>					
oat ( <i>Avena</i> sp.)		Hili 8			
<b>Avicenniaceae</b>					
mangrove ( <i>Avicennia marina</i> )			Tell Abraq?		
white mangrove ( <i>Avicennia marina</i> )		Tell Abraq	Tell Abraq	Tell Abraq	al-Dur
<b>Chenopodiaceae</b>					
goosefoot (sp. indet.)		Hili 8 <sup>2</sup>			Mleiha
<b>Leguminosae</b>					
acacia indet. ( <i>Acacia</i> sp.)		Hili 8 <sup>3</sup>		Muwailah	Mleiha
gum arabic ( <i>Acacia nilotica</i> )					Mleiha
sissoo ( <i>Dalbergia sissoo</i> )		Tell Abraq			Mleiha <sup>4</sup> al-Dur
prosopis ( <i>Prosopis cineraria</i> )				Muwailah	Mleiha
<b>Oleaceae</b>					
ash ( <i>Fraxinus</i> sp.)					Mleiha
<b>Pinaceae</b>					
Aleppo pine ( <i>Pinus halepensis</i> )					al-Dur
<b>Platanaceae</b>					
oriental plane ( <i>Platanus orientalis</i> )					Mleiha
<b>Polygonaceae</b>					
<i>Calligonum</i> sp.		Hili 8			
<b>Rhamnaceae</b>					
Christ's thorn ( <i>Ziziphus spina-christi</i> )	Dalma <sup>5</sup>	Hili 8 <sup>6</sup> Tell Abraq	Tell Abraq	Tell Abraq Muwailah	Mleiha <sup>7</sup>
<b>Rhizophoraceae</b>					
extinct mangrove	Dalma	Tell Abraq	Tell Abraq	Tell Abraq	Mleiha al-Dur
<b>Solanaceae</b>					
desert thorn ( <i>Lycium</i> sp.)					Mleiha
<b>Tamaricaceae</b>					
tamarisk ( <i>Tamarix</i> sp.)		Hili Tell Abraq	Tell Abraq	Tell Abraq Muwailah	Mleiha
<b>FLORA (domestic)</b>					
wheat ( <i>Triticum</i> sp.)		Umm al-Nar <sup>8</sup>			Mleiha
emmer wheat ( <i>Triticum dicoccum</i> )		Hili 8			
bread wheat ( <i>Triticum aestivum</i> )		Tell Abraq <sup>9</sup>	Tell Abraq		
barley ( <i>Hordeum</i> sp.)		Hili 8			
2-row hulled barley ( <i>H. distichon</i> )		Umm al-Nar			Mleiha
6-row hulled barley ( <i>H. vulgare</i> )		Hili 8			
		Tell Abraq	Tell Abraq	Tell Abraq	
		Hili 8			
6-row naked barley ( <i>H. vulgare</i> var. <i>nudum</i> )		Hili 8			
date palm ( <i>Phoenix dactylifera</i> )		Tell Abraq	Tell Abraq	Tell Abraq	Mleiha
		Dalma <sup>10</sup>			
		Hili 8		Muwailah <sup>11</sup>	al-Dur
		Hili 8			

<sup>1</sup> Tengberg and Potts 1999.<sup>2</sup> Coubray 1988, Tengberg 1998.<sup>3</sup> Tengberg 1998.<sup>4</sup> Cleuziou and Costantini 1980, Cleuziou 1989, Potts 1994b, Tengberg 1998.<sup>5</sup> Tengberg 1998.<sup>6</sup> Cleuziou and Costantini 1980, Cleuziou 1989, Potts 1994b.<sup>7</sup> Coubray 1988.<sup>8</sup> Willcox 1995.<sup>9</sup> Willcox and Tengberg 1995.<sup>10</sup> Beech and Shepherd, in press<sup>11</sup> Tengberg 1998.

Most, if not all, of the flora and fauna utilized by the pre-Islamic population of the region is still to be found in the area. This is not an unequivocal indication that no climatic change has taken place since the prehistoric past, but it is certainly an indication that the changes which have taken place have been minor rather than major ones. At the height of the Flandrian Transgression, c. 4000 BC, sea level in the Arabian Gulf reached its peak around .5m higher than it is today (Lambeck 1996), and until c. 3000 BC a more humid environment prevailed, largely as a result of wind systems which were weaker than those at present, 'permitting convection-induced thunder storms in coastal and mountainous areas' (Glennie et al. 1994: p 3). After 3000 BC today's arid regime set in and although there have been minor climatic adjustments since that time, it is safe to say that the basic pattern observable in the region today has prevailed for the past five millennia.

Table 6. Molluscan fauna attested on archaeological sites in the UAE

Species	Late Prehistoric	Umm al-Nar	Wadi Suq	Iron Age	Mleiha/al-Dur
<b>Marine Bivalves</b>					
<i>Acar plicata</i>					Mleiha
<i>Alectryonella plicatula</i>					Mleiha <sup>4</sup>
<i>Amiantis umbonella</i>		Tell Abraq <sup>2</sup>	Tell Abraq Shimal <sup>3</sup>	Tell Abraq	Mleiha
<i>Anadara</i> sp.					Mleiha
<i>Anadara antiquata</i>			Shimal		Mleiha
<i>Anadara ehrenbergi</i>	al-Madar <sup>4</sup>			Tell Abraq Awhala <sup>5</sup>	Mleiha
<i>Anadara uropigimelana</i>					Mleiha
<i>Anodontia edentula</i>					Mleiha
<i>Asaphis deflorata</i>			Tell Abraq Shimal	Tell Abraq	Mleiha
<i>Asaphis violascens</i>					Mleiha
<i>Balanus</i> sp.				Tell Abraq	Mleiha
<i>Barbatia fusca</i>				Tell Abraq	Mleiha
<i>Barbatia helblingii</i>			Shimal		Mleiha
<i>Barbatia obliquata</i>					Mleiha
<i>Barbatia tenella</i>					Mleiha
<i>Barbatia</i> sp.	al-Madar				al-Dur <sup>6</sup>
<i>Callista erycina</i>	Akab <sup>7</sup>	Tell Abraq	Tell Abraq Shimal	Tell Abraq Awhala	Mleiha
<i>Callista</i> sp.					Mleiha
<i>Cardita bicolor</i>					Mleiha
<i>Cardita variegata</i>					Mleiha
<i>Cardita</i> sp.					al-Dur
<i>Certhidea cingulata</i>		Tell Abraq			al-Dur
<i>Chama pacifica</i>					Mleiha
<i>Chama</i> sp.					Mleiha
<i>Chlamys ruschenbergi</i>		Tell Abraq	Tell Abraq Shimal		Mleiha
<i>Circe corrugata</i>			Tell Abraq Shimal		Mleiha
<i>Circe</i> sp.					Mleiha
<i>Circenita callipyga</i>	Dalma <sup>8</sup>		Shimal	Tell Abraq	Mleiha
<i>Codakia tigerina</i>					Mleiha
<i>Decatopecten plica</i>					Mleiha
<i>Dosinia alta</i>					Mleiha
<i>Dosinia ceylonica</i>					Mleiha
<i>Dosinia tumida</i>					Mleiha
<i>Glycymeris</i> sp.					al-Dur
<i>Glycymeris lividus</i>		Tell Abraq			Mleiha
<i>Glycymeris maskatensis</i>		Tell Abraq	Tell Abraq Shimal	Tell Abraq	Mleiha
<i>Isognomon legumen</i>					Mleiha
<i>Laevicardium papyraceum</i>					Mleiha
<i>Lutraria</i> sp.					Mleiha
<i>Macra lilacea</i>					Mleiha
<i>Marcia</i> sp.					Mleiha
<i>Marcia hiantina</i>	Akab al-Madar	Tell Abraq	Shimal Tell Abraq Shimal	Awhala Tell Abraq Muwailah <sup>9</sup> Tell Abraq	al-Dur Mleiha
<i>Marcia opima</i>					Mleiha
<i>Modiolus phillipinarum</i>					Mleiha
<i>Periglypta puerpera</i>					al-Dur
<i>Pinctada</i> sp.		Tell Abraq?	Tell Abraq	Tell Abraq Awhala	Mleiha
<i>Pinctada margaritifera</i>		Tell Abraq	Tell Abraq Shimal	Tell Abraq Muwailah	Mleiha
<i>Pinctada radiata</i>	Dalma al-Madar		Tell Abraq Shimal Tell Abraq	Muwailah	al-Dur Mleiha
<i>Pinna</i> sp.					Mleiha
<i>Pteria marmorata</i>					Mleiha
<i>Saccostrea cucullata</i>	Akab Hamriyah <sup>10</sup> al-Madar	Tell Abraq	Tell Abraq Shimal	Tell Abraq Awhala Muwailah	al-Dur Mleiha
<i>Sanguinolaria cumingiana</i>			Tell Abraq		Mleiha
<i>Solen</i> sp.					Mleiha
<i>Spondylus</i> sp.			Tell Abraq	Tell Abraq	al-Dur
<i>Spondylus ?exilis</i>			Shimal		Mleiha
<i>Spondylus gaederopus</i>					Mleiha
<i>Sunetta effosa</i>					Mleiha
<i>Tellina</i> sp.					Mleiha
<i>Tivela damaoides</i>					Mleiha
<i>Tivela ponderosa</i>					Mleiha
<i>Tivela</i> sp.					Mleiha
<i>Trachycardium</i> sp.					Mleiha
<i>Trachycardium lacunosum</i>			Tell Abraq Shimal	Tell Abraq	al-Dur Mleiha
<i>Turritella</i> sp.					al-Dur
<i>Venus verrucosa</i>					Mleiha
<b>Marine Gastropods</b>					
<i>Ancilla castenea</i>					Mleiha
<i>Architectonica perspectiva</i>			Tell Abraq?		Mleiha
<i>Babylonia spirata</i>					Mleiha
<i>Bullia</i> sp.					Mleiha
<i>Bullia tranquebarica</i>				Tell Abraq	Mleiha
<i>Bursa hardeyi</i>					Mleiha
<i>Bursa</i> sp.					Mleiha
<i>Bythinia</i> sp.					Mleiha
<i>Cerithium</i> sp.					Mleiha
<i>Cerithium caeruleum</i>					Mleiha
<i>Cerithidea cingulata</i>		Tell Abraq	Shimal	Tell Abraq	Mleiha
<i>Charonia</i> sp.?					al-Dur
<i>Clypeomorus bifasciatus</i>					Mleiha
<i>Conus betulinus</i>					Mleiha
<i>Conus cf. ebraeus</i>					Mleiha
<i>Conus cf. kermadecensis</i>					Mleiha

**Table 6. Molluscan fauna attested on archaeological sites in the UAE (continued)**

Species	Late Prehistoric	Umm al-Nar	Wadi Suq	Iron Age	Mleiha/al-Dur
<i>Conus flavidus</i>					Mleiha
<i>Conus striatus</i>					Mleiha
<i>Conus tessulatus</i>					Mleiha
<i>Conus textile</i>					al-Dur
<i>Conus</i> sp.			Tell Abraq		Mleiha
<i>Cronia konkanensis</i>			Shimal		Mleiha
<i>Cuma lacera</i>		Tell Abraq?	Tell Abraq?		Mleiha
<i>Cymatium</i> sp.					al-Dur
<i>Cypraea</i> sp.			Tell Abraq		Mleiha
<i>Cypraea arabica</i>			Tell Abraq		Mleiha
<i>Cypraea clandestina</i>				Awhala	Mleiha
<i>Cypraea caurica</i>					Mleiha
<i>Cypraea gracilis</i>					al-Dur
<i>Cypraea grayana</i>				Awhala	Mleiha
<i>Cypraea</i> aff. <i>lentiginosa</i>					al-Dur
<i>Cypraea turdus</i>		Tell Abraq	Tell Abraq		Mleiha
			Shimal		Mleiha
<i>Engina mendicaria</i>					al-Dur
<i>Engina</i> sp.					Mleiha
<i>Fasciolaria trapezium</i>					Mleiha
<i>Ficus subintermedia</i>		Tell Abraq	Tell Abraq?	Tell Abraq	Mleiha
		Jebel al-Emalah <sup>11</sup>	Shimal		
		al-Sufouh <sup>12</sup>			
<i>Fusinus arabicus</i>					Mleiha
					al-Dur
<i>Lambis</i> sp.					Mleiha
<i>Lambis truncata sebae</i>					Mleiha
<i>Lunella coronatus</i>	Dalma		Shimal		Mleiha
<i>Monilea obscura</i>			Shimal		Mleiha
<i>Morula granulata</i>					Mleiha
<i>Murex (Hexaplex) kuesterianus</i>	Dalma, Akab	Tell Abraq	Tell Abraq	Tell Abraq	al-Dur
	Hamriyah			Muwailah	Mleiha
	al-Madar				
<i>Murex scolopax</i>					Mleiha
<i>Nassarius arcularius plicatus</i>		Tell Abraq		Tell Abraq	Mleiha
<i>Nassarius coronatus</i>					Mleiha
<i>Nassarius</i> sp.			Shimal		Mleiha
<i>Nerita</i> sp.					Mleiha
<i>Nerita albicilla</i>					Mleiha
<i>Neverita</i> sp.					Mleiha
<i>Neverita didyma</i>			Tell Abraq	Tell Abraq	Mleiha
<i>Oliva bulbosa</i>		Tell Abraq	Shimal	Tell Abraq	al-Dur
					Mleiha
<i>Patella exusta pica</i>					Mleiha
<i>Patella</i> sp.					Mleiha
					al-Dur
<i>Phalium fauoris</i>					Mleiha
<i>Phasianella solida</i>			Shimal		Mleiha
<i>Phasianella variegata</i>					Mleiha
<i>Planaxis sulcatus</i>					Mleiha
<i>Polinices tumidus</i>					Mleiha
<i>Polinices</i> sp.			Shimal		Mleiha
<i>Rapana bulbosa</i>					Mleiha
<i>Siratus kuesterianus</i>			Shimal		al-Dur
<i>Strombus decorus persicus</i>	Dalma		Tell Abraq	Tell Abraq	Mleiha
			Shimal		Mleiha
<i>Strombus gibberulus</i>					Mleiha
<i>Strombus</i> sp.					al-Dur
<i>Terebralia palustris</i>	Akab	Tell Abraq	Tell Abraq	Tell Abraq	Mleiha
	Hamriyah		Shimal	Awhala	
	al-Madar			Muwailah	
<i>Thais mutabilis</i>					Mleiha
<i>Thais savignyi</i>			Shimal		Mleiha
<i>Thais</i> sp.					Mleiha
<i>Tonna</i> sp.			Shimal		Mleiha
<i>Tonna dolium</i>					Mleiha
<i>Tonna luteostoma</i>					Mleiha
<i>Trochus erythraeus</i>		Tell Abraq	Tell Abraq?		Mleiha
			Shimal		
<i>Turbo coronatus</i>	al-Madar	Tell Abraq	Tell Abraq	Tell Abraq	Mleiha
<i>Turbo radiatus</i>					Mleiha
<i>Turbo</i> sp.					al-Dur
<i>Turritella</i> sp.					Mleiha
<i>Turritella cochlea</i>					Mleiha
<i>Turritella torulosa</i>					Mleiha
<i>Umbonium vestiartium</i>			Shimal		Mleiha
<i>Vermetes sulcatus</i>					Mleiha
<i>Vermetus</i> sp.					al-Dur
					Mleiha
<b>Scaphopods</b>					
<i>Dentalium octangulatum</i>		al-Sufouh	Shimal		Mleiha
		Jebel al-Emalah			
<i>Dentalium</i> sp.					Mleiha
<b>FRESHWATER MOLLUSCS</b>					
<i>Melanoides tuberculata</i>					Mleiha
					al-Dur

<sup>1</sup> Prieur 1999.<sup>2</sup> Prieur 1990.<sup>3</sup> Glover 1991.<sup>4</sup> Uerpmann and Uerpmann 1996.<sup>5</sup> E. Thompson, pers. comm.<sup>6</sup> Van Neer and Gautier 1993.<sup>7</sup> Prieur and Guerin 1991.<sup>8</sup> Beech and Elders 1999.<sup>9</sup> E. Thompson, pers. comm.<sup>10</sup> Jasim 1996.<sup>11</sup> Benton and Potts, in press.<sup>12</sup> Benton 1996.

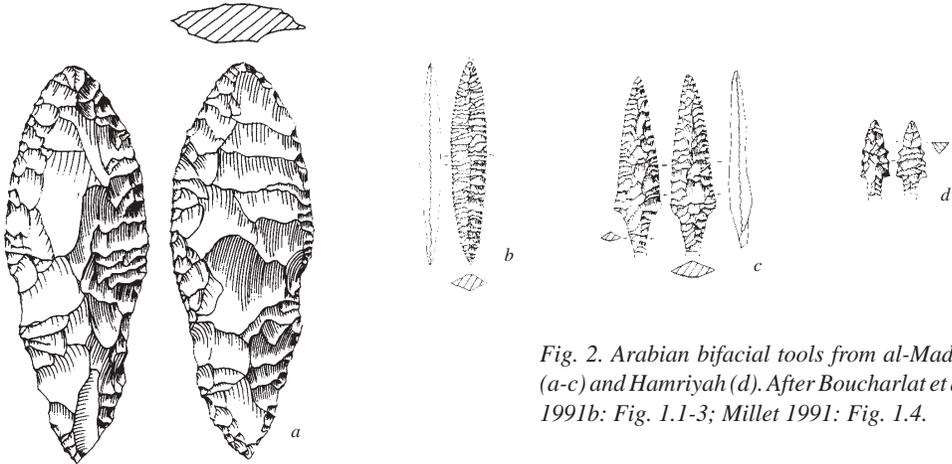


Fig. 2. Arabian bifacial tools from al-Madar (a-c) and Hamriyah (d). After Boucharlat et al. 1994: pp 2–3). This fact, perhaps more than any other, helps to explain the absence of Pleistocene hominid occupation and Middle and Upper Palaeolithic stone tool industries in the UAE. The only exception to this yet identified may come from a site at Jebel Barakah in the Western Province of Abu Dhabi where radial cores and the tip of a bifacial tool were recovered which might date to the Middle Pleistocene (McBrearty 1993, 1999: pp 382–384).

### The Arabian Bifacial Tradition (c. 5000–3100 BC)

During the last glacial maximum (from c. 68,000 to 8000 BC), winds were so strong in the desert regions of the globe that they ‘probably blew at sand-transporting speeds for much of each glacial winter’ in eastern Arabia causing ‘severe dessication, even at reduced air temperatures, producing conditions that were probably too severe for man to tolerate’ (Glennie et al. 1994: pp 2–3). This fact, perhaps more than any other, helps to explain the absence of Pleistocene hominid occupation and Middle and Upper Palaeolithic stone tool industries in the UAE. The only exception to this yet identified may come from a site at Jebel Barakah in the Western Province of Abu Dhabi where radial cores and the tip of a bifacial tool were recovered which might date to the Middle Pleistocene (McBrearty 1993, 1999: pp 382–384).

The last glaciation collapsed around 10,000 years ago, and the slightly moister conditions which ensued from c. 8000 to 3000 BC have often been described as a Climatic Optimum (Glennie et al. 1994: p 3). It was during this period that the first securely dated human settlements in the region appeared. Finely pressure-flaked, bifacial stone tools (Fig. 2) belonging to what has been called the ‘Arabian bifacial tradition’ have been found on a large number of sites in a wide range of environmental zones throughout the Emirates. The most important of these are listed in Table 7. Tanged points, foliates, blades, knives, drills and other tools attest to the diversity of the tool-kit of the region’s first inhabitants. Affinities with material from the Eastern Province of Saudi Arabia, Qatar and Bahrain (Spoor 1997) are obvious, suggesting that the entire region may have formed a single cultural province at this time.

In other respects these areas also show shared traits. Painted pottery of Ubaid type, imported from Mesopotamia, has been found on many of the coastal sites in the UAE, eastern Saudi Arabia, Qatar, Bahrain and the islands of Kuwait, revealing the existence of contacts between these regions and the peoples of southern Iraq in the fifth millennium BC. Petrographic analysis, moreover, has confirmed that some (and most probably all) of the pottery found on the Arabian bifacial sites in eastern Saudi Arabia was imported from Mesopotamia itself, and the likelihood that such was the case in respect to the material found on sites in the UAE is equally strong (Méry 1994: p 398; Méry 1996; Méry and Schneider 1996). Be that as it may, it is important to underscore the fact that this introduction of pottery into the region did not lead immediately to the birth of a local ceramic industry, something which did not appear until the third millennium BC.

**Table 7. Principal late prehistoric sites in the UAE**

Location	Site	Literature
Jazirat al-Hamra	Nadd al-Walid 1-2	Gebel 1988; Glover et al. 1990; Uerpmann 1992
Ra's al-Khaimah	Wadi Haqil	de Cardi 1985; Stocks 1996
Khatt	Kh 92, 117-119, 135	de Cardi et al. 1994
Umm al-Qaiwain	al-Madar	Cauvin & Calley 1984; Boucharlat et al. 1991b; Haerincq 1994b; Uerpmann & Uerpmann 1996
	Ramlah	Uerpmann & Uerpmann 1996
	Akab	Prieur & Guerin 1991; Boucharlat et al. 1991a
	Tell Abraq	Potts 1991a
Sharjah	al-Hamriyah	Cauvin & Calley 1984; Minzoni Déroche 1985a; Haerincq 1991a; Millet 1991; Boucharlat et al. 1991a; Haerincq 1994b; Jasim 1996
	al-Qassimiya	Minzoni Déroche 1985a; Calley & Santoni 1986; Millet 1988; Boucharlat et al. 1991a
	Sharjah Tower	Millet 1988
Mleiha/	P15, 18-19,	Minzoni Déroche 1985b; Millet 1989
Jebel Faiyah	21-22, 28 Jebel al-Emalah	Charpentier 1996
Jebel Buhais	Jebel Buhais	S. Jasim, H.-P. and M. Uerpmann, pers. comm.
al-Madam	al-Madam	Gebel 1988
Qarn Bint Saud	Qarn Bint Saud	Gebel 1988
Al Ain	Jebel Huwayyah	Copeland & Bergne 1976; Gebel et al. 1989
	Jebel Auha	Gebel 1988
	Mazyad	Gebel 1988; Gebel et al. 1989
	Hili 8	Inizan and Tisier 1980
Western Region	Barqat Bu Hassa	Gebel 1988
	Habshan	Gebel 1988
	Jebel Barakah	McBrearty 1993
	Shuwaihat	McBrearty 1999
	Hamra	McBrearty 1999
	Ra's al-Aysh	McBrearty 1999
	Bida al-Mitawaa	Crombé 2000
Liwa oasis	Yaw Sahhab	Harris 1998
Abu Dhabi	Dalma	Hellyer 1993, Flavin and Shepherd 1994
islands	Marawah	King 1998, Hellyer 1998b-c
	Abu Dhabi airport	Hellyer 1998b

Contact with areas to the north may also help account for the introduction of domesticates such as sheep, goat and cattle, the wild forerunners of which were never at home in south-eastern Arabia (Uerpmann and Uerpmann 1996). All of these domesticates have been found on Arabian bifacial sites in eastern Saudi Arabia and they are present at Ra's al-Hamra 6 in Oman by the fifth millennium as well. Thus, it is likely that they were being herded on sites in the UAE by this time. As the stone tool industry found throughout eastern Arabia which precedes the bifacial tradition – known as Qatar B (but absent in the UAE) – shows clear affinities to the pre-pottery Neolithic industry of the Levant, it has been suggested that this may have been the ultimate source of both the people and the herd animals which eventually populated eastern Arabia during the earlier portion of the mid-Holocene Climatic Optimum, beginning c. 5000 BC.

The fact that the tool kit of the earliest inhabitants of the region contained numerous projectile points should not lead us to conclude prematurely that they were primarily hunters. Rather, Uerpmann and Uerpmann (1996) have stressed that herders will maximize their own flocks' secondary products – such as milk, fleece and hair – by preserving their animals and hunting to provide any meat desired. Thus, the Arabian bifacial sites may be those of herders who supplemented their diet by hunting, rather than hunters who kept a few domestic animals. The fact that ostrich eggshell fragments (Aspinall 1998, Potts in press b) have been recovered at sites with bifacial stone tools does not mean that these notoriously shy and elusive creatures were hunted, merely that their eggs, so widely used in antiquity as containers for liquids, were already being employed in this capacity at an early date.

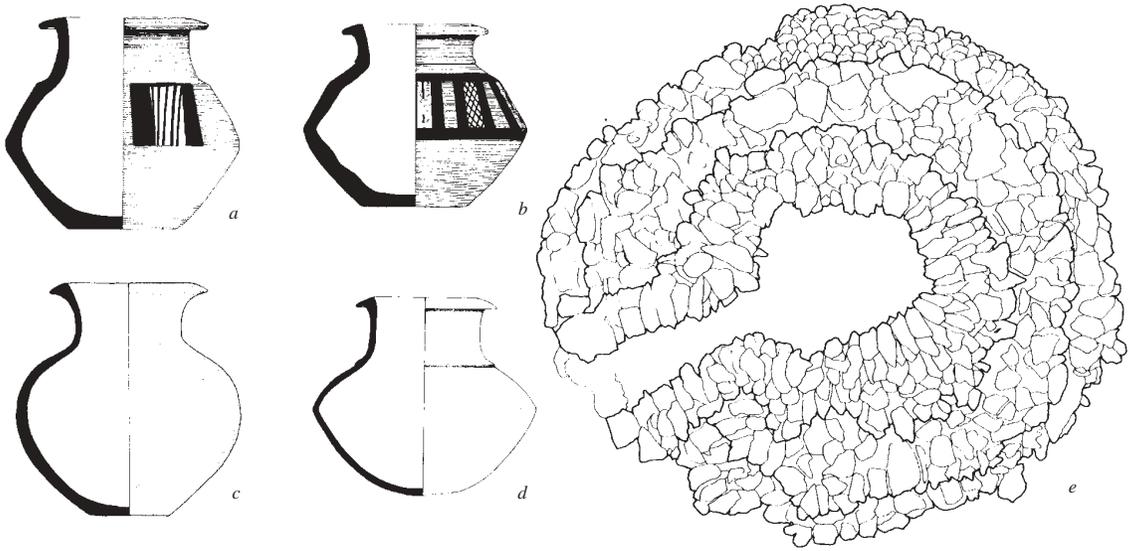
Whether or not these groups were fully sedentary is unknown. A transhumant pattern of occupation along the coasts in the winter, when fishing (Desse 1995, Hellyer 1998a) and shellfish gathering would have been the main pursuits, and summer residence in the interior, when pastoralism and, eventually, horticulture, were practised, is entirely feasible and well-attested elsewhere in south-eastern Arabia (Lancaster and Lancaster 1992: p 345), if as yet unproven for the prehistoric UAE. Certainly this would account for the fact that coastal sites, which usually contain some areas of shell midden formation, are generally not very deep, and interior sites generally have little if any stratification. It would also account for the uniformity in the tool-kit evidenced in both the coast and the interior of the UAE.

As yet we know little about the people who inhabited the territory of the UAE at this time. Burials in an Arabian bifacial site along the coast of the Umm al-Qaiwain lagoon have been excavated but not yet published (C.S. Phillips, pers. comm.). At al-Buhais 18, H.-P. and M. Uerpmann are excavating an important aceramic site with an extensive graveyard at the foot of Jebel Buhais which dates to c. 4700 BC where the remains of domesticated sheep, goat and cattle, as well as a tool-kit of Arabian bifacial type, have been found (Uerpmann, Uerpmann and Jasim, in press; Kieswetter, Uerpmann and Jasim, in press).

### **The Late Fourth and Early Third Millennium (c. 3100–2500 BC)**

At the end of the fourth millennium, c. 3100–3000 BC, a major suite of innovations appeared in the material culture inventory of the region. For the first time collective burials in the form of above-ground tombs (Fig. 3) built of unworked stone appear at two sites in the UAE, Jebel Hafit (including Mazyad) and Jebel al-Emalah. Named after the site where they were first discovered, these ‘Hafit’-type tombs are completely without precedent in the local archaeological sequence. What is more, a number of them have yielded small, biconical ceramic vessels, many so badly preserved as to have lost their original surfaces, but on some of which a panel of painted, geometric decoration in black can still be seen (Potts 1986a). Not only are these vessels (Fig. 3) superficially reminiscent of so-called ‘Jamdat Nasr’ pottery from southern Mesopotamia, but analyses of examples from both Jebel Hafit (Méry 1991: p 72; Méry and Schneider 1996) and Jebel al-Emalah (unpubl.) have confirmed that this material was imported, some of it from the type site Jamdat Nasr in south-central Iraq.

Because of the fact that most of the Hafit tombs in the UAE were robbed in antiquity little data is available on their occupants (but cf. Højgaard 1985), and it is difficult to get a good idea of just how many people were normally buried within them. More than one is probably all that can be said at the moment, but, given the restricted size of their keyhole-like interior chambers, it cannot have been greater than perhaps a dozen or so. Around the keyhole a large area of mounded, unworked rock was heaped up, sometimes with a discernible ‘bench’ encircling the exterior. Whereas the tombs at Jebel Hafit range in size from an estimated 7 to 11 m in diameter (Frifelt 1971: p 377), the Jebel al-Emalah examples are approximately 11 to 12 m across (Benton and Potts 1994). In addition to their pottery, other imported finds of note include a class of roughly square, bone or ivory beads with two diagonal perforations. These find identical parallels in Iran at Susa, Tepe Hissar and Tepe Yahya and in Mesopotamia at Uruk, always in contexts dating to c. 3000 BC (Frifelt 1980: Pl. XVa; Potts 1993a: p 183 for full refs.).



*Fig. 3. Selected examples of Jamdat Nasr-type pottery (a-d) from Hafit-type tombs at Jebel Hafit excavated by the Danish expedition and a plan of one of the tombs (6.4 m. in diameter) excavated by the French mission (e). After Frifelt 1971: Figs. 12A, 17A, 22B and 22A; and Cleuziou et al. 1978: Pl. 15.*

To date the settlements of the population buried in the Hafit tombs of south-eastern Arabia (examples are also found further south in Oman) have yet to be discovered. Although it has been argued by S. Cleuziou that the occupation of the settlement at Hili 8 in Al Ain began c. 3100 BC (Cleuziou 1996) there are good grounds for questioning this early date. Thus, it is striking that the two radiocarbon determinations on which this contention is based (MC-2266 and 2267) are roughly 500 years earlier than the next earliest date from the site and, moreover, both of these early dates derive from samples of wood charcoal (Potts 1997a). As experience has shown at other sites, radiocarbon determinations run on charcoal are often anomalously early because the wood in question was old by the time it was burned. Thus, for example, a ship's timber or architectural beam may have been used initially, re-cycled several times, and finally burned as fuel hundreds of years after its initial employment, unlike dates, fruit pips, matting, and other organic materials which have a much more finite lifespan. If we discount Hili 8 as a settlement which may have existed in tandem with the period in which the graves on the slopes of Jebel Hafit were built, we are left with no settlements with which to pair these important funerary monuments.

The question naturally arises why and how the contact which transmitted the Jamdat Nasr vessels from Mesopotamia to the Oman peninsula was organized. In most discussions of this phenomenon an economic motivation is ascribed to the Mesopotamian bearers of the Jamdat Nasr-type ceramics and beads which have appeared at Jebel Hafit and Jebel al-Emalah. What resources they may have been in search of is unknown, but it is generally admitted that copper from the Hajar Mountains is a likely candidate. Certainly small pins and awls of copper have been found in Hafit burials (Frifelt 1971), but it cannot always be assumed that these date to the original period in which these tombs were used, and at both Jebel Hafit and Jebel al-Emalah we have ample evidence for the later re-use of the tombs during the third, second and first millennia BC and, at the latter site, as late as the fifth or sixth century AD (see below).

More relevant, perhaps, is the fact that the earliest proto-cuneiform texts from Uruk in southern Mesopotamia which date to c. 3400–3000 BC – the so-called ‘Archaic Texts’ from Uruk – already contain references to ‘Dilmun’ copper. Dilmun was later identified with mainland eastern Saudi Arabia and Bahrain, but as there is no copper in either of these areas it has usually been assumed that the copper in question must have come from further afield. On analogy with the situation in the late third and second millennia BC the copper source most often invoked is that which stretches from Fujairah in the north (Hassan and al-Sulaimi 1979) to lower Oman in the south. Thus, although there is no proof as yet, it has generally been assumed that the motivation behind the Jamdat Nasr-period contact between the UAE and southern Mesopotamia was the incipient trade in copper.

### The Mid to Late Third Millennium (c. 2500–2000 BC)

The agricultural settlement of south-eastern Arabia was predicated upon the domestication of the date palm (*Phoenix dactylifera*). Without the date palm, the shade necessary for the growth of other, less hardy cultivars, including cereals, vegetables and fruits, was lacking. Once the *bustan*-type of garden came into existence, watered by wells which tapped the relatively abundant and shallow lenses of sweet water found throughout much of the UAE, the basis was laid for the development of the kind of oasis living (Cleuziou 1996) which is so characteristic of the wadi and piedmont settlements of the region. Herd animals, such as sheep, goat and cattle, of course played a part in the development of a full oasis economy, but no single species was so critical in this process as the date palm.

The earliest villages of the UAE were thus agriculturally based, and perhaps, in order to safeguard their investment in land, water and natural resources, the inhabitants of those villages felt compelled to construct imposing fortifications. These buildings appear for the first time in the middle of the third millennium and are an architectural *leit-fossil* of the so-called ‘Umm al-Nar’ (Umm an-Nar) period (c. 2500–2000 BC). Like their later descendants at sites such

as Nizwa in Oman, the fortress-towers of south-eastern Arabia took the form of raised, circular platforms consisting of massive crosswalls and intervening hollows filled with gravel, the entirety of which supported a surface raised up off the ground (by as much as 8 m) with a still higher, outer wall for defence. Undoubtedly small buildings stood upon these raised platforms as well. Every example excavated to date is also distinguished by the presence of a

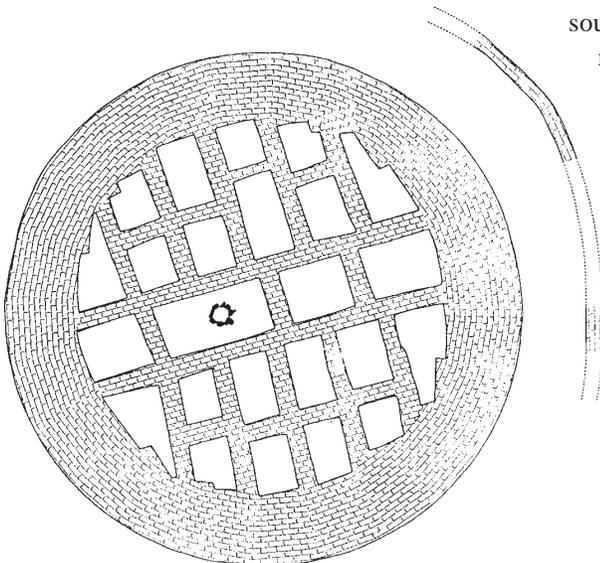


Fig. 4. The Umm al-Nar-period fortress-tower of Hili 1, 24 m. in diameter. After Frifelt 1975: Fig. 3.

well in the centre of the building, and it may be justifiably asked whether or not the entire fortress is not a ‘lock’ placed upon the precious water supply of the village in which the fortress was located.

In the UAE, examples of such Umm al-Nar fortress-towers have been excavated at Hili 1 (Fig. 4), Hili 8 (Cleuziou 1989, 1996), Bidiyah (Al Tikriti 1989), Tell Abraç (Potts 1990a, 1991a, 1993b, 1995a, 2000 a-b) and Kalba (C.S. Phillips, pers. comm.). Whereas most of these range in size between 16 and 25 m in diameter, the tower at Tell Abraç, at 40 m in diameter, is by far the largest yet uncovered. The social and political implications of these towers are intriguing. There is no longer any doubt that, by the late third millennium BC, the Oman peninsula was identified in Mesopotamian cuneiform sources as **Magan** (Sumerian) or *Makkan* (Akkadian). In addition to safeguarding the agricultural settlements in their environs, the towers of the Umm al-Nar period may also have been the power centres for the ‘lords of Magan’ against whom several of the Old Akkadian emperors, including Manishtusu and Naram-Sin, campaigned in the twenty-third century BC (Potts 1986b.). Manishtusu’s allusion to campaigning against no fewer than 32 ‘lords of Magan’ implies a decentralized political landscape at the time, and one can well imagine a situation in which petty lords, each in control of a certain amount of territory centred around a primary settlement (such as Tell Abraç, Bidiyah, Hili, etc.) dominated by a fortress-tower, banded together to repulse the Akkadian invasion of Magan. It should also be noted that unfortified settlements of a more ephemeral nature have also been discovered, particularly along the Gulf coast (e.g. at Ghanadha, see Al Tikriti 1985; al-Sufouh, see Benton 1996; at al-Dur (ed-Dur), see Boucharlat et al. 1988: pp 2–3; Abu Dhabi airport, see de Cardi 1997; and Umm al-Nar, Frifelt 1991).

In general, the dead of the Umm al-Nar period were buried in circular, stone tombs faced with finely-masoned ashlar blocks, although rectangular chambers, perhaps for secondary reburial of bone from circular tombs which had become full, are also known (Haerinck 1990-91). Examples of Umm al-Nar circular tombs were first encountered by a Danish expedition on the island of Umm al-Nar in Abu Dhabi in 1958 (Frifelt 1991). Thus it was that the island gave its name to the period of which these tombs are characteristic. Umm al-Nar-type tombs range in size from c. 4 m to 12 m in diameter. Internally, the structures have a variable configuration of crosswalls which may either be free-standing, bounded on each end by a passage leading from one half of the tomb to the other, or joined to the external tomb wall, dividing the interior of the tomb into two halves without access to each other. By 1995, examples of Umm al-Nar tombs (Fig. 5) had been excavated in both coastal and inland Abu Dhabi (Umm

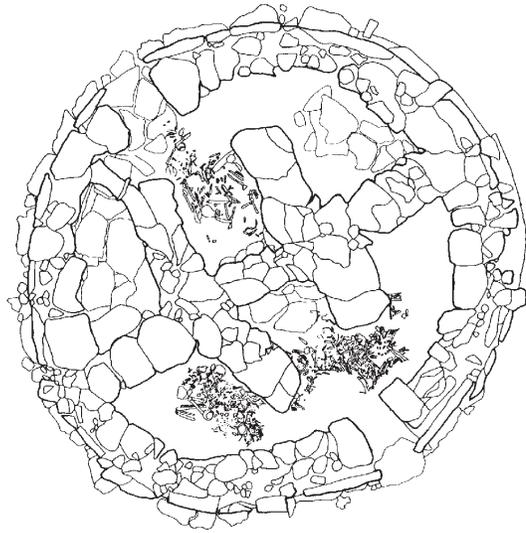


Fig. 5. The Umm al-Nar-type tomb at al-Sufouh, 6 m in diameter. After Benton 1996.

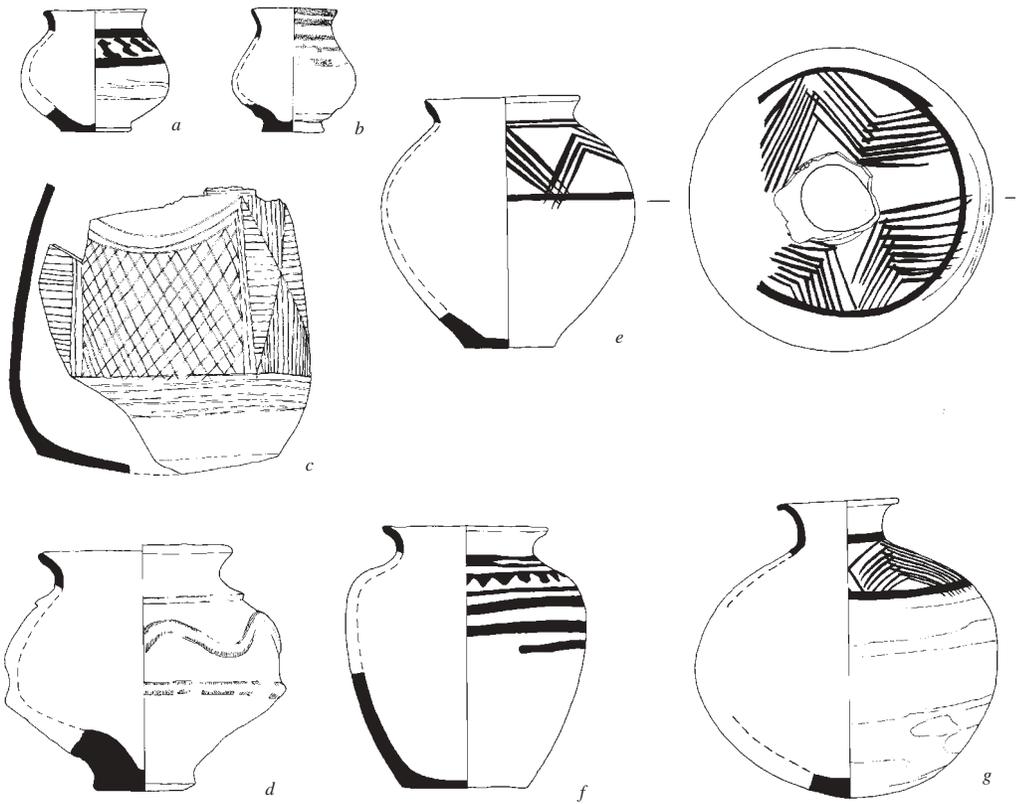


Fig. 6. A selection of Umm al-Nar-period pottery from the tomb at al-Sufouh, including black-on-grey (a-b), incised grey (c), fine tan with raised meandering ridge (d), and fine black-on-orange (e-g). After Benton 1996.

al-Nar island, Hili area), Dubai (al-Sufouh and Hatta), Ajman (Moweihat), Umm al-Qaiwain (Tell Abraç), and Ra's al-Khaimah (Shimal, Wadi Munay'i). The better-preserved examples show that literally hundreds of individuals were buried in these tombs along with a wide range of grave furniture, including soft-stone bowls (David 1990, 1996); fine and domestic black-on-red ceramics (Fig. 6) of local manufacture (Frifelt 1990; Méry 1997); incised grey and painted black-on-grey pottery (Fig. 6) from south-eastern Iran or Baluchistan (Cleuziou and Vogt 1985; Benton 1996; Potts 2000, in press a); copper-bronze weaponry (daggers, spearheads; Potts 1998; Pedersen and Buchwald 1991; Weeks 1997, 1999, 2000, on Umm al-Nar-period metallurgy); personal items of jewellery such as bracelets and necklaces incorporating thousands of beads, a significant proportion of which are Harappan paste micro-beads from the Indus Valley (Benton 1996); and other exotic items such as ivory combs (Potts 1993d; Potts 2000 a-b), gypsum lamps (Potts 1995a), and linen (Reade and Potts 1993).

Like their Hafit counterparts, many Umm al-Nar-period tombs were robbed in antiquity, but those excavated at Umm al-Nar, Hili North (Tomb A), Tell Abraç, Shimal, Moweihat and al-Sufouh have yielded substantial quantities of human skeletal remains which are beginning to provide important evidence on the diet and health of the late third millennium population

of the Oman peninsula (Blau 1996, 1998; Blau and Beech 1999). Furthermore, they reveal that all age grades, from foetal infants to elderly adults, were interred together in these tombs. One of the most intriguing questions concerns the relationship between the individuals buried in the different chambers of a tomb. Recent analyses of the epigenetic traits on teeth (cf. Højgaard 1980) from three of the tombs excavated by the Danish expedition on Umm al-Nar indeed supports the idea that the individuals buried within a single tomb were genetically related, probably representing members of closely inter-married families (Alt, Vach, Frifelt and Kunter 1995).

Palaeopathological inferences can also be drawn from an analysis of Umm al-Nar-period skeletal remains. At Tell Abraq, for example, A. Goodman and D. Martin have studied thousands of bones from a minimum of 394 individuals (Potts 2000b) interred in a tomb dating to c. 2100–2000 B.C. (Potts and Weeks 1999). Some of the preliminary conclusions of their work may be summarized as follows:

*Periostitis and osteomyelitis, both of which result from non-specific infections such as staph and strep, are found on roughly half of the tibia recovered. Signs of trauma in the form of healed and unhealed lesions (mainly on the hands, ribs, and forearms) and osteochondritis dessicans (lesions which develop in response to trauma to joint systems) were detected on roughly 5% of all skeletal elements. Osteoarthritis was found in a significant proportion of the adult population. Fluorosis (exaggerated bone formation at muscle and ligament attachments) and anemia of unknown origin leading to perotic hyperostosis (thickening of the cranium) were also found. Turning to the dental evidence, fluorosis is suggested by dental mottling in a large portion of the dental finds. Attrition was extremely severe, as was caries in certain individuals, and enamel hypoplasias (severe enamel growth disruption due to infection) were common among children (Potts 1993b: p 121).*

Perhaps most surprising in the tomb at Tell Abraq was the discovery, amongst otherwise disarticulated bone, of a unique, fully articulated female aged c. 20. ‘Abnormal upward curvature of the spine of about 30° beyond normal, early osteoarthritis changes in the right knee and ankle, a mild deformity of the left foot and mild changes in the right foot’ suggest that ‘the female was sedentary, overused her right leg and had a neuromuscular imbalance of the lower left leg. It further suggests the individual suffered from a neurological disease of several years’

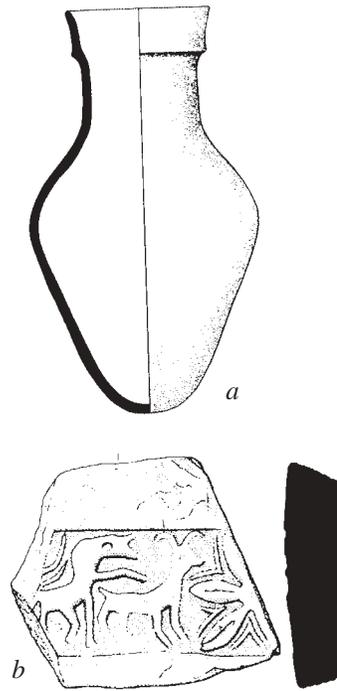


Fig. 7. An Early Dynastic III-type, Mesopotamian storage jar from Grave 1 (a) and a cylinder seal-impressed sherd (b) from the settlement on Umm al-Nar. After Frifelt 1991: Fig. 86 and 1995: Fig. 255.



*Fig. 8. The ivory comb from the late Umm al-Nar-period tomb at Tell Abraq.*

duration which led to partial crippling' ('At Tell Abraq . . .' 1994). After considerable consultation with a wide range of specialists, D. Martin has confirmed that poliomyelitis is the most likely diagnosis, making this the earliest recorded instance of polio ever confirmed in the archaeological record anywhere in the world.

Mention was made above of contact between late third millennium Magan and the Old Akkadian empire. Not only are these connections attested to in cuneiform sources, but complementary archaeological evidence exists in the form of large, buffware storage jars from Umm al-Nar island (Fig. 7), confirmed by analysis to be Mesopotamian (Mynors 1983), and a seal-

impressed jar fragment of Syrian provenance (Amiet 1975, 1985). This material indicates the transport of a liquid, perhaps oil, from Mesopotamia to Umm al-Nar island at this time. Contacts were also maintained in other directions as well. The incised grey and painted black-on-grey wares from numerous Umm al-Nar tombs were manufactured in southern Iran and/or Baluchistan (Blackman et al. 1989) while painted brown-on-buff pottery of Kaftari type from the tombs at Tell Abraq and Shimal/Unar 2 indicate contacts with the Elamite region of southwestern Iran (Potts 2000a: pp 116–117, in press a). Settlements such as Tell Abraq, Hili 8, and Asimah (in Ra's al-Khaimah) have yielded diagnostic examples of black-washed, finely levigated, thick micaceous orange ware which comes from the Indus Valley (Cleuziou 1992: p 97; Potts 1994c: p 617 and Fig. 53.3). These certainly represent fragments of storage jars, suggesting that something was being exported from the Harappan world to the Gulf in bulk. It has recently been posited that a milk-product, perhaps a sort of cheese, was the commodity in question (Gouin 1990: pp 48–49). The presence of diagnostically Harappan etched carnelian beads, as well as thousands of paste micro-beads, and cubical chert weights with identical parallels at all of the major Harappan sites, and small objects of ivory, also implies contact with the Indus Valley in the late third millennium. Finally, a unique ivory comb (Fig. 8) from the tomb at Tell Abraq can be reliably identified on the basis of its particular floral decoration as an import from Bactria (northern Afghanistan/southern Uzbekistan) (Potts 1993d, 2000a: p126).

Excavations at Asimah in the interior of Ra's al-Khaimah have revealed the existence of stone alignments consisting of raised platforms and subterranean graves which, on the basis of their associated finds, also date to the Umm al-Nar period (Vogt 1994a: pp 101ff; Görsdorf and Vogt, in press). These monuments, which have been compared with the triliths and alignments of southern and western Arabia, suggest that a degree of cultural diversity existed in late third millennium south-eastern Arabia which has yet to be adequately investigated.

## The Early and Middle Second Millennium (c. 2000–1200 BC)

For many years it was thought that a major discontinuity occurred in the archaeological sequence of the Oman peninsula at the end of the third millennium. This was speculatively linked to disruptions in the Indus Valley, where the Mature Harappan period came to an end and the Post-Harappan or Late Harappan era began. In the Indus Valley these changes were long attributed to the Aryan invasion, but this explanation has fallen out of favour with most scholars and remains purely conjectural. The absence of direct references to Magan in Mesopotamian cuneiform sources after the Ur III period (2100–2000 BC) also led scholars to speculate that the alleged Aryan invasion may have caused further disruptions, via a sort of cultural ‘ripple effect’, in south-eastern Arabia. The settlement record of the region seemed to evaporate, leaving very few sites occupied on anything like a full-time basis, and making it difficult to find the habitations of the many individuals buried in the collective, second millennium tombs of the sort first found at Shimal, but known by the name ‘Wadi Suq’ after a site in Oman first investigated by Karen Frifelt (Frifelt 1975: pp 377–378). Finally, the notion that the camel (*Camelus dromedarius*) was domesticated sometime in the second millennium gave rise to theories of a reversion to full-time nomadism after the Umm al-Nar period, leading some scholars to view the ‘Wadi Suq period’ (c. 2000–1300 BC) as a cultural ‘dark age’ in the region (cf. the discussion in Potts 1993c: pp 427–435).

It remains true today that the absolute number of early second millennium settlements in the UAE and Oman is not great, but on those which have been investigated, such as Tell Abraq, Kalba 4 (Carter 1997), and from the surface indications at a site like Nud Ziba in Ra’s al-Khaimah (Kennet and Velde 1995), some population centres continued to be inhabited on a full-time basis and show no signs of a cultural ‘decline’. At Tell Abraq, for example, the large fortress-tower of the Umm al-Nar period continued in use down to the middle of the second millennium, with modifications to the outer walls and the construction of new buildings on the interior. Apart from these architectural modifications, there is a major change detectable in the diet of the site’s inhabitants, with marine resources (fish and shellfish) becoming more important than they had been in the late third millennium and accounting for about 50 per cent of all dietary requirements (Potts 1995a: p 96). A similar swing from the exploitation of terrestrial fauna (sheep, goat, cattle) to marine resources has also been observed at Shimal as one moves from the earlier to the later second millennium (Grupe and Schutkowski 1989; Von den Driesch 1994; Glover 1998). However, domesticated camel is not attested until the Iron Age and Wadi Suq camel ‘nomadism’ cannot be invoked as an explanation for the changes in material culture – particularly in the ceramic repertoire – which characterize the period. Moreover, both Tell Abraq and Nud Ziba (Kennet and Velde 1995) provide examples of ceramics which are clearly transitional between Umm al-Nar and classic Wadi Suq types, suggesting that the change from one period to the next was evolutionary rather than revolutionary.

The later Wadi Suq levels at Tell Abraq are paralleled by the occupation of the settlement at Shimal in Ra’s al-Khaimah, where an area of habitation at the base of the Hajar Mountains, and within sight of an ancient mangrove lagoon, was located (Vogt and Franke-Vogt 1987; Velde 1990, 1991, 1992). Shimal, and the nearby sites of Ghalilah and Dhayah are, however, better known for the many collective tombs of the Wadi Suq period located there (Vogt 1998). These belong to a number of different formal types. All are constructed of unworked

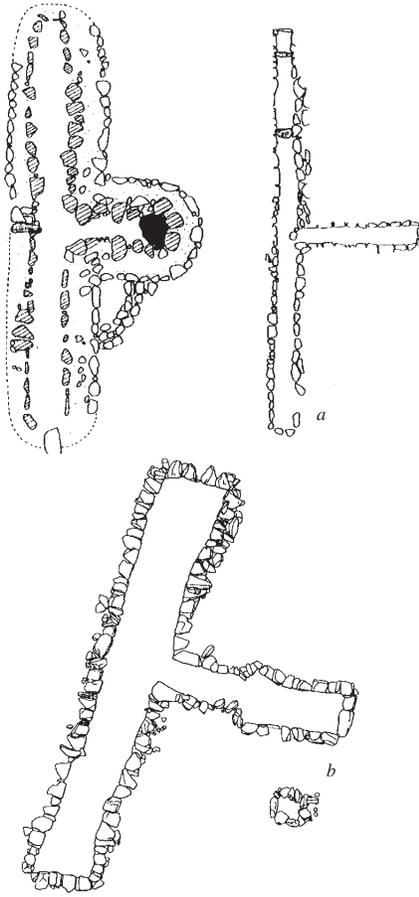
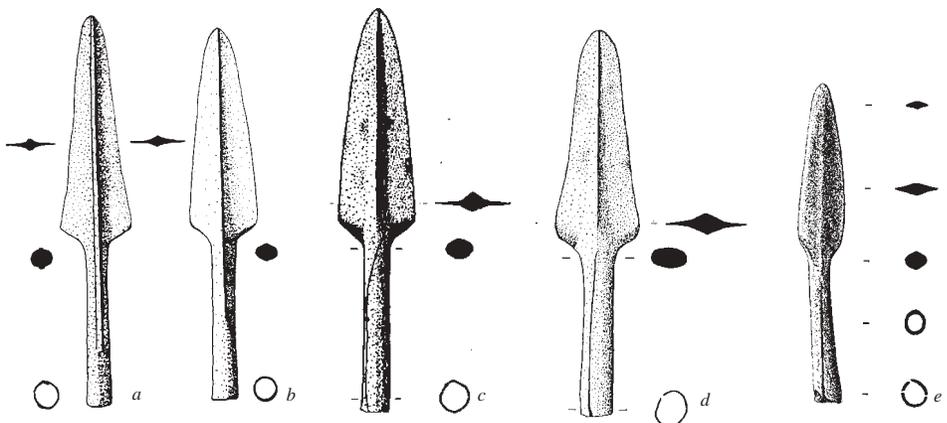


Fig. 9. Plans of the tombs at Dhayah 2 (a) and Bithna (b). After Kästner 1990: Abb. 4, and Corboud 1990: Fig. 4.

Fig. 10. Socketed spearheads of the Wadi Suq period from Dhayah 2 (a-b), and cairn 2 at Jebel Hafit (e). After Kästner 1990: Abb. 6; Vogt and Franke-Vogt 1987: Fig. 21.5-6; and Cleuziou et al. 1979: Pl. 16.1.



boulders and *wadi* pebbles, often of massive size. Unlike their Umm al-Nar counterparts, which were round, the Wadi Suq tombs were generally oval. The simplest 'Shimal' type is an elongated oval enclosure which can be up to 30 m long and roughly 2 m wide (e.g. in the case of Bidiyah 1; see Al Tikriti 1989: 102ff; for Sharm, see Riley and Petrie 1999) with an entrance in one of the long sides. The 'Ghalilah' type is constructed like a broad oval with a central, freestanding wall in the interior. This is used to support the capstones, the ends of which rest on the upper surface of the outer and inner walls. Finally, the 'Khatt' type resembles a Shimal-type tomb with an entrance at one end which is enclosed by an outer wall, thus consisting of two burial spaces, the interior chamber of the 'Shimal'-type structure and a corridor running around its perimeter (Potts 1990b/I: Fig. 28). At Asimah, in the interior of Ra's al-Khaimah, a number of graves with second millennium finds (e.g. As 13) have been excavated which represent a type previously unattested in the region (Vogt 1994a: p 41). These are notable by virtue of their oval shape, marked by a stone wall on the surface, which encloses a subterranean burial chamber, not unlike the original Wadi Suq graves investigated by Frifelt in the 1970s. Many Wadi Suq-period tombs have also recently been excavated at Jebel Buhais, south of Mleiha in the interior of Sharjah, and at Khor Fakkan, on the East Coast of the country (S. Jasim, pers. comm.).

Subterranean, horse-shoe-shaped tombs in the Wadi al-Qawr of southern Ra's al-Khaimah (Phillips 1987) and the Qidfa oasis of Fujairah (unpublished but on display in the Fujairah Museum) must also be dated to the Wadi Suq period. Although previously attributed to the Iron Age (e.g. Potts 1990b/1: p 364), it is now clear from the finds made at Qidfa that the original construction and use of these tombs dates to the second millennium, and that the classic Iron Age material found within them represents the secondary reuse of these structures at a much later date. Subterranean, T-shaped tombs (Fig. 9), such as those excavated at Dhayah (Kästner 1990, 1991) and Bithna (Corboud 1990; Corboud et al. 1996) also date to the Wadi Suq period. Finally, individual inhumation graves dug into the *sabkha* at al-Qusais (Taha 1982–1983), a suburb to the east of Dubai, include many of Wadi Suq date.

The Wadi Suq period is notable for the explosion in metallurgy witnessed at this time. Although often robbed in antiquity, some Wadi Suq tombs, such as the horseshoe-shaped structure at Qidfa, have yielded literally hundreds of weapons and vessels (Weeks 2000a-b). Where the Umm al-Nar period was characterized by daggers and spears, the Wadi Suq period witnessed the introduction of the long sword, the bow and arrow (for incised Wadi Suq arrowheads, see Magee 1998b), and a new, light type of socketed spearhead (Fig. 10). These innovations in weaponry are clearly significant for an understanding of Wadi Suq-period society (Potts 1998a). The long swords of Qidfa, al-Qusais, Qarn Bint Saud Grave 3 (Lombard 1979: Pl. LI.1-4; Vogt 1985: Taf. 122.1-4) and Qattarah (Lombard 1979: Pl. LI.5-6) are double-edged weapons with a raised, central midrib and a concave butt-end marked by rivet holes for the attachment of a separate hilt. The double cutting-edge implies that these were thrusting weapons, and the lack of a well-attached hilt means that they would have been poor devices for slashing. Judging by the light weight of Wadi Suq socketed spearheads, it can be suggested that they were to be used on throwing spears. A comparison with the cuneiform evidence from third millennium Ebla, in Syria, shows that many of the Wadi Suq spearheads are within the weight range of the light throwing spears used there (63.2–79 g.), whereas none of them attain the weight of the heavier points mounted on thrusting lances which were used by foot soldiers at Ebla and weighed approximately 237–474 g. each (Waetzoldt 1990: p 2). The appearance of these weapons, along with hundreds of cast bronze, lanceolate arrowheads with a raised, flattened midrib, suggest an evolution in the technology of warfare during the second millennium unprecedented in the earlier archaeological record of the region.

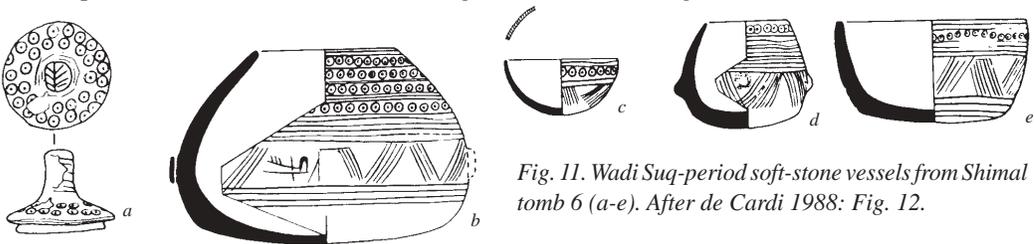
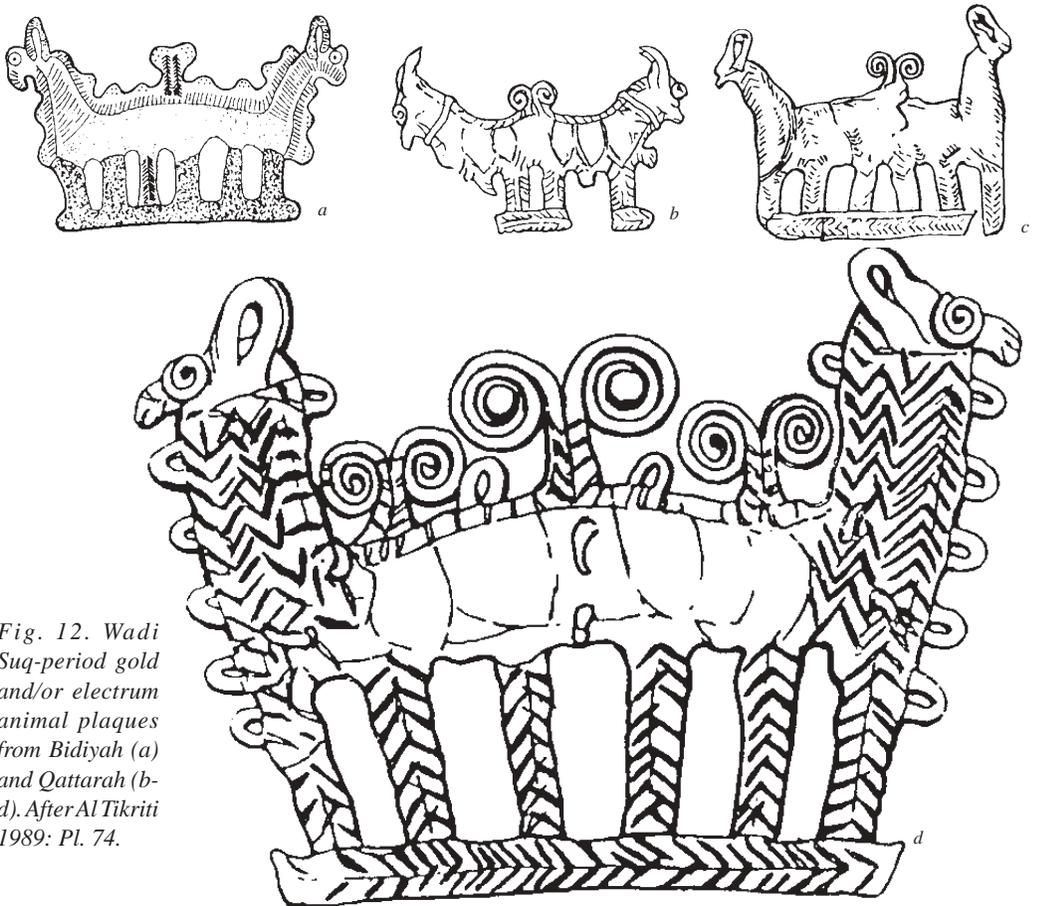


Fig. 11. Wadi Suq-period soft-stone vessels from Shimal tomb 6 (a-e). After de Cardi 1988: Fig. 12.

In the late third millennium an industry arose in the manufacture of soft-stone vessels – generally bowls, beakers and compartmented boxes – decorated with dotted-circles made using a bow drill. During the Wadi Suq period the numbers of soft-stone vessels deposited in tombs increased vastly and new shapes, along with the addition of incised diagonal and horizontal lines in clusters (Fig. 11), allow us to easily separate the later soft-stone vessels from their third millennium forerunners (Häser 1988, 1990a, 1990b).

The continuities visible in settlement at a site like Tell Abraç – in metallurgical technology; in the manufacture of stone vessels, and in the ceramic industry – all point to the obvious conclusion that the Umm al-Nar/Wadi Suq divide, however real archaeologically, was not a complete rupture. We have little evidence of the people themselves from this era, largely because of the poor state of preservation of most of the skeletal remains excavated to date, and the lack of publication of such important complexes as Qidfa and Qattarah. The skeletal material from the tombs at Shimal was highly fragmentary (Wells 1984, 1985; Schutkowski and Herrmann 1987) but studies of the teeth have shown that the population there showed low rates of molar attrition, suggestive of a low ‘intake of dried fish, more efficient grain grinding or sieving, or less grain intake’ which may reflect a diet heavily dependent on fresh fish and shellfish; low rates of caries, suggesting ‘that fermentable carbohydrates [e.g. dates] did not play a large role’ in the diet; high rates of calculus formation, associated with other dental pathologies, such as caries-induced abscessing, which ‘most probably reflect different dietary constituents, food preparation techniques, or levels of oral hygiene’ vis-à-vis other populations in the region; and moderate to severe ante-mortem tooth loss, ‘possibly due to inflammation of the periodontium caused by extensive calculus’ (Littleton and Frøhlich 1993: pp 440–444).

Some indication of an accumulation of wealth during the Wadi Suq period is provided by an interesting class of gold and electrum plaques in the form of two animals, standing back



*Fig. 12. Wadi Suq-period gold and/or electrum animal plaques from Bidyah (a) and Qattarah (b-d). After Al Tikriti 1989: Pl. 74.*

to back, often with their tails curled up in a spiral. Examples (Fig. 12) are now known from Dhayah (Kästner 1990: Taf. 40, 1991: Fig. 6a), Qattarah (Potts, 1990b/I: Pl. IX), and Bidiyah (Al Tikriti 1989: Pls. 74A, 95B). Some of that wealth may have been accumulated through long-distance trade in copper, a commodity for which Dilmun (modern Bahrain) became famous as a retailer to the southern Mesopotamian market city of Ur in the early second millennium. The discovery at Tell Abraç of over 600 sherds of Barbar red-ridged pottery, now shown to be compositionally identical to the pottery from the settlement at Saar on Bahrain (Grave et al. 1996b) and on the island of Balghelam, Abu Dhabi (Hellyer, pers. comm.), points to the clear existence of contacts in that direction, as does the recovery of Barbar pottery at Kalba on the East Coast (Méry, Phillips and Calvet 1998). Moreover, both Tell Abraç (Potts 1994c) and Shimal (de Cardi 1988: Fig. 11) have Post-Harappan pottery in early second millennium contexts which reflect the ongoing existence of contacts with the Indus Valley at this time.

### From the Late Second to the Late First Millennium (c. 1200–300 BC)

Two innovations occurred in the late second millennium which were to revolutionize the economies of south-eastern Arabia. The domestication of the camel, attested by the end of the second millennium at Tell Abraç (Stephan 1995), opened up new possibilities for land transport, while the discovery of the principles of using sub-surface water channels for the transportation of water from aquifers to gardens – so-called *falaj* irrigation – made possible the extensive irrigation of gardens and agricultural plots which resulted in a veritable explosion of settlement across the Oman peninsula (Potts 1990b/I: pp 390–392).

In conformity with usage elsewhere in Western Asia, particularly Iran, the period from c. 1200 to 300 BC has traditionally been referred to as the ‘Iron Age’. No term could be less appropriate, however, for in south-eastern Arabia iron was not widely used until the following period, except at Muwailah in the interior of Sharjah where iron weaponry has been found which, however, is likely to have been imported from Iran (Magee 1998c). Nevertheless, it is convenient to term this era the Iron Age, particularly when referring to comparable sites and finds from other areas, such as Baluchistan, Iran, and Mesopotamia. Based on the evidence from Tell Abraç, the Iron Age sequence in the UAE can be divided into three sub-periods, labelled Iron I (1200–1000 BC), II (1000–600 BC) and III (600–300 BC) (Magee 1995, Magee 1997). With the exception of a tomb at Asimah (As 100) which contains Iron I material (Vogt 1994a: pp 81ff), all of the evidence for Early Iron Age occupation comes from Shimal, Tell Abraç and al-Hamriyah on



Fig. 13. Half of a bivalve (Marcia) shell from an Early Iron Age (Iron I) context at Tell Abraç containing atacamite, a cuprous pigment widely used as eye-makeup in antiquity.

the Gulf coast, and Kalba on the East Coast. Fish and shellfish continued to be important in the diet of the Iron I inhabitants, although domesticated sheep, goat and cattle were kept, and gazelle, oryx, dugong, turtle and cormorant were exploited as well (Stephan 1995; Magee 1995: p 269). Domesticated wheat and barley were cultivated at this time (Willcox and Tengberg 1995; Davis 1998), and the date palm remained as important as ever. The ceramics of the Iron I period show clear signs of continuity with the latest Wadi Suq material (Magee and Carter 1999; Magee et al. 1998), and are in general very coarse, grit-tempered, handmade wares, often in large, open bowl and vat-like shapes (Potts 1990a: pp 103–109). Half of a bivalve shell (*Marcia hiantina*) from an Iron I context at the site was found by x-ray powder diffraction analysis to contain atacamite (Fig. 13), a cuprous pigment widely used in the ancient world as eye make-up (Thomas and Potts 1996). Similar pigment shells have also been found in the late Wadi Suq tomb at Sharm which was re-used during the Iron Age (Masia 2000).

The Iron II period is the ‘classic’ Iron Age in the UAE and is attested at a number of extensively excavated sites with substantial mudbrick architecture such as Rumeilah, Bint Saud, Hili 2, Hili 14 and Hili 17 in the Al Ain area (Boucharlat and Lombard 1985; Magee et al. 1998); al-Thuqaibah and Umm Safah on the al-Madam plain (Benoist, Cordoba and Mouton 1997); and Muwailah (Magee 1998a, 1998c, 1999a, 1999b; Müller 1999) in the sandy desertic area near the Sharjah International Airport. Many other sites, both graves and settlements, have been located, and it is estimated that at least 150 sites of this period have been documented in the UAE and neighbouring Oman. The explosion in settlement at this time is generally attributed to the invention of *falaj* irrigation technology, and cultivation using the hoe may be inferred from the recovery of a bronze hoe-blade at Rumeilah (Boucharlat and Lombard 1985: Pl. 72.7; Weisgerber 1988: Pl. 161; Potts 1994a).

It is interesting to note that the Iron II period also witnessed the appearance of fortified strongholds, such as Hili 14 in Al Ain (Boucharlat and Lombard 1989), Husn Madhab and Husn Awhala in Fujairah (Hellyer 1993b; Potts et al. 1996; Petrie 1998), Jebel Buhais north of al-Madam (Boucharlat 1992), and Rafaq in the Wadi al-Qawr (Phillips 1997). The purpose of these fortresses, it may be argued, was to safeguard the agricultural settlements associated with them, particularly their precious *afraj*, and the concentration of power in such centres is an important social and political phenomenon. A cuneiform inscription from Nineveh in Assyria speaks of the existence of at least one ‘king’ in the Oman peninsula at this time, an individual named Pade, king of Qade, who lived at Is-ki-e (modern Izki in Oman) and sent tribute to the Assyrian emperor Assurbanipal in or around 640 BC (Potts 1990b/I: p 393).

Political and economic control by central bodies may also be implied by the appearance at this time of a tradition of stamp seal manufacture (Lombard 1998), evidenced at a number of sites including Rumeilah (Boucharlat and Lombard 1985: Pl. 66.5–9), Tell Abraq (Potts 1991a: Fig. 135) and Bint Saud (Stevens 1992). Contacts with foreign regions are suggested by a soft-stone pendant from Tell Abraq (Potts 1991a: Figs. 136–137) which shows a figure reminiscent of the Neo-Assyrian and Neo-Babylonian depictions of the *lamashtu* demoness, an evil spirit who spread disease, and it is most probable that such pendants were worn to protect their owners from sickness. The same figure appears in some of the petroglyphs found pecked on rock in the mountains of Fujairah (Ziolkowski 1998; cf. Ceuninck 1998; Haerinck 1998c). Some indication of how such foreign contacts were effected is given by another pendant from Tell Abraq which shows the only Iron Age depiction of a boat in the Oman peninsula

(Potts 1991a: Figs. 142–143). In this case the boat appears to be a square-sterned vessel with a sharp bow and triangular sail (Potts 1995b: p 564). The sail is obviously similar to the Arab lateen sail, otherwise unattested in the region until the Sasanian period and absent in the Mediterranean until c. 900 AD. The Tell Abraq pendant is thus the earliest depiction of a lateen sail yet discovered.

A further link with Assyria (and western Iran) is provided by a class of decorated discs, sometimes described as buttons or buckles, which have been found in a number of Iron Age inhumations in the region, e.g. at Dibba and Qarn Bint Saud (Frifelt 1971: Fig. 11) and Shimal (Vogt and Franke-Vogt 1987: Fig. 18.1-4) and which are strikingly similar to examples known from the Assyrian capital of Nimrud in eighth to seventh century BC. Recently discovered examples in a re-used Wadi Suq tomb at Sharm (Hartnell and Barker 1999) have been shown, upon examination by a scanning electron microscope, to have the internal structure of dentine, corresponding not with a shell but with the lower incisor of a large mammal, such as a camel (Davis 1999a; Susino 1999).

The third and final sub-period of the Iron Age, Iron III, is not very well known, although occupation is attested at half a dozen settlements including Tell Abraq, Shimal, Rumeilah, Hili 17, Hili 2, Nud Ziba and al-Thuqaibah (Magee 1995: p 345), as well as graves in the Wadi al-Qawr (unpubl., in the Ra's al-Khaimah Museum) and Dibba oasis (unpubl., in the Fujairah Museum). The appearance of previously unattested shapes in so-called 'Burnished Maroon Slipped Ware' is significant, for this material, almost certainly imported from Iran, finds close parallels at a number of Iranian sites, including Baba Jan, Godin Tepe, Nad-i Ali, Dahan-i Gulaiman, Tal-i Zohak, and Pasargadae, in contexts dating to between the sixth and fourth centuries BC (Magee 1995: pp 182–183). When combined with the literary and epigraphic record of Achaemenid control over the satrapy of Maka (cf. *Makkan*, **Magan**), the conclusion becomes inescapable that the sudden appearance in the UAE of ceramics paralleled in

Achaemenid contexts in Iran is a reflection of the fact that the area was at this time part of the Persian satrapy of Maka (Potts 1990b/I: 394ff; de Blois 1989). In spite of the fact that messengers from Maka, some of whom are referred to as 'Arabs', are attested in the Persepolis Fortification Texts (PF 1545, 2050; PFa 17, 29) in the year 505/4 BC, as are rations for the satrap of Maka (PF 679–680) in the

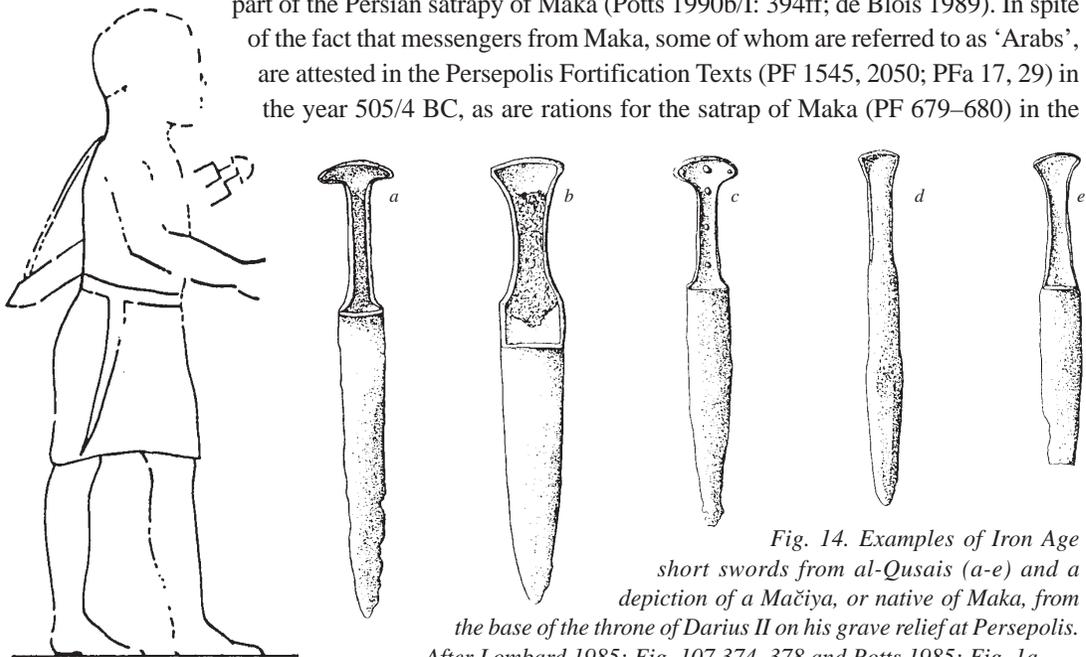


Fig. 14. Examples of Iron Age short swords from al-Qusais (a-e) and a depiction of a Mačiya, or native of Maka, from the base of the throne of Darius II on his grave relief at Persepolis. After Lombard 1985: Fig. 107.374–378 and Potts 1985: Fig. 1a.

years 495/4 and 500/499 BC (Potts 1990b/I: pp 395–397), we still have no idea where the Persian capital of the satrapy may have been located. A contingent from Maka formed part of Xerxes' army at Doriscus in 480 BC (Herodotus, *Hist.* 7.68), and we can get some impression of how they looked from the depictions of Mačiya (inhabitants of Maka) on several Achaemenid monuments, the clearest of which is found on the grave of Darius II at Persepolis (Potts 1985: Fig. 1a). There the Mačiya (Fig. 14) is shown wearing only a short kilt, with a sword slung over his shoulder by a strap. The crescentic pommel of the sword hilt is interesting, and recalls the many Iron Age short swords found at sites in the UAE such as al-Qusais (Fig. 14), Qidfa, Jebel Buhais and Rumeilah (Lombard 1981; Weisgerber 1988).

### **The Mleiha (Late Pre-Islamic A-B) Period (c. 300–0 BC)**

The dissolution of the Persian Empire must have impacted on south-eastern Arabia, for, with the defeat and death of Darius III, Maka was no longer a Persian satrapy. On the other hand, Alexander the Great's conquests never touched the Arabian side of the Gulf and, while he inherited much of what had formerly been the Achaemenid empire, the famous 'last plans' of the Macedonian conqueror, which included an invasion of Arabia, never advanced beyond the stage of initial reconnaissance (Potts, 1990b/II: pp 1–22). Thus, by the third century BC south-eastern Arabia was free of foreign political influence, and it is in this context that the developments of the subsequent centuries must be viewed, for none of Alexander's Seleucid successors was able to establish any sort of Greek dominance in the region either.

How significant these trends were for the local population is difficult to assess. Certainly we can see evidence of continuity as well as change in the local ceramic repertoire, enough to be certain that the basic industry and the people who made and used the wares remained the same. But our evidence is severely restricted and, with the exception of Mleiha, a sprawling settlement on the gravel plain south of Dhaid in the interior of Sharjah which extends over an area several square kilometres in extent (Boucharlat 1987–1988, 1989; Boucharlat and Mouton 1991, 1993; Mouton 1999), we have no other settlements which can be attributed to this time horizon. On the basis of their excavations, French archaeologists working at Mleiha have divided the sequence into four sub-periods, viz. Mleiha I (Iron Age), II (300–150 BC), IIIA (150–0 BC), and IIIB (0–200 AD). For the purposes of this chapter we shall consider Mleiha II and IIIA together, as these correspond to the interval between the end of the Iron Age and the appearance of a different cultural phenomenon best represented further north at al-Dur on the coast of Umm al-Qaiwain (see below).

The occupation of Mleiha represented the continuation of human occupation, in an optimally watered and well-drained area, which had begun in the late prehistoric era (cf. Table 7). The earliest, post-Iron Age settlement probably consisted of *barastis* or 'arish, palm-frond houses, eminently suited to the hot climate of south-eastern Arabia. Starch residues on groundstone tools (Davis 1999b) and macro-botanical remains of wheat (*Triticum durum/aestivum*), barley (*Hordeum vulgare*) and date (*Phoenix dactylifera*) attest to a successful agricultural regime (Peña-Chocarro and Barrón Lopez 1999). The dead, however, were buried in more substantial structures, mudbrick cists surmounted by a solid tower of brick, capped by crenellated stone ornaments. These structures, which have no antecedents in the region, recall the funerary

towers of Palmyra, Qaryat al-Fau, and the early periods at Petra (Boucharlat and Mouton 1993: p 281; Mouton 1997, 1999; Boucharlat and Mouton 1998).

Both settlement and graves have yielded quantities of ceramics, some of it of obviously local manufacture, carrying on and modifying the norms established during the Iron Age, and some of it foreign. This includes glazed pottery, perhaps produced in south-western Iran or southern Iraq; red and black wares readily identifiable as coming from the north-east Arabian mainland or adjacent islands such as Bahrain or Failaka; and even Greek pottery, imported from the Aegean or Mediterranean. In addition to Greek black-glazed sherds identical to finds from the Athenian Agora, more than half a dozen stamped Rhodian amphora handle fragments (Fig. 15) provide precious clues to the absolute chronology of Mleiha. The named and generally datable Rhodian amphora manufacturers attested at Mleiha include *Iasonos* (early second century BC), *P(ana)mo(u) Ant(ig)onou* (late third/early second century BC), and *Epi Ariotuvos/Theomoaori(os)/ou* (200–175 BC) (Mouton 1992: p 48). Folded-flan coinage from Mleiha, modelled on Athenian ‘old style’ tetradrachms of fourth century BC date, may represent the earliest indigenous coinage in the region (Haerinck 1998d; Huth 1998, 1999).

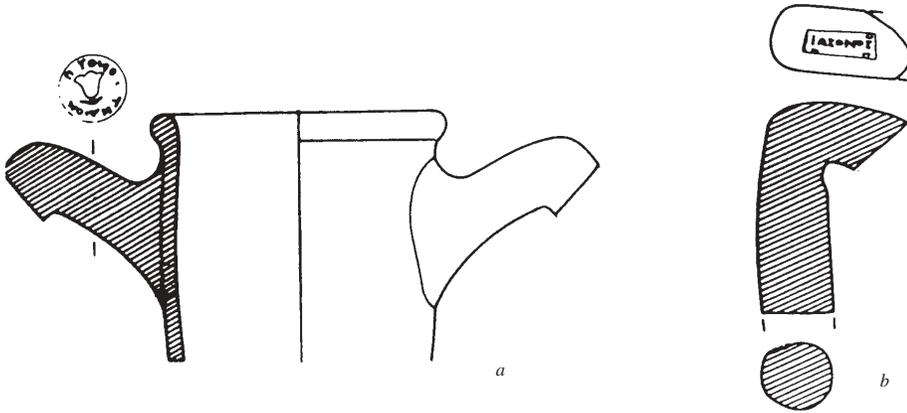


Fig. 15. Stamped Rhodian amphora handles from Mleiha. After Mouton 1992: Fig. 21. 1, 3.

Engraved bronze bowls and beehive-shaped, alabaster vessels from Mleiha II contexts recall examples from South Arabia (Potts 1990b/II: Fig. 18; Boucharlat and Mouton 1993: Fig. 6; Hassell 1997), a fact which is important in connection with the recovery of several items (stone stelae, bronze bowls) inscribed in South Arabian characters (Fig. 16). By themselves, these inscriptions do not necessarily imply contact with South Arabia, for the simple fact that the South Arabian script was also used in north-eastern Arabia to write the so-called Hasaitic inscriptions (Potts 1990b/II: 69–85), many of which begin with the same formula as the Mleiha funerary stele, *nafs/wqbr*, i.e. ‘memorial and tomb (of) . . .’ (cf. the discussion in Müller 1978: p 150; Potts 1990b/II: p 268 n. 11; Mitchell 1990–92). Moreover, alabaster vessels like those found at Mleiha, although of undoubted South Arabian manufacture, have also been discovered at sites like Thaj in north-eastern Saudi Arabia. Several coins found on the surface of the site are, however, unequivocally South Arabian (Sedov 1995). The question of South Arabian contact and cultural influence is an important one, particularly in view of the legend of the Azd migration out of Yemen and its contribution to the later tribal configuration of Oman.

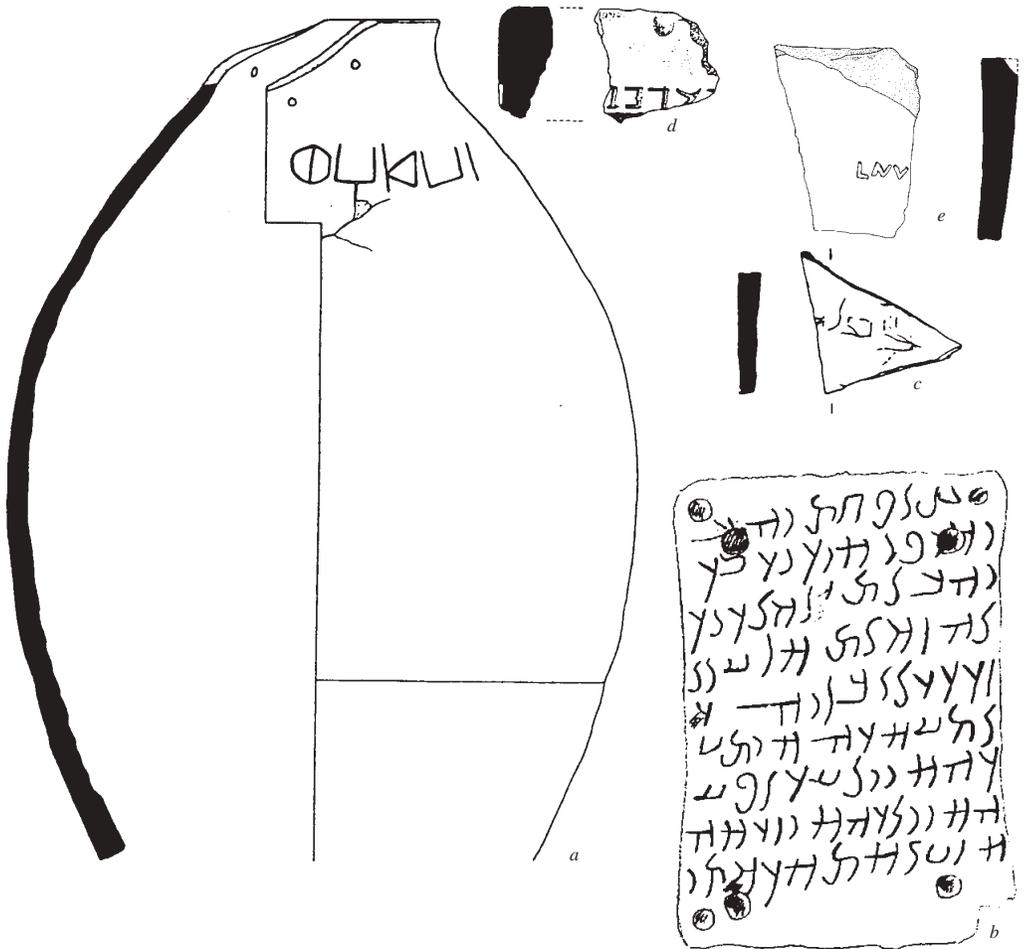


Fig. 16. Examples of inscribed material in South Arabian (a), Aramaic (b-d) and Latin (e) from Mleiha (a-b) and al-Dur (c-e). After Mouton 1992: Fig. 148 and Teixidor 1992: Fig. 2.

One of the cultural innovations which characterizes the late pre-Islamic era is the appearance of iron in large quantities for the first time in the archaeological record of south-eastern Arabia. Alongside utilitarian items such as nails, long swords and arrowheads (Mouton 1990) were used. Whether or not they were manufactured locally is another matter, but in addition to the existence of iron-bearing zones near Jebel Faiyah, Emalah and Buhais, south of Mleiha, the site itself has surface scatters of iron slag (Ploquin and Orzechowski 1994: pp 26ff) suggesting that secondary refining and casting were carried out there. Why iron was previously so rare is a mystery. Certainly the abundance of copper sources in the Hajar Mountains, and the ancient tradition of copper metallurgy may have been a factor contributing to a lack of interest in iron. It has also been suggested that the Seleucid political presence in the Gulf region acted as a catalyst by way of introducing new types of armour and weaponry, made of iron, to peoples previously accustomed to the use only of copper-bronze (Lombard 1989: p 37).

## The Al-Dur (Late Pre-Islamic C) Period (c. 0–200 AD)

By the first century AD we have reached a period for which considerably more literary documentation exists, albeit of a difficult nature to use. The Roman writer Pliny the Younger (23/24–79 AD) completed his *Natural History* in 77 AD and, to judge from his account of the peoples and places of south-eastern Arabia (*Nat. Hist.* VI.32. pp 149–152), combined with the second century AD testimony of Cl. Ptolemy’s map of Arabia (Fig. 17), the area of the UAE was full of settlements, tribes, and physical features, the names of which he recorded for posterity. Fixing the locations of these, and linking them with archaeological sites, has proven difficult, but it has been argued that ‘the town of Omana, which previous writers have made out to be a famous port of Carmania (Pliny, *Nat. Hist.* VI.32. pp 149) [Kerman province in Iran]’ may be identified with the large, nearly 4 km sq. settlement of al-Dur in Umm al-Qaiwain (Potts 1988, 1990b/II: pp 306ff; Groom 1994, 1995). The same site is, moreover, mentioned (§ 36) at about the same time in the anonymous *Periplus of the Erythraean Sea*, an important text which documents the maritime trade between Alexandria in Egypt and Barygaza in India. Certainly the archaeological remains of al-Dur leave us in no doubt that the site was the most important coastal settlement so far identified in the lower Gulf during the first centuries AD.



Fig. 17. South-eastern Arabia according to Cl. Ptolemy. After Groom 1994: 200.

Located opposite what is today a sheltered branch of the Umm al-Qaiwain lagoon, al-Dur extends for well over 1 km in a north-east/south-west direction, and is in places up to 1 km wide. Within this vast area is a dispersed collection of private houses, graves, a fort, and a temple, along with extensive sherd scatters without associated standing architecture which probably represents areas of former 'arish (*barasti*) habitation. Originally investigated in the early 1970s by an Iraqi expedition, al-Dur was the object of a collaborative expedition from four European universities between 1987 and 1994 (Boucharlat et al. 1988, 1989; Haerinck 1991b, 1992, 1993, 1994a, 1994d; Haerinck et al. 1992, 1993; Haerinck 1996b).

Most of the architecture at the site is built of beach rock (Ar. *farush*), a calcareous concretion which forms offshore in shallow tidal areas and can be easily broken into slabs for use as building material. Large houses, some with numerous rooms and round corner towers, have been excavated as well as small, one-room dwellings. The use of alabaster for windowpanes is important and marks the earliest archaeological attestation of alabaster for this purpose in the Arabian Peninsula (Potts 1996). Graves may be either simple subterranean cists for individual inhumations, or large, semi-subterranean collective tombs consisting of a subterranean chamber reached via a stairway from the surface, surmounted by a barrel vault. In general terms the more elaborate graves resemble Parthian tombs at Assur in northern Mesopotamia.

The ceramics from the site are dominated by glazed wares, almost certainly of Parthian manufacture and imported either from southern Mesopotamia or south-western Iran. Fine black-on-orange painted 'Namord' ware (Fig. 18), imported from south-eastern Iran or Baluchistan, indicates contacts across the Straits of Hormuz (Potts 1998b; cf. Wiesehöfer 1998), while rare sherds of Indian Red Polished Ware point to ties with the Indian subcontinent. As the *Periplus* indicates, during the mid-first century AD Omana was the most important port in the lower Gulf, and was twinned with the port of Apologos at the head of the Gulf, a site perhaps located somewhere near modern Basra and one of the main maritime outlets for the kingdom of Characene (Potts 1988, 1997b). While traffic down the Red Sea and across the Indian Ocean provided one means for the Roman acquisition of exotica from India and the east, overland caravan traffic between Palmyra in Syria and the cities of Vologesias, Seleucia and Spasinou Charax in Iraq, followed by seaborne travel down the 'Characene corridor' to Omana and on to India provided an alternative route (Potts 1997b). The latter mechanism may well have been responsible for the diffusion of quantities of Roman glass to al-Dur (Fig. 19), most of which dates to the first century AD (Whitehouse 1998, 2000); at least one western Roman amphora (Papadopoulos 1994); and a handful of Characene coins dating to the reigns of Attambelos II (44/45 AD), Attambelos IV (58/59 AD) and Attambelos VI (104/105 AD) (Potts 1988: pp 141–142). The single Roman coin from al-Dur, an undated PONTIF MAXIM issue of Tiberius (Howgego and Potts 1992) may have reached the site in the same manner.

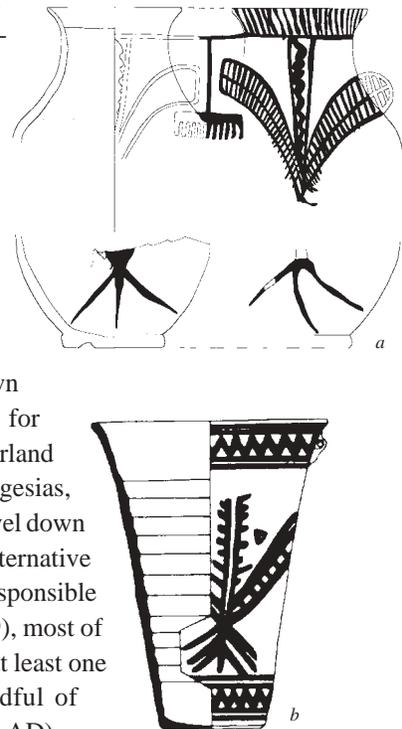


Fig. 18. Examples of early (a) and late (b) Namord ware from al-Dur. After Potts 1998b.

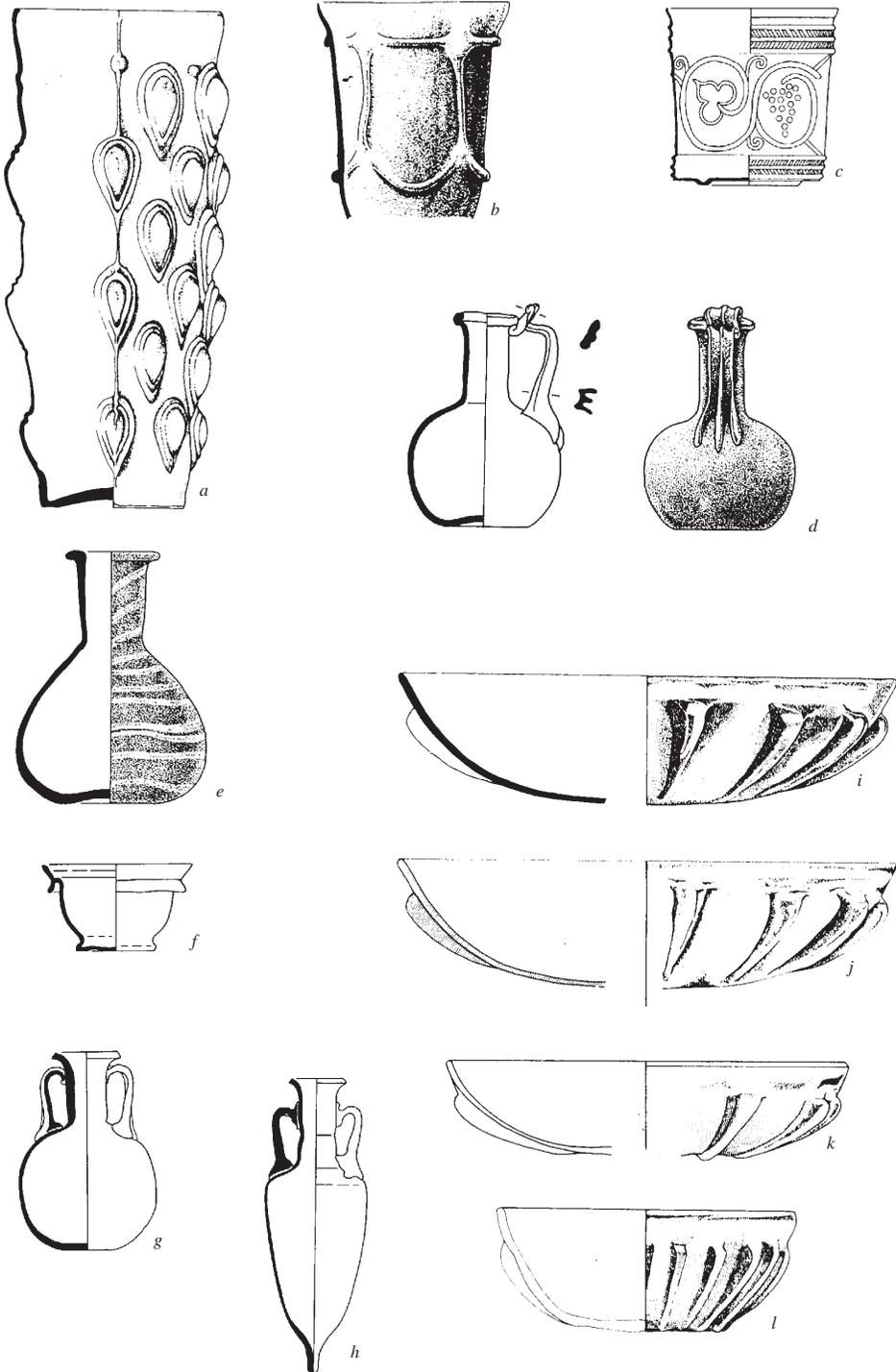


Fig. 19. A selection of Roman glass from al-Dur. After Potts 1997c.

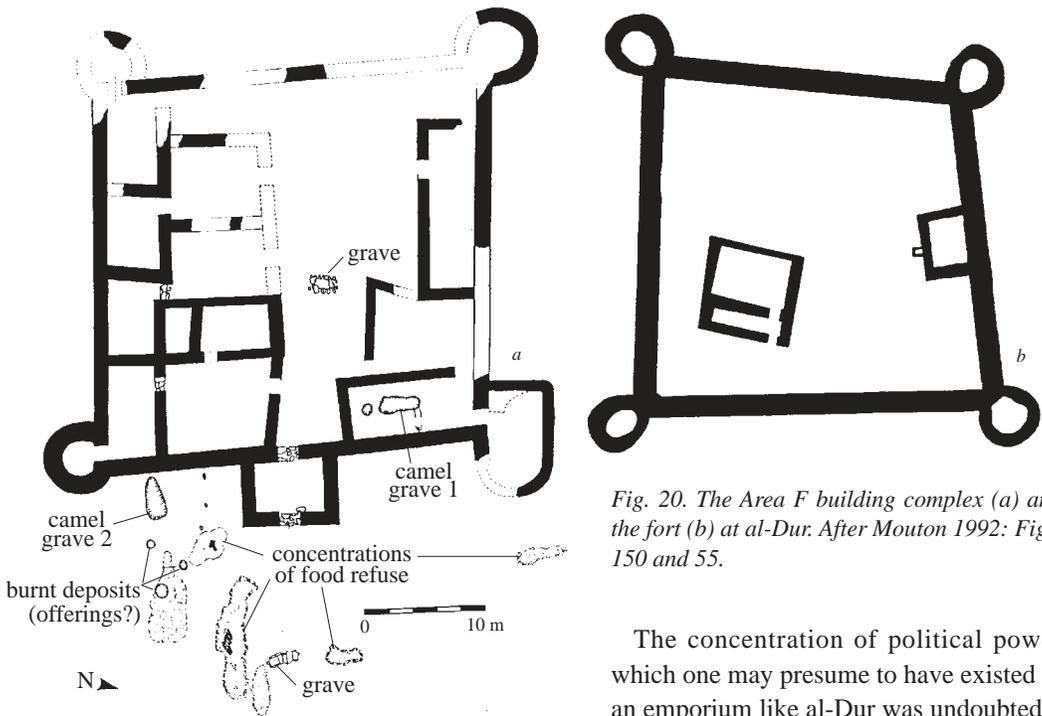


Fig. 20. The Area F building complex (a) and the fort (b) at al-Dur. After Mouton 1992: Figs. 150 and 55.

The concentration of political power which one may presume to have existed in an emporium like al-Dur was undoubtedly centred on the fort (Fig. 20) excavated in 1973 by the Iraqi expedition. Measuring roughly 20 m on a side, and with four circular corner towers each 4 m in diameter, the fort is built of beach rock and shows affinities to contemporary Parthian fortifications in Mesopotamia. South of the fort is an important temple (Haerink, Vrydaghs and Doutrelepon 1998), excavated by the Belgian expedition, which was a simple, one-room, square structure, roughly 8 m on a side, of beach rock faced with finely worked gypsum plaster imitating ashlar masonry. An incense burner from the temple, inscribed in Aramaic with the name Shams, suggests that this was a shrine dedicated to the pan-Semitic solar deity.

While al-Dur was the prime settlement of this period on the Gulf coast, other minor sites have been identified on the islands of Abu Dhabi as well (Hellyer and King 1999; King and

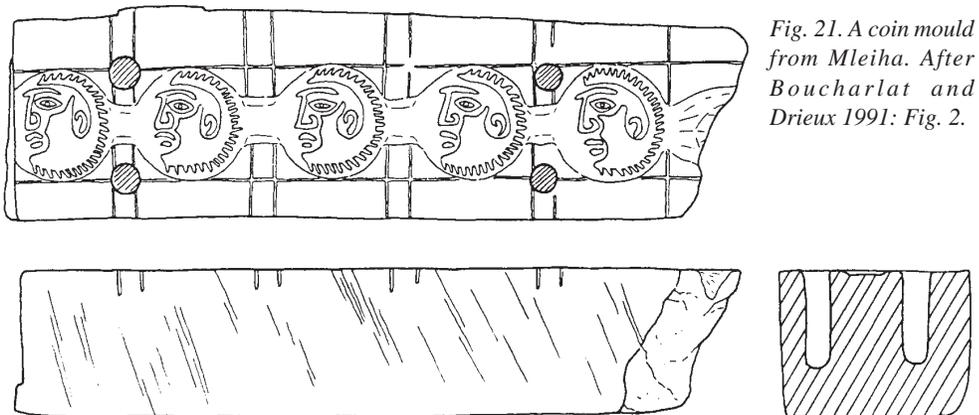


Fig. 21. A coin mould from Mleiha. After Boucharlat and Drieux 1991: Fig. 2.

Tonghini 1998). In the interior, Mleiha was certainly the leading centre, apart from which only a few graves have been identified (de Cardi 1996; Petrie 2000). Mleiha has produced remarkable evidence dating to this period of a cemetery in which both horses and camels were buried. In addition, one of the most important discoveries made in recent excavations at the site was a square fort with square corner towers in Area CW, the main outer wall of which was 55 m long, attributable to Mleiha IIIB (0–200 AD) (Benoist et al. 1994: p 12). Associated with the fort, moreover, was a stone mould (Fig. 21) for the production of coins (Boucharlat and Drieux 1991), and as the right to strike coinage was generally a royal prerogative in the ancient world, it is likely that the Mleiha fort represents the power centre of the polity centred on the site. The coins minted at Mleiha – hundreds of which have been discovered at both al-Dur and Mleiha (Potts 1991b, 1994d; Haerincq 1994c; Grave et al. 1996a; Haerincq 1996a, 1998a, 1998b, 1998e, 1999) – were modelled on the coinage of Alexander. They show a debased head of Heracles wearing the pelt of the Nemean lion on the obverse, and a seated figure, based on that of Zeus, on the reverse. Whereas the original Greek models had the name ALEXANDER clearly written in Greek on the reverse, the Mleiha/al-Dur coins (Figs. 22–23) bear a legend in angular, lapidary-style Aramaic which can be read as ‘Abi’el, son/daughter of *bglm/tmyln/tmlyl/tym..*’ (Potts 1994d: p 43). However the patronymic should be read (Maraqten 1996), the name Abi’el is always clear, and as this must be the monarch who originally minted coins of this type, we can safely conclude that Abi’el was an important ruler in the wider region during the late pre-Islamic era.

The situation is complicated, however, by the fact that variant, prototypical issues with the name Abi’el have been found in a hoard in Bahrain datable to the second century BC. Thus, the later Mleiha issues from the first century AD may have repeated the name of an important political figure in the region long after that individual had died, just as the many Asiatic issues which were based on those of Alexander repeated the name of the Macedonian king over and over again, even centuries after his lifetime. Until this issue can be resolved it is wisest not to assume that the fort at Mleiha represents the stronghold of the eponymous Abi’el. That Aramaic was the language of the populations of Mleiha and al-Dur at this time is, however, confirmed not only by its use on coinage, but also by the discovery of other inscribed objects, such as a unique bronze plaque from Mleiha (Teixidor 1992) and several short lapidary inscriptions at al-Dur (Haerincq et al. 1991: p 36).



Fig. 22. A silver tetradrachm of Abi’el (Class S2) from Mleiha; weight 14.68 g., diameter 2.70 cm. After Potts 1994d: 45, no. 183.



Fig. 23. A silver tetradrachm of Abi’el (Class XLVI) from Mleiha; weight 16.02 g., diameter 2.20 cm. After Potts 1994d: 66, no. 338.

## The End of the Pre-Islamic Era (c. 240–635 AD)

Although the extent of the political influence of the Parthians in south-eastern Arabia has long been debated, there is little doubt that their Sasanian successors swiftly imposed their will on the inhabitants of the region shortly after coming to power. According to the *Karnamak-i Artachsher-i Papakan*, the ‘Book of Deeds’ recounting the exploits of Ardashir (224–240), founder of the Sasanian state, *mčvnyg’n* or natives of Mazun (the name given to Maka in Middle Iranian, Syriac, Armenian and Arabic sources; see de Blois 1989) fought against Ardashir early in his career. Later Arab sources, such as al-Dinawari (c. 895) and the anonymous *Nihayatu’l-irabfi ahbari’l-furs wa’l-’arab* (c. 1000–1050), contend that Ardashir campaigned in Oman. Certainly the great Ka’aba of Zoroaster inscription at Naqsh-e Rostam near Persepolis lists MZWN, i.e. Mazun, as the twenty-seventh land in the empire of Shapur I (240–270 AD), Ardashir’s son (Gignoux 1971: p 92–93; Potts 1990b/II: p 329; Huysse 1999/I: p 24).

Archaeologically, however, there is little concrete evidence of a Sasanian presence in the UAE. The few coins recovered on the Gulf coast include a pair of badly preserved bronzes of Ardashir and Shapur II (309–379) from Ghallah, an island in the lagoon of Umm al-Qaiwain, as well as a silver coin of the latter king from Tell Abraç (Potts and Cribb 1995: pp 129–130). In Fujairah, a small hoard of 18 silver coins was discovered which included issues of two late Sasanian monarchs, Hormizd IV (579–590) and Khusrau II (590–628) (Hellyer 1995).

The absence of Sasanian material should not be interpreted as a sign that there was no settlement in the region at this time. The latest occupation at Tell Abraç can be dated to this period by the Shapur II coin found in 1993 in a context close to the surface (Potts and Cribb 1995: p 130). Area F at al-Dur, a large, multi-roomed house with corner towers, represents the most extensively excavated complex of this date found so far (Lecomte 1993). It is well-dated by the numerous examples of Sasanian glass found there, all of which find close parallels at sites in Mesopotamia. Further up the coast, at Jazirat al-Hulayla, late pre-Islamic ceramics and structures have also been found (Kennet 1994: Figs. 9–11), while excavations at the substantial mound of Kush, near Shimal, demonstrate that settlements with occupation of Sasanian date do exist in the region (Kennet 1997, 1998). In the interior, several intrusive burials with iron weaponry (spear, sword, pike) dug into the prehistoric tombs at Jebel al-Emalah can be attributed to the very end of the pre-Islamic period. A fragmentary individual buried with an iron sword in Tomb I has produced a corrected radiocarbon date of 455–583 AD, while a fully articulated individual buried with an iron-tipped spear from Tomb III has been dated to 513–624 AD (Potts 1997c).

A third burial at Jebel al-Emalah with iron accoutrements was that of a camel in its own, oval grave ringed by stones. Camel burials are a phenomenon well-attested in the late pre-Islamic era throughout the Arabian Peninsula (Vogt 1994b), and elsewhere in the UAE they are known at both al-Dur (Lecomte 1993) and Mleiha (Mashkour 1997; Jasim 1999; Uerpmann 1999). Yet it would be wrong to suggest that the religious climate of the era was dominated either by Arab paganism (viz. camel burial) or Zoroastrianism (viz. Sasanian influence). Nestorian Christianity was a decidedly important component of the religious milieu at this time as well.

In 424 Yohannon, bishop of Mazun, attended an important synod at Markabta de Tayyae in Iraq, where the Nestorian church proclaimed its independence from Antioch (Potts 1990b/II: p 333). This is the first concrete evidence of Nestorian Christianity in south-eastern Arabia, although the *Vita Ionaë*, an account of the life of a monk named Jonah who lived in the time

of the *catholicus* Barb'ashmin (343–346), says that Jonah built a monastery 'on the borders of the black island', a locale which some Nestorian scholars have sought amongst the islands between Qatar and Oman. In this connection it is obvious to consider the islands off the coast of Abu Dhabi as a likely site for Jonah's monastery. The recent discovery on the island of Sir Bani Yas (Hellyer 1993a; King and Hellyer 1994; King 1997) of a monastery and/or church, complete with carved stucco ornamentation including several crosses (Fig. 24), is of enormous interest in this respect, as is the identification of another probable monastery on the island of Marawah (P. Hellyer, pers. comm.).

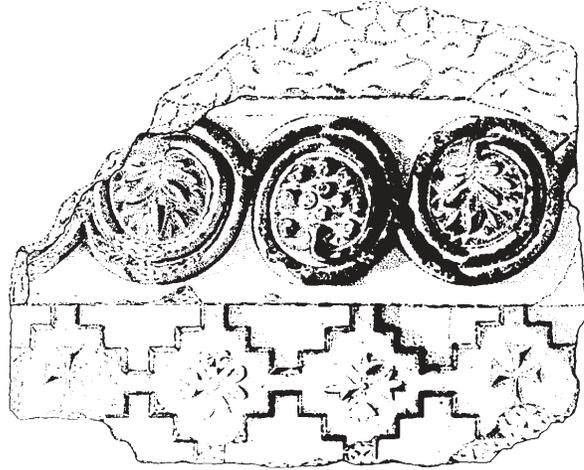


Fig. 24. A stucco fragment from a Nestorian building on Sir Bani Yas. After King and Hellyer 1994: 6.

The literary testimony of Nestorian Christianity in the region does not resume until 544, perhaps due to a temporary loss of control over the area by the Sasanians and their Lakhmid vassals at the hands of the Kinda of central Arabia (Potts 1990b/II: pp 334–335). Be that as it may, in 544 David, bishop of Mazun, attended the Nestorian synod of Mar Aba I, and in 576 Samuel attended the synod of Mar Ezechiel. Mazun is included in an important Armenian list of the provinces of the Sasanian empire compiled late in the Sasanian period, and it is certain that the region was under Sasanian control at the time of the Islamic conversion.

Two major towns of the period are mentioned in literary sources, Tuwwam and Dibba. Both towns were taxed by the Al Julanda, clients of the Sasanians who reported to the Persian *marzban* (military governor) at al-Rustaq in Oman (Potts 1990b/II: p 337). Tuwwam, although identifiable with the region of Al Ain/Buraimi (Wilkinson 1964: p 344), is invisible archaeologically, for no late pre-Islamic remains contemporary with the period of Sasanian governance have been unearthed there. Dibba, of course, is still the name of a major port and oasis settlement on the East Coast of the UAE which is today divided between Oman, Fujairah and Sharjah. Although the archaeology of Dibba in the late pre-Islamic era is known only from chance finds, the literary record is more ample.

In his *al-Muhabbar*, Ibn Habib called Dibba 'one of the two ports of the Arabs; merchants from Sind, India, China, people of the East and West came to it' (Shoufani 1972: 156). At this time Dibba paid a tithe to Al Julanda b. Al Mustakbir on the occasion of a fair held each year for five nights beginning on the first day of Rajab. The commercial importance of Dibba at this time explains why Jayfar, one of the Al Julanda addressed by the Prophet in a letter carried by Abu Zaid and 'Amr b. Al-'As in the year 630 (AH 8), sent a messenger to Dibba exhorting its inhabitants to convert to Islam (Ross 1874: pp 118–119). Just a few years later, however, Dibba became the base of Laqit b. Malik, the leader of the *al-Riddah* or apostasizing movement, and the crushing of that movement by the armies of the Caliph Abu Bakr (Shoufani 1972: p 8) created one of the largest and most important historical sites in the UAE, a vast cemetery said to contain upwards of 10,000 slain rebels (Potts 1990b/II: p 345) on the outskirts of Dibba.

Christianity in Mazun certainly survived some decades after the Muslim conversion, for Stephen, bishop of Mazun, attended a synod in Mesopotamia in 676. The apostasy of the Christian community, however, was rife in this period, a fact amply documented by a series of letters sent by the Nestorian catholicos Isho'yahb III to Simeon of Rev-Ardashir in Iran, complaining about the conversions of 'your people in Mazun' (Potts 1990b/II: p 346). The subsequent absence of any more bishops from Mazun at the synods of the Nestorian church is an indication that Christianity probably did not survive in south-eastern Arabia much beyond the seventh century.

## Conclusion

It is scarcely possible to draw a simple conclusion from the rich archaeological and historical record of the pre-Islamic past of the UAE, but several observations suggest themselves nonetheless. Quite clearly, archaeological research during the past decade has proceeded at a pace scarcely imaginable even 20 years ago, and there has been a veritable explosion of knowledge as the bibliography appended here attests. Archaeological museums have appeared all over the country which display the impressive finds of numerous excavations. The modern inhabitants of the UAE have an archaeological and historical past which should make them the envy of many of their neighbours, and dispel once and for all the notion that this region was peripheral in antiquity. Had it been peripheral, why would a series of Old Akkadian, Achaemenid, or Sasanian emperors have expended so much energy on campaigning in the area? The lack of a local written record comparable to the cuneiform archives of Mesopotamia or the hieroglyphs of Egypt must never blind us to the fact that, in antiquity, the region of the UAE was a strategic, well-resourced, important part of the cultural mosaic of ancient Western Asia. With the continued goodwill of the rulers of the seven emirates, it is to be hoped that archaeological research in the UAE continues to make advances at the pace set by a committed body of scholars from a variety of nations during the past 20 years. Let us hope, also, that their ranks are swelled by the addition of more indigenous scholars from the UAE itself.

## Bibliography

### Abbreviations

<i>AAE</i>	<i>Arabian Archaeology &amp; Epigraphy</i>
<i>Abiel II</i>	C.S. Phillips, D.T. Potts and S. Searight (eds), <i>Arabia and its neighbours: Essays on prehistorical and historical developments</i> , Turnhout, Brepols [=Abiel II: New research on the Arabian peninsula] (1998).
<i>AUAE</i>	<i>Archaeology in the United Arab Emirates</i>
<i>PSAS</i>	<i>Proceedings of the Seminar for Arabian Studies</i>

Alt, K.W., Vach, W., Frifelt, K. and Kunter, M. 'Familienanalyse in kupferzeitlichen Kollektivgräbern aus Umm al-Nar; Abu Dhabi', *AAE*, 6 (1995) pp 65–80.

Al Tikriti, W.Y. 'The archaeological investigations on Ghanadha island 1982–1984: Further evidence for the coastal Umm al-Nar culture', *AUAE*, 4 (1985) pp 9–19.

Al Tikriti, W.Y. 'The excavations at Bidiyah, Fujairah: the 3rd and 2nd millennia BC culture', *AUAE*, 5 (1989) pp 101–114.

- Amiet, P. 'A cylinder seal impression found at Umm an-Nar', *East and West*, 25 (1975) pp 425–426.
- Amiet, P. 'Quelques témoins des contacts de Suse avec les pays du Levant au IIIe et IIe millénaires', in J.-M. Durand and J.-R. Kupper (eds), *Miscellanea Babylonica: Mélanges offerts à Maurice Birot*, Paris, Editions Recherche sur les Civilisations (1985) pp 9–12.
- Aspinall, S. 'New ostrich shell finds', *Tribulus* 8/2 (1998) p 28.
- 'At Tell Abraç – the earliest recorded find of polio', *The University of Sydney – Research*, Sydney, External Relations Division (1994) p 20.
- Beech, M. 'Preliminary report on the faunal remains from an 'Ubaid-related settlement on Dalma Island, Abu Dhabi Emirate, United Arab Emirates', in M. Mashkour, A.M. Choyke, H. Buitenhuis and F. Poplin (eds), *Archaeozoology of the Near East IV*, Vol.B, Groningen, ARC Publicatie 32, (2000) pp 67–78.
- Beech, M. and Elders, J. 'An Ubaid-related settlement on Dalma Island, Abu Dhabi Emirate, United Arab Emirates', *Bulletin of the Society for Arabian Studies*, 4 (1999), pp 17–21.
- Beech, M. and Shepherd, E. 'Archaeobotanical evidence for early date consumption on Dalma Island, United Arab Emirates', *Antiquity*, in press.
- Benoist, A., Cordoba, J. and Mouton, M. 'The Iron Age in al-Madam (Sharjah, UAE): Some notes on three seasons of work', *PSAS*, 27 (1997) pp 59–73.
- Benoist, A., Mokaddem, K. and Mouton, M. 'Excavations at Mleiha site: The 1993 and 1994 seasons', in Mouton, M. (ed), *Archaeological Surveys and Excavations in the Sharjah Emirate, 1993 and 1994: A Seventh Interim Report*, Lyon, Maison de l'Orient (1994) pp 11–19.
- Benton, J.N. *Excavations at al-Sufouh: A third millennium site in the Emirate of Dubai, United Arab Emirates*, Turnhout, *Abiel* 1 (1996).
- Benton, J.N. and Potts, D.T. *Jebel al-Emalah 1993/4*, Sydney, unpubl.
- Blackman, M.J., Méry, S. and Wright, R.P. 'Production and exchange of ceramics on the Oman peninsula from the perspective of Hili', *Journal of Field Archaeology*, 16 (1989) pp 61–77.
- Blau, S. 'Attempting to identify activities in the past: Preliminary investigations of the third millennium BC population at Tell Abraç', *AAE*, 7 (1996) pp 143–176.
- Blau, S. *Finally the skeleton: An analysis of archaeological human skeletal remains from the United Arab Emirates*, Univ. of Sydney, unpubl. Ph.D. thesis (1998).
- Blau, S. 'The people at Sharm: An analysis of the archaeological human skeletal remains', *AAE*, 10 (1999) pp 190–204.
- Blau, S. and Beech, M. 'One woman and her dog: An Umm an-Nar example from the United Arab Emirates', *AAE*, 10 (1999) pp 34–42.
- Boucharlat, R. 'Entre la Méditerranée et l'Inde: Établissements du Golfe Persique à l'époque Gréco-Romaine', *Bulletin de la Société Française d'Archéologie Classique*, 21 (1987–1988) pp 214–220.
- Boucharlat, R. 'Documents arabes provenant des sites "hellénistiques" de la péninsule d'Oman', in T. Fahd (ed), *L'Arabie préislamique et son environnement historique et culturel*, Leiden, Univ. des sciences humaines de Strasbourg, Travaux du Centre de Recherche sur le Proche-Orient et la Grèce antique 10, (1989) pp 109–126.
- Boucharlat, R. 'Note on an Iron Age hill settlement in the Jebel Buhais', in Boucharlat, R. (ed), *Archaeological Surveys and Excavations in the Sharjah Emirate, 1990 and 1992: A Sixth Interim Report*, Lyon, Maison de l'Orient (1992) p 19.
- Boucharlat, R., Dalongeville, R., Hesse, A., and Millet, M. 'Occupation humaine et environnement au 5e et au 4e millénaire sur la côte Sharjah-Umm al-Qaiwain (U.A.E.)', *AAE*, 2 (1991a) pp 93–106.
- Boucharlat, R. and Drieux, M. 'A note on coins and a coin mold from Mleiha, Emirate of Sharjah, U.A.E.', in Potts, D.T. *The Pre-Islamic Coinage of Eastern Arabia*, Copenhagen, Carsten Niebuhr Institute Publications 14, (1991b) pp 110–117.
- Boucharlat, R., Haerincq, E., Lecomte, O., Potts, D.T., and Stevens, K.G. 'The European archaeological expedition to ed-Dur, Umm al-Qaiwayn (U.A.E.): An interim report on the 1987 and 1988 seasons', *Mesopotamia*, 24 (1989) pp 5–72.
- Boucharlat, R., Haerincq, E., Phillips, C.S. and Potts, D.T. 'Archaeological reconnaissance at ed-Dur, Umm al-Qaiwain, U.A.E.', *Akkadica*, 58 (1988) pp 1–26.
- Boucharlat, R., Haerincq, E., Phillips, C.S. and Potts, D.T. 'Note on an Ubaid-pottery site in the Emirate of Umm al-Qaiwain', *AAE*, 2 (1991b) pp 65–71.
- Boucharlat, R. and Lombard, P. 'The oasis of Al Ain in the Iron Age: Excavations at Rumeilah 1981–1983, Survey at Hili 14', *AUAE*, 4 (1985) pp 44–73.
- Boucharlat, R. and Mouton, M. 'Cultural change in the Oman peninsula during the late 1st millennium BC as seen from Mleiha, Sharjah Emirate (U.A.E.)', *PSAS*, 21 (1991) pp 23–33.
- Boucharlat, R. and Mouton, M. 'Importations occidentales et influence de l'hellénisme dans la péninsule d'Oman', in A. Invernizzi and J.-F. Salles (eds), *Arabia Antiqua: Hellenistic centres around Arabia*, Rome, Serie Orientale Roma LXX.2 (1993) pp 275–289.
- Boucharlat, R. and Mouton, M. 'Les pratiques funéraires dans la péninsule d'Oman: Répartition et mode de construction des tombes de Mleiha (E.A.U.)', *Abiel II* (1998) pp 15–32.
- Calley, S. and Santoni, M.-A. 'Sounding at the prehistoric site al-Qassimiya', in R. Boucharlat (ed), *Archaeological Surveys and Excavations in the Sharjah Emirate, 1986: A Third Preliminary Report*, Lyon, Maison de l'Orient, (1986) pp 13–15.
- Carter, R. 'The Wadi Suq period in south-east Arabia: A reappraisal in the light of excavations at Kalba, UAE', *PSAS*, 27 (1997) pp 87–98.

- Cauvin, M.-C. and Calley, S. 'Preliminary report on lithic material' in R. Boucharlat (ed), *Survey in Sharjah Emirate, U.A.E. on behalf of the Department of Culture, Sharjah: First Report (1984)*, Lyon, Maison de l'Orient, (1984) pp 17–20.
- Ceuninck, G. de. 'Les pétroglyphes du Fujairah, Emirats Arabes Unis', *Abiel II* (1998) pp 33–46.
- Charpentier, V. 'Entre sables du Rub' al Khali et mer d'Arabie, préhistoire récente du Dhofar et d'Oman: Les industries à pointes de "Fasad"', *PSAS*, 26 (1996) pp 1–12.
- Cleuziou, S. 'Excavations at Hili 8: a preliminary report on the 4th to 7th campaigns', *AUAE*, 5 (1989) pp 61–88.
- Cleuziou, S. 'The emergence of oases and towns in eastern and southern Arabia', in Afanas'ev, G.E., Cleuziou, S., Lukacs, J.R. and Tosi, M. (eds), *The prehistory of Asia and Oceania*, Forli, ABACO Edizioni (1996) pp 159–165.
- Cleuziou, S. 'The Oman peninsula and the Indus civilization: A reassessment', *Man and Environment*, 17/2 (1992) pp 93–103.
- Cleuziou, S. and Costantini, L. 'Premiers éléments sur l'agriculture protohistorique de l'Arabie orientale', *Paléorient*, 6 (1980) pp 245–251.
- Cleuziou, S., Pottier, M.-H. and Salles, J.-F. 'French archaeological mission, 1st campaign, December 1976/February 1977', *AUAE*, 1 (1978) pp 8–53.
- Cleuziou, S. and Vogt, B. 'Tomb A at Hili North (United Arab Emirates) and its material connections to southeast Iran and the Greater Indus Valley', in J. Schotsmans and M. Taddei (eds), *South Asian Archaeology 1983*, Naples, Istituto Universitario Orientale, Dipartimento di Studi Asiatici, Series Minor XXIII, (1985) pp 249–277.
- Copeland, L. and Bergne, P. 'Flint artifacts from the Buraimi area, Eastern Arabia, and their relations with the Near Eastern post-Paleolithic', *PSAS*, 6 (1976) pp 40–61.
- Corboud, P. 'Compte-rendu de la campagne 1989 du Survey Archéologique du Fujairah (U.A.E.)', *The Arabian Gulf Gazetteer*, 1 (1990) pp 18–19.
- Corboud, P., Castella, A.-C., Hapka, R. and im Obersteg, P. *Les tombes protohistoriques de Bithnah (Fujairah, Émirats Arabes Unis)*, Mainz, Terra Archaeologica 1 (1996).
- Coubray, S. 'Preliminary remarks about the 1988 paleobotanical sampling in the Sharjah Emirate', in R. Boucharlat (ed), *Archaeological Surveys and Excavations in the Sharjah Emirate, 1988: A Fourth Preliminary Report*, Lyon, Maison de l'Orient, (1988) pp 74–75.
- Crombé, P. 'A neolithic site at Bida al-Mitawaa in Western Abu Dhabi (U.A.E.)', *AAE*, 11 (2000) pp 9–14.
- David, H. 'Les vases en chloritite dans la péninsule d'Oman: Une étude pétrographique appliquée à l'archéologie', *Comptes-Rendus de l'Académie de Science, Série II*, 311 (1990) pp 951–958.
- David, H. 'Styles and evolution: Soft stone vessels during the Bronze Age in the Oman Peninsula', *PSAS*, 26 (1996) pp 31–46.
- Davis, K. 'A preliminary study of the ground stone tools from Muwailah, Sharjah Emirate, United Arab Emirates', *AAE*, 9 (1998) pp 209–235.
- Davis, K. 'Optical microscopic analysis of some decorated discs from Sharm, Fujairah', *AAE*, 10 (1999a) pp 213–215.
- Davis, K. 'Preliminary analysis of starch residues on ground stone tools from Mleiha', in M. Mouton, *Mleiha I: Environnement, stratégies de subsistance et artisanats*: Lyon, Travaux de la Maison de l'Orient 29 (1999b) pp 89–96.
- de Blois, F. 'Maka and Mazun', *Studia Iranica*, 18 (1989) pp 157–167.
- de Cardi, B. 'A late pre-Islamic burial at al-Khatt, U.A.E.', *AAE*, 7 (1996) pp 82–87.
- de Cardi, B. 'Further archaeological survey in Ra's al-Khaimah, U.A.E., 1977', *Oriens Antiquus*, 24 (1985) pp 163–240.
- de Cardi, B. 'The grave goods from Shimal tomb 6 in Ra's al-Khaimah, U.A.E.', in D.T. Potts (ed) *Araby the Blest*, Copenhagen, Carsten Niebuhr Institute Publications 7, (1988) pp 45–72.
- de Cardi, B. 'Third-Millennium and later pottery from Abu Dhabi Airport', *AAE*, 8 (1997) pp 161–173.
- de Cardi, B., Kennet, D. and Stocks, R.L. 'Five thousand years of settlement at Khatt, UAE', *PSAS*, 24 (1994) pp 35–80.
- Desse, J. 'Archéo-ichthyologie du Golfe arabique et de l'Océan indien', in H. Buitenhuis and H.-P. Uerpmann (eds), *Archaeozoology of the Near East*, II, Leiden, Backhuys Publishers (1995) pp 72–78.
- Flavin, K. and Shepherd, 'Fishing in the Gulf: Preliminary investigations at an Ubaid site, Dalma (UAE)', *PSAS*, 24 (1994) pp 115–134.
- Frifelt, K. 'Jamdat Nasr fund fra Oman (Jamdat Nasr graves in the Oman)', *Kuml* (1971) pp 355–383.
- Frifelt, K. 'On prehistoric settlement and chronology of the Oman peninsula', *East and West*, 25 (1975) pp 359–424.
- Frifelt, K. "'Jemdet Nasr graves" on the Oman peninsula', in B. Alster (ed), *Death in Mesopotamia*, Copenhagen, Akademisk Forlag, (1980) pp 273–279.
- Frifelt, K. 'A third millennium kiln from the Oman peninsula', *AAE*, 1 (1990) pp 4–15.
- Frifelt, K. *The Island of Umm al-Nar, Vol. 1, Third Millennium Graves*, Aarhus, Jutland Archaeological Society Publications 26/1, (1991).
- Frifelt, K. *The Island of Umm al-Nar, Vol. 2, The Third Millennium Settlement*, Aarhus, Jutland Archaeological Society Publications 26/2, (1995).
- Gautier, A. 'Preliminary report on the fauna of Mleiha', in R. Boucharlat (ed), *Archaeological Surveys and Excavations in the Sharjah Emirate, 1990 and 1992: A Sixth Interim Report*, Lyon, Maison de l'Orient (1992) pp 56–57.
- Gautier, A. and Van Neer, W. 'Étude générale des restes vertébrés de Mleiha', in M. Mouton, *Mleiha I: Environnement, stratégies de subsistance et artisanats*: Lyon, Travaux de la Maison de l'Orient 29 (1999) pp 107–120.
- Gebel, H.-G. *Südosarabien. Prähistorische Besiedlung/Southeast Arabia. Prehistoric Settlements*, Wiesbaden, Tübinger Atlas des Vorderen Orients B I 8.3 (1988).

- Gebel, H.-G., Hanns, C., Liebau A. and Raehle, W. 'The late Quaternary environments of 'Ain al-Faidha/AI-' Ain, Abu Dhabi Emirate', *AUAE*, 5 (1989) pp 9–48.
- Gignoux, P. 'La liste des provinces de l'Eran dans les inscriptions de Sabuhr et de Kirdir', *Acta Antiqua*, 19 (1971), pp 83–94.
- Glennie, K.W., Pugh, J.M., and Goodall, T.M. 'Late Quaternary Arabian desert models of Permian Rotliegend reservoirs', *Exploration Bulletin*, 274 (1994/3) pp 1–19.
- Glover, E. 'Mangroves, molluscs and man: Archaeological evidence for biogeographical changes in mangrove around the Arabian peninsula', *Abiel II* (1998) 63–78.
- Glover, E. 'The molluscan fauna from Shimal, Ra's al-Khaimah, United Arab Emirates', in K. Schippmann, A. Herling and J.-F. Salles (eds), *Golf-Archäologie: Mesopotamien, Iran, Kuwait, Bahrain, Vereinigte Arabische Emirate und Oman*, Buch am Erlbach, Internationale Archäologie 6 (1991) pp 205–220.
- Glover, E., Glover, I. and Vita-Finzi, C. 'First-order <sup>14</sup>C dating of marine molluscs in archaeology', *Antiquity*, 64 (1990) pp 562–567.
- Görsdorf, J. and Vogt, B. 'Asimah: Neue 14C-Datierungen zum späten 3. vorchristlichen Jahrtausend auf der Halbinsel Oman', *AAE*, in press.
- Gouin, P. 'Râpes, jarres et faisselles: la production et l'exportation des produits laitiers dans l'Indus du 3e millénaire', *Paléorient*, 16/2 (1990) pp 37–54.
- Grave, P., Bird, R. and Potts, D.T. 'A trial PIXE/PIGME analysis of Pre-Islamic Arabian coinage', *AAE*, 7 (1996a) p 75–81.
- Grave, P., Potts, D.T., Yassi, N., Reade, W., and Bailey, G. 'Elemental characterisation of Barbar ceramics from Tell Abraq', *AAE*, 7 (1996b) pp 177–187.
- Groom, N. 'Oman and the Emirates in Ptolemy's map', *AAE*, 5 (1994) pp 198–214.
- Groom, N. 'The *Periplus*, Pliny and Arabia', *AAE*, 6 (1995) pp 180–195.
- Grupe, G. and Schutkowski, H. 'Dietary shift during the 2nd millennium BC in prehistoric Shimal, Oman peninsula', *Paléorient*, 15 (1989) pp 77–84.
- Haerincq, E. 'The rectangular Umm al-Nar-period grave at Mowaihat (Emirate of Ajman, United Arab Emirates)', *Genese bidragen tot de kunstgeschiedenis en oudheidkunde*, 29 (1990–91) pp 1–30.
- Haerincq, E. 'Heading for the Straits of Hormuz, an 'Ubaid site in the Emirate of Ajman (U.A.E.)', *Arabian Archaeology and Epigraphy*, 2 (1991a) pp 84–90.
- Haerincq, E. 'Excavations at ed-Dur (Umm al-Qaiwain, U.A.E.) – Preliminary report on the second Belgian season (1988)', *AAE*, 2 (1991b) pp 31–60.
- Haerincq, E. 'Excavations at ed-Dur (Umm al-Qaiwain, U.A.E.) – Preliminary report on the fourth Belgian season (1988)', *AAE*, 3 (1992) pp 190–208.
- Haerincq, E. 'Excavations at ed-Dur (Umm al-Qaiwain, U.A.E.) – Preliminary report on the fifth Belgian season (1991)', *AAE*, 4 (1993) pp 210–225.
- Haerincq, E. 'Excavations at ed-Dur (Umm al-Qaiwain, U.A.E.) – Preliminary report on the sixth Belgian season (1992)', *AAE*, 5 (1994a) pp 184–197.
- Haerincq, E. 'More prehistoric finds from the United Arab Emirates', *AAE*, 5 (1994b) pp 153–147.
- Haerincq, E. 'Héraclès dans l'iconographie des monnaies arabes pré-islamiques d'Arabie du Sud-est?', *Akkadica*, 89–90 (1994c) pp 9–13.
- Haerincq, E. 'Un service à boire décoré: A propos d'iconographie arabe préislamique', in H. Gasche, M. Tanret, C. Janssen and A. Degraeve (eds), *Cinquante-deux réflexions sur le Proche-Orient Ancien offertes en hommage à Leon de Meyer*, Louvain, Peeters, (1994d) pp 401–426.
- Haerincq, E. 'Quelques monnaies pré-islamiques à monogramme provenant d'Arabie du sud-est', in H. Gasche and B. Hrouda (eds), *Collectanea Orientalia: Histoire, arts de l'espace et industrie de la terre, Études offertes en hommage à Agnès Spycket*, Neuchâtel-Paris, Civilisations du Proche-Orient Série I. Archéologie et Environnement, 3 (1996a) pp 113–117.
- Haerincq, E. 'The seventh and eighth Belgian archaeological expeditions to ed-Dur (Umm al-Qaiwain, UAE)', *AAE*, 7 (1996b) 69–74.
- Haerincq, E. 'The shifting pattern of overland and seaborne trade in SE-Arabia: Foreign pre-Islamic coins from Mleiha (Emirate of Sharjah, U.A.E.)', *Akkadica*, 106 (1998a) pp 22–40.
- Haerincq, E. 'International contacts in the southern Persian Gulf in the late 1st century B.C./1st century A.D.: Numismatic evidence from ed-Dur (Emirate of Umm al-Qaiwain, U.A.E.)', *Iranica Antiqua*, 33 (1998b) 273–302.
- Haerincq, E. 'Petroglyphs at Sinadil in the Hajjar Mountains (southeast Arabia)', *Abiel II* (1998c) pp 79–88.
- Haerincq, E. 'South and (South)East Arabian silver Athenian owl imitations from Mleiha', *AAE*, 9 (1998d) pp 137–139.
- Haerincq, E. 'More pre-Islamic coins from southeastern Arabia', *AAE*, 9 (1998e) pp 278–301.
- Haerincq, E. 'Abi'el, the ruler of Southeastern Arabia', *AAE*, 10 (1999) pp 124–128.
- Haerincq, E., Metdepenninghen, C. and Stevens, K.G. 'Excavations at ed-Dur (Umm al-Qaiwain, U.A.E.) – Preliminary report on the second Belgian season (1988)', *AAE*, 2 (1991) pp 31–60.
- Haerincq, E., Metdepenninghen, C. and Stevens, K.G. 'Excavations at ed-Dur (Umm al-Qaiwain, U.A.E.) – Preliminary report on the third Belgian season (1989)', *AAE*, 3 (1992) pp 44–60.
- Haerincq, E., Phillips, C.S., Potts, D.T. and Stevens, K.G. 'Ed-Dur, Umm al-Qaiwain (U.A.E.)', in U. Finkbeiner (ed), *Materialien zur Archäologie der Seleukiden- und Partherzeit im südlichen Babylonien und im Golfgebiet*, Tübingen, Wasmuth, (1993) pp 183–193.
- Haerincq, E., Vrydaghs, L. and Doutrelepon, H. 'Des feux sacrificiels pour la divinité solaire à ed-Dur', *AAE*, 9 (1998) pp 125–130.

- Harris, A. 'A Late Stone Age site south of the Liwa Oasis', *Tribulus* 8/2 (1998) pp 24–27.
- Hartnell, T. and Barker, D. 'Decorated discs from Sharm', *AAE*, 10 (1999) pp 205–212.
- Häser, J. *Steingefäße des 2. vorchristlichen Jahrtausends im Gebiet des Arabischen/Persischen Golfes: Typologie der Gefäße und Deckel aus Serpentin, Chlorit, Steatit und verwandten Steinarten*, Berlin, Free University, unpubl. M.A. thesis (1988).
- Häser, J. 'Soft-stone vessels of the 2nd millennium BC in the Gulf region', *PSAS*, 20 (1990a) pp 43–54.
- Häser, J. 'Soft-stone vessels from Shimal and Dhayah (Ra's al-Khaimah, U.A.E.)', in F.M. Andraschko and W.-R. Teegen (eds), *Gedenkschrift für Jürgen Driehaus*, Mainz, Von Zabern, (1990b) pp 347–355.
- Hassan, M.A. and al-Sulaimi, J.S. 'Copper mineralization in the northern part of Oman Mountains near al-Fujairah, United Arab Emirates', *Economic Geology*, 74 (1979) pp 919–946.
- Hassell, J. 'Alabaster beehive-shaped vessels from the Arabian peninsula: Interpretations from a comparative study of characteristics, contexts and associated finds', *AAE*, 8 (1997) pp 245–281.
- Hellyer, P. 'New discoveries on Dalma and Sir Bani Yas', *Tribulus*, 3/2 (1993a) p 16.
- Hellyer, P. 'Iron Age Fort in Fujairah', *Tribulus*, 3/2 (1993b) p. 17.
- Hellyer, P. 'Safavid and Sassanian coins in Fujairah', *Tribulus*, 5/1 (1995) p 25.
- Hellyer, P. *Waves of time: The maritime history of the United Arab Emirates*, London, Trident (1998a).
- Hellyer, P. *Filling in the blanks: Recent archaeological discoveries in Abu Dhabi*, Abu Dhabi, ADNOC (1998b).
- Hellyer, P. *Hidden riches: An archaeological introduction to the United Arab Emirates*, Abu Dhabi, Union National Bank (1998c).
- Hellyer, P. and King, G.R.D. 'A site from the early first millennium AD at Ra's Bilyaryar, Abu Dhabi, U.A.E.', *AAE*, 10 (1999) pp 119–123.
- Hoch, E. 'Reflections on prehistoric life at Umm al-Nar (Trucial Oman) based on faunal remains from the third millennium BC.' in M. Taddei (ed), *South Asian Archaeology 1977*. Naples, Istituto Universitario Orientale Seminario di Studi Asiatici Series Minor 6 (1979) pp 589–638.
- Hoch, E. 'Animal bones from the Umm al-Nar settlement', in K. Frifelt, *The Island of Umm al-Nar Vol. 2. The Third Millennium Settlement*, Aarhus, Jutland Archaeological Society Publications 36/2 (1995) pp 249–256.
- Højgaard, K. 'Dentition on Umm al-Nar (Trucial Oman), 2500 BC', *Scandinavian Journal of Dental Research*, 88 (1980) pp 355–364.
- Højgaard, K. 'SEM (scanning electron microscope) examination of teeth from the third millennium BC excavated in Wadi Jizzi and Hafit', in J. Schotsmans and M. Taddei (eds), *South Asian Archaeology 1983*, Naples, Istituto Universitario Orientale, Dipartimento di Studi Asiatici, Series Minor XXIII, (1985) pp 151–156.
- Howgego, C. and Potts, D.T. 'Greek and Roman coins from eastern Arabia', *AAE*, 3 (1992) pp 183–189.
- Huth, M. 'The "folded flan" coinage of eastern Arabia: Some preliminary comments', *AAE*, 9 (1998) pp 273–277.
- Huth, M. and Qedar, S. 'A coin from North Arabia with an Aramaic inscription and related coins of the Incense Road', *The Numismatic Chronicle*, 159 (1999) pp 295–298.
- Huyse, P. *Die dreisprachige Inschrift Šabuhrs I. An der Ka 'ba-i Zardušt (ŠKZ)*, I, London, Corpus Inscriptionum Iranicarum III/i.
- Inizan, M.-L. and Tixier, J. 'Industrie lithique taillée de Hili 8', *AUAE*, 2–3 (1980) p 72.
- Jasim, S.A. 'An Ubaid site in the Emirate of Sharjah (U.A.E.)', *Arabian Archaeology and Epigraphy*, 7 (1996) pp 1–12.
- Jasim, S.A. 'The excavation of a camel cemetery at Mleiha, Sharjah, U.A.E.', *AAE*, 10 (1999) pp 69–101.
- Kästner, J.-M. 'Vorbericht über zwei untersuchte Kollektivgräber in Dhayah (Ra's al-Khaimah, U.A.E.)', in F.M. Andraschko and W.-R. Teegen (eds), *Gedenkschrift für Jürgen Driehaus*, Mainz, Von Zabern, (1990) pp 339–346.
- Kästner, J.-M. 'Some preliminary remarks concerning two recently excavated tombs in Dhayah/Ra's al-Khaimah', in K. Schippmann, A. Herling and J.-F. Salles (eds), *Golf-Archäologie: Mesopotamien, Iran, Kuwait, Bahrain, Vereinigte Arabische Emirate und Oman*, Buch am Erlbach, Internationale Archäologie 6 (1991) pp 233–244.
- Kennet, D. 'Jazirat al-Hulayla – early Julfar', *Journal of the Royal Asiatic Society*, 4 (1994) pp 163–212.
- Kennet, D. and Velde, C. 'Third and early second-millennium occupation at Nud Ziba, Khatt (U.A.E.)', *AAE*, 6 (1995) pp 81–99.
- Kennet, D. 'Kush: A Sasanian and Islamic-period archaeological tell in Ra's al-Khaimah (U.A.E.)', *AAE*, 8 (1997) pp 284–302.
- Kennet, D. 'Evidence for 4th/5th-century Sasanian occupation at Khatt, Ra's al-Khaimah', *Abiel II* (1998) pp 105–116.
- Kieswetter, H., Uerpmann, H.-P., and Jasim, S.A. 'Neolithic jewellery from Jebel al-Buhais 18', *PSAS*, 30 (2001), in press.
- King, G.R.D. 'A Nestorian monastic settlement on the island of Sir Bani Yas, Abu Dhabi: A preliminary report', *Bulletin of the School of Oriental and African Studies*, 60 (1997) pp 221–235.
- King, G.R.D. *Abu Dhabi Islands Archaeological Survey, Season 1*, London, Trident (1998).
- King, G.R.D. and Hellyer, P. 'A Pre-Islamic Christian site on Sir Bani Yas', *Tribulus*, 4/2 (1994) pp 5–7.
- King, G.R.D. and Tonghini, C. 'The western islands of Abu Dhabi Emirate: Notes on Ghagha', *Abiel II* (1998) pp 117–142.
- Lambeck, K. 'Shoreline reconstruction for the Persian Gulf since the last glacial maximum', *Earth and Planetary Science Letters*, 142 (1996) pp 43–57.
- Lancaster, W. and F. 'Tribe, community and the concept of access to resources: Territorial behaviour in southeast Ja'alan', in M.J. Asimov and A. Rao (eds), *Mobility and territoriality: Social and spatial boundaries among foragers, fishers, pastoralists and peripatetics*, Providence/Oxford, Berg Publishers (1992) pp 343–363.

- Lecomte, O. 'Ed-Dur, les occupations des 3e et 4e s. ap. J.-C.: Contexte des trouvailles et matériel diagnostique', in U. Finkbeiner (ed), *Materialien zur Archäologie der Seleukiden- und Partherzeit im südlichen Babylonien und im Golfgebiet*, Tübingen, Wasmuth (1993) pp 195–217.
- Littleton, J. and Fröhlich, B. 'Fish-eaters and farmers: Dental pathology in the Arabian Gulf', *American Journal of Physical Anthropology*, 92 (1993) pp 427–447.
- Lombard, P. *Aspects culturels de la péninsule d'Oman au début du 1e millénaire av. J.C.*, Paris, University of Paris 1, unpubl. M.A. thesis (1979).
- Lombard, P. 'Poignards en bronze de la péninsule d'Oman au I<sup>er</sup> millénaire: Un problème d'influences iraniennes de l'Âge du Fer', *Iranica Antiqua*, 16 (1981) pp 87–93.
- Lombard, P. *L'Arabie orientale à l'Âge du Fer*, Paris, Univ. of Paris 1, unpubl. PhD thesis (1985).
- Lombard, P. 'Âges du Fer sans fer: Le cas de la péninsule d'Oman au I<sup>er</sup> millénaire avant J.-C.', in T. Fahd (ed), *L'Arabie préislamique et son environnement historique et culturel*, Leiden, Travaux du Centre de Recherche sur le Proche-Orient et la Grèce Antiques de l'Université des Sciences Humaines de Strasbourg 10 (1989) pp 25–37.
- Lombard, P. 'Quand la tradition tue l'innovation: Réflexions sur la glyptique de l'Âge du Fer à Rumeilah (E.A.U.)', *Abiel II* (1998) 151–164.
- Magee, P. *Cultural change, variability and settlement in southeastern Arabia from 1400 to 250 BC: The view from Tell Abraq*, Sydney, The University of Sydney, unpubl. PhD thesis (1995).
- Magee, P. 'The Iranian Iron Age and the chronology of settlement in southeastern Arabia', *Iranica Antiqua*, 32 (1997) pp 91–108.
- Magee, P. 'Cultural interaction and social complexity in the southeast Arabian Iron Age', *Iranica Antiqua*, 33 (1998a) pp 135–142.
- Magee, P. 'The chronology and regional context of late prehistoric incised arrowheads in southeastern Arabia', *AAE*, 9 (1998b), pp 1–12.
- Magee, P. 'New evidence of the initial appearance of iron in southeastern Arabia', *AAE*, 9 (1998c) pp 112–127.
- Magee, P. 'Settlement patterns, politics and regional complexity in the southeast Arabian Iron Age', *Paléorient*, 24 (1999a), pp 49–60.
- Magee, P. 'Writing in the Iron Age: The earliest South Arabian inscription from southeastern Arabia', *AAE*, 10 (1999b) pp 43–50.
- Magee, P. 'Patterns of settlement in the Southeast Arabian Iron Age', *Adumatu*, 1 (2000) pp 29–39.
- Magee, P. and Carter, R. 'Agglomeration and regionalism: Southeastern Arabia between 1400 and 1100 BC. *AAE*, 10 (1999) pp 161–179.
- Magee, P., Grave, P., Al-Tikriti, W.Y., Barbetti, M., Yu, Z. and Bailey, G. 'New evidence for specialised ceramic production and exchange in the southeast Arabian Iron Age', *AAE*, 9 (1998) pp 236–245.
- Maraqten, M. 'Notes on the Aramaic script of some coins from East Arabia', *AAE*, 7 (1996) pp 304–315.
- Mashkour, M. 'The funeral rites at Mleiha (Sharja - U.A.E.); The camelid graves', *Anthropozoologica*, 25–26 (1997) pp 725–736.
- Mashkour, M. and Van Neer, W. 'Analyse des vestiges fauniques du fort et de la zone d'habitat de Mleiha (3e/4e siècle de notre ère), in M. Mouton, *Mleiha I: Environnement, stratégies de subsistance et artisanats*: Lyon, Travaux de la Maison de l'Orient 29 (1999) pp 121–144.
- Masia, K. 'Pigment shells from Sharm', *AAE*, 11 (2000) pp 22–23.
- McBrearty, S. 'Lithic artifacts from Abu Dhabi's Western Region', *Tribulus*, 3/1 (1993) pp 13–14.
- McBrearty, S. 'Earliest stone tools from the Emirate of Abu Dhabi, United Arab Emirates', in P.J. Whybrow and A. Hill (eds), *Fossil vertebrates of Arabia, with emphasis on the Late Miocene faunas, geology, and palaeoenvironments of the Emirate of Abu Dhabi, United Arab Emirates*: New Haven and London, Yale University Press (1999) pp 373–388.
- Méry, S. 'Origine et production des récipients de terre cuite dans la péninsule d'Oman à l'Âge du Bronze', *Paléorient*, 17 (1991) pp 51–78.
- Méry, S. 'La céramique, témoin de la dynamique culturelle en Arabie durant la Protohistoire', in *Terre cuite et société: La céramique, document technique, économique, culturel*, Juan-les-Pins, Editions APDCA (1994) pp 395–406.
- Méry, S. 'Ceramics and patterns of exchange across the Arabian Sea and the Persian Gulf in the Early Bronze Age', in Afanas'ev, G.E., Cleuziou, S., Lukacs, J.R. and Tosi, M. (eds), *The prehistory of Asia and Oceania*, Forlì, ABACO Edizioni (1996) pp 167–165–179.
- Méry, S. 'A funerary assemblage from the Umm al-Nar period: The ceramics from Tomb A at Hili North, UAE', *PSAS*, 27 (1997) pp 171–191.
- Méry, S., Phillips, C. and Calvet, Y. 'Dilmun pottery in Mesopotamia and Magan from the end of the 3rd and beginning of the 2nd millennium B.C.', *Abiel II* (1998) pp 165–180.
- Méry, S. and Schneider, G. 'Mesopotamian pottery wares in Eastern Arabia from the 5th to the 2nd millennium BC: A contribution of archaeometry to the economic history', *PSAS*, 26 (1996) pp 79–96.
- Millet, M. 'The lithic industry, 1988 report', in R. Boucharlat (ed), *Archaeological Surveys and Excavations in the Sharjah Emirate, 1988: A Fourth Preliminary Report*, Lyon, Maison de l'Orient (1988) pp 19–28.
- Millet, M. 'Archaeological soundings', in R. Boucharlat (ed), *Archaeological Surveys and Excavations in the Sharjah Emirate, 1989: A Fifth Preliminary Report*, Lyon, Maison de l'Orient (1989) pp 22–27.
- Millet, M. 'Comments on the lithic material from an 'Ubaid site in the Emirate of Ajman (U.A.E.)', *AAE*, 2 (1991) pp 91–92.

- Minzoni Déroche, A. 'The prehistoric periods: the artefacts', in R. Boucharlat (ed), *Second Archaeological Survey in the Sharjah Emirate, 1985: A Preliminary Report*, Lyon, Maison de l'Orient (1985a) pp 21–26.
- Minzoni Déroche, A. 'Survey on prehistoric sites', in R. Boucharlat (ed), *Second Archaeological Survey in the Sharjah Emirate, 1985: A Preliminary Report*, Lyon, Maison de l'Orient (1985b) pp 53–61.
- Mitchell, T.C. 'An inscription in epigraphic South Arabian script from Sharjah', *Persica*, 14 (1990–92) pp 131–134.
- Mouton, M. 'Les pointes de flèches en fer des sites préislamiques de Mleiha et ed-Dur, E.A.U.', *AAE*, 1 (1990) pp 88–103.
- Mouton, M. *La péninsule d'Oman de la fin de l'Âge du fer au début de la période sassanide (250 av.–350 ap. J.-C.)*, Paris, Univ. of Paris 1, unpubl. PhD thesis (1992).
- Mouton, M. 'Les tours funéraires d'Arabie, nefesh monumentales', *Syria*, 74 (1997) pp 81–98.
- Mouton, M. *Mleiha I: Environnement, stratégies de subsistance et artisanats*: Lyon, Travaux de la Maison de l'Orient 29 (1999).
- Müller, W.W. 'Ein Grabmonument aus Nagran als Zeugnis für das Frühnordarabische', *Neue Ephemeris für semitische Epigraphik*, 3 (1978) pp 149–157.
- Müller, W.W. 'Zur Inschrift auf einem Krugfragment aus Muwailah', *AAE*, 10 (1999) pp 51–53.
- Mynors, H.S. 'An examination of Mesopotamian ceramics using petrographic and neutron activation analysis', in A. Aspinall and S.E. Warren (eds), *The proceedings of the 22nd symposium of archaeometry*, Bradford, Schools of Physics and Archaeological Sciences (1983) pp 377–387.
- 'Neolithic flints from Marawah', *Tribulus*, 3/1 (1993) p 20.
- Papadopoulos, J.K. 'A Western Mediterranean amphora fragment from ed-Dur', *AAE*, 5 (1994) pp 276–279.
- Pedersen, C.H. and Buchwald, V.F. 'An examination of metal objects from Tell Abraq, U.A.E.', *AAE*, 2 (1991) pp 1–9.
- Peña-Chocarro, L. and Barrón Lopez, E. 'Plant remains from the site of Mleiha', in M. Mouton, *Mleiha I: Environnement, stratégies de subsistance et artisanats*: Lyon, Travaux de la Maison de l'Orient 29 (1999b) pp 63–69.
- Petrie, C. 'The Iron Age fortification of Husn Awhala (Fujairah, U.A.E.)', *AAE*, 9 (1998) pp 246–260.
- Petrie, C. 'Late pre-Islamic ceramics from the tomb at Sharm, Fujairah, U.A.E.', *AAE*, 11 (2000) pp 80–86.
- Phillips, C.S. *Wadi al-Qawr, Fashgha 1. The excavation of a prehistoric burial structure in Ra's al-Khaimah, U.A.E., 1986*, Edinburgh, Dept. of Archaeology, Univ. of Edinburgh Project Paper No. 7 (1987).
- Phillips, C.S. 'The pattern of settlement in the Wadi al-Qawr', *PSAS*, 27 (1997) pp 205–218.
- Ploquin, A. and Orzechowski, S. 'Palaeo-metallurgy at Mleiha: Preliminary notes', in Mouton, M. (ed), *Archaeological Surveys and Excavations in the Sharjah Emirate, 1993 and 1994: A Seventh Interim Report*, Lyon, Maison de l'Orient (1994) pp 25–32.
- Potts, D.T. 'From Qadê to Mazûn: Four notes on Oman, c. 700 BC to 700 AD', *Journal of Oman Studies*, 8/1 (1985) pp 81–95.
- Potts, D.T. 'Eastern Arabia and the Oman peninsula during the late fourth and early third millennium BC', in U. Finkbeiner and W. Röhlig (eds), *Gamdat Nasr: Period or Regional Style?*, Wiesbaden, Ludwig Reichert (1986a) pp 121–170.
- Potts, D.T. 'The booty of Magan', *Oriens Antiquus*, 25 (1986b) pp 271–285.
- Potts, D.T. 'Arabia and the kingdom of Characene', in D.T. Potts (ed) *Araby the Blest*, Copenhagen, Carsten Niebuhr Institute Publications 7 (1988) pp 137–167.
- Potts, D.T. *A prehistoric mound in the Emirate of Umm al-Qaiwain: Excavations at Tell Abraq in 1989*, Copenhagen, Munksgaard (1990a).
- Potts, D.T. *The Arabian Gulf in Antiquity*, I and II, Oxford, Clarendon Press (1990b).
- Potts, D.T. *Further excavations at Tell Abraq: The 1990 season*, Copenhagen, Munksgaard (1991a).
- Potts, D.T. *The Pre-Islamic Coinage of Eastern Arabia*, Copenhagen, Carsten Niebuhr Institute Publications 14 (1991b).
- Potts, D.T. 'The late prehistoric, protohistoric, and early historic periods in Eastern Arabia (ca. 5000–1200 BC)', *Journal of World Prehistory*, 7 (1993a) pp 121–162.
- Potts, D.T. 'Four seasons of excavation at Tell Abraq (1989–1993)', *PSAS*, 24 (1993b) pp 117–126.
- Potts, D.T. 'Rethinking some aspects of trade in the Arabian Gulf', *World Archaeology*, 24 (1993c) pp 423–440.
- Potts, D.T. 'A new Bactrian find from southeastern Arabia', *Antiquity*, 67 (1993d) pp 591–596.
- Potts, D.T. 'Contributions to the agrarian history of Eastern Arabia I. Implements and cultivation techniques', *AAE*, 5 (1994a) pp 158–168.
- Potts, D.T. 'Contributions to the agrarian history of Eastern Arabia II. The cultivars', *AAE*, 5 (1994b) pp 236–275.
- Potts, D.T. 'South and Central Asian Elements at Tell Abraq (Emirate of Umm al-Qaiwain, United Arab Emirates), c. 2200 BC – 300 AD', in A. Parpola and P. Koskikallio (eds), *South Asian Archaeology 1993*, vol. II, Helsinki, Annales Academiae Scientiarum Fennicae Ser. B-271 (1994c) pp 615–628.
- Potts, D.T. *Supplement to the Pre-Islamic Coinage of Eastern Arabia* (Copenhagen, Carsten Niebuhr Institute Publications 16 (1994d).
- Potts, D.T. 'Eine frühe Stadt in Magan: Ausgrabungen in Tell Abraq', *Das Altertum*, 41 (1995a) pp 83–98.
- Potts, D.T. 'Watercraft of the Lower Sea', in R. Dittmann, U. Finkbeiner and H. Hauptmann (eds), *Beiträge zur Kulturgeschichte Vorderasiens: Festschrift für Rainer M. Boehmer*, Mainz, Von Zabern (1995b) pp 559–571.
- Potts, D.T. 'The diffusion of light by translucent media in antiquity: Apropos two alabaster windowpane fragments from ed-Dur (United Arab Emirates)', *Antiquity*, 70 (1996) pp 182–188.
- Potts, D.T. 'Re-writing the late prehistory of southeastern Arabia: A reply to Jocelyn Orchard', *Iraq*, 59 (1997a) pp 63–71.

- Potts, D.T. 'The Roman relationship with the *Persicus sinus* from the rise of Spasinou Charax (127 BC) to the reign of Shapur II (309–379 AD)', in S. Alcock (ed), *The Early Roman Empire in the East*, Oxford, Oxbow, (1997b).
- Potts, D.T. 'Late Sasanian armament from Southern Arabia', *Electrum*, 1 (1997c) pp 127–137.
- Potts, D.T. 'Some issues in the study of the pre-Islamic weaponry of southeastern Arabia', *AAE*, 9 (1998a) pp 182–208.
- Potts, D.T. 'Namord ware in southeastern Arabia', *Abiel II* (1998b) 207–220.
- Potts, D.T. *Ancient Magan: The secrets of Tell Abraq*, London, Trident Press (2000a).
- Potts, D.T. 'Arabian time capsule: An undisturbed trove of relics reveals the trading patterns of a Bronze Age society', *Archaeology Magazine*, 53/5 (2000b), pp44–48.
- Potts, D.T. 'Anshan, Liyan and Magan c. 2000 B.C.', *Iranian archaeology at the turn of the century: Studies in honor of William Marvin Sumner*, Los Angeles, UCLA, in press a.
- Potts, D.T. 'Ostrich distribution and exploitation in the Arabian Peninsula', in press b.
- Potts, D.T. and Cribb, J. 'Sasanian and Arab-Sasanian coins from eastern Arabia', *Iranica Antiqua*, 30 (1995) pp 123–137.
- Potts, D.T. and Weeks, L. 'An AMS radiocarbon chronology for the late Umm al-Nar type tomb at Tell Abraq', *Tribulus* 9/1 (1999) pp 9–10.
- Potts, D.T., Weeks, L., Magee, P., Thompson, E. and Smart, P. 'Husn Awhala: A late prehistoric settlement in southern Fujairah', *AAE*, 7 (1996) pp 214–239.
- Prieur, A. 'Notes on the Malacofauna', in R. Boucharlat (ed), *Archaeological Surveys and Excavations in the Sharjah Emirate, 1989: A Fifth Preliminary Report*, Lyon, Maison de l'Orient (1989) pp 28–31.
- Prieur, A. 'Étude faunistique et aspects anthropiques du site de Tell Abraq', in Potts, D.T., *A prehistoric mound in the Emirate of Umm al-Qaiwain, U.A.E.: Excavations at Tell Abraq in 1989*, Copenhagen, Munksgaard (1990) pp 141–151.
- Prieur, A. 'Molluscs from Mleiha' in M. Mouton (ed), *Archaeological Surveys and Excavations in the Sharjah Emirate, 1993 and 1994: A Seventh Interim Report*, Lyon, Maison de l'Orient (1994) pp 33–38.
- Prieur, A. 'Distribution et interprétation de la malacofaune des fouilles archéologiques de Mleiha', in M. Mouton, *Mleiha I: Environnement, stratégies de subsistance et artisanats*: Lyon, Travaux de la Maison de l'Orient 29 (1999) pp 145–170.
- Prieur, A. and Guerin, C. 'Découverte d'un site préhistorique d'abattage de dugongs à Umm al-Qaiwain (Emirats Arabes Unis)' *AAE*, 2 (1991) pp 72–83.
- Reade, W.J. and Potts, D.T. 'New evidence for late third millennium linen from Tell Abraq, Umm al-Qaiwain, U.A.E.', *Paléorient*, 19 (1993) pp 99–106.
- Riley, M. and Petrie, C.A. 'An analysis of the architecture of the tomb at Sharm, Fujairah, U.A.E.', *AAE*, 10 (1999) pp 180–189.
- Ross, E.C. 'Annals of 'Omán, from early times to the year 1728 AD from an Arabic ms. by Sheykh Sirha'n bin Sa'id bin Sirha'n bin Muhammad, of the Benú 'Alf tribe of 'Oman', *Journal of the Asiatic Society of Bengal*, 43 (1874) pp 111–196.
- Schutkowski, H. and Herrmann, B. 'Anthropological report on human remains from the cemetery at Shimal', in Vogt, B. and Franke-Vogt, U. *Shimal 1985/1986: Excavations of the German Archaeological Mission in Ra's al-Khaimah, U.A.E., A Preliminary Report*, Berlin, Berliner Beiträge zum Vorderen Orient 8 (1987) pp 55–65.
- Sedov, A. 'Two South Arabian coins from Mleiha', *AAE*, 6 (1995) pp 61–64.
- Shoufani, E. *Al-Riddah and the Muslim conquest of Arabia*, Toronto, Univ. of Toronto Press (1972).
- Spoor, R.H. 'Human population groups and the distribution of lithic arrowheads in the Arabian Gulf', *AAE*, 8 (1997) pp 143–160.
- Stephan, E. 'Preliminary report on the faunal remains of the first two seasons of Tell Abraq/Umm al Quwain/United Arab Emirates', in H. Buitenhuis and H.-P. Uerpmann (eds), *Archaeozoology of the Near East II*, Leiden, Backhuys (1995)
- Stevens, K.-G. 'Four "Iron Age" stamp seals from Qarn bint Sa'ud (Abu Dhabi Emirate – U.A.E.)', *AAE*, 3 (1992) pp 173–176.
- Stocks, R. 'Wadi Haqil Survey November 1992', *PSAS*, 26 (1996) pp 145–163.
- Susino, G. 'Material composition analysis of artefact S-393 from Sharm, U.A.E.', *AAE*, 10 (1999) pp 216–219.
- Taha, M. 'The archaeology of the Arabian Gulf during the first millennium BC', *Al-Rafidan*, 3–4 (1982–1983) pp 75–87.
- Teixidor, J. 'Une inscription araméenne provenant de l'Émirat de Sharjah (Émirats Arabes Unis)', *Comptes rendus de l'Académie des Inscriptions & Belles-Lettres* (1992) pp 695–707.
- Tengberg, M. *Paléoenvironnements et économie végétale en milieu aride: Recherches archéobotaniques dans la région du Golfe arabo-persique et dans le Makran pakistanais (4ème millénaire av. notre ère – 1er millénaire de notre ère)*, Univ. of Montpellier II, unpubl. PhD thesis (1998).
- Tengberg, M. 'L'exploitation des ligneux à Mleiha: Étude anthracologique', in M. Mouton, *Mleiha I: Environnement, stratégies de subsistance et artisanats*: Lyon, Travaux de la Maison de l'Orient 29 (1999) pp 71–82.
- Tengberg, M. and Potts, D.T. 'mes.má-gan-na (*Dalbergia sissoo* Roxb.) at Tell Abraq', *AAE*, 10 (1999) pp 129–133.
- Thomas, R. and Potts, D.T. 'Atacamite pigment at Tell Abraq in the early Iron Age', *AAE*, 7 (1996) pp 13–16.
- Uerpmann, H.-P. 'Camel and horse skeletons from protohistoric graves at Mleiha in the Emirate of Sharjah (U.A.E.)', *AAE*, 10 (1999) pp 102–118.
- Uerpmann, H.-P. and M. 'Ubaid pottery in the eastern Gulf – new evidence from Umm al-Quwain (U.A.E.)', *AAE*, (1996) pp 125–139.
- Uerpmann, M. 'Structuring the Late Stone Age of Southeastern Arabia', *AAE*, 3 (1992) pp 65–109.
- Uerpmann, M., Uerpmann, H.-P., and Jasim, S.A. 'Stone age nomadism in SE-Arabia – Palaeo-economic considerations on the Neolithic site of al-Buhais 18 in the Emirate of Sharjah, UAE', *PSAS*, 30 (2001) in press.

- Van Neer, W. and Gautier, A. 'Preliminary report on the faunal remains from the coastal site of ed-Dur, 1st–4th century AD, Umm al-Quwain, United Arab Emirates' in H. Buitenhuis and A.T. Clason (eds), *Archaeozoology of the Near East, Proceedings of the first international symposium of the archaeozoology of southwestern Asia and adjacent areas*, Leiden, Universal Books Services (1993) pp 110–118.
- Velde, C. 'Preliminary remarks on the settlement pottery in Shimal (Ra's al-Khaimah, U.A.E.)', in F.M. Andraschko and W.-R. Teegen (eds), *Gedenkschrift für Jürgen Driehaus*, Mainz, Von Zabern (1990) pp 357–378.
- Velde, C. 'Preliminary remarks on the settlement pottery in Shimal', in K. Schippmann, A. Herling and J.-F. Salles (eds), *Golf-Archäologie: Mesopotamien, Iran, Kuwait, Bahrain, Vereinigte Arabische Emirate und Oman*, Buch am Erlbach, Internationale Archäologie 6 (1991) pp 265–288.
- Velde, C. *Die spätbronzezeitliche und früheisenzeitliche Siedlung und ihre Keramik in Shimal/Ra's al Khaimah (Vereinigte Arabische Emirate)*, Göttingen, Georg-August University, unpubl. M.A. thesis (1992).
- Vogt, B. *Zur Chronologie und Entwicklung der Gräber des späten 4.–2.Jtsd.v.Chr. auf der Halbinsel Oman: Zusammenfassung, Analyse und Würdigung publizierter wie auch unveröffentlichter Grabungsergebnisse*, Göttingen, Georg-August University, unpubl. PhD thesis (1985).
- Vogt, B. *Asimah: An account of a two months rescue excavation in the mountains of Ra's al-Khaimah, United Arab Emirates*, Dubai, Shell Markets Middle East (1994a).
- Vogt, B. 'Death, resurrection and the camel', in N. Nebes (ed), *Arabia Felix: Beiträge zur Sprache und Kultur des vorislamischen Arabien, Festschrift Walter W. Müller zum 60. Geburtstag*, Wiesbaden, Harrassowitz (1994b) pp 279–290.
- Vogt, B. 'State, problems and perspectives of second millennium B.C. funerary studies in the Emirate of Ra's al-Khaimah (U.A.E.)', *Abiel II* (1998) pp 273–290.
- Vogt, B. and Franke-Vogt, U. *Shimal 1985/1986: Excavations of the German Archaeological Mission in Ra's al-Khaimah, U.A.E., A Preliminary Report*, Berlin, Berliner Beiträge zum Vorderen Orient 8 (1987).
- Von den Driesch, A. 'Viehhaltung, Jagd und Fischfang in der bronzezeitlichen Siedlung von Shimal bei Ra's al-Khaimah/U.A.E.', in P. Calmeyer, K. Hecker, L. Jakob-Rost and C.B.F. Walker (eds), *Beiträge zur altorientalischen Archäologie und Alttertumskunde: Festschrift für Barthel Hrouda zum 65. Geburtstag*, Wiesbaden, Harrassowitz (1994) pp 73–85.
- Waetzoldt, H. 'Zur Bewaffnung des Heeres von Ebla', *Oriens Antiquus*, 29 (1990) pp 1–38.
- Weeks, L. 'Prehistoric metallurgy at Tell Abraq, U.A.E.', *AAE*, 8 (1997) pp 11–85.
- Weeks, L. 'Lead isotope analyses from Tell Abraq, United Arab Emirates: New data regarding the 'tin problem' in Western Asia', *Antiquity*, 73 (1999) pp 49–64.
- Weeks, L. *Prehistoric metallurgy of the Gulf*, Univ. of Sydney, unpubl. PhD thesis (2000a).
- Weeks, L. 'Metal artefacts from the Sharm Tomb', *AAE*, 11 (2000b), pp 180–198.
- Weisgerber, G. 'Oman: A bronze-producing centre during the 1st half of the 1st millennium BC', in J.E. Curtis (ed), *Bronzeworking centres of Western Asia c. 1000–539 BC*, London, Kegan Paul International (1988) pp 285–295.
- Wells, C. 'Appendix 1. Human bone', in Donaldson, P. 'Prehistoric tombs of Ra's al-Khaimah', *Oriens Antiquus*, 23 (1984) pp 213–218, 277–280.
- Wells, C. 'Human bone', in Donaldson, P. 'Prehistoric tombs of Ra's al-Khaimah', *Oriens Antiquus*, 24 (1985) pp 87–88.
- Whitehouse, D. *Excavations at ed-Dur (Umm al-Qaiwain, United Arab Emirates), Vol. 1. The glass vessels*, Leuven, Peeters (1998).
- Whitehouse, D. 'Ancient glass from ed-Dur (Umm al-Qaiwain, U.A.E.) 2. Glass excavated by the Danish expedition', *AAE*, 11 (2000) pp 87–128.
- Wiesehöfer, J. '*Mare Erythraeum, Sinus Persicus und Fines Indiae*: Der Indische Ozean in hellenistischer und römischer Zeit', in S. Conermann (ed), *Der Indische Ozean in historischer Perspektive*, Hamburg, E.B.-Verlag [=Asien und Afrika, 1] (1998) pp 9–36.
- Wilkinson, J.C. 'A sketch of the historical geography of the Trucial Oman down to the beginning of the sixteenth century', *The Geographical Journal*, 130 (1964) pp 337–349.
- Willcox, G. 'Some plant impressions from Umm an-Nar island' in K. Frifelt, *The Island of Umm an-Nar Vol. 2. The Third Millennium Settlement*, Aarhus, Jutland Archaeological Society Publications 36/2 (1995) pp 257–259.
- Willcox, G. and Tengberg, M. 'Preliminary report on the archaeobotanical investigations at Tell Abraq with special attention to chaff impressions in mud brick', *AAE*, 6 (1995) pp 129–138.
- Ziolkowski, M. 'A study of the petroglyphs from Wadi al-Hayl, Fujairah, United Arab Emirates', *AAE*, 9 (1998) pp 13–89.