

New evidence for the Neolithic settlement of Marawah Island, Abu Dhabi, United Arab Emirates

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Introduction

This paper discusses the results and wider significance of recent archaeological excavations carried out on site MR11, a Neolithic settlement located on the island of Marawah [Marāwih] in the Western Region of Abu Dhabi, United Arab Emirates.

Marawah lies around 100 km to the west of the city of Abu Dhabi, and is located just to the north of the Khor al-Bazm (Fig. 1). To the west is the small island of al-Fiyyā, to the south-east the island of Junānah, and to the east the island of Abū al-Abyaḍ. It is around 15 km

north of the main coastline and about 8 km north-west of Junānah. Marawah is around 13 km east-west and a maximum of 5.5 km north-south. The structure of the island is formed from relict Pleistocene limestone platforms linked by Holocene (recent) sand and beach deposits and intervening patches of sabkha/salt flats with patches of coastal mangrove (Evans, Kirkham & Carter 2002). Geomorphological work carried out on Marawah suggests that at the maximum sea-level height in the lower Gulf around 2500 BC, the island consisted of four small rock-core islands that ultimately became linked by infilling with Holocene sediments (Evans, Kirkham &

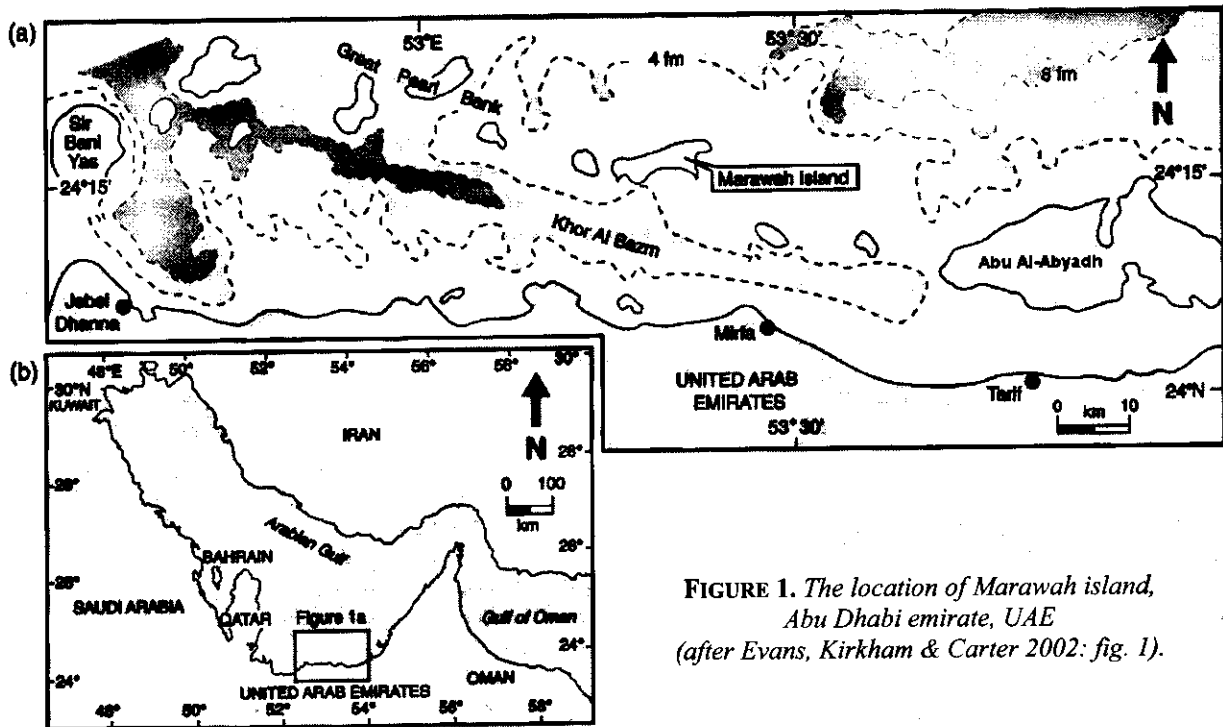


FIGURE 1. The location of Marawah island, Abu Dhabi emirate, UAE (after Evans, Kirkham & Carter 2002: fig. 1).

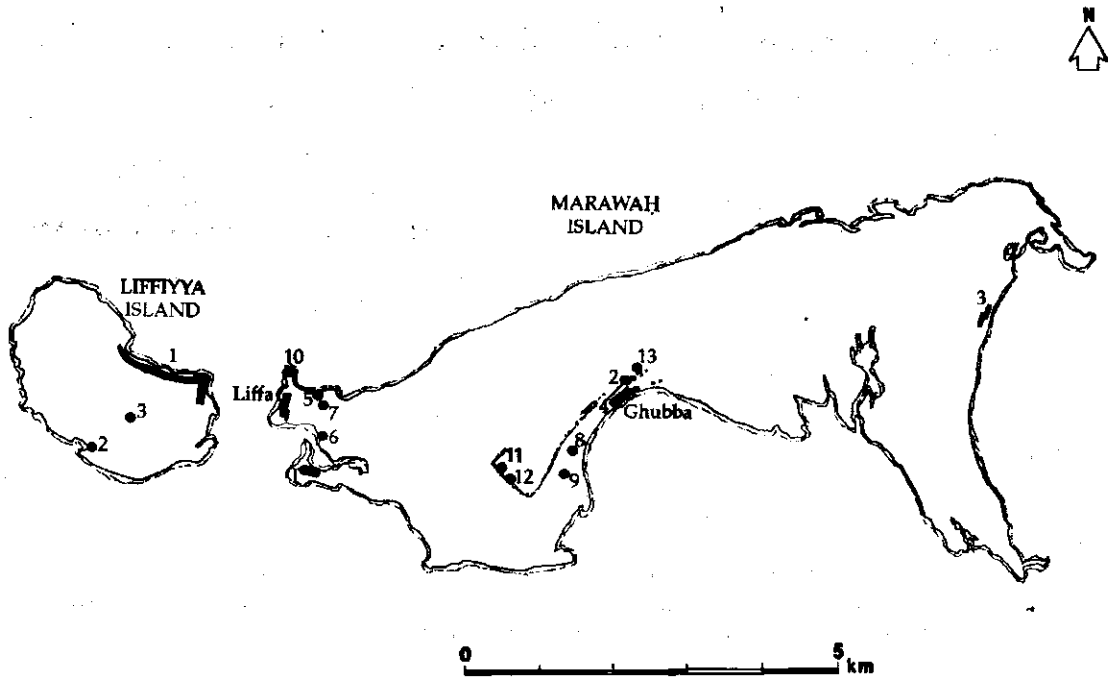


FIGURE 2. The location of archaeological sites on Marawah island (after King 1998: fig. 31).

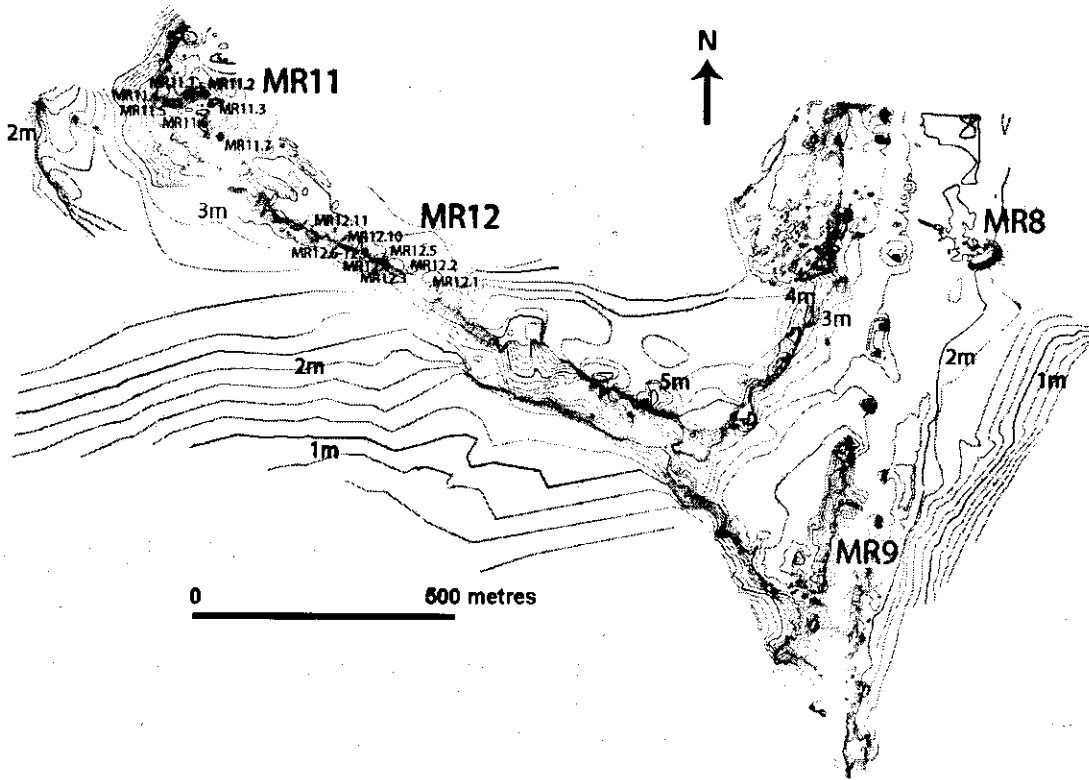


FIGURE 3. A contour map of the south-west part of Marawah island showing the major archaeological sites.

Carter 2002: fig. 15). Although in some areas of the Gulf it has been noted that there is a sea-level high occurring during the first half of the sixth millennium BC (Dalongeville & Sanlaville 1987), there is no evidence, so far, for this on Marawah. An extensive series of radiocarbon dates from the raised former beaches on the island has not yielded any dates older than *c.* 2500 BC (Evans, Kirkham & Carter 2002). It is clear from an examination of the literature on sea-level changes in the Gulf, however, that there is some discrepancy in estimated sea-level heights between different areas, and that one cannot directly extrapolate from one area to another without taking into account local factors. We do not know the precise sea-level on Marawah around the time of the occupation of site MR11, and further work is required to investigate this problem. It may well be that the island was a small archipelago offering an important

strategic safe harbour to passing shipping.

The site of MR11 is located at the north-west tip of a limestone ridge located in the south-west part of Marawah, about 2 km south-east of the modern day settlement of Ghubba (Fig. 2). Other archaeological sites in the vicinity (Fig. 3) include: (i) site MR12, a group of seven pre-Islamic period cairns in a line along the edge of the limestone ridge running south of MR11; (ii) site MR8, a group of six wells, located about 1 km south-west of Ghubba, with an associated water catchment system and channel; and (iii) site MR9, a complex of around 160 hearths located to the south of MR8 at the southern end of the limestone area (Garfi 1998). Ash from five of these hearths has been radiocarbon dated providing a range of dates from the late third to the late first millennium BC. One hearth was dated to the Late pre-Islamic period, second-fourth century AD. MR11

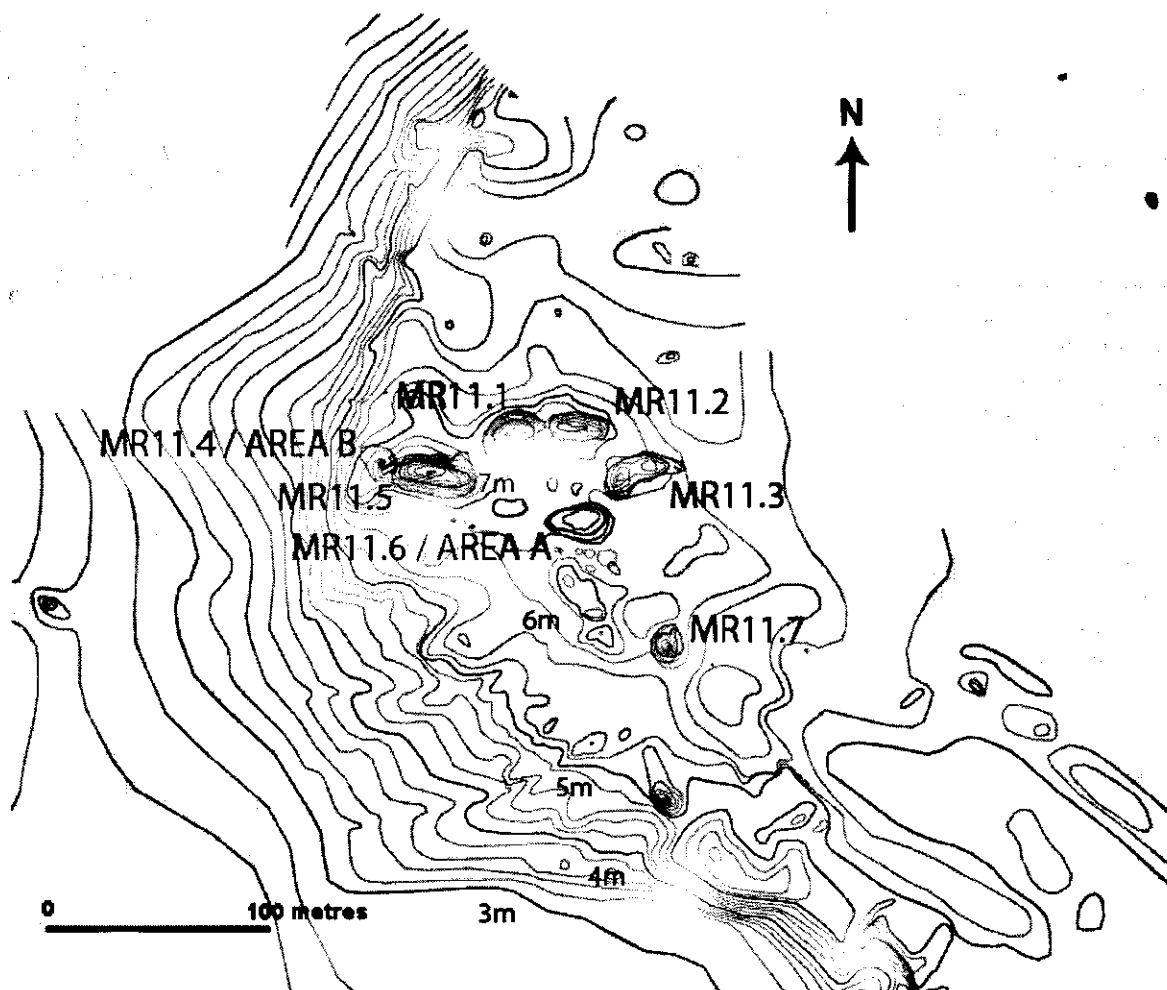


FIGURE 4. A contour map of site MR11 showing the seven mounds.

consists of a group of seven mounds (Fig. 4). The largest of these, designated as MR11.1, was 20 m long x 8 m wide x 2 m high, whilst the others varied in size and were generally only 1.5–2 m in height. MR11.4 was much smaller and measured 5 m in diameter, being only 50 cm high. MR11.7 lay to the south of the main group of mounds.

Earlier work at MR11

The Abu Dhabi Islands Archaeological Survey, ADIAS, carried out a preliminary survey of archaeological sites on the island in 1992 (King 1998). This identified a total of thirteen major sites ranging in date from the Late Stone Age to the Late Islamic period. Site MR11 was initially interpreted in this 1992 brief survey as being pre-Islamic burial mounds and were described as follows:

"...They seemed to be circular structures/mounds to which stones had been added over time. All the cairns were similar, made from mounded sand with large (50–60 cms; 10 cms thick) and medium (20–30 cms) slabs of local beachstone." (King 1998: 79).

It was noted that one of the mounds (MR11.3) had what appeared to be stretches of "walling".

The site was subsequently re-examined in 2000 (8th–18th April) and 2003 (16th–24th March) by an ADIAS team, comprising Dr Joseph Elders and John Martin. In 2000 one of the smaller flatter mounds, MR11.6, re-designated as Area A, was selected for examination because of the time frame and manpower available. It was noted that no anthropogenic material was visible on the surface of the mounds with the exception of possible "plaster" fragments (Elders 2001: 47). An area 10 m east–west and 8 m north–south was cleaned, and a 2 m x 1 m sondage was opened in one area. This revealed a sequence consisting of natural limestone bedrock followed by a thin occupation layer a few centimetres thick and then successive layers of rubble. After the 2000 season it was concluded that it was probably a church for a number of reasons, such as the quality of its build, its ground plan and orientation (east–west), the lack of occupation detritus, and its similarity in dimensions to the church known from Şir Banî Yās island (Elders 2001: 54; and Fig. 5 here). It was noted that the walls of the structure were well built and constructed from blocks of local limestone and beach rock. The church hypothesis fell apart, however, in 2003 when the brief excavations conducted at the site by Dr

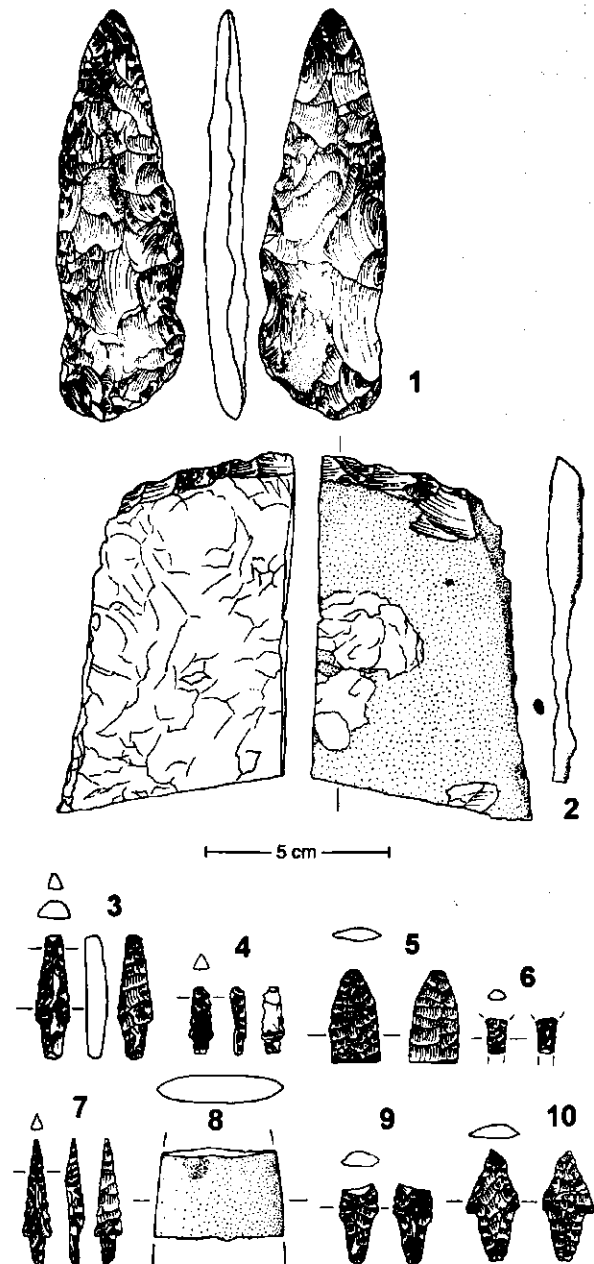


FIGURE 5. The lithics from MR11. All the finds are from the 2004 season and Area A, unless otherwise indicated: 1. 2003 season, Area B, context 23, no. 13; 2. context 58, no. 210; 3. context 64, no. 214; 4. context 43, no. 57; 5. context 48, no. 140; 6. context 38, no. 341; 7. context 43, no. 82; 8. context 43, no. 87; 9. context 35, no. 51; 10. context 1, no. 15.

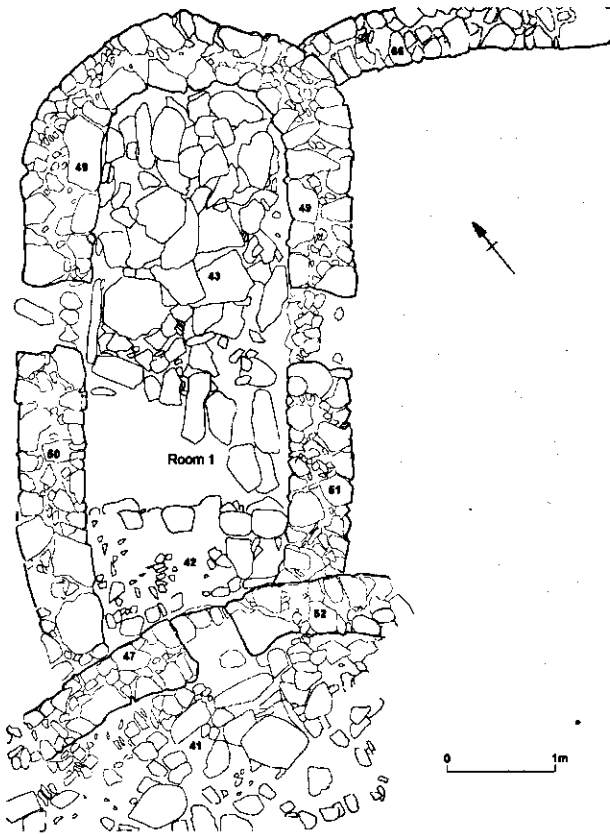


FIGURE 6. A plan of the excavated structure and what may be its collapsed roof.

Joseph Elders and John Martin revealed that the ground plan of the buildings could not be so confidently defined. A flint arrowhead (Fig. 5/10) was also retrieved during removal of the coarse grey-white aeolian sand covering Area A (Layer 1). In Area A the exposed wall lines clearly did not follow the hypothetical figure published in 2001 (Elders 2001: fig. 5; and see discussion below, and Figs 6, 7 and 8 here). In Room 5, to the south of Room 1 (the large apsidal room previously identified as the "chancel"), an ashy burnt deposit (Layer 32) was noted just below the modern-day ground surface. A sample of this ash was taken for radiocarbon dating. This was successfully AMS dated at the Scottish Universities Environmental Research Centre (SUERC), the uncalibrated radiocarbon date being 5630 ± 50 BP, which using the CALIB4.4 program gives a calibrated range of 4550–4350 CalBC (2 sigma). The stratigraphic position of this layer high up above the neighbouring structure may suggest that this deposit forms part of the final phase of occupation at the site.

A second small trench 3 m x 2 m was excavated by John Martin in 2003 in mound 11.4, re-designated as Area B. This revealed a rectangular stone-built structure measuring 2.40 m east-west and 1.20 m north-south, with a doorway in the north wall adjacent to the north-east corner. The walls were roughly built of the locally occurring limestone, generally employing small thin slabs roughly coursed but with some larger, irregularly shaped blocks interspersed. They appeared to be constructed as dry-stone walls, the interstices being filled with silty brown sandy sediment. It is possible that the walls continue to the south of this room, perhaps defining further rooms. Traces of walls were also noted further down the slope to the north-west. The walls were more than 50 cm thick and stood to a height of nearly 1 m at their highest point. The room and the immediate

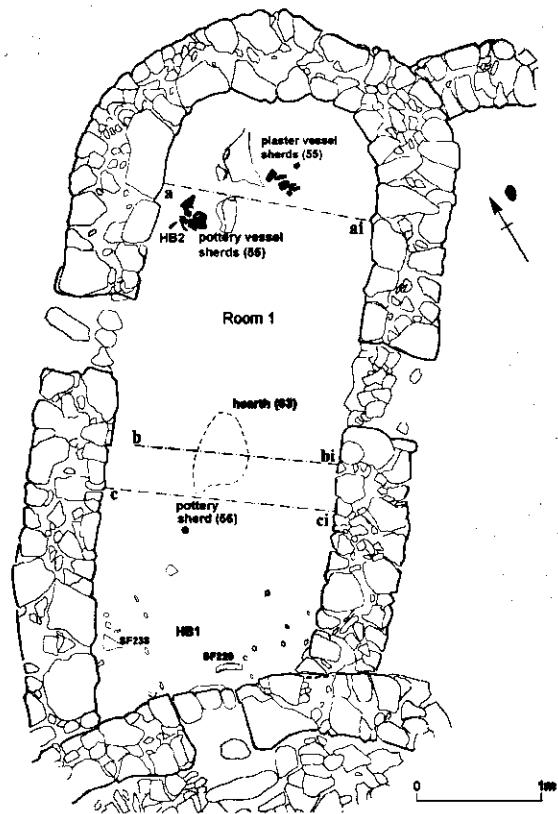


FIGURE 7. A plan of the major finds within Room 1 and the location of section lines. The numbers in brackets indicate layer numbers. Key: HB1 = the location of the human skeleton; HB2 = the articulated foot from the human skeleton; SF229 = a dugong rib; SF238 = a dugong scapula.



FIGURE 8. A photograph of the structure at the end of the 2004 excavation season. Room 1 has been excavated down to the bedrock.

area to the north and west were buried in a layer of rubble from the collapsed walls, in turn sealed by an uneven layer of windblown sand. Following the removal of these layers, a large bifacial point (Fig. 5/1) was found in the north-west corner in the very lowest lens of rubble and sand (Layer 23), slightly above the surface of a dark occupation layer (Layer 26) which appeared to spread from outside the walls (Layer 25), under them, and through into the room itself. This layer contained on its surface a tip fragment of a stone pestle, made from a black-coloured stone. This was found very close to the large bifacial point in the north-west corner of the room, less than 30 cm away. The dark occupation layer lay directly on the bedrock on which the walls were built, sloping down and thickening to the north, but was never thicker than 20 mm. It contained charcoal fragments and tiny fragments of bone. The layer was present throughout the western half of the room and extended underneath the wall to the exterior of the structure. A sample of ash from this layer was taken for radiocarbon dating and gave an uncalibrated date of 5850 ± 50 BP. This provides a *terminus post quem* for the construction of one of the walls of the structure of 4833–4552 CalBC (2 sigma).

The 2004 Season at MR11

A topographic survey was first of all undertaken by Richard Cuttler and Mark Beech of the south-western area of Marawah island, using a total station. This was carried out in order to provide data on the physical setting of the site. The work concentrated on the provision of a detailed contour map of site MR11 and the adjacent site of MR12 (the series of stone cairns along the top edge of the ridge). This mapping was joined to the earlier extensive mapping work undertaken for sites MR8 and MR9 by Salvatore Garfi and Jakub Czastka for ADIAS. It is now possible to view the topography of the entire south-west corner of Marawah (Fig. 3). The base of the mounds at site MR11 lies some 6 m+ above the modern-day sea-level high tide mark, and the height on top of the tallest mound is about 8.60 m above sea level. Excavations at MR11 during the 2004 season were directed by Mark Beech, and the excavation team included Richard Cuttler, Derek Moscrop and John Martin. Some field assistance was also provided by Heiko Kallweit and Mohammed Hassan (ADCO). Work was carried out between 3rd March and 3rd April 2004.

During the 2003 season a small test-pit had been ex-

cavated into Room 1, which provided a window into the deposits at the northern extent of the mound. The north-eastern extent of the mound was cleaned and recent deposits removed until a well-defined structure (Room 1) was apparent. The aim of the season was to excavate one of the cells entirely. As the chronology of the structures was not clear, Room 1 — as a clear, discreet deposit — was subsequently chosen for excavation. All deposits were hand excavated and sieved using a 4 mm mesh. Twelve samples were taken from appropriate deposits for the recovery of carbon suitable for radiocarbon dating and possible charred plant macro remains.

Results

Phase 1. Pre-dating the building

The natural bedrock (Layer 53) is natural limestone. The earliest feature sealing this was the remains of a small hearth. This consisted of a small mound of compacted ash, charcoal and stone (Layer 63) located towards the middle of Room 1 (Figs 7 and 9). The ash deposit (Layer 63) appeared to be resting directly on the bedrock, and there appeared to be no discernible cut for this deposit. A layer of firm, grey sand (Layers 57 to 61) appears to have built up against the hearth deposit. This sand varied in depth between 3 and 15 cm, and also filled dips and natural fissures in the bedrock. The sand appeared to continue below the walls of Room 1, although without actually excavating either side of the walls and removing their matrix, it is difficult to be certain. The sand did, however, produce fragments from a plaster vessel. A fragment of charcoal was also retrieved from Layer 58. This gave an uncalibrated date of 6750 ± 40 BP which, using the CALIB4.4 program, gives a calibrated range of 5724–5563 CalBC (2 sigma). This same layer also contained one of the sherds belonging to a remarkable ceramic jar (Fig. 10).

Phase 2. Rooms 1, 2, and 3

Room 2

To the south of Room 1 was a building (Room 2, Fig. 7), only partially exposed, against which Room 1 had been abutted. Room 2 was not excavated, but appeared to be aligned east–west, and clearly predated Room 1. The northern wall of Room 2 measured 0.50 m in width and survived to a height of 0.70 m as approximately eight courses of roughly shaped limestone slabs. From the exterior of the wall (Layers 47 and 52) there was no evidence of the use of mortar. Within the wall was an

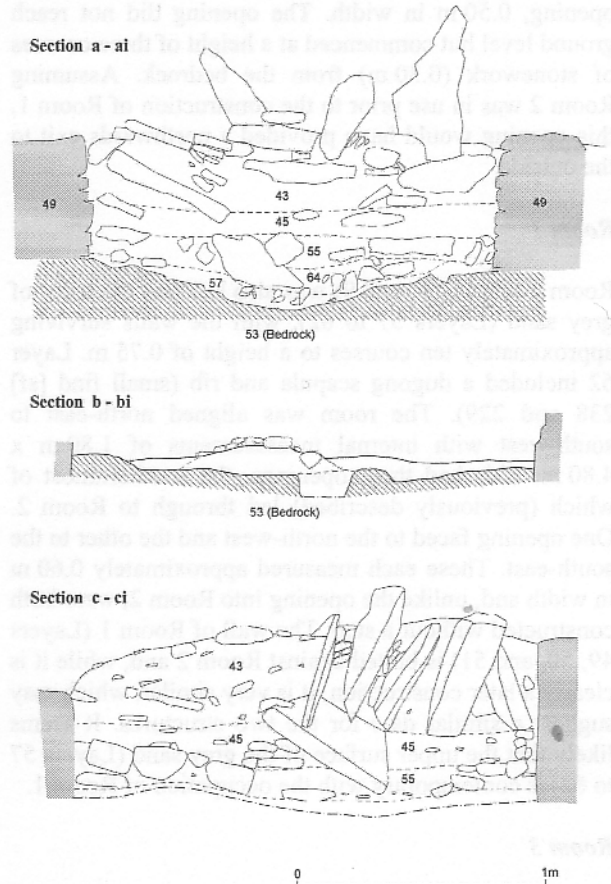


FIGURE 9. Sections through Room 1. See Fig. 7 for the locations of the sections.



FIGURE 10. The pottery vessel from Room 1 at MR11.

opening, 0.50 m in width. The opening did not reach ground level but commenced at a height of three courses of stonework (0.30 m) from the bedrock. Assuming Room 2 was in use prior to the construction of Room 1, this opening would have provided a northwards exit to the outside.

Room 1

Room 1 (Figs 7, 8, and 9) was also built on the layer of grey sand (Layers 57 to 62), with the walls surviving approximately ten courses to a height of 0.75 m. Layer 62 included a dugong scapula and rib (small find [sf] 238 and 229). The room was aligned north-east to south-west with internal measurements of 1.80 m x 4.80 m. This had three openings, the southernmost of which (previously described) led through to Room 2. One opening faced to the north-west and the other to the south-east. These each measured approximately 0.60 m in width and, unlike the opening into Room 2, were both constructed without a step. The wall of Room 1 (Layers 49, 50, and 51) is butted against Room 2 and, while it is clearly a later construction, it is very similar, which may suggest a similar date for the two structures. It seems likely that the upper surface of the grey sand (Layers 57 to 62) is contemporary with the occupation of Room 1.

Room 3

Abutting the eastern wall of Room 1 was a wall aligned east-west (Layer 66, Fig. 6), approximately 3.20 m long, which may have formed the northern wall of a third building (Room 3). While this was later than Room 1, it is possible that all these structures were in use in the same period.

Phase 3. Post occupation/burial

Room 1

It seems likely that two sandy rubble layers (55 and 56) represent the last phase of use of the structure for settlement. While these layers contain some settlement debitage (eggshell, plaster vessel fragments and beads) there are clearly some signs of the early stages of building collapse in the form of a few large slabs and some smaller limestone rubble. Some of the finds contained in this layer may still correspond to Phase 2, as the building debris had probably collapsed into the upper surface of sand relating to the occupation. This boundary could not easily be determined until the rubble was all removed.

A fragment of charcoal was retrieved from Layer 55. This was successfully radiocarbon dated by AMS and gave an uncalibrated date of 6675 ± 40 BP which, using the CALIB4.4 program, gives a calibrated range of 5663–5485 CalBC (2 sigma). Layer 55 also contained a concentrated cluster of potsherds, which formed the greater part of the remarkable ceramic jar (Fig. 10). One potsherd belonging to the same vessel was also found in Layer 56.

At the southern extent of the building it appeared that the stones from Layer 56 had been deliberately laid to form a flat surface, suggesting that these provided a platform for a burial (HB1, Layer 54, Fig. 11). It seems unlikely that the buildings were occupied by this time, since the burial would have impeded access from the opening to Room 2. There is also some suggestion, from the rubble encountered in Layer 55, that the building was no longer being repaired by this time. This phase does, however, clearly predate the collapse of the roof. This would appear to have remained in place for a long period, enabling the build-up of sand and rubble (Layers 45 and 46) to a depth of 0.19 m within the interior.

While much of the skeleton is articulated, there is also evidence that the burial was disturbed. This is suggested by the fact that some of the bones are spread across the interior of the building (see below). The unusual pottery vessel may well have been a grave-good associated with the burial, even though it was not found adjacent to the majority of the bones. The fact that conjoining sherds occur in a number of different locations and levels, demonstrates that there has been some disturbance to the site. This was not a result of the previous archaeological excavations of the "church", but is more likely due to robbing of the structure in antiquity.

Phase 4. Abandonment and collapse

Layers 45 and 46 were sealed by large slabs of limestone, measuring approximately 0.75 m x 0.50 m, with a thickness of 0.40 m (Figs 6 and 9, Section C). Set within a matrix of loose sand, 0.36 m in depth, these tilted inwards from the exterior, towards the middle of the building. It seems unlikely that these were once upper courses of the walls, which subsequently collapsed. The walls were carefully constructed from selected and shaped flat stones. Most of the collapsed stones on the interior of Room 1 (Layer 43) are too wide to have formed part of the wall. It seems more likely that these were once part of a superstructure, and Room 1 was built with a corbel roof. One of the more interesting finds within the collapsed stone layer (43) was a button (sf 119) made from pearl-oyster shell, with two holes

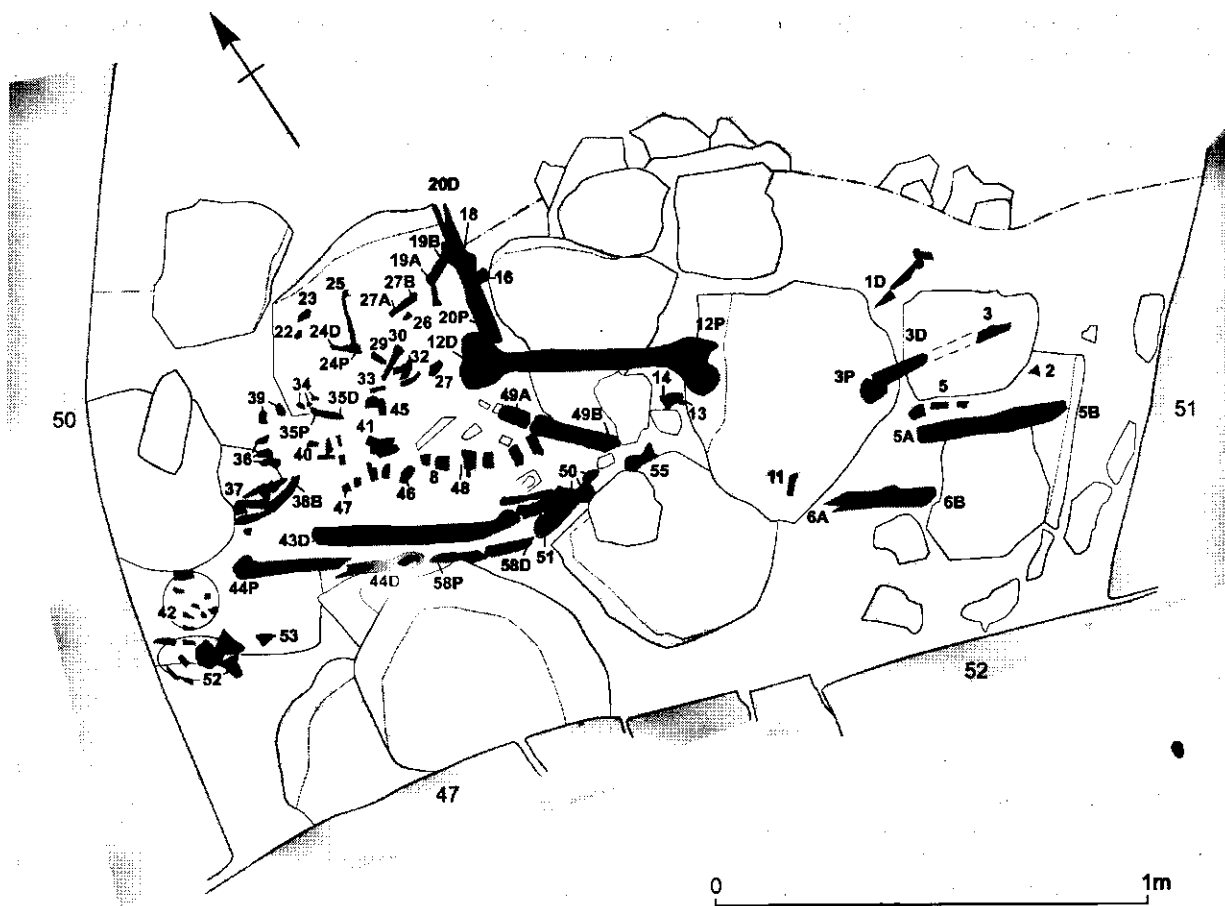


FIGURE 11. A plan of the skeleton (HB1) found on the stone platform at the southern end of Room 1.
 KEY: 12 = left femur, 38 = ?right clavicle, 43 = right tibia, 48 = lumbar vertebrae, 52 = skull fragments.

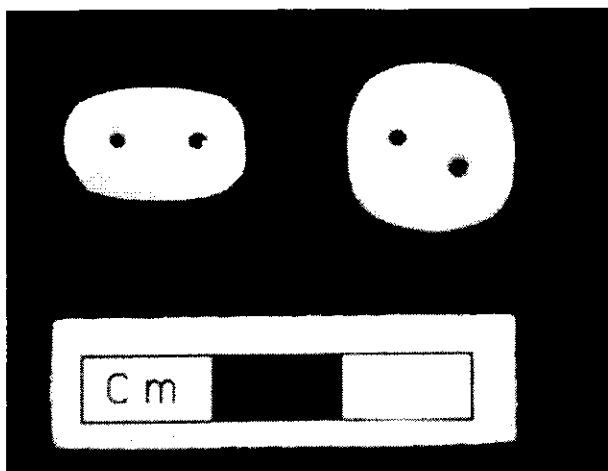


FIGURE 12. Pearl-oyster buttons from Room 1 at MR11.

(Fig. 12). A layer of loose brown sand and rubble (35 and 37) sealed the collapsed roof.

The finds

The human skeleton

The skeleton identified in Phase 3, Room 1, was of an adult male and may have originally been in a highly flexed position turned slightly on its left side, with its head facing north-east (Fig. 11). Unfortunately most of the bones were poorly preserved, probably as a result of post-burial disturbance and the collapse of the walls and roof. All that remained of the skull were a few fragments and some loose teeth, located close to the south-western corner of the room. The trunk was represented by a number of vertebrae, some ribs, a sacrum fragment

and pelvis, all of which appeared to be largely *in situ*. There were also fragments of the arms. Most of the left femur and part of the right tibia remained. The position of these suggested that either the legs had been bent in a highly flexed position, or that the legs had been bundled post-mortem with the rest of the body. Clearly the burial had been disturbed, with the right femur being found towards the south-east corner of the room. The feet from this individual were found some 2.50 m away in the northern half of the room. One of the feet was found next to a cluster of pottery sherds which turned out to be the greater part of the pottery vessel (see below). The conjoining pottery fragments were found distributed across the room, perhaps indicating that there had been some linear pattern of disturbance.

The bones were not very well preserved and therefore it was not immediately possible to determine the precise age and sex of the individual, although it is estimated that the skeleton is of an adult aged approximately between 20–40 years. Assistance was subsequently provided by the Abu Dhabi Police Forensic Science Laboratory.

Among parts of the skeleton that were better preserved were several teeth. Three of these have now been examined by Lt. Col. Ahmad Hassan Al-Awadi, Director of the Forensic Science Laboratory, and Dr. Saeid M.E. Shawgi, Head of the Forensic Pathology Unit at Abu Dhabi Police Headquarters. Although the ancient DNA was not well preserved, Al-Awadi and Shawgi, using the latest forensic science techniques, were able to determine that the skeleton was a male from its DNA profile. Further studies on the skeleton are currently under way in the Forensic Science Laboratory.

Pottery

The most spectacular of the finds recovered from Room 1 was an almost complete pottery vessel. An initial sherd from this vessel was found in a sandy rubble deposit (Layer 56) whilst cleaning the base part of the section of the sondage. This layer was from Phase 3 in Room 1 and dated to the final use of the room. A further sherd from the same vessel was recovered from a layer of firm, grey sand (58), which was built up against the hearth deposit in the same phase. The remainder of the conjoining sherds were discovered in a rubbly layer (55) situated only 1.50 m away, next to an articulated foot from the skeleton. This layer was part of Phase 3, the post-occupation burial phase in Room 1. The same phase also had a plain undecorated sherd in a sand and rubble layer (45). A further, very eroded, sherd, decorated with a dotted line between nested chevrons, was

noted in Phase 4, the abandonment/collapse phase, amongst a layer of collapsed stones (43). This pottery vessel could well be a grave-good associated with the burial. It is characteristic for Ubaid-period burials to be accompanied by pottery.

The vessel is a high-necked jar with an intricate painted design on its exterior (Fig. 10). This jar has an estimated height of about 20 cm from rim to base, with a 4.5 cm tall neck and a rim diameter of 11.5 cm. As far as we can tell, this is the earliest, most complete, pottery vessel ever found in the United Arab Emirates. Whilst the form of the vessel, and to some degree its painted components, are clearly "Ubaid" in tradition, this vessel does not at first sight match previous Ubaid material found in the UAE or indeed elsewhere in the Arabian Gulf. Its fabric is rather grey in colour and is quite friable. Much of the other Ubaid pottery previously found in this area is more pale green in colour with a firm fabric. This, however, largely depends on the degree of firing to which it was exposed (Joan Oates, personal communication). However, the particular combination of painted design with nested chevrons, dotted lines between them on the body and inverted triangles on the neck, has not been previously found in eastern Arabia. Exact parallels for this vessel remain elusive. Judging from the three radiocarbon dates we have available from Area A, the deposits in which it is buried date to sometime between the mid-sixth to the first half of the fifth millennium BC.

Consultation with various specialists suggests diverse opinions and a number of interesting points. Single rows of dots between parallel lines occur in pottery as early as Ubaid 0 (Breniquet 1996: 191, pl. XX/1, 2, 10; 193, pl. XXII/C 89 65 1; Thissen 1996: 254, pl. 40/C 83 27 8; 274, pl. 65a; 277, pl. 68/C 85 60 5) and Ubaid 1 (Breniquet 1996: 178, pl. VII/1; 181, pl. X/6) from Tell Oueilli. Dots also occur on pottery from Khuzistan, e.g. at Choga Mish (Dan Potts, personal communication). The repeated dark inverted triangle decoration is, however, not usually a feature of the neck section — "Segment I" — but more usually forms the decoration on the main body part of the vessel — "Segment II or III" — (Thissen 1996: 216–217, figs 15–17). The jar is intriguing because of the combination of attributes on this particular form. Inverted triangles tend to be Ubaid 2–3/Susiana b–c, but it is not a common form of decoration on jar-necks. The combination of lines and dots tends to be later, but it is found on some Ubaid 2–3 "tortoise jars" (Henry Wright, personal communication).

It has been suggested that the vessel may come from the Ubaid 2 (Hajji Muhammad) phase, not because there

is an exact parallel, but because the flavour, the style of fussy painting, the colour, and the grammar of design all point in that direction (Abbas Alizadeh, personal communication).

Is it possible that the vessel originates not from southern Iraq but from the lowlands of south-west Iran, from the Early to Middle Susiana, the Sabz to Bayat phases? Sites contemporary with Ubaid 2 in the lowlands of south-west Iran, had pottery similar to the Hajji Muhammad style, perhaps due to the influence from the west which dated back to the end of the Samarran period. Middle Susiana period pottery, similar to Ubaid 3/4, is also known from Khuzistan. The general form and decoration of the vessel may provide hints of an Iranian origin, and it has some similar decorative elements to Khazineh phase (5500 BC) material (Joan Oates, personal communication). This combination of decoration does not have any exact parallels within the existing corpus of published pottery from Ubaid sites in Iraq (Sabah Jasim, personal communication). Elements of the decoration are present, however, on some other forms of vessels.

The vessel may be as early as Ubaid 1, or possibly Ubaid 2, and the chevron decoration, as well as parallel lines with dots between them, compare with those found in Ubaid 1 levels at Oueili (Breniquet 1996: 176, pl.V/2; Calvet 1987: 130–131, fig. 1), Ubaid levels at Eridu (Safar, Mustafa & Lloyd 1981: 207, level XVI no. 3; 211, level XVII nos 5, 26, and 27), as well as at Chigha Sabz from the Rumishkan region of western Iran (Ernie Haerinck, personal communication).

Work on the precise attribution of the pottery vessel is currently under way. A sherd from the vessel has been thin-sectioned and subjected to chemical analysis by Dr Sophie Méry (UMR 7041-CNRS, Paris). The fabric has also been sampled by Dr M. James Blackman (Smithsonian Center for Materials Research and Education, SCMRE, Washington, DC), who is undertaking instrumental neutron activation analysis (INAA) in the SCMRE facility, to compare it with known reference samples from different sites in Mesopotamia and Iran. The results of this analysis will be presented in due course (Méry, Blackman & Beech, in preparation).

Plaster vessels

A large number of fragments of plaster vessels were found within Room 1 (Fig. 14). Most were plain, although some had traces of pinkish-red and dark grey paint on the outside of them. Some were clearly pieces of quite large vessels with walls almost 1 cm thick. There were also some very fine fragments of plaster

vessels, which were only about 4 mm thick.

The only site in the Gulf region, apart from Marawah, where similar plaster vessels have been found is from the ADIAS excavations at the Ubaid period settlement on Dalma island. Some of these plaster vessel fragments have painted black chevrons and lines on them, as well as pink colouration (Carter, in preparation). Some of the fragments from Dalma have been analysed by Dr Louise Joyner (Department of Archaeology, Cardiff University, UK) when she was formerly employed in the Department of Scientific Research at the British Museum (Joyner 2001). Her work demonstrated that whilst most were manufactured from local gypsum, some were also made of lime plaster.

The tradition of using plaster is, of course, known from the early pre-Pottery Neolithic period in the Levant and Mesopotamia. Now that such plaster vessels have been found at two sites in the lower Gulf, Dalma and Marawah island, perhaps we are beginning to see that it is a genuine expression of a local tradition. It is fascinating that the peoples of the southern Gulf felt the need to manufacture such vessels and in particular, that the painted patterns on some of these apparently emulated the designs on the imported Ubaid pottery.

Lithics

A surprisingly low number of lithics have so far been excavated from MR11. In contrast to other Neolithic settlement sites in the Arabian Gulf, where debitage and tools are counted in thousands, only 128 pieces have been recorded to date. This is in contrast, for instance, with the site of DA11 on Dalma Island, where 35,589 pieces were collected (Kallweit, in preparation *a*), and the site of al-Buhais 18 in Sharjah Emirate, UAE, where around 50,000 pieces have been recorded (Margarethe Uerpman, personal communication). At the site of H3 at as-Sabiyah in Kuwait, around 10,000 pieces have been currently studied, out of a total excavated assemblage of around 50,000 pieces (Kallweit, in preparation *b*). The reason for the small number of lithics recovered from MR11 remains uncertain. A possible explanation could be the function of the excavated part of the site, which might not have been designed as a living area, as perhaps indicated by the presence of human remains. Another reason could be the lack of a natural source of suitable raw material on the island. Natural flint sources, mostly tabular flint, are known from Dalma and other islands as well as from the mainland of Abu Dhabi Emirate. Flint-bearing strata in these cases are tertiary limestone, and usually the flint is of poor quality, but homogenous fine-grained material does also occur. The

lithic assemblage resulting from the 2004 excavations at MR11 is characterized by a few arrowheads, cutting tools, and a number of flakes. The flint flakes are exclusively of blue-brown, translucent flint with a fine-grained texture, but in most cases a very thick, whitish patina covers the original colour. The flint is very similar to the material found on the coast of Abu Dhabi, embedded in tertiary deposits. A few flakes of presumably volcanic rock stones are also present. Seven arrowheads were recorded from MR 11 (Fig. 5). Six of them are trihedral. Their cross-section is clearly triangular, with all three faces being almost equally sized. Apart from one fragment (MR 11-51, Fig. 5/9), which is made of a reddish unidentified stone, all of the arrowheads are manufactured from a blue to grey-brownish coloured flint, covered by a thick, whitish patina. The only nearly complete preserved piece (MR11-82, Fig. 5/7) was heavily patinated, measured 34 mm in length, 8 mm in width with a thickness of 5 mm, and weighed 0.8 gm. An emphasized ridge on the back was shaped flat at the shoulder section. Two tiny barbs formed a T-shaped haft, while the right and left edges were slightly denticulated. The whole armature was curved towards the dorsal face, indicating a curved spall-like removal as the pre-form. The larger and smaller fragments MR11-341 (Fig. 5/6), MR11-57 (Fig. 5/4) and MR11-51 (Fig. 5/9) seem to be rather similar to MR11-82 (Fig. 5/7).

One large and flat fragment, MR11-140 (Fig. 5/5), made of opaque, beige, and greyish marbled flint, seems to be of another type. It is characterized by a biconvex cross-section and a careful parallel retouch on both faces.

Both types can be compared to other finds from various sites in the UAE. A large number of them have been reported from the contemporary site of MR1 on Marawah Island (Charpentier 2004; Charpentier, in preparation). Many trihedral arrowheads are also part of the so-called "Rothfels Collection", a private lithics collection donated to Al Ain Museum in the UAE. These are collected from various sites, including Yahar, in the Eastern Region of Abu Dhabi, mainly situated along the border with the Sultanate of Oman. Interestingly, this type is also common in the Yemen (Amirkhanov 1994: 226 and fig. 10/1-2, 4; Kallweit 1996: 90, Table 3, SaS1/8 and SaS1/14). Recently it has been demonstrated that this type of arrowhead is indeed very widespread throughout south-east Arabia, examples being found in the UAE, Oman, Saudi Arabia, and Yemen (Charpentier 2004). An example was also found at Wādī Wuṭayyah in level IV (first half of the fifth millennium BC), as well as being known in the lowest levels and surface contexts at Ra's al-Ḥamrā' (Uerpmann M 1992: 86, fig.

21b). Radiocarbon determinations published to date suggest that trihedral points in the UAE can be dated to the second half of the sixth millennium and the first half of the fifth millennium BC.

Let us now consider the other tools represented within the lithics assemblage from MR11. A piece of tabular flint with traces of work on one edge was also recovered, MR11-210 (Fig. 5/2). The raw material resembles the coastal Abu Dhabi flint described above. Its rough manufacture and poor flint quality indicate an *ad hoc* manufacture, and it most likely served as an unspecified cutting or chopping tool. Another interesting find, MR11-87 (Fig. 5/8), was made of a reddish brown, fine grained, presumably volcanic stone. The cross-section of the fragment is flat and biconvex, with both faces smoothed with straight but not sharp edges. Its two breaks and trapezoid shape could indicate that the piece is possibly a medial fragment from a willow-leaf shaped point.

The 2003 excavations conducted by Joseph Elders and John Martin recovered two further interesting lithic finds. MR11-15 (Fig. 5/10) is another type of arrowhead roughly resembling the trihedral type. Compared to the very thin elegant pieces described above, this type is thickset and its stem is nearly as large as its point. A ridge was present although it was less emphasized. MR11-13 (Fig. 5/1) is a large bifacially retouched, elongated point 10.5 cm in length and 3.3 cm maximum width. The delineation of its edges and shape are irregular. Together with its varying thickness, the dull edges indicate a semi-final stage of manufacture. Its rounded base and notches towards its base seem to point towards some sort of preparation for hafting, but the artefact does not seem to have been finished. A break on MR11-13 revealed a patina nearly 1 mm thick, covering a translucent, fine grained and homogenous brownish flint. The less patinated arrowhead seems to be manufactured from the same raw material. Both are rather similar to flint sources known from the coast of Abu Dhabi.

The total number of flint tools and debitage is far too low to draw far-reaching conclusions, but it is clear that the typology of the flints so far recorded matches other Neolithic sites known from the Gulf region. The other known Neolithic settlement site on Marawah, MR1, appears to be extremely rich in flint weaponry and tools (Charpentier 2004; Charpentier, in preparation). In this case, however, the flint is of various different colours and textures, reflecting its diverse origins. However, lithic assemblages on the islands of Abu Dhabi should be considered within their wider social and economic context. We now know that sophisticated boats were

already in existence in the Gulf during this early time period (Carter 2002). Sites located on the islands would have been in regular contact with the mainland and even with other coastal areas, so raw material as well as finished artefacts would have been introduced as a result of these contacts.

Beads and other artefacts

A total of 139 beads were recovered. The majority of these ($n=136$) came from Area A, Room 1. Three examples were recovered from Area B. A preliminary catalogue of these beads has been made by Karen Cooper (ADIAS). They were generally made from marine shell, although there were a few which may be of coral, and several of stone. Most were extremely small, just a few millimetres in size, although there were also a few larger and longer tubular beads made of limestone. The beads are similar to those found at other late sixth- or early fifth-millennium BC sites in the UAE such as site DA11 on Dalma island (Flavin & Shepherd 1994: 131, fig. 10; King 1998: 90, pl. 45) and al-Buhais 18 in Sharjah (Kiesewetter, Uerpmann H-P & Jasim 2000: 139–141, figs 2–5).

Two buttons made from pearl-oyster shell with double perforations were amongst the most delicate and beautiful finds from the site (Fig. 12). A very similar pearl button with double perforation was found at Al Khor in Qatar (Nayeem 1998: 215, fig. 7). Similar artefacts have also been noted at the Ubaid-related site of H3 at As-Sabiyah site in Kuwait (Carter & Crawford 2002: 2, fig. 2). The tradition of making jewellery from mother-of-pearl has also been observed in different forms elsewhere, e.g. the bay-leafed pendants at Al-Buhais 18 (Kiesewetter, Uerpmann H-P & Jasim 2000: 141, fig. 6), as well as the artefacts from the somewhat later shell middens at sites RH5 and RH10 at Ra's al-Hamrā' near Muscat (Biagi, Maggi & Nisbet 1989; Coppa *et al.* 1985: 99, fig. 1 and pl. 3; Santini 1987).

Other finds at MR11 included a couple of other small pieces of worked shell, one of which may be the shaft of a fish-hook. A bone awl made from an ovicaprid/gazelle metapodial was also uncovered in one of the main occupation layers (61) in Room 1.

Food remains

The remains of food consumed by the inhabitants included bone fragments from sheep or goat, dugong, and marine turtle, as well as various types of fish including sawfish, requiem shark, grouper, emperor and sea bream (Fig 15). A small quantity of crab remains has been

noted to date, some of which include chelae fragments from portunid crabs. Bird bones as well as eggshell fragments occurred in a number of layers throughout the site. This suggested that they may have formed an occasional part of the diet. Shellfish were also collected and these included predominantly the bivalve species, *Asaphis violascens*, the gastropod species, *Lunella coronata*, and pearl-oyster, *Pinctada* spp. The shell remains are to be studied at a future date by Emily Glover. No archaeobotanical remains have been retrieved to date, with the exception of small fragments of charcoal, which remain as yet unstudied.

Concluding remarks

The MR11 site provides a dramatic new insight into the life of early Neolithic coastal communities in the southern Arabian Gulf. It is clearly an important new discovery. We find ourselves asking more questions than receiving answers as we begin to analyse and process the results of the recent excavation.

The unique architecture that was discovered does not have any obvious parallels with other sites in south-east Arabia. The quality of the build of the walls at site MR11 is really quite striking if compared to the Neolithic building structures already known in the Gulf from sites such as H3 at As-Sabiyah in Kuwait (Carter *et al.* 1999; Carter & Crawford 2001, 2002, 2003), Al Qannas (Inizan 1988a: 129, 219), sites 29 and 38 in the Hawar islands (Crombé, De Dapper & Haerincx 2001: 149), Ras Abaruk 4b (de Cardi 1978: 182), Shagra (Inizan 1988b: 101, 214–215; figs. 47–48), Dalma island (Beech & Elders 1999; Beech, Elders & Shepherd 2000) and Kharimat Khor Al Manahil (Kallweit, Beech & Al-Tikriti 2005). If one considers evidence of building structures on the Omani coast, then Suwayh SWY-11 is one of the most ancient habitation sites with stratified levels on the Oman coast. A number of man-made structures were identified, including one described as being delimited by large angular stones (Charpentier *et al.* 2000: 74). At the nearby site of Suwayh SWY-1 a circular stone structure was also noted (Charpentier, Marquis & Pelé 2003: 16, fig. 6). Interestingly, as at MR11, this site was transformed towards the end of its occupation into a funerary area, and a number of skeletons were excavated there.

Further work is currently under way on the finds from the 2004 season. The beautiful decorated jar, like the structure it was found in, does not have any exact parallels in this region. Work is in progress on attempting to source the origin of this jar using neutron activation analysis (Méry, Blackman & Beech, in prepara-

tion).

Studies on the skeleton from MR11 are continuing. The only other known Neolithic coastal site with associated human burials in the United Arab Emirates is the midden and cemetery in Umm al-Qaywayn excavated by Carl Phillips (2002). Here a number of skeletons were identified, although no building structures were noted.

More excavations are planned for March 2006. It is intended that a geophysical investigation of the other mounds and general site area will be carried out using techniques such as magnetometry and ground penetrating radar, in collaboration with the Birmingham Archaeology Unit in the UK. This will help to inform the strategy for future excavation seasons at the site.

AREA	CONTEXT	TYPE OF SAMPLE	RADIOCARBON AGE BP	LAB CODE	CALIBRATED RADIOCARBON DATE BC (2 sigma)	DELTA 13C REL. PDB
A	58 (sample 283)	charcoal	6750 +/- 40 BP	SUERC-3612	5724 - 5618 CalBC (0.952) 5578 - 5563 CalBC (0.048)	- 23.1 o/oo
A	55 (sample 195)	charcoal	6675 +/- 40 BP	SUERC-3608	5663 - 5647 CalBC (0.052) 5644 - 5512 CalBC (0.927) 5497 - 5485 CalBC (0.021)	- 23.4 o/oo
B	26 (sample 16)	ashy soil	5850 +/- 50 BP	SUERC-1181 (GU-11460)	4833 - 4822 CalBC (0.016) 4807 - 4580 CalBC (0.959) 4569 - 4552 CalBC (0.025)	- 15.3 o/oo
A	32 (sample 17)	ashy soil	5630 +/- 50 BP	SUERC-1182 (GU-11461)	4550 - 4350 CalBC (1.000)	- 15.7 o/oo

PHASE	CONTEXTS	DESCRIPTION	BEADS & BUTTONS	LITHICS	PLASTER VESSELS	POTTERY	OTHER FINDS
Phase 4 Abandonment/Collapse	35	Loose brown sand and rubble		arrowhead (51)			
	37	Loose brown sand and rubble		2 flint flakes (52 & 55)			
	43	Collapsed stones layer	21 beads, including 10 white shell, 6 black 7-coral beads, 4 made from Dentalidae, and one from Spondylus	3 arrowheads (59, 57 & 62); Hammer-stone fragment (68); flint flake (86); stone spatula (87); stone fragment (108); black stone fragment, 4 flint flakes	14 body fragments	sherd with dotted lines in between nested chevrons (134)	Worked shell fragment = part of fish hook (120)
Phase 3 Post-occupation/Burial Room 1	45	Sand and rubble	Pearl oyster button (119); 21 beads, including 13 white shell beads, 6 black 7-coral beads and 2 made from Dentalidae	Black stone fragment (143); flint flakes (167 & 169); 9 flint flakes	17 body fragments, 1 with grey painted stripe	plain undecorated sherd (176)	
	54	Human burial (HB1) male skeleton on stone platform	4 black 7-coral beads	2 flint flakes	33 body fragments including 1 with black decoration, 2 with grey and 1 with pink decoration		
Labcode: SUERC-3608 Radiocarbon age: 6875 ± 40 BP Calibrated range (2 sigma): 5663-5465 CalBC	55	Sandy Rubble layer	14 beads, including 5 black 7-coral beads, 8 shell beads and one from Spondylus	Black stone fragment (143); flint flakes (167 & 169); 9 flint flakes	346 body fragments, including 304 plain fragments, one of which has a big plus 7 with black decoration, 18 with grey, 1 with grey and pink, and 16 with pink decoration	* Group of 12 sherds (179)	
	56	Sandy Rubble layer — last phase of use of structure			29 body fragments, including 2 with black and 1 with black and pink decoration	* sherd (72)	
Phase 2 Main occupation Room 1	57	Sandy layer	4 white shell beads	Black stone fragment (235); black stone fragment, 2 flint flakes	39 body fragments, including 2 with pink decoration		
Labcode: SUERC-3612 Radiocarbon age: 8750 ± 40 BP Calibrated range (2 sigma): 5724-5563 CalBC	58	Sandy layer	10 beads, including 7 white shell beads, 2 black 7-coral beads and one from Spondylus	Flint (le knits (210); Worked stone fragment (294); 5 flint flakes	43 body fragments, including 3 with pink decoration	* sherd (287)	
	59	Sandy layer	5 white shell beads	Hammerstone fragment (285); flint flake (285); flint flake	21 body fragments including 1 with pink decoration		
	60	Sandy layer	5 beads, including 3 white shell beads, one black 7-coral bead and one made from an as yet unidentified clear crystal	Dark stone flake (202); flint flake	20 body fragments, including 2 with grey decoration, 1 with pink, and 1 with both pink and grey decoration		
	61	Sandy layer	Pearl oyster button (228)	Flint flake	47 body fragments, including 1 with pink and 1 with grey decoration		bone awl (271)
	62	Sandy layer			124 body fragments, including 115 plain fragments, 7 with grey decoration, 1 with black and 1 with pink decoration		
Phase 1 Pre-dating the building	63	Hearth	2 beads, one black 7-coral bead, and one made from Dentalidae		4 body fragments, including 2 with grey and 1 with black decoration		

FIGURE 14. A summary of the archaeological finds from MR11 (2004 season).²

PHASE	CONTEXT	DESCRIPTION	MARINE SHELL	BIRD BONE	DUGONG BONE	FISH BONE	MAMMAL BONE (TERRESTRIAL)	SMALL MAMMAL BONE	TURTLE BONE	OTHER INVERTEBRATE FINDS
Phase 4 Abandonment/Collapse	35	Loose brown sand and rubble	Asaphis violascens, Lunella coronata	bird bone						
	37	Loose brown sand and rubble	Asaphis violascens, Lunella coronata, Pinctada spp.	bird bone						
	43	Collapsed stones layer	Acrostegia lacunosa, Anadara ehrenbergi, Asaphis violascens, Lunella coronata, Pinctada spp.	25 bird bones	Tooth fragment	requiem shark, sea bream including many otoliths	sheep/goat/gazelle-sized limb bone fragments	many small mammal bones		2 crab claws bird eggshell
Phase 3 Post-occupation/Burial Room 1	45	Sand and rubble	Asaphis violascens, Lunella coronata, Pinctada spp.	16 bird bones		seawife, grouper, jack, sea bream including many otoliths	sheep/goat/gazelle-sized limb bone fragments	small mammal bones	Carpapce fragment	Crab claw bird eggshell
	54	Human burial (rib 1), adult male skeleton on stone platform	Asaphis violascens, Lunella coronata, Pinctada spp.	15 bird bones		grouper, sea bream including otoliths	sheep/goat/gazelle-sized limb bone fragments	small mammal bones		bird eggshell
Labcode: SUERC-3608 Radiocarbon age: 6675 ± 40 BP Calibrated range (2 sigma): 5663-5685 CalBC	55	Sandy Rubble layer	Asaphis violascens, Lunella coronata, Pinctada spp.	6 bird bones		requiem shark, sea catfish, grouper, sea bream including many otoliths	sheep/goat/gazelle-sized limb bone fragments	small mammal bones	Carpapce fragments	5 crab claws bird eggshell
	56	Sandy Rubble layer — last phase of use of structure	Asaphis violascens, Lunella coronata, Pinctada spp.	3 bird bones		requiem shark, sea bream including otoliths	sheep/goat/gazelle-sized limb bone fragments	small mammal bones	Carpapce fragments	
Phase 2 Main occupation Room 1	57	Sandy layer	Asaphis violascens, Marceia flammula, Pinctada spp.	bird bone		requiem shark, sea bream including otoliths	sheep/goat/gazelle-sized limb bone fragments	small mammal bone	Carpapce fragments	bird eggshell
	58	Sandy layer	Asaphis violascens, Lunella coronata, Pinctada spp.	8 bird bones	two rib fragments (302)	requiem shark, sea bream including many otoliths	sheep/goat/gazelle-sized limb bone fragments	small mammal bones		Crab claw (Portunus spp.) bird eggshell
Labcode: SUERC-3612 Radiocarbon age: 6750 ± 40 BP Calibrated range (2 sigma): 5724-5653 CalBC	59	Sandy layer	Asaphis violascens, Lunella coronata, Pinctada spp.		no fragment	sea bream including otoliths	sheep/goat/gazelle-sized vertebrae fragments	two small mammal bones	Carpapce fragment	Crab claw (Portunus spp.) bird eggshell
	60	Sandy layer	Asaphis violascens, Lunella coronata, Pinctada spp.	3 bird bones		sea bream including otoliths	Unidentified mammal bone fragments	small mammal bones		bird eggshell
Phase 1 Pre-dating the building	61	Sandy layer	Asaphis violascens, Lunella coronata, Pinctada spp.	15 bird bones		requiem shark, grouper, sea bream including otoliths	sheep/goat/gazelle-sized limb bone fragments	small mammal bones		crab claw
	62	Sandy layer	Asaphis violascens, Lunella coronata, Marceia flammula, Pinctada spp., Spondylus marginatus	bird bone	scapula (236), rib (228)	requiem shark (pic. 5 complete teeth), grouper, sea bream including otoliths	sheep/goat/gazelle-sized limb bone fragments	small mammal bones	Carpapce fragments	crab claw
	63	Hearth	Spondylus marginatus, Asaphis violascens, Lunella coronata, Pinctada spp.	bird bone		sea bream including otoliths	burnt sheep/goat/gazelle-sized rib fragment	small mammal bones		bird eggshell

FIGURE 15 A summary of the environmental finds from MRI1 (2004 season).³

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Notes

- ¹ Note: all the radiocarbon dates are AMS dates from the Scottish Universities Environmental Research Centre (SUERC) Radiocarbon Dating Laboratory. Calibrated radiocarbon dates are presented using the 2-sigma values, which account for 95.4 % of the probability of the date falling within that particular range. All samples are calibrated using CALIB4.4 and the atmospheric terrestrial calibration curve of Stuiver, Reimer & Braziunas 1998; and Stuiver *et al.* 1998.
- ² This is a preliminary summary of material, which highlights some of the key finds occurring within some of the major layers in each phase at the site. Numbers given in brackets indicate the registration numbers assigned to finds. The sherds listed in bold with an asterisk are those which join together to form the almost complete vessel (Fig. 10).
- ³ This is based on a preliminary scan of material by Dr Mark Beech and is by no means a complete list of the taxa represented. It nevertheless highlights common taxa occurring within some of the major layers in each phase at the site. Numbers given in brackets indicate the numbers assigned to finds.

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