

C14 dating of Iron Age hearths on the island of Rufayq, Abu Dhabi

by Peter Hellyer and Mark Beech

Introduction

During late 1998 and early 1999, the Abu Dhabi Islands Archaeological Survey, ADIAS, undertook an archaeological baseline study of parts of the concession area of the Abu Dhabi Company for Onshore Oil Operations, ADCO, part of the Abu Dhabi National Oil Company, ADNOC, Group of companies.

Among areas examined was the Dabb'iyah oilfield, west of Abu Dhabi, where a number of archaeological sites were identified. These included sites on the island of Rufayq, among which were a number of stone lined fireplaces (1).

In discussion with ADCO, it was decided to collect carbon samples from fireplaces at RU-2 and from another, more extensive, group of fireplaces at RU-5, so that these samples could be submitted for Carbon 14 dating, in order to determine the age of the sites.

Samples were collected in April 2000 by Dr. G.R.D. King (Academic Director, ADIAS), Miss Philippa Loates (Field Archaeologist, ADIAS) and PH from the following fireplaces:

- Site RU-2.2
- Site RU-2.3
- Site RU-5.1
- Site RU-5.2

The samples were divided into two parts, a control sample from each site, (held by ADIAS in its Abu Dhabi office) and a sample for testing. The test samples were shipped to the United Kingdom in June 2000 for radiocarbon dating.

Results

(by Mark Beech)

Radiocarbon dating of the four charcoal samples from archaeological sites on Rufayq was carried out by the Scottish Universities Research and Reactor Centre, SURRC, of the University of Glasgow.

Calibrations were made using the University of Washington Quaternary Isotope Laboratory Radiocarbon Dating Programme Rev. 4.0; 1998. The decadal atmospheric calibration curve is used throughout and the calendar age ranges, obtained from the intercepts method (Method A), are expressed at both the one and two sigma levels of confidence.

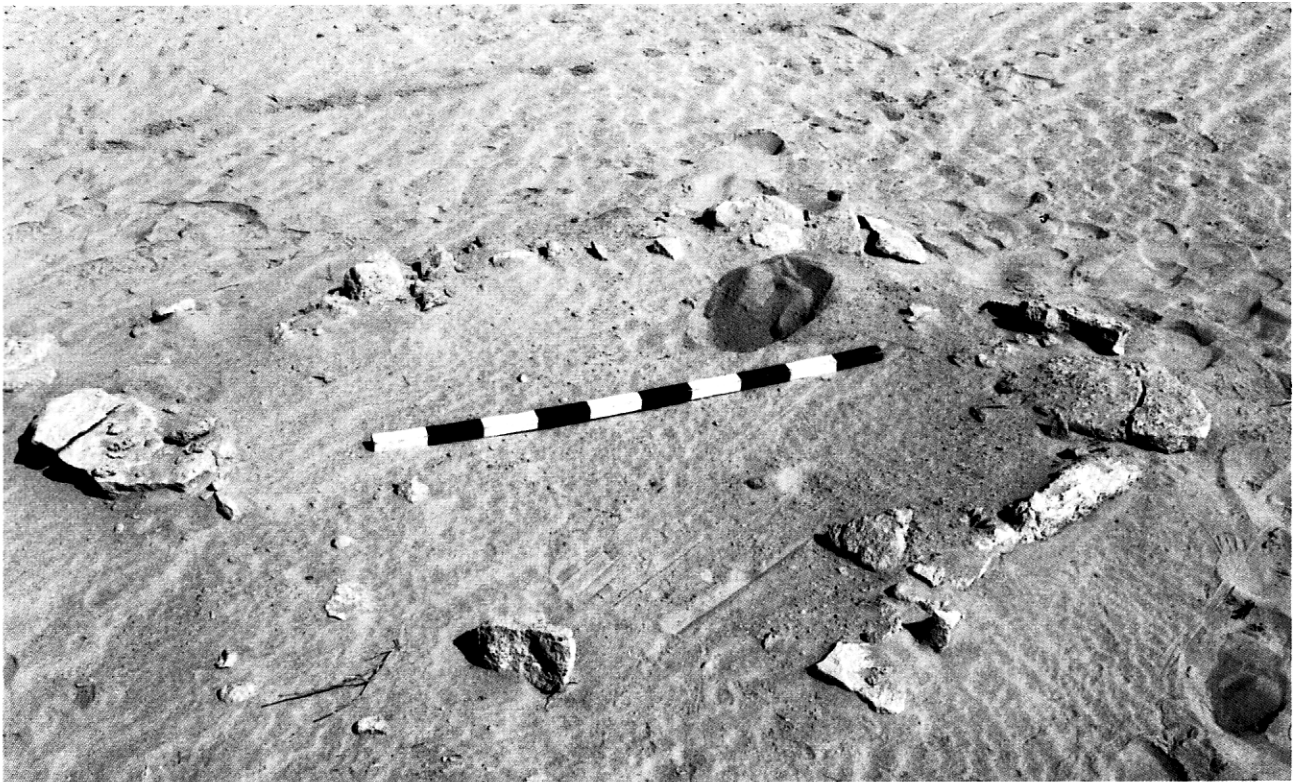
The results were as follows.

Sample Reference: Rufayq Site RU-2.2

Sample Code: GU-9156
Delta 13C rel. PDB = -22.0%
Radiocarbon age BP (Before Present) = 2790 +/- 70
Calibrated age range:
1 sigma cal BC 1105-834, cal. BP 2955 – 2784
2 sigma cal BC 1187-805, cal BP 3137-2755

Sample Reference: Rufayq Site RU-2.3

Sample Code: GU-9157
Delta 13C rel. PDB = - 20.9%
Radiocarbon age BP = 2890 +/- 110
Calibrated age range:
1 sigma cal BC 1259 – 917, cal BP 3209 – 2867
2 sigma cal BC 1405 – 817, cal BP 3355 – 2767



The Iron Age hearth at Rufayq Site RU-2.2. *Picture: Peter Hellyer*

Sample reference: Rufayq Site RU-5.1

Sample Code: GU-9158
Delta 13C rel. PDB = - 20.6%
Radiocarbon age BP = 2800 +/- 50
Calibrated age range:
1 sigma cal BC 1003 – 898, cal BP 2952 – 2847
1 sigma cal BC 1108 – 829, cal BP 3057 – 2778

Sample Reference: Rufayq Site RU-5.2

Sample Code: GU-9159
Delta 13C rel. PDB = - 22.5%
Radiocarbon age BP = 2480 +/- 60
Calibrated age range:
1 sigma cal BC 782 – 411, cal BP 2732 – 2361
2 sigma cal BC 798 – 401, cal BP 2748 – 2351

Discussion

All four samples produced dates that fall within the local Iron Age, which is generally considered to have lasted from c. 1300 BC to 300 BC, or 3300 BP to 2300 BP (2). Results from RU-2.2, RU-2.3 and RU-5.1 all fall within the range of periods Iron Age I/II (1300 BC to 600 BC). The result from RU-5.2 falls in the Iron Age II/III period, 1100 BC to 300 BC).

These results provide the first securely dated evidence of Iron Age occupation on the islands west of Abu Dhabi, although Iron Age metal weapons have been excavated from burial cairns at Bitashar, a mesa a few kilometres inland, south west of Jebel Dhanna (3).

As such, they provide an important addition to understanding of former patterns of occupation on the islands of Abu Dhabi.

A brief description of the two sites involved, RU-2 and RU-5 is appropriate.

Site RU-2 is a group of six fireplaces and raised sub-circular mounds (probably concealing fireplaces), situated adjacent to an eroded outcrop lying at the inner edge of an area of sand and near-*sabkha* immediately above present day High Water Mark, on the western side of the island of Rufayq. During the Iron Age, sea level may have been slightly above current High Water Mark, and the site would then have been adjacent to the coast.

Site RU-5 lies on top of a raised area of rock to the northwest of Site RU-2, approximately 50 metres in from the current High Water Mark. In excess of twenty hearths as well as other features have been identified in this area, which, again, would have been adjacent to the coast during the Iron Age period.

The hearths or fireplaces are generally constructed of slabs of available rock inserted vertically into the sandy substrate, forming circular, sub-circular or near-rectangular shapes. In some cases, there are larger low sub-circular mounds with pieces of rock present on the surface, this rock often showing evidence of having been subjected to high temperatures. Excavation by ADIAS of such mounds on other islands, (e.g. Liffiyah and Balghelam) have shown them to conceal larger, rectangular fireplaces.

Such hearths have been identified by the Abu Dhabi Islands Archaeological Survey on many of the islands of Abu Dhabi, including the island of Abu al-Abyadh, immediately to the west of Rufayq (4), and also on the island of Qusabi, to the east of Rufayq, and also within the area of ADCO's Dabb'iya field (5). Some have also been identified on the Abu Dhabi coastline, although in far fewer numbers. In all, over 500 of such hearths have been located by ADIAS.

A few have also been identified by the Department of Antiquities and Tourism in the Diwan of The Ruler's Representative in Abu Dhabi's Eastern Region at Ghanadha, northeast of Abu Dhabi, where at least one was ascribed an Iron Age date of 2470 +/- 100 BP (6).

The number of hearths varies greatly from site to site. In some cases, (as at RU-2), there are only a few hearths present. In other cases, the number may be significantly greater. The largest known grouping of such hearths is on the island of Marawah, where Site MR-9 has in excess of 150 hearths, while a group of 30+ hearths has been identified on the island of Balghelam (Site BG-5/6). Site RU-5 is the third largest group thus far identified.

Carbon 14 dating has previously been undertaken on hearths from Sites MR-9 and BG-5/6. These have produced a wide range of dates, from c. 2000 BC to c. 200 AD, but all of the dates from these hearths have fallen either in the Bronze Age, (c. 3000 BC to 1300 BC) or in the Late pre-Islamic period (300 BC to 630 AD). Thus the Rufayq results have filled in the gap that previously existed for the Iron Age period.

Examination of the structures of these hearths has thus far suggested that all are of similar construction, suggesting that the same technology and style was utilised over a period of at least 2000 years. Oral information (7) and evidence from the island of Abu al-Abyadh (8) suggests that the same types of hearth were used well into the Late Islamic period, perhaps as recently as 40 - 50 years ago.

The relative consistency of the radiocarbon results from Site RU-2, where there are, in any case, only a small number of hearths, are sufficiently close for it to be suggested that the site may have been used over only a relatively limited period. It is possible that the site was abandoned as a result of a slight change in sea level, although there is, as yet, no data to confirm such a hypothesis.

Analysis of the Rufayq ceramic assemblage by Dr. Robert Carter offers a range of dates. The few sherds from RU-2, (all in association with RU-2.1, and, unfortunately, not with, RU-2.2 or 2.3), are probably Barbar (i.e. late third/early 2nd millennium BC) and Late pre-Islamic. The two sherds of pottery from RU-5 are both from RU-5.1, and are more likely to be Barbar than Iron Age, although precise identification is not possible. Probable Late pre-Islamic or Early Islamic material is present at RU-6, close to RU-5, while Late Islamic material is the majority of the RU-6 assemblage and is also present at other sites on the island, such as RU-3 and RU-7.

Altogether, the ceramic assemblage from Sites RU-2, RU-3, RU-5 and RU-6 suggest occupation of this part of Rufayq over a period of more than 4000 years.

The absence of Iron Age pottery at any of the Rufayq sites implies, however, that this period may have been largely aceramic on the island, although not necessarily on other islands or the coastline.

Conclusion

Hearth/Fireplace sites such as those of RU-2 and RU-5 are rarely accompanied by datable ceramics or other artefacts. Moreover, as is the case with the major site BG-5/6 and RU-5, they are often situated in areas where geographical factors (e.g. proximity to a sheltered coastline) mean that they would have been favoured for settlement over a long period. The presence of Late Islamic ceramics on such sites, which have also produced much earlier dates from radiocarbon dating is, therefore, not a reliable dating tool.

Moreover, the results of radiocarbon dating carried out on samples from fireplaces on Marawah and Balghelam, referred to above, have indicated that a wide date range can be obtained from sites which are similar in appearance.

In consequence, even if ceramics are present, the dates of such sites can only be determined with confidence through the carrying out of radiocarbon dating of charcoal.

The results from the dating of samples from Sites RU-2 and RU-5 confirm the importance of carrying out such dating, with the Iron Age dates obtained being of major

importance in confirming the continuity of occupation on the islands of Abu Dhabi during a period that is still little understood.

Acknowledgements

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Mr. Nicholas Cochrane-Dyett, Deputy Chief Representative of British Petroleum, Abu Dhabi, arranged for the shipping to the United Kingdom of the samples from the fireplaces. Dr. Robert Carter provided information on the ceramic assemblage collected at the Rufayq sites.

References

1. King, GRD, Hellyer, P. & Aspinall, SJ [1999]. *An Archaeological Baseline Study of the ADCO oilfields. A Final Report to the Abu Dhabi Company for Onshore Oil Operations, Vol. 1.*
2. Magee, P. [1996]. *The Chronology of the Southeast Arabian Iron Age.* *Arabian Archaeology and Epigraphy* 7: 240-252.
3. Vogt, B., Gockel, W., Hofbauer, H. & Al-Haj, A.A. [1989]. *The Coastal Survey in the Western province of Abu Dhabi, 1983.* *Archaeology in the United Arab Emirates, Vol. V, 1989, pp.*

49-60.

4. Hellyer, P. Hull, D. & Rowland, S. [2001]. *An Archaeological Survey of the island of Abu al-Abyadh. A preliminary report.* ADIAS unpublished report, 93 pp.
5. See King, Hellyer & Aspinall [1999].
6. Al Tikriti, W.Y. [1985]. *The Archaeological Investigations on Ghanadha island, 1982, 1984. Further Evidence for the Coastal Umm an Nar Culture.* *Archaeology in the United Arab Emirates, Vol. IV, pp. 9 – 19.*
7. Darwish Juma al-Rumaithi, a local fisherman, has indicated that he used such hearths on the island of Balghelam in the 1950s and/or 1960s (Al Rumaithi, *pers. comm*, 1997).
8. A small circular hearth with a piece of Late Islamic pottery used in its construction has been identified by ADIAS on Abu al-Abyadh (Hellyer *et. al.*, 2001.)
9. See ceramic analysis by Dr. R.A. Carter in King, Hellyer & Aspinall, [1999].

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A newly recognised Iron Age site near Jabeeb, Al Ain, U.A.E.

by Brien Holmes

The presence of Iron Age settlement in the area between the city of Al Ain, in the Eastern Region of the Emirate of Abu Dhabi, and Dhaid, in the Emirate of Sharjah, in areas that are now covered in sand and unsuitable for agriculture is well attested. Immediately north of Al Ain, the Iron Age village at Rumailah has walls that were still standing to a height of two metres when excavated in the 1980s, although it was completely covered with sand. Further north, near the rocky outcrop of Qarn bint Saud (or Bida bint Saud), the presence of an Iron Age *falaj* (pl. *afaj*) and village has been proven by recent excavations carried out by Dr. Walid Yasin al-Tikriti, Archaeological Adviser at the Department of Antiquities and Tourism in Abu Dhabi's Eastern Region. On the al-Madam plain, south of Dhaid, another Iron Age settlement concealed beneath the sand has been the focus of recent excavations carried out by the Autonomous University of Madrid, in association with the Sharjah Directorate of Archaeology, part of the Department of Culture and Information.

In the intervening areas, evidence of an Iron Age *falaj* was identified in the 1980s by Dr. al-Tikriti in the Jabeeb area, more than fifty kilometres north of Al Ain, although it has not yet been published.

With the exception of Rumailah, the sites above mentioned all have *falaj* irrigation systems, now dried up, although they are a considerable distance from the Hajar Mountains, which provide the sources of water for the *afaj* of the villages in the Al Ain/Buraimi area. All are now also largely covered, often to a depth of two metres or more, by mobile sand dunes. It has been presumed that, during the Iron Age, there were supplies of underground water close enough to the surface to be tapped by *afaj*, these supplies perhaps being supplemented by greater rainfall than there is today.

With a declining water table, and perhaps a decline in rainfall, the *afaj* would have dried up, agriculture would have become increasingly unproductive and the settlements abandoned. The sand dunes would then have moved in to cover much of the settlement area, although remains of them, including artefacts such as potsherds, remained visible in areas of inter-dunal plains.

During weekend forays from Al Ain over the last few years, I have been able to locate numerous archaeological sites in the inter-dunal plains to the north of Al Ain. Many of these have yielded pottery of Late Islamic date, and may represent simple, but frequently re-visited, camp-sites comparable to one identified in the late 1970s by the Emirates Natural History Group near Al Khatam, on the route from Al Ain to Abu Dhabi.

In late 1999, I ventured into the Jabeeb area, exiting the Al Ain - Dubai highway at the Jabeeb overpass, which provides access to recently-established farms on either side of the highway. The route to the west was taken, towards an area where the sand dunes are higher, and the track is more substantial, due to the presence of numerous camel-camps and a small five-kilometre training track for camel-racing.

I returned to an area where I had previously located an iron object which was initially assessed as being a piece of jewellery, but which, on further study, seemed to resemble a key. The 'key' itself had been found on an inter-dunal gravel plain, surrounded for the most part by sand dunes. To the north-west, however, a flat promontory about the size of two football fields rose several metres above the floor of the plain.

On the surface of the promontory was an extensive scatter of potsherds, so thick that in many places it was almost impossible to walk without treading on them.