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The origin and development of the oasis landscape of al-ᶜAin (UAE)

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Summary

This paper constitutes a brief review of the archaeological evidence for the origin and development of the oasis landscape of al-ᶜAin, prompted by the inscription of the cultural sites of al-ᶜAin on the list of UNESCO World Heritage sites in June 2011. For the purposes of this review our definition of an oasis is based on the existing form found in al-ᶜAin, characterized by artificially watered sunken basins supporting intensive palm cultivation. The recent excavations by the Abu Dhabi Authority for Culture and Heritage (ADACH) at the Bayt Bin ᶜĀtī al-Darmakī produced the most complete archaeological sequence to have been published from the al-ᶜAin (Buraimi) oasis. This offers fresh insights into the ceramic chronology of al-ᶜAin which can be applied to the developing landscape.

The distribution of known settlement sites and residual ceramics suggests that from the Bronze Age onwards, there appears to have been a general tendency of settlement to expand from the north-east to the south-west of al-ᶜAin. Although date stones were found in Bronze and Iron Age settlements, we note that no evidence for palm cultivation has been found prior to the late Islamic period. The concept of prehistoric date-palm oases, which appears in the archaeological literature, represents a retrospective and a historic projection of the present oasis landscape into the remote past.

We present new evidence from Bin ᶜĀtī and other sites excavated by ADACH in the al-ᶜAin oases, which suggests that many of the sunken date-palm gardens and associated underground water channels (*aflāj*, sg. *falaj*) were cut in the late Islamic period, and that the present oasis landscape was a product of this activity. Archaeological and historical evidence is then brought together to trace the development of the oases through the late Islamic period to the present day.

Keywords: oasis landscape, al-ᶜ*Ain*, Bin ᶜĀtī, sunken date-gardens, late Islamic period

Introduction

The inscription of the cultural sites of al-ᶜAin on the list of UNESCO World Heritage sites in June 2011 prompted this brief review of the archaeological evidence for the origin and development of the oasis landscape of the city. For the purposes of this review, our definition of an oasis is based on the existing form found in al-ᶜAin, i.e. artificially watered sunken basins supporting intensive palm cultivation. The recent excavations at the Bayt Bin ᶜĀtī al-Darmakī (Fig 1/F) in Qaṭṭārah oasis are the key to understanding this process, for the site produced 5 m of stratigraphy divided into eleven horizons reaching from the late twentieth century to the beginning of the first millennium BC (Power & Sheehan 2011*a*). Iron Age, late pre-Islamic, and early, middle, and late Islamic occupations were revealed, constituting the most complete sequence to have been published from the al-ᶜAin (Buraimi) oasis. Bin ᶜĀtī therefore offers fresh insights into the ceramic sequence of al-ᶜAin and as such provides a new basis for understanding the development of the historic landscape.

The site is particularly important in that it allows us to extend the ceramic sequence beyond the Bronze and Iron Ages, which have hitherto received most attention. Some 30,000 sherds were retrieved during excavation and subjected to the quantification methodology used by Derek Kennet in his now seminal publication of the Raʾs al-Khaimah pottery (2004). This approach has been adapted according to the dictates of the Bin ᶜĀtī material, wherein a number of new types were identified and established typologies refined (Power & al-Kaabi 2012). Excavation at other large development projects and during conservation work on historic buildings located throughout the al-ᶜAin oases allowed the Bin ᶜĀtī sequence to be refined, an ongoing process which will eventually be published as a handbook to the ceramics of al-ᶜAin (Figs 2–4).

Equipped with a refined understanding of the post-Iron Age ceramic sequence, the known archaeological

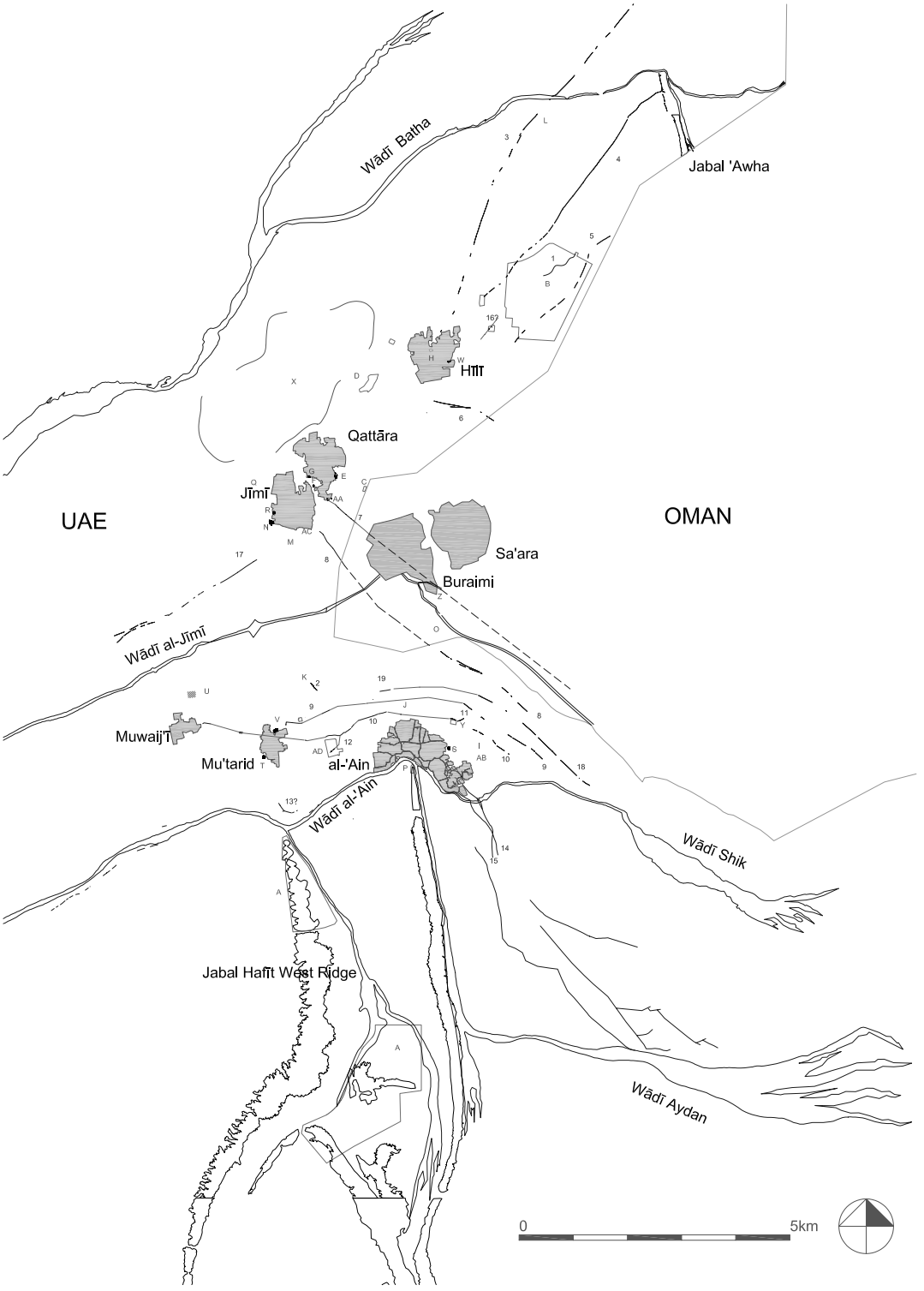

Figure 1. *A plan of the oasis landscape of al-ᶜAin showing the sites and aflāj mentioned in the text. The letters and numbers correspond to those in Figure 2.*

Fig. 2	Site	Type	Oasis	HAF	UAN	WSQ	IA 2	IA 3	PIR	EI	MI	LI 1	LI 2
A	Ḥafīt Tombs	Tomb	N.A.										
B	Ḥīlī	Settlement	N.A.										
C	Qaṭṭārah	Tomb	N.A.										
D	Rumaylah	Settlement	N.A.										
1	Hīlī 15	*Falaj*	N.A.										
E	ʿAbd Allāh b. Sālim	Tower House	Qaṭṭārah										
F	Bin ʿĀtī	Tower House	Qaṭṭārah										
G	Bin Biduwah	Tower House	Qaṭṭārah										
H	Bin Hādī	Tower House	Hīlī										
I	Kuwaitāt	Site/*falaj*?	al-ʿAin										
J	Town Centre	Site/*falaj*?	al-ʿAin										
K	ʿAwd al-Tawbah	Settlement	N.A.										
2	ʿAwd al-Tawbah	*Falaj*	N.A.										
L	ʿUwayr	Tower	N.A.										
M	Al-Khrais	Settlement	Jīmī										
N	Bin Jabr	Enclosure House	Jīmī										
O	Qaṣr al-Sudairī	Fort	Ḥamāsa										
P	Nagfa Ridge	Site	al-ʿAin										
Q	Muraijib	Tower House	Jīmī										
R	Jīmī Western	Enclosure House	Jīmī										
S	Qalʿat Sulṭān	Fort	al-ʿAin										
T	Bin Surūr 1	Enclosure House	Muʿtariḍ										
U	Qaṣr al-Muwaijʿī	Fort	Muwaijʿī										
3	al-Hīlī	*Falaj*	Hīlī										
4	al-Raki	*Falaj*	Hīlī										
5	al-Ghashabī	*Falaj*	Hīlī										
6	'Camel market'	*Falaj*	Hīlī										
7	al- Qaṭṭārah	*Falaj*	Qaṭṭārah										
8	al-Jīmī	*Falaj*	Jīmī										
9	al-Muʿtariḍ	*Falaj*	Muʿtariḍ										
10	al-Muwaijʿī	*Falaj*	Muwaijʿī										
11	al-Murabbaʿ	*Falaj*	al-ʿAin										
12	al-Jāhilī	*Falaj*	al-ʿAin										
13	al-Hazāʿ	*Falaj*	al-ʿAin										
14	al-Dawūdī	*Falaj*	al-ʿAin										
15	al-ʿAinī	*Falaj*	al-ʿAin										
V	Bin Surūr 2	Enclosure House	Muʿtariḍ										
W	Bin Huḍaibah	Tower	Hīlī										
X	al-Masʿūdī	Settlement	N.A.										
Y	Murabbaʿ	Fort	al-ʿAin										
Z	Qaṣr al-Khandaq	Fort	Buraimi										
AA	Daramka Tower	Tower	Qaṭṭārah										
AB	Ḥiṣn al-Nayyādāt	Fort	al-ʿAin										
AC	Aḥmad b. Hilāl	Enclosure House	Jīmī										
AD	Qalʿat Jāhilī	Fort	al-ʿAin										
16	al-Hinyāmī	*Falaj*	Hīlī	Uncertain									
17	Unknown	*Falaj*	W. Jīmī	Uncertain									
18	al-Kuwaitāt	*Falaj*	Uncertain	Uncertain									
19	al-ʿAin City	*Falaj*	Uncertain	Uncertain									

Key

Colour Scheme	Degree of Occupation	Features	Approximate Quantity of Ceramics
	Uncertain	Insufficient dating evidence or insufficiently examined but suggested date range indicated	
	Trace	No anthropogenic features	< 10 sherds
	Low	Some anthropogenic features	10s of sherds
	Moderate	Semi-permanent structures	100s of sherds
	High	Permanent structures	1000s of sherds

Dates *Note that all dates given are only approximate. There are several lacunae in the sequence which need to be addressed.*

HAF	UAN	WSQ	IA 2	IA 3	PIR	EI	MI	LI 1	LI 2
Ḥafīt	Umm al-Nār	Wādī Sūq	Iron Age 2	Iron Age 3	Pre-Islamic	Early Islamic	Middle Islamic	Late Islamic 1	Late Islamic 2
3000 BC	2700 BC	2000 BC	1100 BC	600 BC	300 BC	AD 800	AD 1000	AD 1500	AD 1800
2700 BC	2000 BC	1300 BC	600 BC	300 BC	AD 400	AD 1000	AD 1500	AD 1800	AD 1950

Figure 2. *A flow chart showing the chronological distribution of known sites and the development of the oasis landscape.*

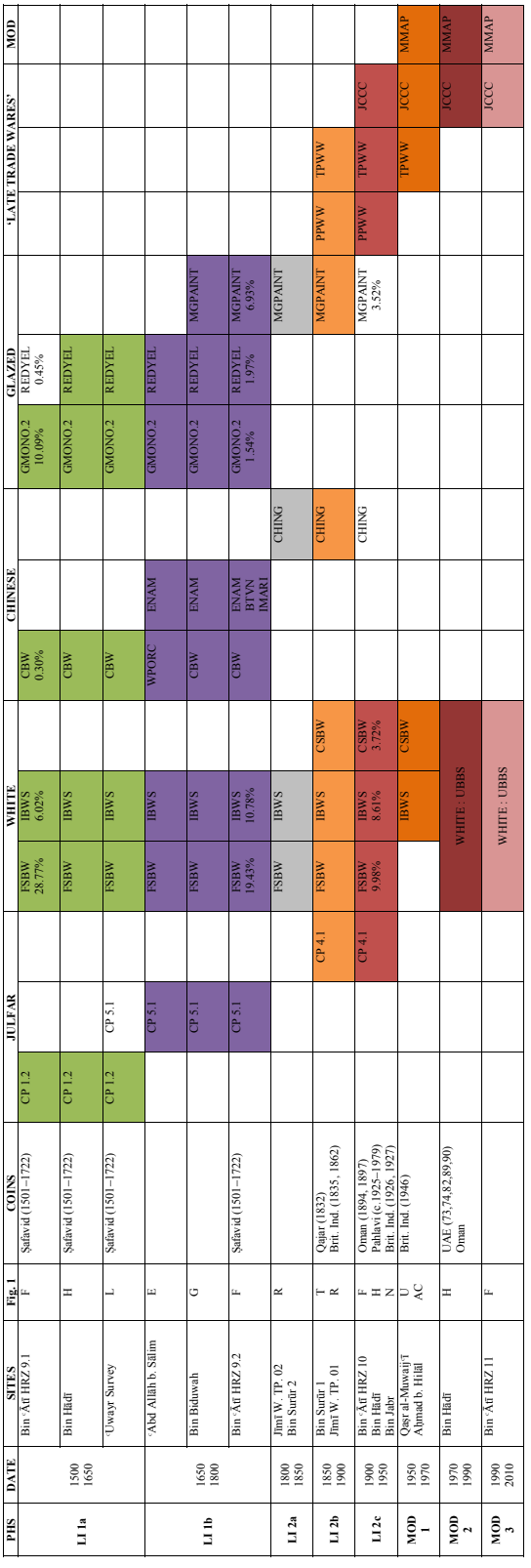

Figure 3. *A flow chart showing the late Islamic ceramic sequence of al-ʿAin.*

sites and the associated dating evidence have been plotted on the topographical layers of the al-ʿAin Municipality base map alongside the main features of the landscape (see Fig. 1). Two summary observations immediately became clear. First, periods of greater and lesser activity can be observed in the ceramic sequence. These may be characterized as episodes of 'Bedouinization' and 'sedentarization'. Subsistence strategies employed by individual groups living in a peripheral environment may shift, over time, along a sliding scale between poles of nomadic pastoralism and sedentary agriculturalism (Johns 1994). Since shifting subsistence strategies and levels of economic development produce different landscapes, it cannot simply be assumed that the present landscape was an autochthonic natural entity or the timeless inheritance of remote antiquity, but rather the product of a fluid and reflexive discourse between humans and the natural world.

Second, there appears to have been a general tendency of settlement to expand from the north-east to the south-west. Prehistoric settlement apparently clusters in the northern oasis zone, which is to say the area north of the east–west flowing Wādī al-Jīmī including the oases of Hīlī, Qaṭṭārah, Jīmī, Ḥamāsah, and Buraimi. In general, pre-Islamic sherds represent the earliest material found in the southern oasis zone, namely the area north of Wādī al-ʿAin, comprising the oases of Muwaijʿī (Muwayjiʿī), Muʿtariḍ, and al-ʿAin. Iron Age material, however, has been retrieved from the Nagfah ridge (Fig. 1/P) and Mezyad (Mazyad) road (al-Tikriti, personal communication). Medieval and late Islamic sherds are subsequently found throughout all the oases (Figs 1 & 2). The geomorphology of al-ʿAin remains very poorly known and lack of information about the changing wadi systems is a particular problem. Quantities of silt and a possible sub-soil were found at Bin ʿĀtī overlying the natural sand gravels. These silt deposits were cut by multiple phases of an Iron Age field system, suggesting that a wadi or palaeo-channel may once have flowed in the vicinity, bringing silts down from the Ḥajar mountains.

The prehistoric landscape, *c.*3000–300 BC

This review focuses on the period after 3000 BC for, as yet, there is no archaeological evidence relating the present oasis landscape to isolated finds of Neolithic (8000–4000 BC) encampments and flint scatters along the eastern flank of Jabal Ḥafīt. Its only clear relationship to the cairn burials of the Early Bronze Age Ḥafīt culture (3200–2700 BC) is

FSBW	Fine Striated Buff Ware	WPORC	White Porcelain
PRBW	Perpendicular Rim Buff Ware	ENAM	Enamelled Porcelain
CSBW	Coarse Striated Buff Ware	CBW	Chinese blue-and-white
IBWS	Incised Buff WareS	BTVN	Batavian
JULFAR	Julfār Ware	IMARI	Imari
KHUNJ	Khunj / Bahlā Ware	TPWW	Transfer Printed White Ware
GMONO.2	Green Monochrome Glazed Ware	WILLOW	Willow Pattern
REDYEL	Red-Yellow Glazed Ware	PPWW	Polychrome Painted White Ware
MGPAINT.2	Underglaze Painted Manganese Purple Glazed Ware	JCCC	Japanese / Chinese Coffee Cups
MMAP	Modern Mugs & Plates	UBBS	Unidetified Buff Body Sherds

Figure 4. *Late Islamic ceramic types of al-ᶜAin.*

the location of the latter 'on the rocky ridges overlooking the cultivated areas' (Cleuziou 1996: 160).

All the known Bronze Age settlements cluster to the north-east of the present Hīlī oasis, although we may also note the Wādī Sūq period tomb to the east of the Qaṭṭārah oasis (Fig. 1/C). There appears to be an increase in the number of sites and the total inhabited area in the Iron Age, which continues to include Hīlī in the north-east and now stretches south-west to the Qaṭṭārah oasis. The distribution of Iron Age residual sherds found in late Islamic deposits is significant in this regard. Considerable residuality is attested in the Hīlī and Qaṭṭārah oases, although it is considerably less in the southern oasis zone (Figs 1 & 2). Iron Age settlement therefore appears to concentrate in the northern oasis zone.

Roughly 8500 Iron Age sherds were identified at Bin ʿĀtī, of which the vast majority were of recognisably Iron Age II (*c.*1100–600 BC) with some Iron Age III (*c.*600–300 BC) material. In general, the Iron Age assemblage from Bin ʿĀtī resembles that of Rumaylah (Benoist 1998). It is possible that the agricultural and industrial activity found at Bin ʿĀtī reflects the economic hinterland supporting Iron Age settlement in al-ʿAin.

Two discrete phases of Iron Age industrial activity were found at Bin ʿĀtī. First, a large basin 18 m long by 1.5 m deep was cut through the friable gravels to expose the impermeable bedrock. A series of square tanks connected by shallow channels was cut into the sloping rock surface. These tanks were fed by a well located at the top of the slope. They contained no residual fill and their purpose is unknown. We have argued elsewhere that they were associated with the washing of copper ores (Power & Sheehan 2011*a*: 270–272). A second phase produced about 2500 pieces of copper slag and crucible fragments weighing 50 kg. This activity may have constituted a re-exploitation of earlier copper-processing waste.

Between the industrial phases, two distinct Iron Age agricultural systems were found at Bin ʿĀtī. In the northern part of the site, a series of circular tree pits fed by a well was found in a large sunken basin, representing the reuse of an earlier industrial installation for agricultural purposes. The root bowls were too small for date-palm cultivation and it seems instead that a small tree or bush was grown. To the south an open field system was revealed, characterized by an arterial irrigation ditch connected to overflow basins feeding gullies. Two large wells were found, of which the larger was 3 m wide by 4.5 m deep, and which produced two complete vessels, including an Iron Age II bridge-spouted jug. Bin ʿĀtī is the only known site that has produced direct evidence for agriculture and industry in the al-ʿAin oases and attests to a changing economic base in which there is no evidence for date cultivation.

This is somewhat at odds with the previous understanding of the origin and development of the al-ʿAin oases. Serge Cleuziou made an analogy between Bronze Age Hīlī and the present-day oases of Oman, wherein 'we may imagine that some plants were grown in the shade of these palm trees (e.g. melon) while cereals were cultivated during winter in the surroundings' (1982: 19). Date stones were found at Hīlī 8 and on this basis Cleuziou came to believe that already by 3000 BC there were 'palm tree oases watered by sophisticated irrigation systems, while the steppic surrounding environment was exploited by sheep and cattle-herding' (Cleuziou & Tosi 2007: 143; cf. Cleuziou 1996: 159). Walid al-Tikriti writes that 'large fields must have been cultivated and the landscape of the (Iron Age) oases cannot have been very different from what it was before the recent oil-boom era' (2002: 137). Such statements represent retrospective projections of the present date-palm oasis onto the past for which there is only indirect evidence. The first direct evidence for the date-palm oases comes from the late Islamic period, raising the possibility that the oases of al-ʿAin are a more recent phenomenon than has hitherto been supposed.

The pre-Islamic landscape, *c.*300 BC–AD 800

A number of Parthian glazed ware sherds together with a complete green-glazed bowl similar to types found at Mleiha in Sharjah were found at Bin ʿĀtī, which probably date to between the late second and third century AD. Two complete turquoise glazed jars have previously been retrieved from watching briefs in central al-ʿAin, including one from a deep *falaj* (pl. *aflāj*), which represents the earliest material from the al-ʿAin oasis itself. Parthian glazed ware of this kind is found in quantity in the UAE from the first century BC and reaches a peak in the third to early fourth centuries AD (de Paepe et al. 2003: 209, 212, fig. 4/3; Kennet 2004: 29–31; Mouton 2008: 40–41, 65–66, 94–97, 127–128). Late pre-Islamic activity is therefore attested in both the northern and southern zones of the al-ʿAin oases.

The presence of late pre-Islamic material and general lack of Iron Age finds may imply that the area of settlement now extended still further to the south to incorporate the vicinity of the present al-ʿAin oasis for the first time. It is possible that *aflāj* were being used at this time, although the finds from the fills of *aflāj* probably contain a good

deal of washed or residual material and must be carefully considered if they are to be used as dating evidence (Fig. 2).

The medieval Islamic landscape, *c.*800–1500

A growing number of sites of the early and middle Islamic periods have been found. Excavations by al-Tikriti at ᶜAwd al-Tawbah (Fig. 1/K) north of Muᶜtariḍ oasis, revealed a mud-brick mosque near a *falaj*. A ^{14}C date range of *c.*1150–1350 was retrieved from charcoal samples taken from baked bricks in the roof of the *falaj*, while the fill produced turquoise alkaline glazed sherds together with Iron Age and late Islamic types. Al-Tikriti suggested that both the *falaj* and mosque date to the mid-eighth century (al-Tikriti 2002: 119–137; 2003: 16–17; 2011: 126–130: cf. Petersen 2009: 67). Recent excavations by the Historic Environment Department of Abu Dhabi Authority for Culture and Heritage (ADACH) at the site uncovered two houses associated with early Islamic pottery (al-Tikriti 2011: 130), the plans of which recall a similar settlement at Jumayrah and, more generally, the well-known Umayyad and early Abbasid castles (pl. *quṣūr*, sg. *qaṣr*).

Two phases of post holes interpreted as an early Islamic *ᶜarīsh* settlement were found at Bin ᶜĀtī. Over 600 sherds were retrieved from these phases including quantities of readily identifiable types dating from the eighth to tenth centuries (Power & Sheehan 2011*a*: 275–276). Glazed types include turquoise alkaline glazes, white tin glazes, white tin glazes with black decoration, splashed ware, and some early sgraffiato. Unglazed types include eggshell and possibly proto-Julfār ware, together with an apparently unpublished and possibly local cooking pot dubbed 'soft plain brown ware'.

A limited number of eleventh- to thirteenth-century sherds were found at Bin ᶜAtī. Single surface sherds of sgraffiato have been found at the Nagfah ridge (Fig. 1/P) south of the al-ᶜAin oasis and by Andrew Petersen at the site of the Qaṣr al-Sudairī (Fig. 1/O) in Buraimi, built after 1853 by the Wahhābī *nāʾib* Turkī b. Sudairī (Petersen 2009: 70–71; Kelly 1964: 83). The sgraffiato sherds are in fact almost certainly residual although they are nevertheless important as indicators of medieval activity in the broader area. Evidence for the eleventh to thirteenth centuries is much less frequently encountered than for the eighth to tenth centuries, which might imply a wider decline of activity in the al-ᶜAin oases. Certainly this seems to be the case for the fourteenth to fifteenth centuries, for no instances of Persian blue speckled ware or Longquan celadon have been identified in the al-ᶜAin oases. The 'Hormuzi boom' identified by Kennet on the basis of the Raʾs al-Khaimah sequence does not therefore appear to have extended from the coast into the interior (Kennet 2003: 121–122; cf. Petersen 2009: 71; Power & Sheehan 2011*a*: 276).

The late Islamic I landscape, *c.*1500–1800

The depth of stratigraphy, large ceramic sample size, and use of a quantified methodology has allowed a revised chronology for the late Islamic period to be developed on the basis of the Bin ᶜĀtī assemblage. There are two main periods, dubbed 'late Islamic I' and 'late Islamic II', which are principally distinguished by the imported component. A number of hypotheses have been put forward on the basis of these findings which are now being targeted by further archaeological fieldwork. These results should allow us to refine considerably the provisional chronology presented here and will be included in the forthcoming handbook to the ceramics of al-ᶜAin.

The late Islamic Ia (*c.*1500–1650) is characterized by the presence of Julfār cooking pot 1.2 and a green monochrome glazed ware imitating celadon (Figs 3 & 4). A small amount of Chinese blue-and-white is attested although this may be intrusive. Ṣafavid (*c.*1501–1736) coins are quite commonly found in association with this assemblage, although unfortunately only low denominations and therefore undated instances have thus far been retrieved. The architecture of these periods is dominated by the tower house, a three-storey tower usually situated in one corner of a large walled courtyard, including the late Islamic Ia Bin ᶜĀtī (Fig. 5), Bin Hādī (Fig. 1/H), Bayt ᶜAbd Allāh b. Sālim (Fig. 1/E), and Bayt Bin Biduwah (Figs 1/G, 5, 7).

The late Islamic Ia sherds retrieved from Bin ᶜĀtī and Bin Hādī were associated with architectural tumble and wind-blown sand, indicative of abandonment. Bin Hādī remained abandoned until the nineteenth century. Speculation as to the causes of the ruin of certain tower houses at the close of the late Islamic Ia may be elucidated with reference to historical sources. The Ibāḍī chronicles state that the al-ᶜAin (Buraimi) oasis was occupied by Imām Nāṣir b. Murshid al-Yaᶜribī (r. 1625–1640). We hear of two *wālī*s or governors appointed over the oases, Muḥammad b. Sayf al-Hawhānī and Aḥmad b. Khalf, who were actively involved in the defence of the oases from the Banī Hilāl of al-Ḥasāʾ. Events came to a head in *c.*1633, when 'the chief wālī... came with an army from Nizwā, and ordered the demolition of all the forts

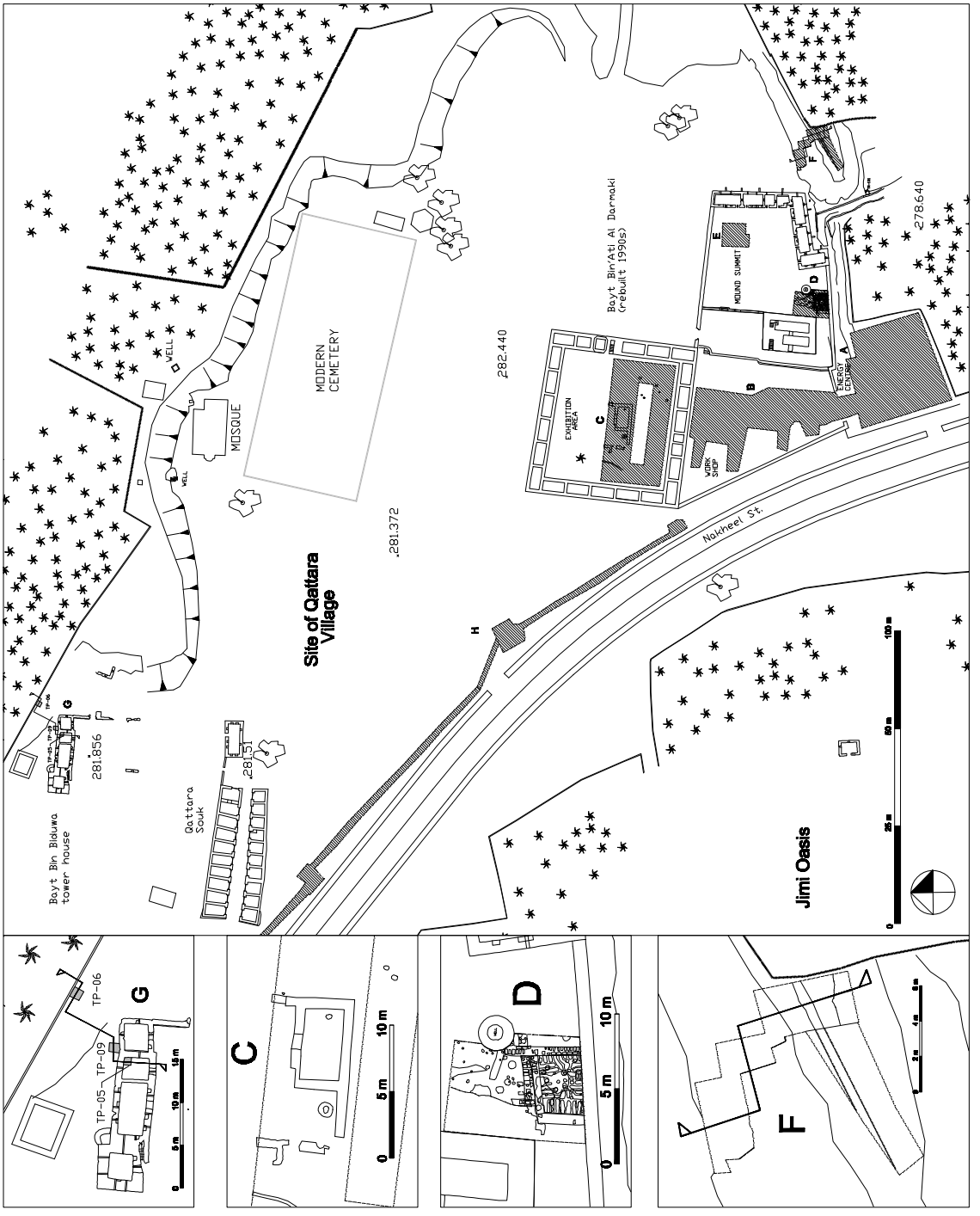

Figure 5. *A general plan of the Qaṭṭārah mound area, showing archaeological investigations by ADACH 2009–2011.* **A–E.** *The excavation areas at the Bayt Bin ʿĀtī al-Darmakī;* **F–G.** *the position of the two sections through the edge of the mound shown in Figures 6 & 7;* **H**. *the sewer line excavation monitored in March 2011.*

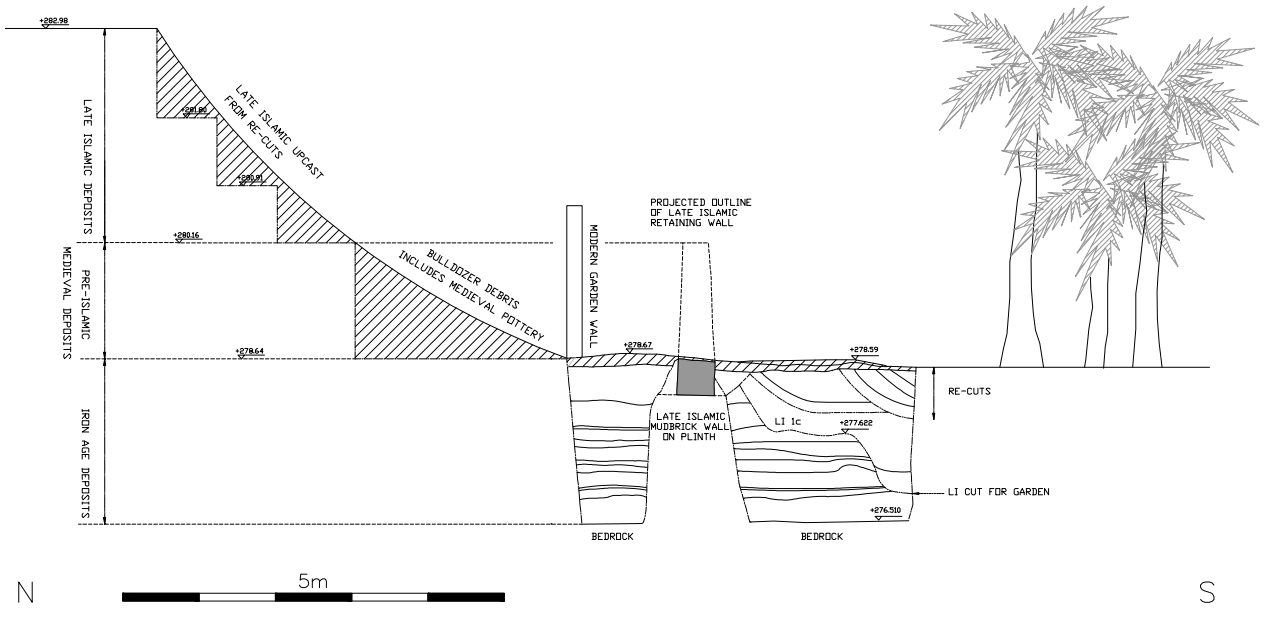

Figure 6. *A schematic section through the south-east mound at Qaṭṭārah. This shows the remains of the late Islamic retaining wall and the associated excavation for the palm-garden cutting through horizontal Iron Age and pre-Islamic deposits.*

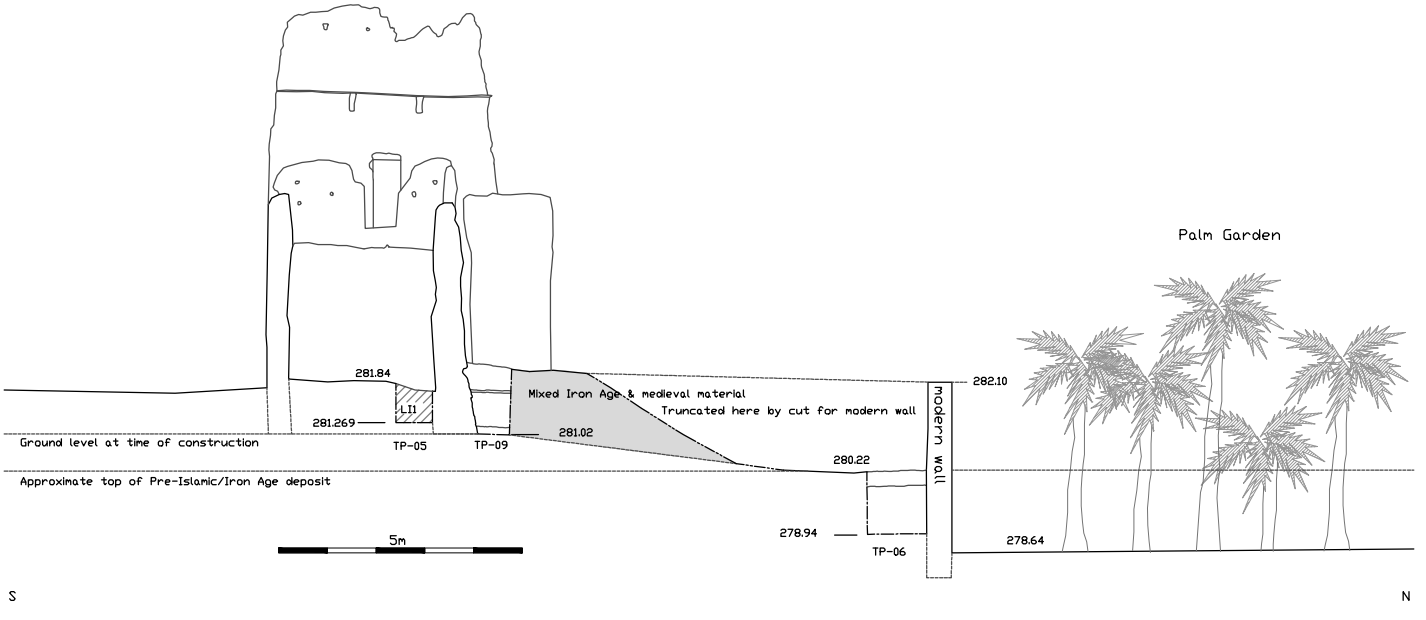

Figure 7. *A schematic section through Bayt Bin Biduwah. This shows the deposits noted in this area in relation to the sunken date-palm garden.*

Period		*ᶜUmān*	*Ẓafrah*	*Events*
Late Islamic Ia	**1500**	al-Nabāhinah	Banī Jābir	1498, Portuguese round Cape of Good Hope & arrive at Calicut
	1510	1500–1529, Muḥammad b. Ismaᶜīl		1507, Portuguese arrive in Gulf & in 1510 capture Goa
	1520			1515, Portuguese capture Hormuz
	1530	1529–1560, Barakāt b. Muḥammad		1521, Portuguese capture Bahrain & kill ruler of the Banī Jābir
	1540			1538, Portuguese defeat Ottomans & capture Diu (India)
	1550			1548, Ottomans capture Aden & in 1552 capture Muscat
	1560	1560–1624, ᶜAbd Allāh b. Muḥammad		1565, Ottoman expedition to Acheh (Sumatra)
	1570			
	1580			
	1590			1587–1629, Shāh ᶜAbbās I. In 1602 captures Bahrain & in 1614 establishes Bandār ᶜAbbās
	1600			1600, English East India Company established & in 1602 Dutch East India Company (VOC) established
	1610			1619, Dutch established base at Batavia (Jakarta)
	1620	Yaᶜāribids (*c.*1624–1744)	Āl Hilāl (early 17th century)	1622, Ṣafavids & English (British) expel Portuguese from Hormuz
	1630	1624–1649, Naṣir b. Murshid	*fl.* 1633, Nāṣir b. Kātan	1633, Yaᶜāribids destroy forts of al-ᶜAin/Buraimi oases
	1640			1643, Yaᶜāribids expel Portuguese from Ṣuḥār & in 1644 Ming dynasty overthrown in China
Late Islamic Ib	**1650**	1649–1688, Sulṭān I b. Sayf		1650, Yaᶜāribids expel Portuguese from Muscat
	1660			1659, Dutch expel Portuguese from Ceylon (Sri Lanka)
	1670			1668, British establish base in Bombay & also in 1668 Ottomans capture Basra
	1680			
	1690	1692–1711, Sayf I b. Sulṭān		
	1700			1698, Yaᶜāribids expel Portuguese from Mombasa & capture Zanzibār
	1710	1711–1719, Sulṭān II b. Sayf		
	1720	1719–1724, Sayf II b. Sulṭān #1		1722–1744, Omani civil war
	1730	1728–1743, Sayf II b. Sulṭān #2		1737–1744, Afshārid occupation of Oman. Army marches through al-ᶜAin/Buraimi oasis
	1740	Āl Bū Saᶜīd (*c.*1744–present)		1744, Āl Bū Saᶜīd overthrow the Yaᶜāribid dynasty
	1750	1744–1778, Aḥmad b. Saᶜīd		
	1760		Āl Nahayyān (*c.*1761–present)	1761, Traditional date for foundation of Abu Dhabi. (Dubai established in *c.*1799)
	1770		1761–1793, Dhiyāb b. ᶜIsā	1780, Āl Bū Saᶜīd gain control of Bandar ᶜAbbās & in 1783 gain control of Gwadar
	1780	1783–1792, Ḥamad b. Saᶜīd		1780–1784, Fourth Anglo-Dutch War results in decline of Dutch East India Company
	1790	1792–1804, Sulṭān b. Aḥmad	1793–1816, Shakhbūt b. Dhiyāb	1792, Āl Bū Saᶜīd establish Banī Jābir as vassals in al-ᶜAin/Buraimi oases
Late Islamic IIa	**1800**	1806–1856, Saᶜīd b. Sulṭān		1800–1819, First Wahhābī occupation of al-ᶜAin/Buraimi oases
	1810			1819–1821, British capture Raʾs al-Khaimah & in 1822 conclude General Maritime Treaty
	1820		1818–1833, Ṭahnūn b. Shakhbūt	1824, Destruction of 'the towers at Buraimi' by the Naᶜīmāt to appease Āl Bū Saᶜīd
	1830		1833–1845, Khalīfah b. Shakhbūt	1833–1839, Second Wahhābī occupation of al-ᶜAin. 1837 Zanzibār capital of Āl Bū Saᶜīd
	1840		1845–1855, Saᶜīd b. Ṭahnūn	1845–1850, Third Wahhābī occupation of al-ᶜAin/Buraimi oases
Late Islamic IIb	**1850**			1853–1869, Fourth Wahhābī occupation of al-ᶜAin/Buraimi oases
	1860	1856–1866, Thuwaynī b. Saᶜīd	1855–1909, Zāyid b. Khalīfah	1861, Zanzibār becomes independent under subsidiary branch of Āl Bū Saᶜīd
	1870	1871–1888, Turkī b. Saᶜīd		1868, Āl Bū Saᶜīd of Oman lose control of Bandār ᶜAbbās
	1880			1887, Banī Yās defeat Naᶜīmāt revolt in al-ᶜAin/Buraimi oases
	1890	1888–1913, Fayṣal b. Turkī		1891, Banī Yās take village of ᶜAin al-Ẓawāhir in al-ᶜAin/Buraimi oases
Late Islamic IIc	**1900**			1896, *Farizah* agreement between Oman & Banī Yās in al-ᶜAin/Buraimi oases
	1910	1913–1932, Taymūr b. Fayṣal	1912–1922, Ḥamdān b. Zāyid	1913, Wahhābīs capture al-Ḥasāʾ from the Ottomans. 1914–1918, WWI & rise of America
	1920		1922–1926, Sulṭān b. Zāyid	1922, British succeed in ending East African slave trade
	1930	1932–1970, Saᶜīd b. Taymūr	1926–1966, Shakhbūt b. Sulṭān	1930, Great Depression & Japanese cultured pearls ends Gulf pearl industry
	1940			1939–1945, WWII & end of British Empire. 1946–1947, Arab-Israeli War & creation of Israel
M 1	**1950**			1952–1955, 'Buraimi Dispute' & 1958 Oman cedes Gwadar to Pakistan
	1960			1963, Zanzibār revolution results in exodus of Arabs to Oman. 1967 Arab-Israeli War
M 2	1970	1970–present, Qābūs b. Saᶜīd	1966–2004, Zāyid b. Sulṭān	1971, Creation of United Arab Emirates & 1973 Arab-Israeli War causes rise in oil prices
	1980			
M 3	1990			
	2000			

Key. M = Modern era

FIGURE 8. *Ceramic chronology and historical events.*

of al-Jaw, except that of the imām, and the enemies were dispersed' (Sirḥān Ibn Saᶜīd 1984: 53). The apparent abandonment of the tower houses in the late Islamic Ia period broadly fits with the events described in the chronicles.

Late Islamic Ib (*c.*1650–1800) is characterized by the prevalence and variety of 'Gulf Glazed Wares' and mostly Chinese porcelain imports (Figs 3 & 4). Glazed wares include Bahlā (Khunj), green monochrome, manganese purple, and red-yellow, of which the last two types may be dated to the post-al-Maṭāf period (after 1600). East Asian imports include Chinese enamelled porcelain, Meissen porcelain, Batavian ware, and Imari ware, all dateable to the first half of the eighteenth century. These types were retrieved in only limited quantities from the tower houses, implying that occupation may have ceased sometime after the sixteenth century. The date-press trench located immediately to the east of the Bin ᶜĀtī tower (Fig. 5/D) testifies to a late Islamic Ia abandonment of the site. Another trench located to the north of the tower revealed a single storey courtyard house (Fig. 5/C) built and abandoned within the late Islamic Ib, a period marked by the Omani civil war (*c.*1724–1744) and Afshārid invasion (*c.*1737–1744) (Fig. 8).

The late Islamic I period provides the first archaeological direct evidence for intensive date-palm cultivation in al-ᶜAin. A strong case for the origins of the present landscape of date-palm oases being placed in the sixteenth to eighteenth centuries can be made quite explicitly at a number of sites:

(i) The earliest evidence for date-palm cultivation is the corpus of date presses (*madābis*, sg. *madbasah*) found at almost every tower house so far examined. Finds from deposits overlying the date presses at Bin ᶜĀtī (Fig. 5/D) and Bin Hādī produced late Islamic Ia material attesting to a broadly sixteenth- to seventeenth-century abandonment.

(ii) A stepped profile of a sunken palm garden was found, cutting undisturbed Iron Age deposits in the south-east mound area of Bin ᶜĀtī in the Qaṭṭārah oasis (Figs 5/F & 6). Late Islamic Ib sherds were found in the fill directly overlying the cut for the sunken palm garden, including manganese painted ware and green monochrome glazed ware (Fig. 4). The garden was therefore probably created shortly before the seventeenth century, and may in fact be contemporary with the date press and Bin ᶜĀtī tower.

(iii) At the Bayt Bin Biduwah tower house, at the northern end of the same elevated mound on which Bin ᶜĀtī stands and which represents the site of the former village of Qaṭṭārah, a test pit (TP-09) showed about 1.5 m of sandy material deposited against the exterior of the north wall of the building (Figs 5/G & 7]). Finds inside the house from TP-05 consisted of late Islamic Ia ceramics, while the material from TP-09 contained a mix of late Islamic and residual material, including Iron Age, late pre-Islamic, and early and middle Islamic sherds (Fig. 2). Intact Iron Age deposits were noted at broadly the same level as those in the south-east mound trench during excavation of a further test pit (TP-06) to the north of Bin Biduwah, against the modern boundary wall that has replaced the earlier mud-brick retaining wall of the oasis. The approximate ground level at the time of construction of the Bin Biduwah house, indicated by the level of the bottom of its walls, suggests that the mixed multi-period upcast material found in TP-09 may have been redeposited during excavation for the palm garden below the level of the top of pre-Islamic deposits on the site. Subsequent work for a new sewerage line along the western edge of the site (Fig. 5/H) has confirmed the top of these broadly horizontal pre-Islamic deposits on the site to be generally around 280 m above mean sea level.

(iv) The ruined Jīmī Western house (Fig. 1/R) in the oasis of the same name was built abutting the enclosure wall of a date-palm garden. A date for the terminal occupation is provided by plausibly late Islamic IIa sherds (*c.*1800–1850) retrieved from the uppermost layer of degraded mud-brick tumble mixed with wind-blown sand. These further provide a *terminus ante quem* of the first half of the nineteenth century for the construction of the garden wall and confirm that the garden was established in the preceding late Islamic Ib.

The dating of the palm gardens to the sixteenth to eighteenth centuries logically implies that the majority of the *aflāj* were cut at this time (Figs 1 & 2). The creation and utilization of the *aflāj* produced a series of associated elements in the landscape, ranging from the access shafts

for the underground sections to the upcast mounds created by the excavation of the palm gardens. The *aflāj* also directly influenced the location of both contemporary and subsequent settlements with their mosques, cemeteries, and watchtowers concentrated around the point of entry at the fields and gardens. The sophistication and engineering inherent in the *falaj* system and the lengths sometimes involved argue that they took place only within specific periods when these conditions applied. It is worth noting that hydrological conditions and the technology adapted to them appear very similar to those of Ṣuḥār and its hinterland studied by P.M. Costa and T.J. Wilkinson (1987: 54–60), where the majority of the *aflāj* were dated to either the early or the late Islamic period (Wilkinson JC 1980: 182–185).

The Ibāḍī chronicles provide pertinent historical evidence for the interpretation of the archaeological record. It is quite clear that the Yaᶜāribids of Oman, who controlled the al-ᶜAin oases in the seventeenth and eighteenth centuries, invested heavily in date cultivation:

> [The Imām Sayf b. Sulṭān al-Yaᶜribī] improved a large portion of Oman by making water-courses and planting date and other trees… he had acquired one-third of all the date-trees in Oman [over the course of his reign, *c*.1692–1711]… he repaired the es-Sâyighy [al-Sāyighy] canal at er-Rastâk [al-Rastāk], the el-Yazîly [al-Yazīlī] in ezh-Zhâhirah [the Ẓāhirah], the el-Kûthir [al-Kūthir] at el-Hazm [al-Hazm], and also the el-Barzamân [the Barzamān] and el-Misfâh [al-Misfāh] canals… [He] planted at Naàmân-Barkah [Naᶜmān Barkah] 30,000 young date-trees and 6,000 cocoa-nut trees, besides which he planted at Bîr-en-Nashâwah [Biʾr al-Nashwah], er-Râssah [al-Rāssah] and el-Mandzariyyah [al-Mandzariyyah]. (Ibn Razīq 1871: 93; cf. Mershen 2001: 158–159)

This fits the date of the late Islamic Ib (*c*.1650–1800) ceramic assemblage quite neatly. It is moreover highly likely that this agricultural expansion was made possible by slave labour (cf. Wilkinson JC 1987: 220). The same Sayf b. Sulṭan is credited with the expulsion of the Portuguese from Mombasa in 1698, an event that marks the beginning of the Omani empire in East Africa (Fig. 8). Ibn Razīq states that he ‘had many male and female slaves… he possessed seven hundred male slaves and twenty-eight ships’ (1871: 93). The connection between slaves and ships in the mind of the author perhaps suggests that these ships plied the trade in East African slaves. It is moreover clear that slaves were set to work in the date gardens. In 1902, the Reverend Zwemer wrote of the al-ᶜAin (Buraimi) oasis that ‘the gardens are well kept, and all the labour is done by slaves, who form, I think, at least one-half of the population’ (1902: 62). The excavation of the many sunken date-palm gardens and associated *aflāj* was, arguably, only made possible after the seventeenth century by the availability of slave labour resulting from the expansion of the Omani maritime empire.

Date production in the oasis was geared to meet more than just the subsistence needs of the population. Percy Cox put the population of al-ᶜAin (Buraimi) oasis at around 5000 with some 60,000 date palms in the early twentieth century (Cox 1925: 207), and by 1970 J.H. Stevens put the number of date palms at 65,000 and suggests that this actually represented a decline, with date gardens having been replaced by more profitable cultivars in the second half of the twentieth century (Stevens 1970: 414). Moreover, all the late Islamic I houses examined by ADACH contained date presses that allowed dates to be dried and compacted before storage and transport and provided date syrup (*dibs*) as a by-product of the process. Date cultivation may have been stimulated by the opening of new markets as the al-ᶜAin (Buraimi) oasis was incorporated into the Indian Ocean empire of the Yaᶜāribids. The English traveller John Ovington, who visited Muscat in 1689, observed that ‘the staple commodity of the country is dates, of which there are whole orchards for some miles together. They have so much plenty of this fruit, for which they have so ready a vent in India, that several ships are sent thither loaded from hence without any other cargo’ (1696: 423). Dates may therefore have been produced for export as part of a monetized exchange: it is perhaps significant that (Ṣafavid) coins are first found consistently and in quantity during this period.

The late Islamic Ia ceramic assemblage demonstrates a peak in foreign contacts. Chinese porcelains appear in small quantities and Gulf glazed wares are commonly found (Fig. 4). This material was most likely reaching the al-ᶜAin (Buraimi) oasis via Ṣuḥār, especially after the Portuguese were expelled in 1643. Links with the Swahili coast are borne out by similarities in the ceramic assemblage. Manganese purple wares were found at Kilwa and Manda (Kennet 2004: 41; Chittick 1974: 305, pl. II, pl. 114/d, e; 1984: 12, 84, pl. 36), green-glazed ware at Shanga (Kennet 2004: 43; Horton 1996: table 14), with Bahlā (Khunj) ware also commonly attested (de Cardi & Doe 1971: 266–267). Explicit links between the al-ᶜAin

(Buraimi) oasis are found in local histories, wherein one Sayf b. Sulaymān al-Darmakī — whose tribal *nisbah* indicates an association with the Ẓahīrah hinterland of the al-ᶜAin (Buraimi) oasis — became *wālī* of Mombasa in 1874 (Anonymous 1994: 27). The Ibāḍī chronicles dealing with this period contain numerous references and anecdotes relating to Indian Ocean commerce. Omani, Yemeni, and Hindu merchants are mentioned, and connections to the Makrān, Sindh, and Malabār appear to have been close (e.g. Ibn Razīq 1871: 98–99).

We would therefore argue that the *falaj* system and associated palm gardens were instigated as part of a major centralized investment project, which constitutes a major factor in the creation of the oasis landscape of al-ᶜAin. Moreover, we would posit that the contemporary parallel development of Ṣuḥār and al-ᶜAin in the broader late seventeenth to mid-eighteenth century belongs to a single phenomenon we have termed the 'Yaᶜāribid Expansion' (Fig. 8).

The late Islamic II landscape, *c.*1800–1950

While the oasis landscape was therefore substantially the product of the late Islamic I period, it underwent further modification in the ensuing late Islamic II period, which covers the nineteenth and first half of the twentieth centuries.

The late Islamic IIa (*c.*1800–1850) assemblage constitutes a transitional episode between the disappearance of 'Gulf Glazed Wares' and the appearance of 'Late Trade Wares.' Chinese porcelains now became limited to 'Kitchen Ching' while the imported glazed component was limited to manganese purple; it is worth noting that Bahlā (Khunj) ware remains common throughout the late Islamic period and should be regarded as a local glazed type**.** This period is associated politically and economically with the disturbance of trade by the British destruction of the Qawāsim mercantile fleet in 1819, the neglect of the Omani interior by the Āl Bū Saᶜīd especially after the move of the capital to Zanzibar in 1837, and the repeated invasions by the Wahhābīs between 1800 and 1869 (Fig. 8). Historical sources dealing with the second half of the nineteenth and early twentieth century attest to an inherited landscape of derelict gardens and choked *aflāj* (see below).

The Wahhābī occupation seems to have been particularly destructive. Writing of the career of Muṭlaq al-Mutayrī (*fl.* 1808–1813), the *nāᵓib* of Buraimi, one Omani observer recalled that 'anybody who did not accept Wahhābism (had) their women and children sent into captivity and their property plundered' (al-Sālimī 1961, ii: 187; cf. Kelly 1964: 55). Wellsted wrote of Maḳiniyát (Maqnīyāt), a town of the southern Ẓāhirah, that 'it has never, I understood, recovered from a visit which the Wahabis paid to it in 1800. They then took the castle, burnt the houses and destroyed the greater number of trees' (Wellsted 1837: 111). The destruction and neglect of property in these unsettled times appears to have similarly affected the al-ᶜAin (Buraimi) oases, for Captain Hamerton wrote of Buraimi in 1840 that 'the greater part of the town is represented to be in a dilapidated state and the (town) wall is a perfect ruin' (abridged in Hughes 1856: 116–118).

The expulsion of the Wahhābīs brought further destruction. When Miles visited Buraimi in 1875, he found the Qaṣr al-Sudairī had been destroyed by ᶜAzzān b. Qays (*fl.* 1869–1871), a counter claimant to the imamate, who wrote in a letter to the British Political Resident in the Gulf that 'some of their fortresses have been destroyed by action of a canon' (Kelly 1964: 87, 95). Of the former allies of the Wahhābīs, Hamerton notes that 'the Naim tribes are now evidently much reduced in numbers, and sunk in consequence among the tribes of Oman. The Suamis of Byreemee formerly mustered four thousand men, and they do not now amount to more than eight hundred' (Kelly 1964: 44–45). Forty years later, Miles doubted whether the shaykh of the Naᶜīmāt could even command 500 fighting men (Miles 1881 in *Annals of Oman* 1984: 109).

The troubled late Islamic IIa period is associated with a wave of fort building in the al-ᶜAin (Buraimi) oases. The Qaṣr al-Subarah, Qaṣr al-Khandaq (Fig. 1/Z), and Qaṣr al-Sudairī (Fig. 1/O) were built by the Wahhābīs during their intermittent occupation of the Ḥamāsah and Buraimi oases between 1800 and 1869. The Ẓāhirī tribes and their Banī Yās allies responded by building watchtowers, including the Bin Huḍaiba tower (Fig. 1/W) in Hīlī oasis, the Daramkah tower (Fig. 1/AA) in Qaṭṭārah oasis, and the Jāhilī tower (Fig. 1/AD) between the oases of al-Muᶜtariḍ and al-ᶜAin. So it was that the forts and watchtowers, which constitute such a prominent part of the built environment, took their place in the landscape, in many cases built on top of the upcast mounds created by the excavation of its gardens.

The late Islamic IIb (*c.*1850–1900) is characterized not only by the appearance of 'Late Trade Wares' (Carter 2011; Grey 2011), but by important changes to the local wares, viz. the introduction of Julfār cooking pot 4.1, the beginning of the coarse striated sub-type of white

ware water jars, and a new closed form of Bahlā (Khunj) ware. The late Islamic IIc (*c.*1900–1950) is principally distinguished by the appearance of Japanese/Chinese coffee cups, together with the retreat of 'Kitchen Ching' and manganese painted ware (Fig. 4). Modern era I (*c.*1950–1970) is associated with an increasing pace of modernization, although archive photographs from the late 1960s and early 1970s demonstrate that the material culture of al-ᶜAin remained in many ways unchanged. Nevertheless, traditional clay cooking pots were increasingly replaced by mass-produced tin items, and Julfār ware virtually disappeared. Porous globular water jars (white ware) remained popular, however, and are still to be found wrapped in hessian hanging from trees inside the oases.

A second wave of fort building took place at the onset of the late Islamic IIc around the turn of the twentieth century. The Qalᶜat Jāhilī (established in 1897; Fig. 1/AD) and Ḥiṣn al-Nayyādāt (Fig. 1/AB) were built by Shaykh Zāyid b. Khalīfah Āl Nahayyān (r. 1855–1909) in the late nineteenth century and mark the rise to ascendancy of the Āl Bū Falāḥ in the al-ᶜAin oases. Following the expulsion of the Wahhābīs in 1869, Shaykh Zāyid subdued the Naᶜīmāt in 1887–1888 and took the principal Ẓawāhir village of al-ᶜAin in 1891 (Kelly 1964: 96), which was to become the focus of the Banī Yās settlement and the nucleus of the modern city. It may be significant that these forts were built shortly after the *farizah* agreement of 1896, wherein Sayyid Faiṣāl b. Turkī (r. 1888–1913) of Oman undertook to pay Shaykh Zāyid b. Khalīfah 3000 Maria Teresa dollars each year in return for maintaining the defence of the al-ᶜAin (Buraimi) oasis and ensuring peace among the Ẓāhirah tribes (Kelly 1964: 101; Lorimer 1908–1915: 747). The Qaṣr al-Muwaijᶜī (Fig. 1/U) and Qalᶜat Sulṭān (Fig. 1/S) were built by sons of Shaykh Zāyid b. Khalīfah in the troubled years after his death in 1909 (Power & Sheehan 2011*a*). The Āl Bū Falāḥ further established new agricultural estates with ᶜ*arīsh* settlements, such as the Banī Yās 'colony' at al-Masᶜūdī (Fig. 1/X), and undertook to buy derelict gardens and repair choked *aflāj* inherited from the late Islamic IIa landscape (e.g. Lorimer 1908–1915: 264; cf. Heard-Bey 1982: 225).

Conclusion

The evidence reviewed here for the origin and development of the oasis landscape of al-ᶜAin points to a number of conclusions. First, the palm gardens appear to be a product of a major centralized investment project undertaken in the late seventeenth to mid-eighteenth centuries, possibly during the reign of Imām Sayf b. Sulṭān (r. 1692–1711). Second, the oasis settlements are broadly contemporary with the development of the palm gardens, while the forts and watchtowers are part of the subsequent political wrangling for control of this precious resource. Other accounts of the origin and development of the oasis landscape in al-ᶜAin are of course possible but they rely on a degree of inference and speculation, which goes beyond the limits of available archaeological evidence.

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