

C.S. Phillips, D.T. Potts and S. Searight
(editors)

Arabia and its Neighbours

Essays on prehistorical
and historical developments
presented in honour of Beatrice de Cardi

SERIES EDITORS:

D.T. Potts (Sydney)

M.C.A. Macdonald (Oxford)

ABIEL - The name chosen for this series is that of a king (or kings) who minted coins with Aramaic legends in southeastern Arabia in the last centuries B.C. Whereas earlier monarchs in this region are attested in Mesopotamian cuneiform sources, Abiel is the first historical personage from the area mentioned in an indigenous source.

Arabia and its Neighbours

Essays on prehistorical
and historical developments
presented in honour of Beatrice de Cardi

C.S. Phillips, D.T. Potts and S. Searight (eds.)

1st Edition, 1st Printing 1998

© Brepols 1998

All rights reserved

No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical photocopying, recording or otherwise without the prior permission of the copyright owner

Layout by Ben Churcher, Astarte Design

ISBN 2-503-50665-8

D/1998/0095/54

The western islands of Abu Dhabi Emirate

Notes on Ghagha¹

Geoffrey King and Cristina Tonghini

Introduction (GK & CT)

This paper dedicated to Beatrice de Cardi constitutes a preliminary review of the results achieved in the course of three seasons of survey of the westernmost islands of Abu Dhabi Emirate's Western Region, carried out between 1993 and 1995².

During this period, the survey has examined Kufayy, Ufzayyah (or al-Fzayya), off the east coast of Ras Ghumays, the group of islands known as Jazâ'ir Ghagha', north of Ras Ghumays (of which the main island, Ghagha', is the subject of the present paper) and the two Yasât islands (Yasât al-'Ulya' to the north and Yasât al-Sufla' to the south), further eastwards. In addition to the survey of the westernmost islands of Abu Dhabi Emirate, the Abu Dhabi Islands Archaeological Survey (ADIAS) team has also been engaged in excavation of a ca. 6th/7th C. AD monastery and settlement site on the island of Sîr Banî Yâs to the east (1993-1996), an 'Ubaid-related settlement on the island of Delma to the N.E. (1993-1994), and a site on Balghalam, east of Abu Dhabi City (1996-7) (G.R.D. King, et al., 1995, 63-74; King, in press; Flavin and Shepherd, 1994, 115-134)³.

The present observations are not a final synthesis of the results as the survey is still in progress, not only in terms of fieldwork, but also of data processing, study of the finds and interpretation. Nevertheless, these notes provide a general account of the aims of the survey, the field strategy employed and the preliminary results of three seasons in the field. We concentrate on Ghagha' here, not only because this island has been more extensively studied than others, but because our work on Ghagha' also illustrates the methodology of the survey, and its practical application to a wide range of archaeological situations⁴.

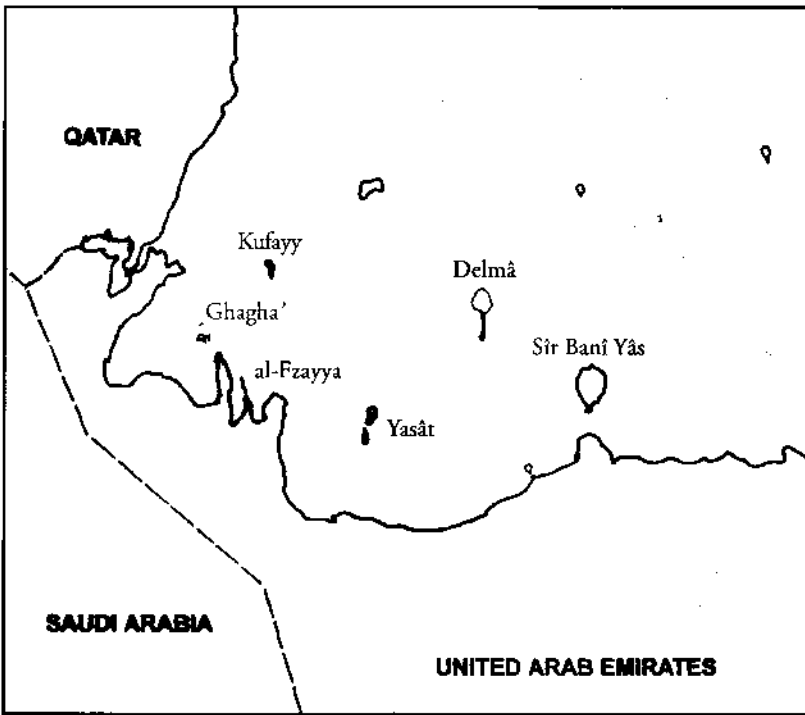


Fig. 1.
Map of region.

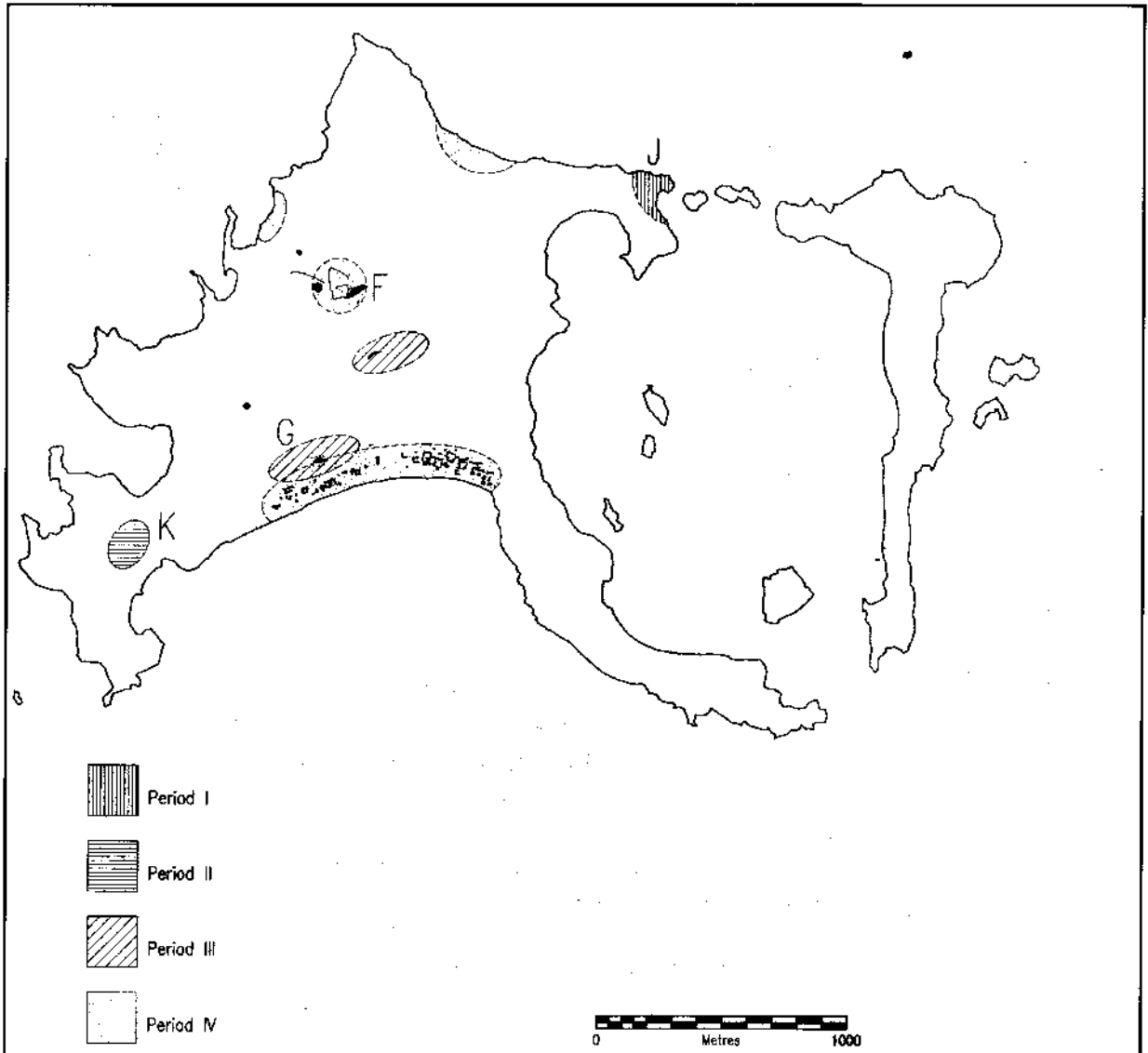


Fig. 2.
'Ghagha' site location map.

The study of Islamic sites on the Abu Dhabi Islands

(GK)

Compared with earlier periods, the Islamic period had been largely neglected in the archaeology of Abu Dhabi until we commenced our work on the off-shore islands of the Western Region. Indeed, only in very recent years has any clarity emerged for the sites of the beginning of the first millennium AD in the region as a whole, as a result of the excavations at al-Dûr in Umm al-Qaiwain and at Mleiha in Sharjah. Yet this information largely relates to the so-called 'Hellenistic' period (i.e. the beginning of the first millennium AD), and the subsequent centuries immediately preceding Islam are only gradually gaining focus with discoveries at Sir Banî Yâs, off the coast of Abu Dhabi, al-Hulaylah (Kennet and King, 1994, 163-212), al-Khatt and Kush all in Ra's al-Khaimah (de Cardi, Kennet and Stocks, 1994, 35-114), with Beatrice's own earlier work at Musandam (de Cardi, 1973, 305-310; de Cardi, with Vita-Finzi and A. Côles, 1972, 9-75) and Baramki's work and that of Husayn al-Qandil at al-Jumayrah in Dubai (Baramki, 1975).

This growing body of information suggests a sea-oriented society before Islam and thereafter, and this raises the question of the role of the islands of the Gulf generally, including the large number off the Abu Dhabi coast. The environment of the islands sustains life far more readily than the coast and hinterland of western Abu Dhabi, characterised as it is by shallow inshore waters and salt-marsh (*sabkhah*). By contrast, the islands have relatively a more clement climate, reasonably adequate water supplies, good anchorages, and rich fishing grounds and pearl beds.

A more general problem relating to the immediately pre-Islamic centuries and the Islamic period as a whole is exactly what impact derived from the Gulf's role as the main artery from the Indian Ocean to Iraq. While discussions of the growth of al-Basrah, Baghdad and Samarra' in the early Islamic period recognise the profound significance of the Gulf as a trading artery, our knowledge of it as a place with tangible archaeological sites has so far been very restricted. Excavations at Siraf (on the Iranian shore) have been published and reflect the importance of this key town of the Sasanian through to the Abbasid period.

Elsewhere in the Gulf there had been sporadic discoveries for this period that were so varied in nature and separated in terms of distance that it was hard to understand what they meant overall. Sites recorded up to 1990 included a church at Kharg Island, another in Kuwait at Faylaka', an Abbasid site at Murwab in Qatar, the pre-Islamic and early Islamic site at al-Jumayrah (Dubai) and a small

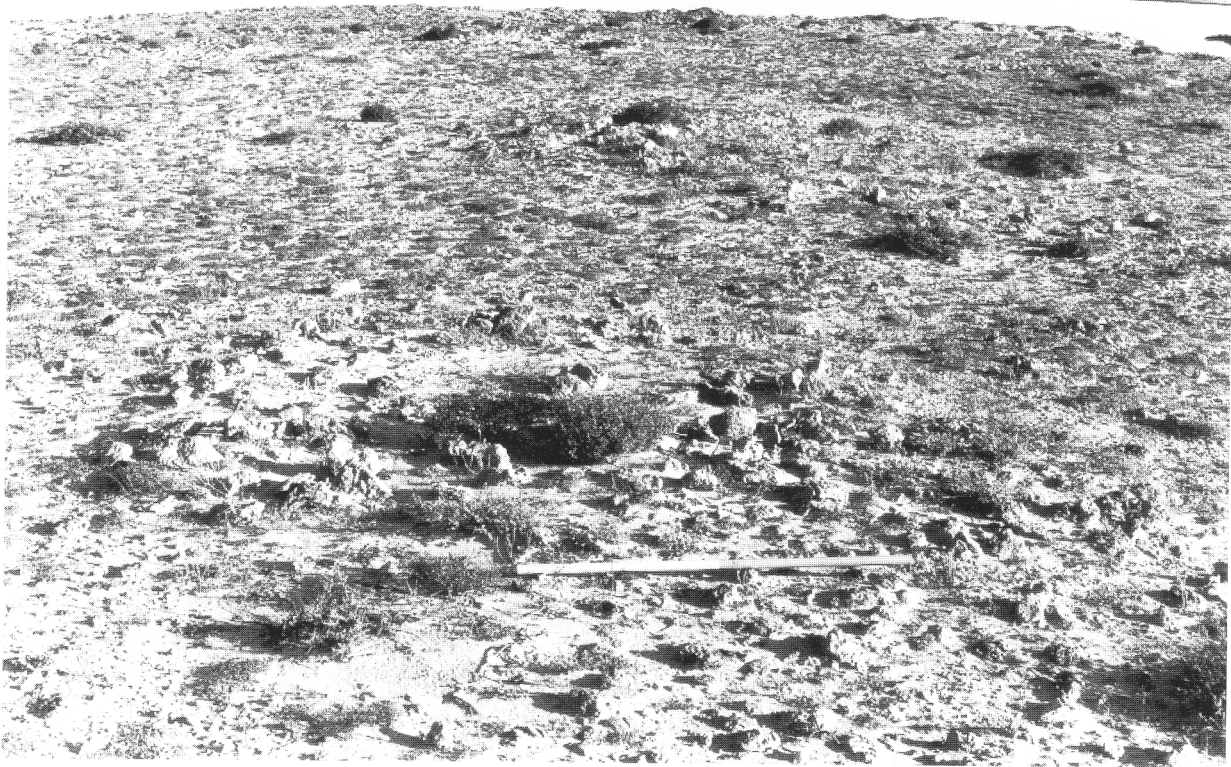


Plate 1.
Ghagha' Site J.

Plate 2.
Later Islamic houses near
Ghagha' G.



Sasanian site at Ra's Musandam. This is a group so scattered geographically that it was unwise to make any generalised observation about them as a whole. The overview of the literature by D.T. Potts, while comprehensive as far as the available material was concerned, also revealed very clearly the paucity of our information for the period of the rise of Islam in the Gulf (Potts, 1992, vol. II).

If knowledge of Gulf archaeology for the years of the rise of Islam was slight, our knowledge of the middle Islamic period in the region was still more imprecise, apart from the results of excavations at Bahrain (Kervran, 1983, 71-77). By contrast, for later Islamic times throughout the Gulf, there was a plethora of textual information, but little progress generally had been made in tying this together with the equally plentiful material cultural evidence for most of the area, apart from the excavated site of Julfar (Hansman, 1985; King, 1990, 79-93; King, 1991, 123-134; King, 1992, 47-54; Hardy-Guilbert, 1991, 162-203; Sasaki and Sasaki, 1992, 105-120).

In the light of these issues, a focus on the Islamic period was therefore inherently interesting. In 1992, the ADIAS research team was asked by HH President Zayed b. Sultan Al Nahyan to survey the coast and islands of the Western Region of Abu Dhabi with the intention of identifying archaeological sites to ensure their protection. Where appropriate, we were requested to undertake further study and excavation, and when necessary, rescue excavation. The opportunity of a broad survey provided us with the possibility of correlating island sites from the eve of Islam and the Islamic period as a whole into a much larger picture of the Gulf in the Islamic period. The Abu Dhabi islands with their undisturbed sites allowed us to focus on the Islamic period within the wider objectives of general site identification and protection, in order to build up a broad picture on a number of islands with similar or identical environments and to see them as a totality across the Islamic period. By thus concentrating on a relatively concentrated but large area rather than a single site, we intended to provide a broader backdrop to other better known pre-Islamic and Islamic sites in the Gulf region and its neighbourhood, including Siraf, Qal'at al-Bahrain and Suhar, to contribute a wider picture of the Islamic archaeology of the area.

By the nature of the survey which we were requested to undertake, all sites were recorded and where it has been possible, we have been allowed to fence them off to protect them as development is starting to transform some islands. It is extremely fortunate that the survey of the western islands began at a time when, in general, they remained largely undisturbed.

Because of the islands' remoteness and limitations on access to them, we are quite confident that the integrity of sites has not been compromised by casual sherd collection by previous visitors. This is a

point worth emphasising as many sites in the region in recent years have suffered loss of surface finds, especially sherds, as a result of the number of visitors to them.

Sites encountered on the islands, including Ghagha⁷, encompass the full local chronological range of the region. Our procedure therefore has been to record all sites, regardless of period, to make knowledge of their existence available to the scholarly community, and where possible, to protect them with fencing⁶. The longer term intention is that specialists in the various periods concerned should undertake further investigation at pre-Islamic sites identified in the future.

Beyond our own interests in the Islamic period was the more general point that, before the start of our survey of the Abu Dhabi islands in 1992, virtually nothing was known of Abu Dhabi Emirate's coastal and island region. The only published work had been a survey by B. Vogt and Y. Tikriti conducted between Jabal Barakah and Mirfa on the mainland in 1983 (Vogt, Gockel, Hofbauer and al-Haj, 1989, 49-60). The rest of the Western Region of Abu Dhabi Emirate was a total blank archaeologically, not only for the Islamic period but for all other periods as well. This contrasted with the growing body of archaeological information for all periods emerging from the other Emirates of the U.A.E. (Dubai, Ajman, Sharjah, Umm al-Qaiwain, Ras al-Khaimah and Fujairah), as well as from the Sultanate of Oman. Within the Emirate of Abu Dhabi itself, the absence of information for coastal areas also contrasted starkly with the plethora of information from al-^ʿAyn in the interior. Furthermore, the numerous sites of Qatar identified by Beatrice de Cardi herself in 1973 and then examined by a French team in 1976-77 and 1977-8 showed that there was activity in the next major region west of Abu Dhabi from the Stone Age through to the modern period (de Cardi 1978; Tixier, 1400/1980, t. 1; Hardy-Guilbert, 1984, 169-188; Hardy-Guilbert, 1991, 131-192; Hardy-Guilbert and J.P. Saint-Aubin, October, 1984, 199-206).

This cumulative evidence all suggested that the apparent blank that the archaeological map of western Abu Dhabi presented before the start of ADIAS fieldwork was less a reality rather than the result of a lack of investigation. Thus, the present record of the ADIAS survey is of broader concern than the immediately pre-Islamic period and the Islamic centuries, insofar as it reports as a matter of record on the Stone Age and other early periods that were noted.

The historical framework

(GK)

The western islands of Abu Dhabi emerge into historical view at a late date. Ptolemy was aware of several islands in the Gulf but his

references are imprecise (Ptolemy, 1932, 140). Al-Idrisi, writing in 1154 in Sicily for the Norman king, Roger II, termed these western waters as the Sea of Qatar but although he recorded no names, he accurately described desert islands populated only by sea birds and land birds in the area (al-Idrîsî, 1836, i, 157; al-Idrîsî, 1972, ii, 162). Their guano was gathered for use at al-Basra whence it was transported and where it would fetch a good price. It was used for manure on the farms for vineyards and date palms. Although no names of islands are recorded, his map shows a group of islands in the area to the north of Julfar (i.e. Ras al-Khaimah) on the Arabian side, most of which are nameless⁷. Al-Idrîsî's report is remarkable for its accuracy. The colonies of seabirds, especially cormorants, on the offshore islands of western Abu Dhabi are vast, and islands favoured by them are indeed deep in their guano. Some of the islands which we examined correspond precisely in this respect for they have thousands of cormorants and their nests, and great stretches of land are covered with their guano. The island of Khardal, the northernmost of the Jaza'ir Ghagha' group, is an excellent example, devoid of visible archaeological remains, but deep in guano. A colony of up to 10,000 pairs of cormorants nested on the island in 1995⁸.

Al-Idrîsî also mentions the pearl beds of S.E. Arabia although he associates them with Suhar, Damar, Muscat and with al-Jabal (i.e. Musandam) and Julfar. However, he says nothing of the far more extensive group of pearl-beds that lie in the western waters of the U.A.E., between Abu Dhabi and Qatar. Although Gasparo Balbi visited islands north and east of Delmâ and Sîr Banî Yâs in 1580 he mentions nothing of Ghagha' despite the fact that it is in the midst of the pearl banks (Slot, 1993, 37-40). However, like al-Idrîsî, he knows the waters as the Sea of Qatar (*Barechator*).

It is not until the hydrographic surveys by the East India Company Navy in the 19th century that these islands emerge into sight in the literature. The first specific accounts of any of these islands is provided by Capt. R. Taylor, referring to a survey in 1818 of Ghagha' and the Yasât Islands to the east (Taylor, 1856, 556);

'Rarah, or St. Thomas' Islands, are a group of low rocky islands, situated in the mouth of the Khore Don. The centre island is in lat. 24° 24' N., long. 51° 34' 50' E. These islands are safe to approach to five or six fathoms distant in all directions.'

The survey of the Western Islands (CT)

Aims of the survey

As explained above, a principal aim of the ADIAS survey was to detect and investigate traces of human activity related to the Islamic

period on the Abu Dhabi off-shore islands. It is an area that had been remarkably little studied hitherto, despite the fact that it was one of the primary arteries of the trading network system between the Near East and the Indian Ocean, with strong connections with Mesopotamia. This continued a pattern already established in the pre-Islamic period⁹.

Archaeology has contributed significant new evidence in relation to the Islamic period in the area over the last two decades with a number of settlements of the Islamic period identified and finds that have provided a large corpus of data reflecting the circulation and exchange of goods. Imported ceramic wares, more precisely assessed chronologically than other local wares, have had a significant role in building up a diachronic typology for pottery in the Gulf area, where Mesopotamian and Persian glazed wares have become the fossil index for the early and middle Islamic periods¹⁰, while Chinese ceramics play a similar role in the late Islamic period (Hansman, 1985; Kennet, 1994, 170-171; de Cardi, Kennet and Stocks, 1994, 61-63; Morgan, 1991).

Archaeological investigations have shown that some areas of the Gulf were densely settled and connected with major trading arteries during all or part of the Islamic period: among coastal sites of Islamic date, extensive archaeological work has been devoted to major ports such as Siraf, Kish, and Old and New Hurmûz on the Iranian coast (For a discussion, see, for example, Whitehouse, 1983; Williamson, 1973; Morgan 1990).

On the Arabian coast, important coastal sites have been identified at Faylakâ, off Kuwait, Bahrain and Qatar; further east, the coastal sites of al-Jumayrah (Dubai) and especially al-Hulaylah (Ras al-Khaimah) all have revealed significant archaeological evidence related to the Islamic period (Hardy-Guilbert, 1991; see also Bernard and Salles, 1991; Patitucci and Uggieri, 1984; Kennet, 1991 (Faylaka'); Potts et al., 1978 (Eastern Arabia); Larsen, 1983 (Bahrain); de Cardi, 1978 (Qatar); Hansman, 1985; Kennet, 1994 (al-Hulaylah/Julfar) For a discussion, see e.g. Whitehouse, 1983; Williamson, 1973; Morgan, 1990). This work has shown that major maritime trading centres were located not only on the mainland, but also on islands, with the best known example being New Hormûz (see conclusion).

The settlement distribution map of the Islamic period in the Gulf, however, cannot be considered complete by any means: there are still areas which have been barely investigated archaeologically for the Islamic period and until 1992, these included the territory of Abu Dhabi Emirate. Moreover, the historical sources concerned with the Gulf provide a much more detailed picture from the 16th century onwards, whereas they are silent or at best laconic for earlier periods. We felt that the apparent contrast between the abundance of

historical records for the late Islamic period and the scanty written documentation for the early and middle Islamic period should be tested against the archaeological record.

Thus, the specific goal at this stage of the ADIAS study of the western islands has been to gather evidence concerning the configuration of Islamic settlements, to evaluate them on a diachronic basis, and to identify the specific patterns of settlement for each chronological horizon in terms of location, extension, and structural features. On the basis of the results of this early stage of the survey, combined with the results of geological and paleoenvironmental research, the project has aimed at investigating and interpreting the function of settlements in the area in relation to production activities and, more generally, to the economy of the area to produce a diachronic model of occupation, land and sea use and circulation of goods.

In the course of the survey, however, it has also become clear that most of the sites identified could be attributed to a wide range of pre-Islamic periods as well as to the late Islamic period. A field strategy to deal with this great variety of site dates was established to make a preliminary assessment of the archaeological remains. Furthermore, it has been our intention to plan future field research involving experts in the various pre-Islamic periods identified at sites, and in the meantime to work out a strategy to protect and preserve sites at risk, as explained above.

The survey concentrated on the western islands of Abu Dhabi and the Sila^c peninsula, not least because the area formed a homogeneous geographical unit to be treated as a sample in the context of Abu Dhabi's numerous off-shore islands as a whole. This area, relatively small, was felt to be the most likely to allow a detailed study in a relatively short amount of time, to produce both a model for field strategy and for the results to be tested and compared with data from other islands¹¹.

The geographical context

The westernmost islands of Abu Dhabi Emirate - Jazâ'ir Ghagha', the Yasâts, and al-Ufzayyah - can be considered as a homogeneous geographical subsystem with definable natural boundaries and a circumscribed environmental system given its geological features and climate; it also seems very likely that these islands have always been a part of the same cultural sub-system.

All of the islands are situated off the Sila^c peninsula, close to the border with Saudi Arabia, and at present, they are mainly occupied by coastguards. The islands are outcrops of various types of limestone¹² and are quite small, generally fairly flat, with a landscape of low plateaux. In this respect they contrast with the mountainous

islands of Sir Banî Yâs and Delmâ further east. Vegetation is limited to winter grass and sparse shrubs. Occasionally, some surviving palm-trees indicate that more extensive and systematic plantation was practised in the relatively recent past.

The islands have a number of wadis which flow during the rainy season. On some of the islands, such as north Yasât (al-^cUlyâ') and Ghagha', the presence of artesian water is attested by the local informants, historical sources and by archaeological evidence. Approach to the islands by sea can be fairly difficult because of the shallowness of the water which surrounds them and landing is only possible by small, shallow draught boats. However, the deeper waters around the islands can offer good and well protected anchorage for larger vessels.

The field strategy/methods

The strategy adopted was established in the light of methodology discussed in the literature from other well known study cases¹³, and adapted to the needs of the ADIAS survey.

In its earliest stage the survey aimed to identify and record the remains of all past activities. Initially, the survey undertook only surface reconnaissance, based on extensive field walking covering the totality of each area; no sufficiently detailed aerial photographs or maps to allow a more systematic approach to fieldwork were available at the start of work.

Sites were detected and recorded in a very preliminary way; they were summarily described and their location was noted. The word 'site' in the context of this survey refers to 'dense concentrations of artefacts with definable spatial limits' (Wright et al. 1990, 606). The concept of site was applied and used during the process of field reconnaissance and while collecting, recording and processing data. To apply the concept of 'settlement' to a site or to a complex of sites requires a much higher degree of interpretation, and involves the understanding of function and of chronological horizon.

Specific areas and sites were then selected for further analysis, in order to collect enough evidence to establish future strategy. What can be defined as macro-mapping of these areas was carried out, with major structures recorded and plotted. This was also combined with contour mapping of the area; because of the lack of existing contour maps of the area, as noted above, the mapping operation was considered an important element of the archaeological survey.

In some cases, a total collection of surface finds was undertaken. More often, however, a sampling of surface finds was carried out, employing a variety of strategies according to the context. In the majority of cases the material was collected along transect lines. The

location of the transects was arbitrarily decided in the light of the needs of the site: this non-probabilistic approach was determined by what was felt as a priority at this stage of the research, i.e., the urgency of acquiring a collection of surface finds to enable a preliminary chronological assessment and, where possible, a functional assessment of sites¹⁴. Meteorological conditions related to the days preceding our survey, to the time of the day that we examined sites and the names of the collectors of information and finds were systematically recorded. Only occasionally was what can be described as a micro-mapping practised for selected sites, with all artefacts and surface features plotted. This will be undertaken more extensively in the future for a series of these island sites.

Ghagha⁷ had a denser settlement in the past, although only temporarily or seasonally in certain periods. Traces of settlements encountered tended to be ephemeral, consisting in most cases of scatters of pottery or stone slabs. Erosion (primarily by the strong wind, but also by the effect of wadi action and tides and also the effects of the sun) has caused the deflation of archaeological deposits. The temporary or seasonal character of some of the settlements (camp-sites or hunting areas) may have had little impact on the environment.

To this situation encountered at surface level there corresponds a similar picture below the surface, where very shallow archaeological deposits characterise the stratigraphy of those sites which have been excavated so far on the Abu Dhabi islands.

Moreover, in some cases, later or modern sites are located over more ancient ones, leading to their destruction and to the mixing of features; this process continues today, for on some islands modern building activities threaten the already fragile and ephemeral traces of the past. Indeed, while the survey started with the aim of evaluating the archaeological potential of the area, it also became a major rescue operation, with a strategy of protecting threatened sites and concentrating the survey operations on areas at particular risk.

Dating and phasing

One of the most thorny problems the survey has had to face is that of dating the broad range of chronological horizons encountered in the course of the survey. This general problem was exacerbated by the fact that the survey was primarily prepared to focus on the much narrower range of the immediately pre-Islamic and Islamic periods, as already explained, rather than more ancient sites.

The team worked on the assumption that a site which could be defined as a homogeneous complex of features related to a homogeneous assemblage of finds; such a site would correspond to a specific 'period', a specific chronological horizon. A preliminary kind of periodisation was made on the basis of the sites considered; periods

were identified by a number (1, 2, 3, etc.). It was then possible to apply this concept of period to other sites: groups of sites with similar finds and features were taken to belong to the same chronological horizon. The periods identified were then organised into a sequence if enough evidence for relative and absolute dating could be gathered; in this case, they were identified by a Roman numeral (I, II, III, etc.).

Hypotheses for absolute dating were formulated in relation to the finds discovered on the surface. As stated above, structural remains, in most cases, were too ephemeral to provide dating evidence. Reference to securely dated assemblages of surface finds was generally the only means to solve the problem of chronology. However, in certain cases, reference collections from other archaeological field-work in the area did not cover the total range of periods encountered in the course of our survey. The difficulty was also compounded by the fact that the range of periods identified was much broader than the range on which the primary specialisation of the survey team was focused.

Among the material to which reference was made were excavation finds from work carried out as part of the ADIAS project¹⁵. Further research, and, more specifically, excavations of relevant sites on the islands should eventually allow integration of our data into the occupational sequence.

Until this is achieved, we prefer to use a tentative sequence of periods (I to IV), and we discuss here briefly the suggested dating rather than employing a more direct periodisation in terms of absolute dating. We feel that the final interpretative work on the dating of a number of settlements can only be made by experts specialised in particular periods.

The survey at Ghagha³ (CT)

This island has received the most attention so far in terms of field-work¹⁶. The team concentrated on Ghagha³ among the western islands primarily because it was exposed to a greater risk, being seriously threatened by modern building activities. Secondly, after a preliminary surface reconnaissance it became clear that this island had been the most extensively occupied over time, and therefore could offer a detailed, diachronic model of settlement.

Jazâ'ir Ghagha³ are located due north of the westernmost finger of the Sila^c peninsula at Ras Ghumays and consist of a group of four islands, of which the largest island is also known as Ghagha³. Only this main island revealed remains of human settlement, while Khardal,

as noted above, is the site of a bird colony covered with guano. At the time that the survey started its work, the island was deserted with the exception of a coastguard station. Beginning in 1995 major development was initiated on the island. This work was taken into account in our recommendations for protecting the sites that we identified.

Field methods and results

The island was subjected to extensive field-walking during the 1993 season and most of the sites were identified in this period. Between 1993 and 1995 all sites were studied at a varying levels of detail and all features of selected sites were plotted. Surface finds were either systematically picked up, or collected according to the sampling strategy described above. Contour mapping of selected area, including sites, was also carried out.

About 20 different sites were identified, belonging to a wide range of periods. A summary of the results and a preliminary discussion of the interpretation is offered here¹⁷.

Period I

Only one settlement of this period has been identified on Ghagha' at site (J), consisting only of lithic tools. They have been attributed to the 5th-4th millennium B.C. on the basis of the presence of so-called Arabian bifacial tradition arrow-head types (see below, note 18). A similar cultural horizon was identified on the island of Marawah further to the east; the settlement on Marawah, like Site J on Ghagha', is located on a rocky plateau. No interpretation of the function of the site can be offered at this stage, but excavations conducted by an expert in this period are planned in the future.

Site J, Ghagha'

This site was identified and studied during the 1995 season; the team carried out extensive survey in this area after it was recognised by Beatrice de Cardi, who made the first preliminary visit to the site. Five mounds were identified on a little plateau on the northern peninsula of the island, consisting of stone rubble and earth; their diameters range from 2 m. to 4 m. across and they rise 50-60 cm. above present day surface. A very significant number of flints (*ca* 117), including arrow-heads, scrapers, and other tools were found in this area; no other artefacts were found in this area. Flints have been classified as belonging to the Arabian bifacial tradition by the team flint expert, J. Czastka. This cultural horizon is dated to the 5th millennium B.C., but it may have lasted until 3500 B.C.¹⁸ The distribution of flints on the surface was plotted as were all features. All lithics from this area were collected, as their survival on the surface could not be guaranteed. Recommendations were made to protect the site

in order to continue investigations; excavations have been planned in order to acquire evidence to interpret the function of the site and of the mounds (i.e. whether a hunting ground, burial area, etc).

Period II

This period identified at Site K has been tentatively attributed to the second half of the 3rd-early 2nd millennium B.C. on the basis of a preliminary assessment of the pottery found on the surface. However, more secure evidence for dating will be provided by future work on the site and on the finds by experts specialised in the period.

A much larger assemblage of the same kind of pottery has been noted and recorded on the surface of the island of al-Ufzayyah at Site C, on the south-west end of that island. The common characteristic of al-Ufzayyah site C and al-Ghagha' Site K is that of being located on lower ground, on flats by the sea, contrasting with the Arabian bifacial tradition related sites which are situated on rocky plateaux.

Site K, Ghagha'

Site K was identified in the 1995 season. It is located just behind the sand dunes which are part of the present-day beach on the south-west part of the island. It appears as a clear area in relation to its surroundings, with little shrub and no grass. It consists of a scatter of pottery and unworked stone over a fairly large area (150 m. by 160 m.). Only a limited number of features were identified on this area, including two slightly rising mounds, approximately 8 m. in diameter located along a wadi, and a number of smaller accumulations of stone, some of which could have been hearths. A rectangular hearth, measuring 40 x 40 cm., was also noted¹⁹. A water catchment device has been located upstream of the wadi crossing the site, but its relationship to the other features studied could not be established.

After a preliminary assessment of the extent of the artefact scatter, a collection of surface finds was made from 2 m². units along three transects (two parallel lines crossed by a third line), arbitrarily set across the site. Finds were collected from every other unit. The assemblage collected included some flint waste and pottery which was tentatively classified as so-called 'red-ridged ware'. 'Red-ridged ware' pottery seems to be widely distributed in the Gulf. It is attested in a number of varieties, from a wide chronological horizon stretching from the second half of 3rd millennium B.C. to the first half of the 2nd millennium B.C.²⁰ The presence of flint waste on Site K may point to an early date within the span of time indicated²¹.

Recommendations to protect the site have been made in order to preserve it for further study.

Period III

This period seems to be the best represented not only at Ghagha³, but also on other islands examined in this area. Sites are larger than the sites attributed to earlier periods and are, in most cases, also located on coastal flats, behind present day beaches and also on inland flats. The surface material is much more conspicuous and abundant than that related to earlier periods.

The identification of sites of this period is based on pottery and glass finds; they shows a similarity with Periods C and D at al-Dûr, attributed respectively to the 1st-early 2nd century AD and to the 3rd-4th century AD²². The structures related to this period at Ghagha³ have only been investigated in a very limited manner. Part of the problem encumbering us was the fact that buildings of Period IV were often located on top of Period III sites, showing that criteria for site location in Period III were based on criteria similar to those for Period IV.

Site F, Ghagha³

This site was identified during the 1994 season. It consists of a long spread of pottery and stones (measuring 200x439 m.) located south of the area of wells of Period IV. No features were identified in relation to this site. The possibility that this scatter of pottery may have been washed down from its original location has been taken into account because the area showed traces of flooding. However, extensive field survey has produce no evidence of settlements in the adjacent area.

The extension of the pottery and stone spread was assessed in a preliminary sense and subsequently a finds pick-up was carried out from 3 m.² units along two crossing transect lines. The transects were arbitrarily set across the estimated centre of the artefacts scatter, running respectively N-S and E-W.

Site G, Ghagha³

The ephemeral remains of site G, partly disguised by later installations, were identified during the 1994 season. The site mainly consisted of a large scatter of pottery and glass, located behind the Period IV village on the south-east bay of the island. Only a large, rectangular structure was identified in the north-east part of the pottery spread; the whole area, measuring 400 m. by 200 m., was mapped. A sample of the pottery was collected in relation to 5 x 5 m.² units at an interval of 20 m. covering the whole area; the first sampled unit was arbitrarily located in the south-west corner of the sample area.

The pottery shows strong similarities with that found on Site F. A visit to the site in 1995 revealed that the site had been completely

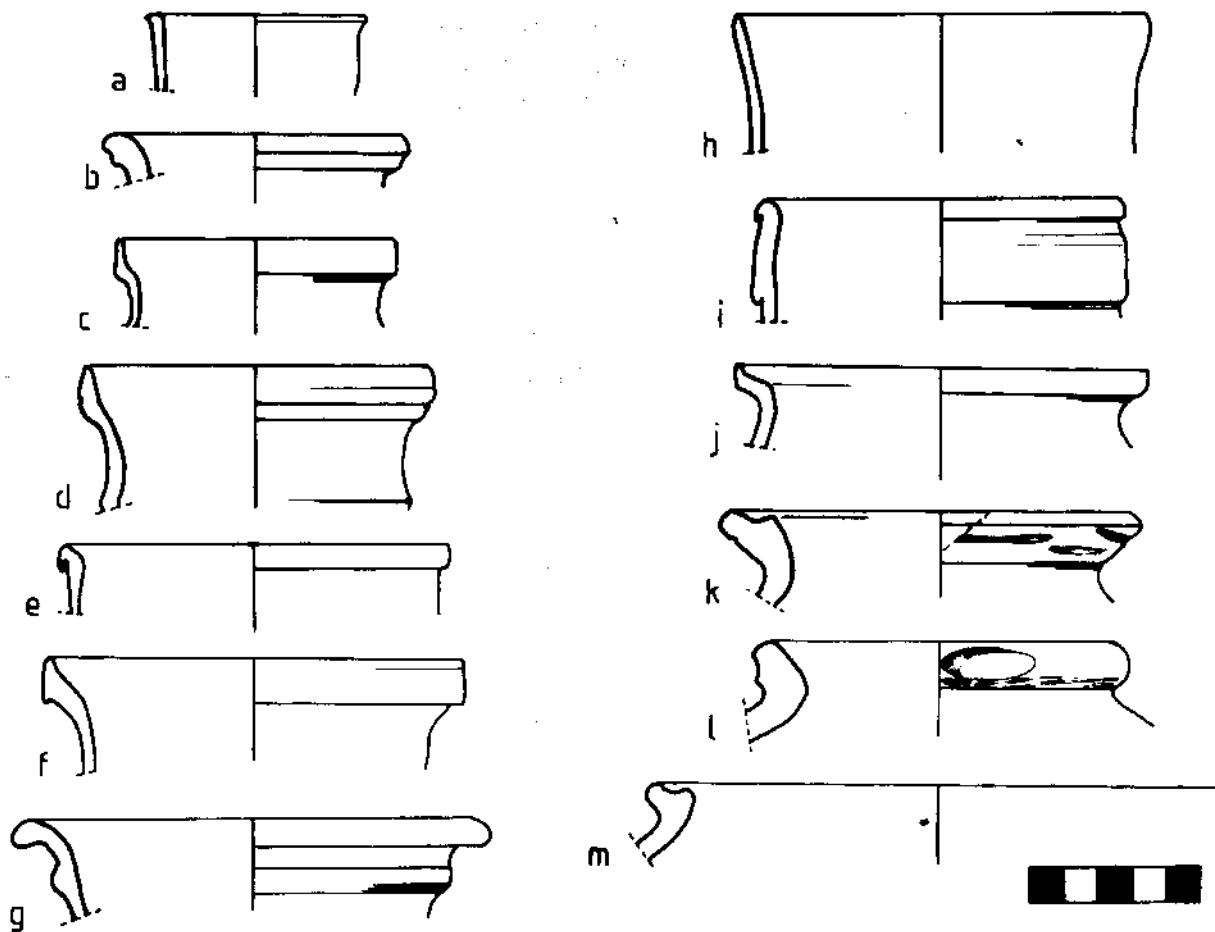


Fig. 3.

destroyed by modern building activities.

It is especially the quantity and quality of glass found at this site that indicates that it may have been an installation of some importance, connected with the glass production source.

Period IV

There is evidence to suspect that this period spread over a significant span of time, or consists of a combination of different phases/sub-periods. However, according to the criteria established here (i.e., sites with similar features and/or finds can be ascribed to the same period) it is treated at present as a single period. Once more, attribution of sites to this period was made through surface finds. In period IV, structures are much better preserved than those of previous periods. The study of these abundant remains should lead to an understanding of the occupation, and land and sea use of Ghagha' by the pre-oil period inhabitants of the islands. Indeed, settlement modes may not have significantly changed over a very long span of time, and may go back with little variations to at least the 16th century.

Absolute dating is based essentially on the pottery found in association with a large variety of structures. Such a wide variety of pottery types have been identified in relation to this period that it is not possible here to offer an overview of its incidence. It suffices to say

that the ubiquitous presence of so-called Julfâr ware and Julfâr-related wares was noted (Hansman, 1985; Kennet, 1994, 170-171; Whitcomb, 1975, 128-129)²³. Chinese fine wares, generally abundant in the Gulf coastal sites, were rarely noted. However, in the whole of the Gulf region, pottery typology for these later periods is still in the process of being refined. It is especially for this reason that absolute dating offered here should be reconsidered eventually in the light of future evidence.

A very large number of sites of this Period IV date were identified in the course of the Abu Dhabi Islands survey; ethnographic studies, combined with the excavations of selected sites of this period, will allow a precise interpretation of the archaeological evidence recorded so far²⁴.

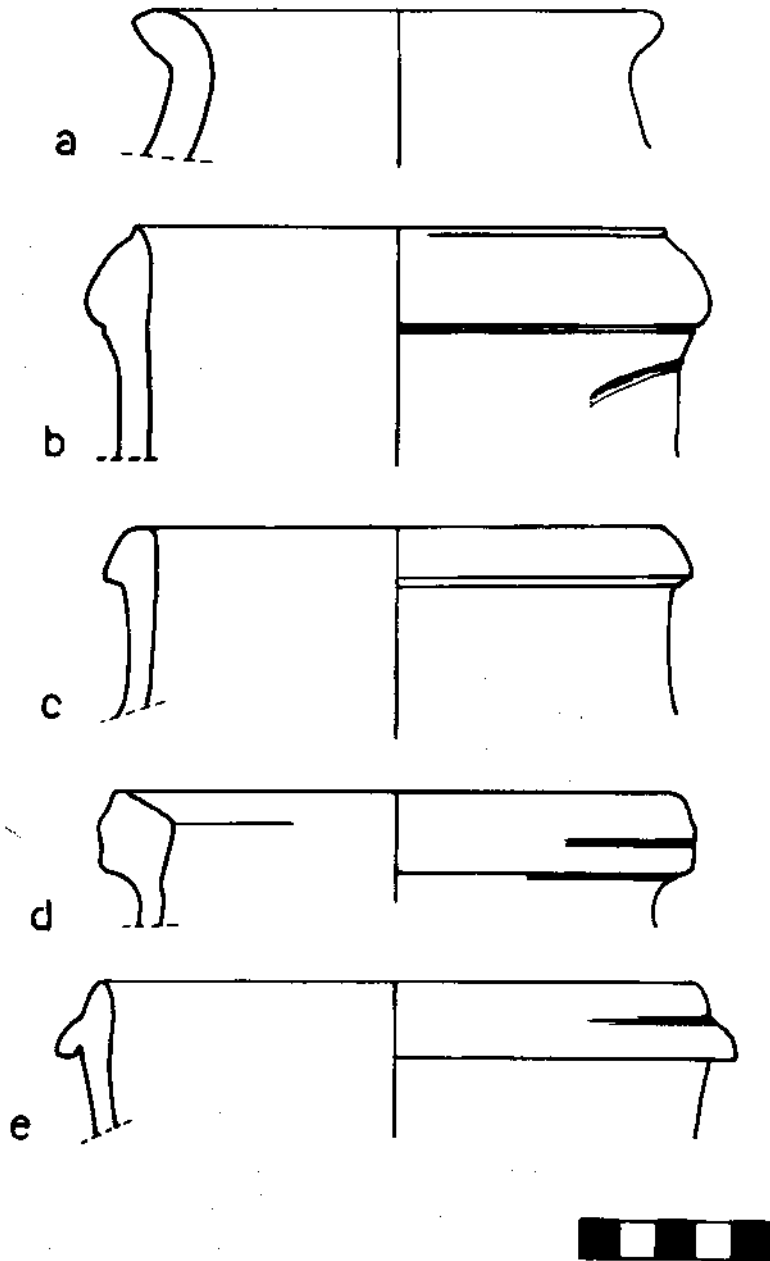


Fig. 4.

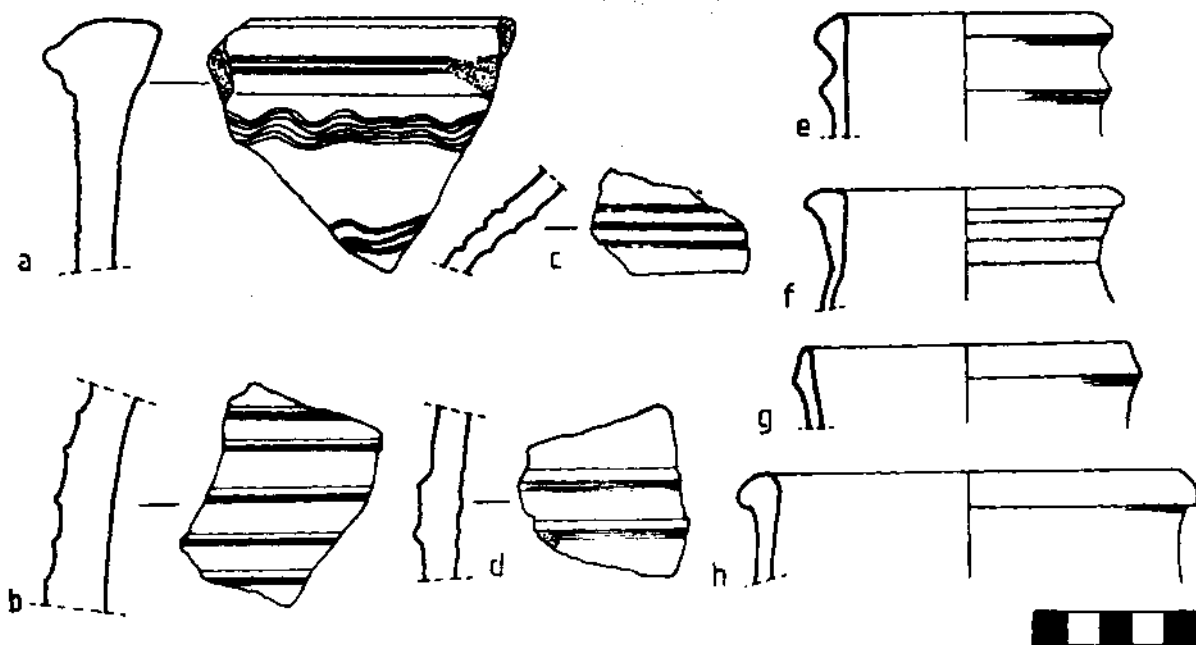


Fig. 5.

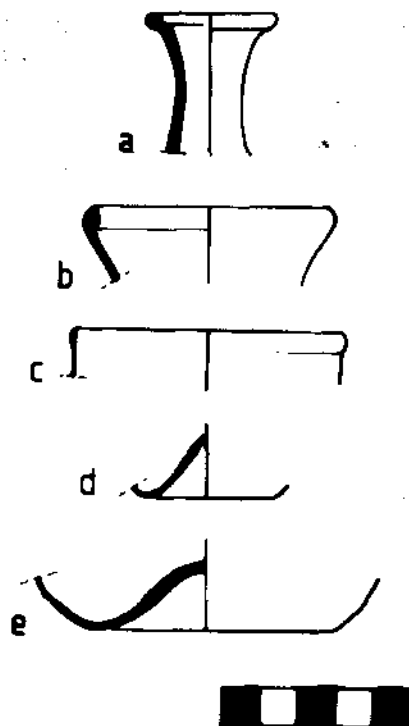
The sites

A large number of sites related to this period were found on Ghagha' during the 1993 season. Two villages were located on the southern bay and on a smaller bay on the north-west coast of the island. The buildings were partly preserved in elevation (max. 1.5 m. above present surface); they consisted of single-storey courtyard houses, a mosque, and water tanks. These sites were mapped, but no surface finds collection was undertaken; the sites were sketched, finds were typed in a preliminary manner, counted in relation to features and left in place. This strategy has also been applied at al-Ufzayya, and aims primarily at preserving sites in their totality for future, more detailed work.

All along the south-eastern peninsula, a very large number of sites related to this period were found, consisting of low, eroded mounds, possibly the remains of huts, hearths, shell middens (pearl oysters and edible shells) and scatters of pottery. It is possible that production activities were especially concentrated in these areas, close to beaches or on the beaches themselves, rather than in the villages described above.

In the centre of the islands the team studied and mapped a still-living palm-tree plantation, once supported by a sophisticated water-management system. Such a system would have certainly required constant maintenance, and, therefore, can be considered evidence for the permanent character of settlement on Ghagha' in this period. Further work, combined with an ethnographic study, is planned in future in order to interpret settlements of this period on the island as a whole.

Fig. 6.



X Period

In the course of the survey, a number of features with no associated finds were identified on Ghagha' as well as on other islands. The most frequently encountered sites consisted of clusters of unworked limestone slabs, water catchments set across the wadis, *mihrâb*-shaped stone alignments, and little shelters. They may have been in use over a long span of time, and even fairly recently, but there is no evidence to relate them to a particular period. Their relation to other sites of known chronological horizon may be clarified by excavations in the future. A more detailed study of these features, combined with ethnographic research, has been planned for the next stage of our fieldwork. This will concentrate on other islands, since they seem to offer better opportunities than Ghagha' to investigate these issues, as the latter is being developed rapidly.

Conclusion (GK & CT)

A striking point to emerge from the survey of Ghagha' is the contrast between the absence of evidence for the early and middle Islamic period and the abundance of data related to the pre-Islamic period. The survey provide a rich corpus of data for the pre-Islamic period, which deserves to be investigated further.

The concentration of sites dated to the early centuries of the first millennium AD is notable not only on Ghagha' but on other islands in the area. However, while there is good evidence of sites of 1st-early 2nd century AD/3rd-4th century AD date (i.e. periods C and

D at al-Dûr) there is a marked absence of sites of the chronological horizon related to the Nestorian monastic complex excavated on Sîr Banî Yâs island by the ADIAS team and attributed to the 6th-7th century (King et al., 1995, 67-72; King [in press]).

However, the most important results from the survey in relation to its focus on the Islamic period on Ghagha¹ and the other western islands is in terms of negative evidence. Thus, no remains of the early or middle Islamic period were found and the negative evidence provided from archaeology matches a similar paucity of evidence in the historical record.

By contrast, the picture of more intense activity suggested by the textual sources for the late Islamic period in the area generally can be compared to that deriving from the archaeological evidence.

Another point deserves attention: only rarely have Chinese pottery imports, so ubiquitous elsewhere in the Gulf, been found in relation to the late Islamic period sites off the Abu Dhabi coast. This data is not easy to interpret at present, primarily because the chronological horizon of these late Islamic sites still requires to be better defined in terms of absolute dating.

The islands offer interesting material for ethnographic studies of post-mediaeval phases but remains of the recent past are gradually disappearing from the islands. Furthermore, the older population has abandoned the islands with the coming of oil revenues, gradually losing the memory of the way of life to which these sites relate. As with other periods, this general issue deserves further attention by specialists to develop an understanding of this later period in terms of occupation, production systems, and the use of both the land and the sea, for we are dealing here with a sea culture as much as one based on land.

¹ Parts 1 and 6 are by King and Tonghini; Parts 2 and 3 are by King; Parts 4 and 5 are by Tonghini.

² We offer this paper to Beatrice de Cardi as the most appropriate that we can present to a key team member of the Abu Dhabi Islands Archaeological Survey (ADIAS), both as collaborator with the authors in project planning and ceramic studies and as a founder member of the ADIAS team in its first season in 1992. Subsequently she was a member of the field survey team in 1993 when Ghagha¹ was initially examined. Beatrice noted a Neolithic site on the NW tip of the island, one of the first to be identified off the Abu Dhabi coast. Above all she is singlehandedly responsible, directly or indirectly, for bringing every British archaeologist now working in the UAE and many others besides to the country.

³ Survey and excavation on Balghalam has been led by S. Garfi.

⁴ Team members who took part in the survey of Ghagha¹ between 1993

and 1995 were C. Czastka, B. de Cardi, D. Dunlop, G. King, S. Garfi, B. Langton, A. Stephenson, C. Tonghini and E. Whitehead.

⁵ These include the rescue excavations conducted by the ADIAS team at Dalma (Flavin and Shepherd, 1994).

⁶ We warmly acknowledge the co-operation shown by HE Mr M. al-Hamili of the Abu Dhabi *baladiya* for his willing and constructive support in providing materials and labour to erect fences at major sites on the western islands. This has been vital in ensuring sites' preservation for future detailed study.

⁷ Bodleian Library, Ms Pococke 375, 60 v.-61 r.

⁸ Communication, P. Hellyer, 13.3.1997.

⁹ See, for example, the spread of Mesopotamian 'Ubaid culture in the Gulf (Potts 1990, I, 54-58 for a synthesis; also, Flavin & Shepherd 1994). For a synthetic diachronic overview, see Potts 1990, II, 348-354.

¹⁰ See Kennet 1994, pp. 167-170; De Cardi, Kennet and Stocks 1994, pp. 58-61; Sasaki 1990. 'Abbasid glazed wares from Mesopotamia have also been observed by G. King and C. Tonghini in the assemblage excavated at al-Jumayrah by Baramki (see Baramki, 1975); both authors would like to express their gratitude to Dr. Husayn al-Qandil, Museum of Dubai, for kindly showing to them the excavated material.

¹¹ Most significant as a point of reference in this respect is the ADIAS team's work at Sîr Banî Yâs where, since 1993 we have been engaged in excavating a church and monastery of 6th/7th century date (See King et al., 1995, 63-74; King, in press).

¹² An extensive geological survey of the islands has been planned; field work will be conducted by geologists in the future seasons.

Palaeobotanic studies will also be part of the next stage of the research.

¹³ For a synthesis and discussion of survey methodological approach see De Guio, 1985. Among others, see also Flannery, 1976 in particular, Plog, 1976, Plog, Plog and Wait, 1978; De Guio, Whitehouse and Wilkins, 1989, 1990, 1992; Ricci, 1983.

¹⁴ For a synthesis of sampling approach methods, see De Guio, 1985.

¹⁵ For a synthesis of the sampling methods, see De Guio, 1985.

¹⁶ I refer to the assemblage excavated at the monastery site of Sîr Banî Yâs, which indicates a 6th-7th century AD phase; and to the assemblage of finds which were systematically collected from a site interpreted as a bedouin camp of the beginning of the century from Ra's Danân, on the northern tip of Sîr Banî Yâs. For the monastery, see King et al., 1995, pp. 63-74; King, in press).

¹⁷ Out of a total of 11 weeks of survey (1993-1995), 4 weeks have been devoted to Ghagha'.

¹⁸ Detailed drawings for all the sites will be included in the final publication of this stage of the survey (1993-1996).

¹⁹ Lithics have been studied by Jakub Czastka, the ADIAS flint expert. For a discussion on Qatar flint culture, and periodisation, see Potts 1990, I, pp. 28-58. For Qatar D, see discussion on pp. 37-54.

²⁰ Salvatore Garfi, deputy director of the ADIAS islands survey project, is currently investigating the topic of these ubiquitous rectangular hearths. On the basis of his excavations at the island of Balghalam, he is trying to establish the chronology of these hearths and their function in relation to the various sites associated with them.

²¹ Identification of the pottery is to be regarded as tentative, since an expert for the period could not be provided at this stage. For a discussion on red-ridged pottery and associated wares in context, with detailed references, see Potts 1990, I, pp. 102-106, 178-179, 194-196, 201-205, 210-212, 215, 244-249, 273-274.

²² For a similar association, see Potts, 1990, I, pp. 178-179.

²³ This dating is based on the work of Michel Mouton (see Mouton, 1992, I, pp. 32-35, 85-106, 125-136). For a discussion of the relevant archaeological and historical evidence concerning al-Dûr, see Potts, 1990, II, pp. 274-291. Similar types appear in the assemblage from Jazirat al-Ghanam attributed to the 4th century AD (see de Cardi, 1972). Residual pottery of the al-Dûr type was also found in the excavations of the monastery on Sir Banî Yâs, attributed to the 6th-7th century AD. This confirms that Period III can be ascribed to the pre-monastery horizon, although it does not provide evidence for suggesting that Period III may have lasted longer than the time span indicated by Mouton for his Period D.

²⁴ Derek Kennet is at present working on a reassessment of Late Islamic pottery on the basis of the assemblage from the British excavations at Julfar (Kennet, 1994, note 22, 171,).

²⁵ Excavations are in progress at Balghalam under the direction of Salvatore Garfi. They are especially concerned with the Later Islamic period.

²⁶ Only the Number of Fragments is indicated here. The condition of most of the pottery sherds did not allow a successful assessment of Minimum Form Number. A brief description of wares is provided here; wares with similar characteristics have been grouped in this summary.

Pottery sample description and occurrence tables²⁶

GHAGHA': site K	
Extension of the area	150 m. by 160 m. = 24,000 m ²
Sampled area	856 m ² (3.6 %)
Total N. of pottery sherds collected	104 Fragments
Theoretical average distribution of pottery per m ²	0.1 per m ²
Maximum density of pottery sherds per unit (2 m ²)	8 Fragments (6 Minimum Forms Number)

Pottery Wares	Number of Fragments
RED-WARE, often with ridges (W 49): handmade; dense red body with fine sand and yellow 'explosions'	55
RED-SLIPPED WARE (W 46): handmade; dark grey body with fine sand, bright red slip	26
GREEN WARE (W 45): wheelthrown; very hard yellow green ware with fine sand; often with melted surface	8
Non-identified buff ware (W 36 or W 16 ?)	6
Non-identified	9

GHAGHA': SITE F	
Extension of the area	200 m. by 439 m. = 87,800 m ²
Sampled area	1917 m ² (2.2 %)
Total N. of pottery sherds collected	1037 Fragments
Theoretical average distribution of pottery per m ²	0.5 sherd per m ²
Maximum density of pottery sherds per unit (3 m ²)	33 Fragments (26 Minimum Forms Number)

Pottery Wares	Number of Fragments
TURQUOISE-GLAZED WARE (W1) wheelthrown; dense, light buff ware with turquoise glaze	1
THICK GREY/BROWN WARE (W 4, W11, W 35, W 78 and W 79) wheelthrown; very hard grey or brown ware with coarse sand	180
RED WARE (W 12, W 31 and W 27): wheelthrown; very hard red ware with little, fine sand	271
RED WARE with BLACK SURFACE (W 30) wheelthrown; very hard red ware with little, fine sand; blackened surface	34
CREAM-SLIPPED RED WARE (W 32) wheelthrown; very hard red ware with little, fine sand; cream slip	10
ORANGE WARE (W 77 and W 82) wheelthrown; very hard orange ware with coarse sand	5
CREAM SLIPPED ORANGE WARE (W 76 and W 21) wheelthrown; very hard orange ware with coarse sand; cream slip	2
BLACK WARE (W 2, W 34) wheelthrown; very hard black ware with little, fine sand	247
ORANGE-SLIPPED GREY WARE (W 25) wheelthrown; very hard grey ware with coarse sand; orange slip	8
THICK DARK-BROWN WARE with yellow explosions (W 17) wheelthrown; hard dark-brown ware with yellow explosions	20
BUFF WARE (W 33) wheelthrown; dense, buff ware with little fine sand	98
COARSE SAND BUFF WARE (W 16 and W 36) wheelthrown; dense, buff ware with little coarse sand	79
SANDY ORANGE WARE (W 3) wheelthrown; orange ware with abundant fine sand	67
OTHER/non-identified	15

GHAGHA': site G	
Extension of the area	200 m. by 400 m. = 80,000 m ²
Sampled area	575 m ² (0.7 %)
Total N. of pottery sherds collected	430 Fragments
Theoretical average distribution of pottery per m ²	1.3 sherd per m ²
Maximum density of pottery sherds per unit (5 m ²)	115 Fragments (28 Minimum Forms Number)

Pottery Wares	Number of Fragments
TURQUOISE-GLAZED WARE (W1) wheelthrown; dense, light buff ware with turquoise glaze	1
THICK GREY/BROWN WARE (W 4, W11, W 35) wheelthrown; very hard grey or brown ware with coarse sand	56
RED WARE (W 12, W 31 and W 27): wheelthrown; very hard red ware with little, fine sand	48
RED WARE with BLACK SURFACE (W 30 and W 38) wheelthrown; very hard red ware with little, fine sand; blackened surface	13
CREAM-SLIPPED RED WARE (W 32) wheelthrown; very hard red ware with little, fine sand; cream slip	1
ORANGE WARE (W 82) wheelthrown; very hard orange ware with coarse sand	3
BLACK WARE (W 2, W 34) wheelthrown; very hard black ware with little, fine sand	140
ORANGE-SLIPPED GREY WARE (W 25) wheelthrown; very hard grey ware with coarse sand; orange slip	1
THICK DARK-BROWN WARE with yellow explosions (W 17) wheelthrown; hard dark-brown ware with yellow explosions	16
BUFF WARE (W 33) wheelthrown; dense, buff ware with little fine sand	10
COARSE SAND BUFF WARE (W 16 and W 36) wheelthrown; dense, buff ware with little coarse sand	22
SANDY ORANGE WARE (W 3) wheelthrown; orange ware with abundant fine sand	63
JULFAR-RELATED WARE (W 50) hand-made; grey/brown brittle ware	26
DALMATIAN WARE (W 51) hand-made; thick greenish-buff ware with very coarse black grit	4
OTHER/non-identified	26

Bibliography

- Bernard, V. and Salles, J.-F. 1991, Discovery of a Christian Church at al-Qusur, Failaka (Kuwait), *PSAS*, 21, pp. 7-22.
- Baramki, D.C. 1975, An Ancient Caravan Station in Dubai, *Illustrated London News*, 2903.
- Boucharlat, R. and Salles, J.-F. 1981, The history and archaeology of the Gulf from the fifth century B.C. to the seventh century A.D.: a review of the evidence, *PSAS*, 11, pp. 65-94.
- de Cardi, B. 1972, A Sasanian outpost in northern Oman, *Antiquity*, XLVI, pp. 305-310.
- de Cardi, B. with sections by Vita-Finzi, C. and Coles, A., 1972, Archaeological Survey in Northern Oman, 1972, *East and West* 25 pp. 9-75.
- de Cardi, B. 1978, *Qatar Archaeological Report, Excavations 1973*, Oxford.
- de Cardi, B., Kennet, D. and Stocks, R.L. 1994, Five thousand years of settlement at Khatt, U.A.E., *PSAS*, pp. 35-95.
- de Guio, A. 1985, Archeologia di superficie ed archeologica superficiale, *Quaderni di archeologia del Veneto*, I, pp. 176-184.
- de Guio, A., Whitehouse, R., and Wilkins, J. (eds.) 1989, Progetto Alto-Medio Polesine-Basso Veronese: terzo rapporto, *Quaderni di Archeologia del Veneto*, V, pp. 181-206.
- de Guio, A., Whitehouse, R., and Wilkins, J. (eds.) 1990, Progetto Alto-Medio Polesine-Basso Veronese: quarto rapporto, *Quaderni di Archeologia del Veneto*, VI, pp. 217-238.
- de Guio, A., Whitehouse, R., and Wilkins, J. (eds.) 1992, Progetto Alto-Medio Polesine-Basso Veronese: quinto rapporto, *Quaderni di Archeologia del Veneto*, VIII, pp. 173-190.
- Flannery, K. (ed.) 1976, *The Early Mesoamerican Village*, New York.
- Flavin, K. and Shepherd, E.L. 1994, Fishing in the Gulf: Preliminary investigations at an Ubaid Site, Dalma (U.A.E.), *PSAS* 24 pp. 115-134.
- Hansman, J. 1985 *Julfâr. An Arabian Port*, London.
- Hardy-Guilbert, C. 1984, Fouilles archéologiques à Murwab, Qatar, in *Arabie orientale, Mésopotamie et Iran méridional de l'Âge du Fer au début de la période islamique*, Ed. Recherche sur les Civilisations, Paris pp. 169-188.
- Hardy-Guilbert, C. 1991, Julfâr, cité portuaire du Golfe arabo-persique à la période islamique, *Archéologie islamique* II pp. 162-203. 192.
- Hardy-Guilbert, C. 1991, Dix ans de recherche archéologique sur la période islamique dans le Golfe (1977-1987), *Documents de l'Islam Médiéval. Nouvelles Perspectives de Recherche. Actes de la Table Ronde organisée pa le CNRS, Paris, Mars 1988*, Institut Français d'Archéologie Orientale du Caire, pp. 131-192.

- Hardy-Guilbert, C. and Saint-Aubin, J.P. 1984, Relève photogrammatique du Site Abbaside de Murwab (Qatar), *Photogrammetric Surveys of Islamic Architecture*, Tunis, pp. 199-206.
- al-Idrîsî, trans. into French from the Arabic, 1836, Jaubert, P.-A., *La Géographie d'Edrisi*, Paris.
- al-Idrîsî, *Opus Geographicum*, 1972, (ed.) A. Bombaci, A., Rizzitano, U., Rubinacci, R., Veccia Vaglieri, L., Naples, Rome.
- Kennet, D. 1991, Excavations at al-Qusur, Failaka, Kuwait, *PSAS*, 21, pp. 97-111.
- Kennet, D. with a historical comment by King, G.R.D. 1994, Jazirat al-Hulayla - early Julfâr, *JRAS*, 4/2, pp. 163-212.
- Kervran, M. 1983, Deux fortresses islamiques de la côte orientale de l'Arabie, *PSAS*, 13 pp. 71-77.
- King, G.R.D. 1990, Excavations of the British team at Julfâr, Ras-al-Khaimah, United Arab Emirates: Interim Report on the first season (1989), *PSAS* 20 pp. 79-93.
- King, G.R.D. 1991, Excavations of the British team at Julfâr, Ras-al-Khaimah, United Arab Emirates: Interim Report on the second season (1990), *PSAS* 21 pp. 123-134.
- King, G.R.D. 1992 Excavations of the British team at Julfâr, Ras-al-Khaimah, United Arab Emirates: Interim Report on the third season, *PSAS* 22 pp. 47-54.
- King, G.R.D. (at press) A Nestorian Monastic Settlement on the Island of Sîr Barî Yâs, Abu Dhabi, *BSOAS*.
- King, G.R.D., Dunlop, D., Elders, J., Garfi, S., Stephenson A., and Tonghini, C. 1995, A Report on the Abu Dhabi Islands Archaeological Survey (1993-4), *PSAS* 25, pp. 63-74;
- Larsen, C. E. 1983, *Life and Land Use on the Bahrain Islands*, Chicago.
- Lowick, N.M. 1974, Trade patterns on the Persian Gulf in the light of recent coin evidence, in Kouymjian, D.K. (ed.), *Near Eastern Numismatics, Iconography, Epigraphy and History. Studies in Honour of George C. Miles*, Beirut, pp. 319-333.
- Lowick, N.M. 1982, Further unpublished Islamic coins of the Persian Gulf, *Studia Iranica*, 11, pp. 247-261.
- Morgan, P. 1991, New Thoughts on Old Hormuz: Chinese Ceramics in the Hormuz Region in the Thirteenth and Fourteenth Centuries, *Iran*, XXIX, pp. 67-83.
- Patitucci, S and Uggeri, G. 1985, *Failakah. Insediamenti Medievali Islamici. Ricerche e scavi nel Kuwait*, Rome.
- Plog, S., Plog, F., and Wait, W. 1978, Decision making in modern surveys, in M. Schiffer (ed.), *Advances in Archaeological Method and Theory*, 1, pp. 383-421.
- Plog, S. 1976, Relative Efficiencies of Sampling Techniques for Archaeological Surveys, in Flannery 1976, pp. 136-158.

- Potts, D.T. et al. 1978, *Comprehensive Archaeological Survey Program: Preliminary Report on the Second Phase of the Eastern Province Survey 1397/1977*, *Atlatl*, 2, pp. 7-27.
- Potts, D.T. 1990, *The Arabian Gulf in Antiquity* Oxford, 2 vols.
- Ptolemy, C. 1932, *Geography of Claudius Ptolemy*, translated into English and edited by Stevenson, E.L., NY.
- Sasaki, T. 1990, Excavations at A'Ali: 1988/1989, *PSAS*, 20, pp. 111-129.
- Sasaki, T. and Sasaki, H. 1992, Japanese excavations at Julfar—1988, 1989, 1990 and 1991 seasons, *PSAS* 22 pp. 105-120.
- Slot, B.J. 1993 *The Arabs of the Gulf, 1602-1784*, Leidschendam.
- Tampoe, M. 1989, *Maritime Trade between China and the West. An Archaeological Study of the Ceramics from Siraf (Persian Gulf), 8th to 15th centuries AD*, BAR International Series 555, Oxford.
- Taylor, R. 1856, *Extracts from brief notes, containing historical & other information connected with the Province of Oman; Muskat and the adjoining country; the other ports and places in the Persian Gulf, Bombay (1818). Selections from the Records of the Bombay Government*, no. xxix, new series, Bombay.
- Tibbetts, G.R. 1977, Arabia in the Fifteenth Century Navigational Texts, in Serjeant, R.B. and Bidwell, R.L. (eds.), *Arabian Studies*, London, pp. 86-101.
- Tixier, J. 1980, *Mission archéologique française à Qatar*, Paris and Doha t. 1.
- Vogt, B., Gockel, W., Hofbauer, H., and al-Haj, A.A. 1989, The Coastal Survey in the Western Province of Abu Dhabi, 1983, *Archaeology in the United Arab Emirates* V pp. 49-60.
- Whitehouse, D. 1983, Maritime trade in the Gulf: the 11th and 12th centuries, *World Archaeology*, 14/3, pp. 328-334.
- Whitehouse, D. and Williamson, A. 1973, Sasanian maritime trade, *Iran*, 11, pp. 29-49.
- Whitcomb, D.S. 1975, The Archaeology of Oman: A preliminary discussion of the Islamic Periods, *Journal of Oman Studies* I pp. 123-157.
- Williamson, A. 1973, Hormuz and the trade of the Gulf in the 14th and 15th centuries AD., *PSAS*, 3, pp. 52-68.
- Wright, J.C. et al. 1990, The Nemea Valley archaeological project. A preliminary report, *Hesperia*, 59, 4, pp. 579-617.