

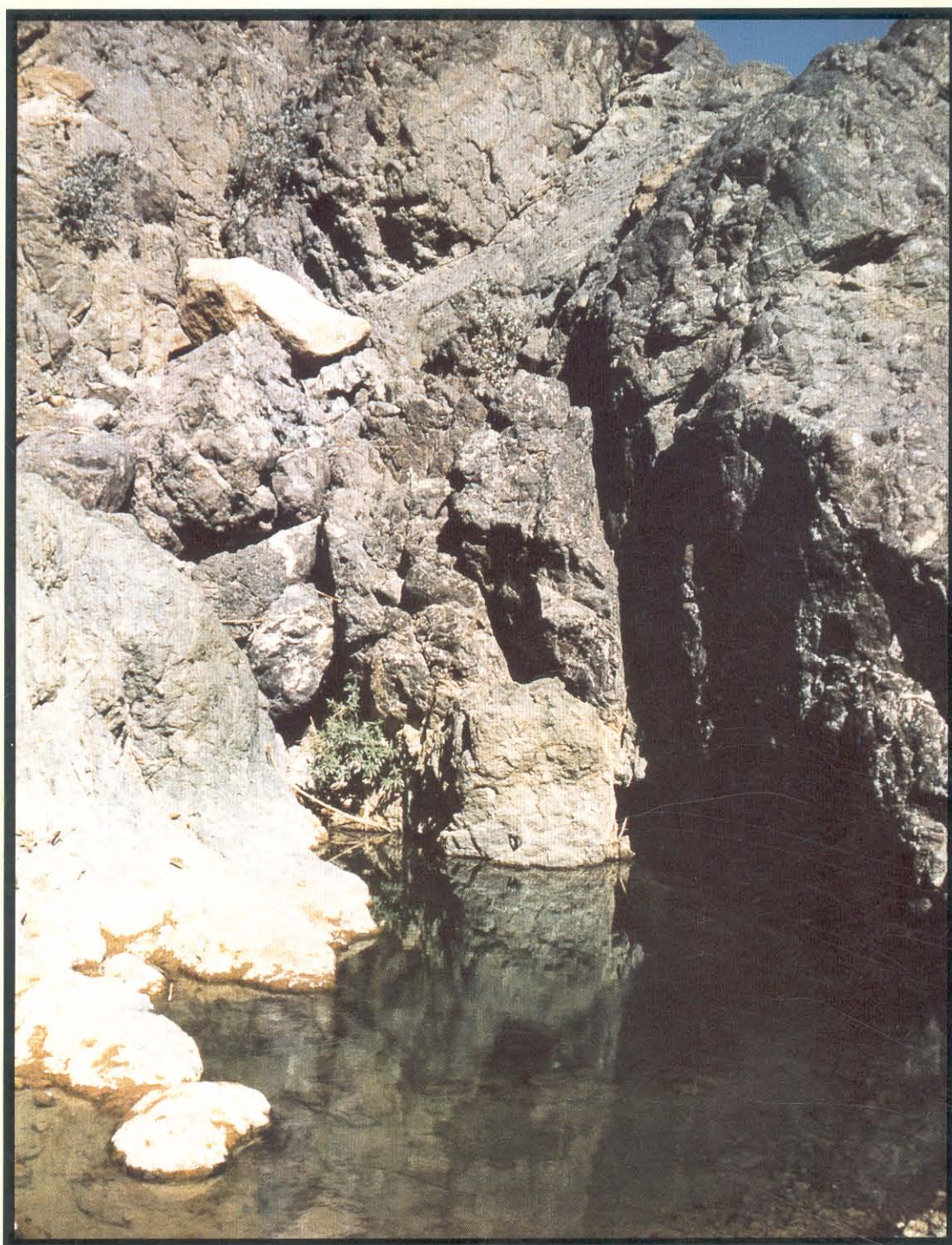
# TRIBULUS



**Bulletin of the Emirates Natural History Group**

**Vol. 10.1**

**Spring/Summer 2000**



## NOTES FOR CONTRIBUTORS

TRIBULUS is the name of the Bulletin of the Emirates Natural History Group. The Group was founded in 1976, and over the next fourteen years, 42 issues of a duplicated Bulletin were published. The revised format of TRIBULUS, introduced in 1991, permits the inclusion of black and white and colour photographs, not previously possible.

TRIBULUS is published twice a year, in April and October. The aim of the publication is to create and maintain in standard form a collection of recordings, articles and analysis on topics of regional archaeology and natural history, with the emphasis on the United Arab Emirates and adjacent areas. Papers, short notes and other contributions are welcomed from anyone but should not have been published elsewhere. Guidelines are set out below. The information carried is as accurate as the Editorial Board and Advisory Panel can determine, but opinions expressed are those of the authors alone.

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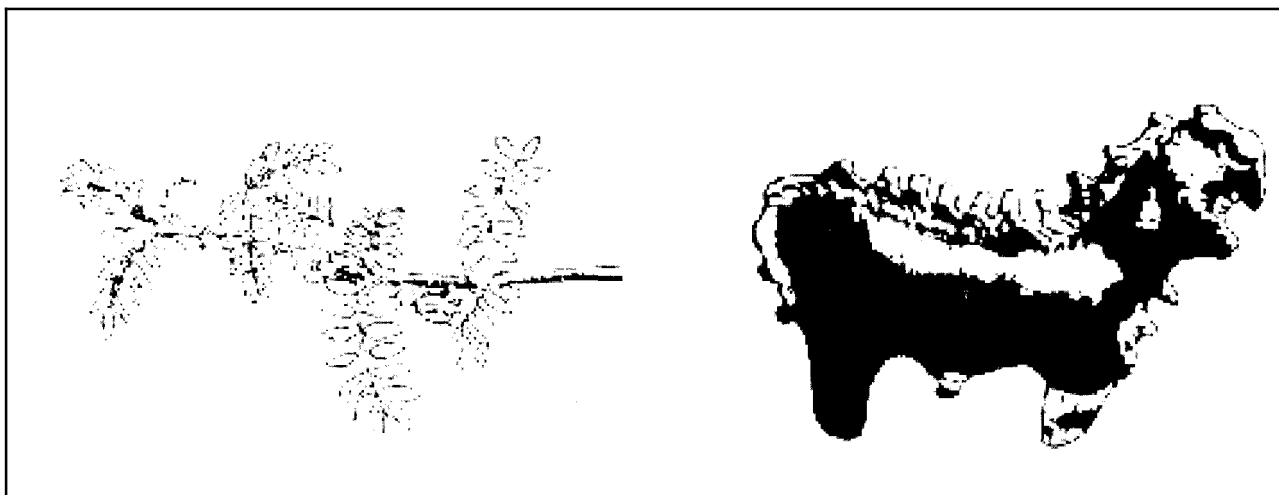
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The plant motif above is of the genus *Tribulus*, of which there are six species in the UAE. They all have pinnate leaves, yellow flowers with free petals and distinctive five-segmented fruits. They are found throughout the country, except in coastal *sabkha*.

The animal motif above is of a tiny golden bull, excavated from the early Second Millennium grave at Qattarah, Al Ain. The original is on display in Al Ain Museum, and measures above 5 cm by 4 cm.

Manuscripts should be typed, on one side only, and double-spaced, and should be accompanied by a disc for material in excess of 500 words in length. A short abstract should precede the article, with the address(es) of the author(s) at the end.

Photographs may be submitted and should be either glossy black-and-white or colour prints or colour slides, which should be clearly captioned. Line drawings and maps should be in black ink on strong white or translucent paper.

References should give the author's name, with the year of publication in brackets, and with the list of articles, showing title and publisher, in date order.

Scientific names should follow customary nomenclature in Latin, while the English and, if appropriate, available Arabic names should also be supplied.

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The Editorial Board of TRIBULUS and the Committee of the Emirates Natural History Group acknowledge, with thanks, the support of the Group's Corporate members, a full list of whom can be found on Page 4, without whom publication in this format would be impossible. We also acknowledge the support and encouragement of our Patron, H.E. Sheikh Nahayan bin Mubarak Al Nahayan, the U.A.E. Minister of Higher Education and Scientific Research.

TRIBULUS is published for circulation to members of the ENHG and is also available for sale to members of other natural history groups and similar bodies as well as subscribers in the UAE and overseas. It is also available through the Ornithological Society of the Middle East. Details on request.

The text of this issue is also available on the website of the UAE Ministry of Information and Culture:  
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## EDITORIAL

The topic of conservation, long a favourite subject for this journal, has been receiving increased attention in the UAE so far this year. Two major conferences have been held, one, in January, organised by the Environmental Research and Wildlife Development Agency, ERWDA, and the other, in April, by the Centre for Environmental Research of the Emirates Heritage Club. Other smaller events have also been organised, including one, sponsored by the Breeding Centre for Endangered Arabian Species, in Sharjah, on endangered carnivores of Arabia.

These events have been matched, at the legislative level, by the bringing into effect of new federal laws, including a new general law on environmental protection and another specifically on the marine environment, while several local decrees have been issued to add enforcement powers to the federal laws.

Less publicly, other steps are being taken. ERWDA is, for example, considering the creation of a special unit of 'desert rangers' to implement decisions on the protection of the habitat and wildlife of Abu Dhabi, while work proceeds on the ERWDA-led Environmental Strategy for the Emirate of Abu Dhabi, while plans to boost the power of the authorities to clamp down on polluting tankers are being prepared.

With the benefit of over twenty years of existence, the Emirates Natural History Group, and this journal, are loth to say that all is now 'plain-sailing' on the environmental protection front. We have seen conferences and legislation before, and questions remain as yet unanswered as to whether implementation decrees and laws and adoption of recommendations will reach a satisfactory level.

It is abundantly clear, however, that the agenda has now been clearly set. It is up to all those concerned (including interested individuals and NGOs) to work for it to be carried out.

One feature of the conferences earlier in the year was the way in which locally-based institutions and researchers are now collaborating closely with top international researchers and organisations, the work of the CER in the marine field being a particularly good example, as is the burgeoning relationship between ERWDA and the World Wide Fund for Nature, WWF, which is shortly to establish an office in Abu Dhabi.

We welcome this collaboration.

At the same time, however, we would sound a note of caution. In seeking to benefit from the wisdom of those overseas, it is important that locally-based expertise is not overlooked. There is no need for the wheel to be re-invented in terms of environmental research in the UAE by importing skills from abroad when local skills already exist. At the very least, there is a need for harmonious co-operation.

That said, however, the progress being made is to be welcomed. The ENHG looks forward to helping in whatever way it can.

One way, of course, is through the continued publication of the results of research. Through this, further research

can be stimulated while, at the same time, this journal hopes to encourage newcomers to enter the field of research and publication by showing not only the great diversity of topics of interest but also the way in which new discoveries are continually being made. That diversity is reflected, as usual, in this issue of *Tribulus*.

Following the papers on Fujairah archaeology in the last issue, we return again to the East Coast. The work on the fort in the Wadi Safad, by Gareth Longden and Salvatore Garfi reports on one of Fujairah's lesser-known fortifications. Their work was partly funded by a grant from the ENHG Conservation Fund. A short paper on the traditional '*shasha*' fishing boats records a once familiar, but now increasingly rare, sight in Fujairah.

More archaeology follows with Rob Carter's important study on early pottery from Abu Dhabi island, which has pushed back knowledge of the island's occupation for over a thousand years. The pottery in question, we should note, was collected by members of the ENHG, long before there was anyone around to study it, and kept carefully over the years. The foresight of the collectors, including ENHG founder J.N.B. Brown, now pays off handsomely.

Regular contributor Gary Feulner teams up with Peter Cunningham to continue his look at freshwater fish, while other studies include ticks, the spread of the Namaqua Dove, desert truffles, Blanford's Fox, reptile records, and more. Reviews of the latest books are also included.

The Editors are delighted to note that some new contributors appear for the first time in this issue of *Tribulus*. Their pieces are of particular value because they cover topics which have received little attention in the journal in recent years. More authors are always welcome - whether living in the UAE or researchers who come here to carry out studies.

This issue has sought to maintain the objective of publishing new material about the natural history and heritage of the UAE, and to make that material available both locally and within the broader research community overseas.

We believe that the papers prove, again, that there is much valuable scientific research still to be done in the Emirates. At the same time, as the paper on the medieval pottery from Abu Dhabi island clearly shows, there is much that can be done by the interested amateur.

Few, perhaps, would aspire to the impressive scientific output that emanates from the pen, or computer, of one of our regular contributors who is a lawyer by profession, (although also a geologist by training). The simple collection of material or the recording of sightings can, however, play an important part in studies of the country.

If this issue of the journal helps to stimulate such activity, we shall be well pleased.

Production of *Tribulus*, and many of the other activities of the Emirates Natural History Group, including the grant programme of the Group's Conservation Fund, would not be possible without the generous support of the Group's Corporate members, many of whom have provided consistent assistance over many years. The Editorial Board and the Group Committee acknowledge, with thanks, the invaluable support of the following companies and bodies:

ABN Amro Bank, Abu Dhabi Company for Onshore Oil Operations, ADCO, Al Bawardi Enterprises, Al Fahim Group, Al Nasser Holdings, Al Sayegh Richards Butler, ANZ Grindlays Bank, Bin Hamoodah, BritBank, The British Council, British Petroleum, Forte Grand Hotel, Gulf Automation Services and Oilfield Supplies, Jashanmal National Company, METCO, Mobil Abu Dhabi, Mohammed bin Masaood & Sons, Motivate Publishing, National Bank of Abu Dhabi, Pencol International, Ready-Mix Abu Dhabi, Shell Gas Abu Dhabi, Stork Engineers and Contractors, B.V., Tebodin Middle East, Union National Bank and Van Oord ACZ BV.

# An archaeological and architectural evaluation of a fort in the Wadi Safad, Emirate of Fujairah

by Gareth Longden and Salvatore Garfi

In December of 1998 archaeologists from Trinity College, Carmarthen, University of Wales conducted research within the Wadi Safad, Emirate of Fujairah. Interest focused upon a fort (*husn*) located approximately nine kilometres inland from the village of al-Qurayya (plate 1). The site was first examined by King in 1994 (King and Maren-Griesebach 1999 - in *Tribulus* 9:2, 10-18); an initial survey of the site was conducted by Garfi (1995) under the sponsorship of the Abu Dhabi Islands Archaeological Survey, ADIAS. The *husn* originally stood on the end of a spur of rock projecting into the wadi, the construction of a road along the wadi in 1994/5, however, has truncated the spur leaving the *husn* isolated on a rocky outcrop (*fig. 1*). The outcrop upon which the *husn* stands is surrounded by the remains of abandoned settlements.

The *husn* itself has two distinct areas: a defended enclosure with towers and internal rooms; and a second extra-mural area located on a platform to the south of the main defended area, containing the insubstantial remains of at least seven buildings may be discerned on the platform.

## The husn

The overall dimensions of the *husn* are approximately 32m north to south, by 20m east to west (*fig. 2*). The *husn* is largely constructed with random rubble and a mud mortar, although in places dry-stone techniques were also utilised. The main defensive elements of the *husn* are two, now ruinous, towers situated on rocky

outcrops, one at the northern end of the site and another in the south-west corner. The northern tower is round in form and the south-west tower is sub-rectangular in form.

The curtain wall links these two structures and follows the topography of the platform upon which the *husn* was built. The curtain wall curves out broadly from the northern tower to the south-east before turning west and linking up with the south-west tower, the wall then runs directly north-east to return to the north tower. The curtain wall appears to be continuous and the presence of any entrance way into the enclosure cannot be reliably identified, and indeed the likelihood of such a feature should be questioned. The curtain walls of the *husn* are in many places approximately 2m high internally, and 3m high externally, the wall varies from approximately 0.75m to 2m in thickness. The interior of the *husn*, on its eastern and southern walls, are fringed with what appear to be the remains of 6 casemate rooms or chambers. A further sunken gabled room can be identified in the north-west corner of the interior of the *husn*. The north-west area of the interior also contains the remains of a juss-lined sunken water cistern and a small ancillary structure, probably a sheltered hearth or storage area. Immediately to the south of the *husn* the hill top has been revetted to enhance a triangular shaped level area. This platform extends to the south for approximately 40m and is approximately 25m wide at its northern end. On this revetted area are the remains of at least seven structures and a small, dry-stone



Plate 1: Husn Safad, looking south. Picture by G.R.D. King

construction, a 'watch station'. Below the level of the husn, on the sides of the spur are the remains of at least two other "watch stations" (fig. 1).

#### Discussion

The examination of the structure has revealed a previously unsuspected complexity to the construction of the *husn*. It is clear that the building went through two distinct phases of rebuilding. The most significant alteration occurred in the second phase when the entire south end of the complex was redesigned. The addition of the southern tower and the suite of rooms along the interior of the south wall clearly illustrate the desire to improve the residential and defensive facilities of the structure and may represent a change in function towards a more permanent occupation. The third phase of activity at the site saw a series of minor alterations to the layout of the rooms that seems to indicate a more transitory period of squatter occupation. The relationships between the *husn* and the platform to its south and the surrounding settlements are difficult to assess. No such difficulty exists in regard to the three watch stations that lie to the north, north-west and south of the main *husn* complex. These small observation points are positioned so as to allow for unrestricted access down the steep slopes of the *husn* hill into the wadi bed and form part of an integrated defensive system. The seven structures on the platform to the south consist of low lines of stones, that often utilise natural outcrops, these lines of stones form enclosures, 2m by 3m that are open along one axis. It is likely that these small buildings were designed to be seasonally occupied 'arish covered dwellings, which were intended to complementary to the main *husn* occupation.

Alternatively, these buildings may simply be utilising the level area on top of the hill and would therefore have no relationship with the husn, ultimately only excavation will resolve this issue. From the results of the preliminary ceramic analysis of the site as a whole it is clear that most of the pottery is locally produced Julfar red unglazed ware, incised white ware and post-Julfar horizon wares and a small number of imported Persian turquoise glaze sherds (Ziolkowski pers. comm.). It is likely, therefore, that the earliest activity on the site dates from the 16th and 17th centuries and continued into the modern period.

#### Conclusions

The architectural and archaeological analysis of the husn in the Wadi Safad have revealed a previously unsuspected complexity to the structure. It seems that the *husn* in its final form bore close typological similarities to the nearby, and roughly contemporary site at al-Qurayya (see Note appended to this paper). Furthermore, Kennet's (1995) analysis in Ras al-Khaimah suggests that this type of complex can be found throughout the north-eastern part of the United Arab Emirates. The initial synthesis of the ceramic evidence would suggest that this type of building should be attributed to the 16th or 17th century. The form of the buildings with their provision for both storage and occupation suggests that they were intended for extended, perhaps even permanent occupation, unlike the redoubts of the coastal towers that were used as part of an integrated system of watchtowers and places of safety. Further research is required to bring greater clarity to the historical position of these buildings and also to examine in detail the way that they may have functioned in the wider social landscape, these issues are discussed elsewhere (Longden & Garfi in prep.).

#### Acknowledgements

We are grateful to His Highness Sheikh Hamad bin Mohammed Al Sharqi, Ruler of Fujairah, for giving approval for the work to be conducted. We are also grateful to Mr Ahmed Khalifa Al Shamsi, Director of the Department of Antiquities and Heritage of the Government of Fujairah, for the generous support offered by his Department. Mr Salah Ali Hassan, of the Department of Antiquities and Heritage, with whom we liaised throughout our stay in the Emirate. We would also like to thank Mr Peter Hellyer, Executive Director of the Abu Dhabi Islands Archaeological Survey, ADIAS, who undertook discussions on our behalf with the Fujairah authorities prior to commencement of the work, and for his continued assistance throughout this project. We would also like to acknowledge the provision of grants by the Emirates Natural History Group and by the Abu Dhabi Islands Archaeological Survey towards the cost of our work. Michele Ziolkowski of the University of Sydney provided invaluable advice on the ceramics from the site. Finally, we would like to acknowledge the generous assistance provided by the Department of Archaeology, Trinity College, Carmarthen.

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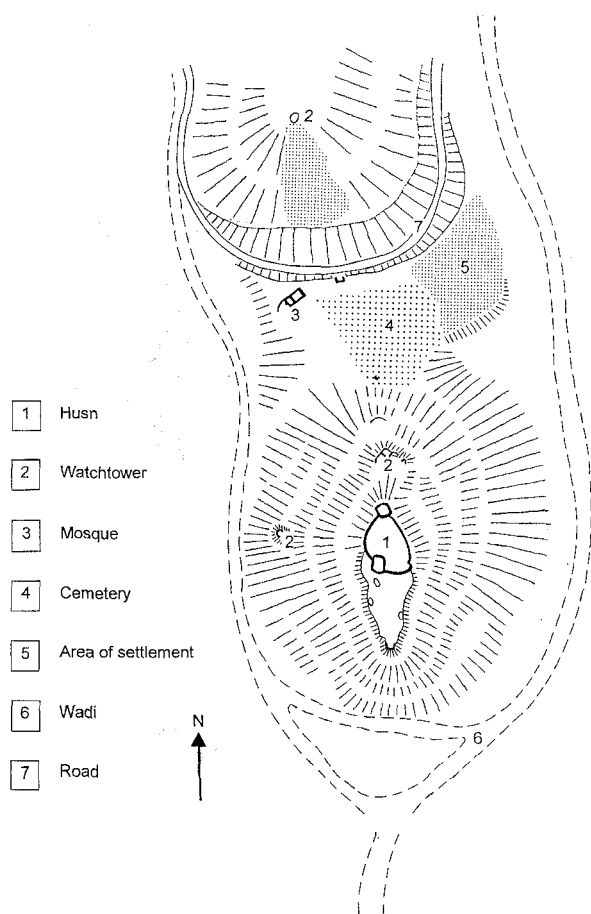


Fig. 1 Sketch plan of survey area



Longden, G. & Garfi, S. (in prep.) The evolution of a defended residence: Insights from recent archaeological and architectural fieldwork in the Wadi Safad, Emirate of Fujairah, United Arab Emirates.

## Recent work at al-Qurayya, Emirate of Fujairah

In December 1999 work by the Department of Archaeology, Trinity College, Carmarthen continued on the Late Islamic fortified structures of the Wadi Safad. The centre of research shifted to the defended fort at al-Qurayya, colloquially known as the fort of Mohammed bin Mohammed (de Cardi 1971). The work revealed a much larger although simpler structure than the contemporary fort higher up the wadi at Safad, where the College's research programme began in 1998. The fort at al-Qurayya is approximately 70m by 90m in size. The main feature is a massive defensive curtain wall that encompasses the entire hilltop. In many places this wall still stands to a height of over 2.5m. The construction of such a wall would have been a significant undertaking for a large population. The wall is pierced by at least two original entrances, one to the east and one to the south, a third entrance on the north is probably later. There are few internal features. The five rooms that are present are small, the average size being 3m by 2m. These are more likely to be store rooms than rooms intended for permanent occupation. There is within the defended enclosure a sunken juss-lined cistern, which if full might contain as much as 18,500 litres of water. The

eastern side of the hill has approximately 50 small terraces or platforms. The function of these platforms is unclear but it is interesting to note that c.20 small (3m by 2m) platforms were found around the fort at Safad. To the south of the hill on a lower-lying shoulder are the remains of a mosque.

The large open, very public space at al-Qurayya can be contrasted with the much more private and intimate space created at Safad. The fort at Safad evokes ideas associated with a prestigious private residence. The fort at al-Qurayya offers little evidence of this type of occupation. Instead one is left feeling that the interior of the fort was intended not for permanent occupation by any group but as a temporary place of safety, somewhere where a larger population could find protection. Further work is planned in December 2001.

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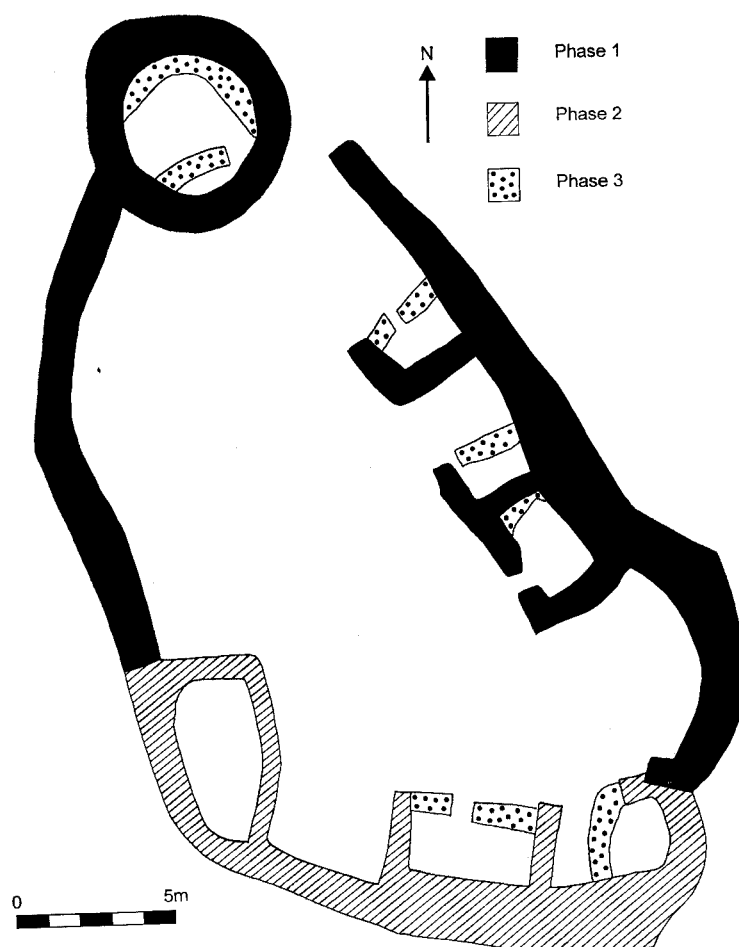


Figure 2: Schematic plan of Husn Safad, looking north

# The Shasha - traditional fishing craft of the UAE's East Coast

by Michelle Ziolkowski

(An interview with Abdullah Mohammed Sulaiman;  
translation by Naser Ali Tajalli & Sheikh Abdullah bin Sohail Al Sharqi)

## Introduction

The Emirate of Fujairah, on the Gulf of Oman (Batinah) coast of the United Arab Emirates, still retains numerous traditions now less common in the larger emirates due to the rapid development which has taken place in the country over the past three decades. It is reasonable to assume, however, that it is only a matter of time before much of the traditional knowledge and expertise developed over centuries disappears. The construction and use of the small fishing boat built of bound bundles of palm fronds known as the **shasha** (pl., **shoosh**) represents one of these traditional aspects.

One of the few remaining **shasha** builders in Fujairah is Abdullah Mohammed Sulaiman, now in his forties. He was introduced by his father at the age of four to the art of **shasha** building, and is now trying to pass on his knowledge to his sons. In view of the current development process, however, including the introduction of fibreglass boats and the mechanisation of the fishing industry, he doubts that his sons will follow in his footsteps.

According to Abdullah, there were traditionally two main families of master **shasha** builders in Fujairah. One of these is his own and the other is the Drieder family. Each family would hire workers to assist the master builders with their projects. The construction of a **shasha** could take anywhere between a half to one full day, providing all the materials had been collected and prepared beforehand. One master builder and three or four assistants could construct a boat between 7 am and midday, although with only one assistant a full day is necessary to complete the task.

## The Shasha

Ninety percent of the material necessary for building these boats is obtainable from the date palm tree **Phoenix dactylifera**. The remaining material is gathered from trees located in the mountains, such as the **Zizyphus** and **Acacia**. The long fronds of the date palm are prepared by removing the leaves and soaking the stems which will make them pliable and manageable. These stems are tied together securely with a rope made from the date palm. Today nylon rope is often substituted for the original date palm rope.

The base layer of stems is bound tightly and is secured by a frame made of wood from the **Zizyphus** or **Acacia** tree. This frame contains seven cross beams along the base with corresponding beams on either side of the boat. The large section of the date palm stem which is attached to the trunk (that is, the branch stumps) was originally used to create buoyancy. Today, however, styrofoam is generally used.

These segments are bound together with date palm rope and secured above the base of the stems. Above this are placed another seven cross beams and a layer of tightly bound stems. The sides of the **shasha** are also constructed with tightly bound date palm stems. All of the cross beams and stems are secured with the date palm rope. The date palm stems were once also used to construct the fishing cages known as **gargour**, (pl., **garagir**) which are now made of metal.

A **shasha** usually has two oars, one located in the middle and one at the back. These oars are also constructed with wood, again from either **Zizyphus** or **Acacia** trees. The **shasha** usually seats between two and four people, although larger **shoosh** can also be



Master **Shasha**builder Abdullah Mohammed Sulaiman with one of his craft. Picture by M. Ziolkowski



constructed. These can carry up to five people.

The primary function of the **shasha** is as a fishing boat and it is, therefore, only designed to travel short distances. The stems used for buoyancy can become heavy due to absorbing of water and thus impede long distance travel. Once a **shasha** has reached its desired destination, fishing nets or cages can be dropped. The distance travelled is usually no more than 15km. It may also be used for short distance travel, for example from Fujairah to Kalba or Fujairah to Qurayyah.

In the past, fishing trips from Fujairah to the Omani town of Sohar, further down the Batinah coast, were occasionally made. These could last for anywhere between 15 days and a month. For more extensive journeys, for the purpose of coastal trade, for example, large sailing ships, like the Al Baggara, made on the Persian coast of wooden planks sewn together with ropes, were used.

According to S.B. Miles, the **shasha** boat-type was commonly used on the UAE's East Coast during the late 19th Century. He ascribed this to the lack of shelter available for vessels and to the heavy surf which occurred in these coastal waters. He described the **shasha** as an illustration of "the singular ingenuity with which the Arab adapts the materials he has at hand to the wants and necessities of his life and avocation". He went on to say that they were very fragile, but so elastic that they could ride the heaviest surf. Miles also said that they were used for fishing and for communicating with larger craft anchored offshore (1).

The **shasha** is a boat type primarily known from the Batinah (East) Coast in Fujairah and in Oman. Interestingly, there is also a historical reference to the type being present on the island of Socotra, off the tip of the Horn of Africa, and now part of Yemen. During a visit to Socotra in 1897, Mr. and Mrs. Theodore Bent noticed that boat building in the western port of Qalansiyyah was accomplished by the binding together of palm fronds (2). B. Doe has noticed the similarity between these boats and the **shoosh** still used by fishermen on the Batinah

Coast of Oman and Fujairah (3). The similarity of boat type is an indication of the exchange of ideas and of the movements of peoples along the Indian Ocean - East Africa trade route.

According to Abdullah, the people of Dibba, at the northern tip of the UAE's East Coast, purchased **shoosh** from Fujairah but never constructed their own. It is possible, therefore, that this type of seafaring vessel may have originally been developed along the Batinah coast. Abdullah's own family, together with some others, first arrived in Fujairah around seventy years ago, coming from the southern coast of Iran. Upon arrival in Fujairah, they noticed **shoosh** present in the area, probably imported from further down the Batinah coast, in Oman, and subsequently learned how to build them.

**Shoosh** have been an integral part of the lifestyle and coastal economy practised along Fujairah's coastline for at least a century. They display traditional local skills and craftsmanship and an understanding of the raw materials available on the UAE's East Coast.

#### Notes

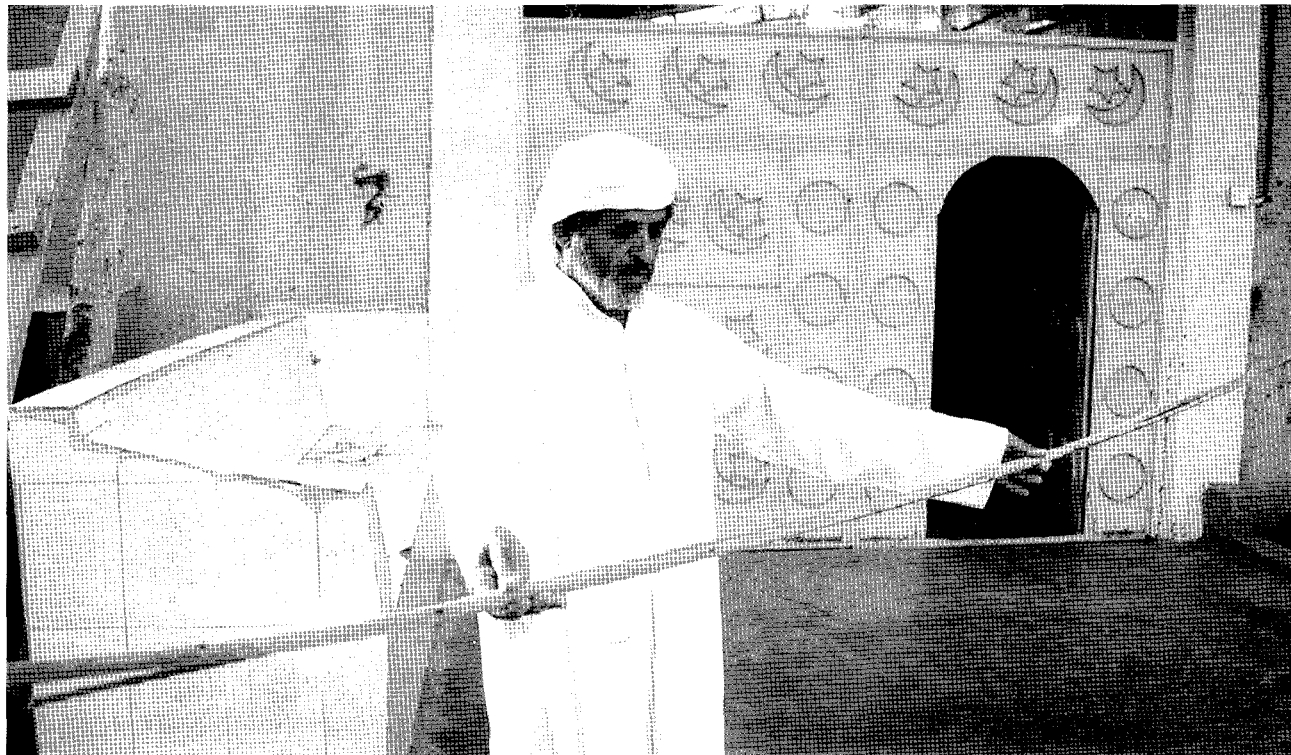
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3. *Ibid.*

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Examining the stem of a date palm frond: the key raw material of the shasha. Picture by M. Ziolkowski

# New Evidence for the Medieval Occupation of Abu Dhabi

by Robert Carter

Golf and archaeology make unlikely bedfellows, but recent study of finds from the Abu Dhabi Golf and Equestrian Club has provided new evidence of the medieval occupation of Abu Dhabi Island.

Written sources state that Abu Dhabi island was first settled during the 18th century by members of the Bani Yas tribal confederation. Lorimer recounts that water was accidentally discovered there in 1761, after which a small village of twenty houses was established (Lorimer 1915: 763). Ceramics collected by the Abu Dhabi Islands Archaeological Survey, ADIAS, from one site on Abu Dhabi, known as AD-2, appear to confirm the historical record: the pottery dates to the 18th and 19th centuries, and not before.

Evidence from two other sites now shows that occupation began considerably earlier. Although it was apparently empty at the time of the settlement of the Bani Yas, Abu Dhabi island had been inhabited long before. Both these sites, AD-3 and AD-4, have since been destroyed or buried by development. It is thanks to the efforts of amateur enthusiasts, who collected pottery from the sites, that we know of their existence.

Material from the first of these, AD-3, was picked up in Bateen during the late 1970's by J.N.B. Brown and was deposited in the collections of the Emirates Natural History Group. It has subsequently been made available to ADIAS for study. The area concerned is now covered by the area of development that includes the Central Bank. The collection consists only of base fragments, and a tight dating framework cannot yet be established. The ceramics are considerably earlier than the 18th century, and their paste and firing indicate a date some time during the 1st millennium AD. One sherd, a delicate base with a smooth red slip, is reminiscent of western Indian pottery dating to the first five centuries AD.

The chronology of the second collection, from the Golf and Equestrian Club (Site AD-4), is clearer. This

material was gathered by ENHG member and golfer Cathy Ryan between the mid 1980s and the early 1990s from a pottery scatter on the golf course. At the time of its first exposure, imported soil and sand had not been brought to the area, so it appears that the pottery relates to a small settlement within the golf course area, rather than having been transported from elsewhere during landscaping activities. No remains are reported other than the surface scatter of ceramics, and the site has since been destroyed.

Two widely separated phases of occupation are evident in the Golf Course collection. The latest relates to the recent historical occupation of the island, and dates to the 19th and possibly the 18th century AD. Five pieces of porcelain belong to this horizon, including a fragment with a brown glaze sometimes known as "dead leaf brown" (fig. 1: top left). This variety first became popular during the 18th century (Hansman 1985: 32). Blue and white porcelain is also present, as are two porcelain cups with black and red paint over the glaze. Other relevant wares include speckled brown-glazed "Bahla Ware", made in Oman from at least the 18th century and up to the present day (fig. 1: bottom centre). Another characteristic ware has a thin speckled bluish or greenish glaze, and geometrical black under-glaze paint (fig. 1: top centre). This ware is a common and late variant of a type of pottery sometimes referred to as "Manganese Purple" (Kennet 1994: 193), named after the composition of its paint. This first appears in the 17th century, but the variety found here probably dates to the 19th century. A sherd with a speckled mustard-coloured glaze is also present, a type which often accompanies Manganese Purple at the later end of its range (fig. 1, middle centre). The unglazed wares include a fragment of earthenware originating from the Northern Emirates: this known as Julfar Ware, after a site in Ras al-Khaimah (fig. 1: top right). Additionally, there are two pieces of a



Fig. 1: Late Islamic ceramics from the Abu Dhabi Golf and Equestrian Club. *Picture by R.A. Carter*



type probably originating from the kilns at Ali, Bahrain, which are still in use (fig. 1: middle right). Finally, three pieces of a buff ware with a roughly grooved external surface were found, a variety of pottery found at numerous recently abandoned villages in the U.A.E. and Oman (fig. 1: bottom right).

The earlier, medieval phase of occupation took place some time between the 9th and 13th centuries AD. This horizon is represented by at least two types of pottery. One type has a turquoise glaze and a cream body (fig. 2 left hand side), and belongs to a long ceramic tradition of turquoise-glazed vessels stretching from the Hellenistic period to the 14th century AD or later (Kennet 1994: 188). The external ribbing and applique under-glaze decoration may indicate that some of these pieces belong to a sub-class of "Sasanian-Islamic" turquoise glazed vessels dated to the 8th/9th centuries (Kennet 1994: 194), though most of the sherds are from vessels too small to fall into that category.

The other type, represented by two sherds (fig. 2 top and middle right), has a fine red-brown body and a green glaze covering a cream slip. Crucially, one of these has had its surface incised below the glaze. Despite the poor condition of this sherd, it can be identified as sgraffiato, a type of decorated pottery which appeared around the start of the 10th century, and became widespread until the 13th century AD (Kennet 1994: 191). It is not clear where sgraffiato was manufactured, but it does not appear to have been on the Arabian peninsula. Another sherd has an unusual light-brown speckled glaze on one side, with green glaze on the other; it may be a variety of sgraffiato (fig. 2 bottom right). Sgraffiato has not been previously recorded among ADIAS ceramic collections from the coast and islands of the Emirate of Abu Dhabi.

The discovery of an early medieval horizon lurking in a bag of pottery that, at first impression, appeared to relate only to the 19th century, was unexpected. Unfortunately there is insufficient evidence to discern the nature of the medieval settlement, for example whether it was a permanent village or a temporary campsite. It seems, however, that people were visiting or living on Abu Dhabi island at least five centuries before the start of its current occupation, and that these people were in contact with the wide trading networks running through the Arabian

Gulf. The finds from the Central Bank site at Bateen may represent an even earlier horizon, whose connections stretched as far as the Indian Ocean.

If these finds had not been brought to the attention of archaeologists, neither of these sites would have been recorded and dated. It is essential that enthusiasts and professionals continue to cooperate to record the U.A.E.'s fast-disappearing archaeological heritage.

### Acknowledgements

I am grateful to Dr. Geoffrey King and Peter Hellyer, respectively Academic Director and Executive Director of ADIAS, for providing me with the opportunity to study the collections discussed in this note. Mrs. Cathy Ryan kindly provided the sherds collected by her from the Golf and Equestrian Club site, permitting a hitherto unknown aspect of the occupation of Abu Dhabi island to be identified. The contribution of the late J.N.B. Brown to the study of the natural history and history of Abu Dhabi also deserves acknowledgement, in particular his insistence on the necessity to record observations and finds. His collection twenty years ago of the material from the Central Bank site has permitted the identification of the earliest evidence yet discovered of settlement on the island. In view of recent development, the likelihood of further evidence being found must be considered remote.

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**Fig. 2: Medieval ceramics from the Abu Dhabi Golf and Equestrian Club. Picture by R.A. Carter**



# The freshwater goby (*Awaous aeneofuscus*) in the Wadi Hatta watershed (U.A.E./Oman)

by Gary R. Feulner and Peter L. Cunningham

## Abstract

A small population of the freshwater goby *Awaous aeneofuscus* (Peters, 1852) has been identified in the northern Hajar Mountains in an intermittent watercourse that empties into the Gulf of Oman. The population is suspected to reproduce *in situ*. *A. aeneofuscus* occurs in Indian Ocean watersheds from South Africa to Pakistan, but is rare in Arabia and has not been publicly reported from Gulf of Oman watersheds for more than a century.

## Identification and Range of *Awaous aeneofuscus*

A small population of gobies was recognized in late 1997 in an Omani tributary of Wadi Hatta, not far from the U.A.E. town of Hatta, during a survey of the freshwater fish of the northern Hajar Mountains. This was noteworthy since only four other fish species, three native and one introduced, occur in this area. These are the freshwater cyprinids *Garra barreimiae*, endemic to the Hajar Mountains, and *Cyprinion microphthalmum*, found on both sides of the Gulf of Oman; the euryhaline cyprinodont *Aphanius dispar* or Arabian killifish, a circum-Arabian species; and the introduced tilapia *Oreochromis* spp. (Feulner, 1998).

A specimen was initially identified as a goby (Family Gobiidae) with the assistance of the Breeding Centre for Endangered Arabian Wildlife in Sharjah and the fish was described and depicted, pending identification, in Feulner (1998). It is shown here in the accompanying photographs, while its wadi habitat, in Wadi Qahfi, is shown in the cover photograph of this issue.

Gobies constitute one of the largest families of fish, containing almost 200 genera and more than 800 species (Nelson, 1976; Moyle, 1993). Most inhabit coastal marine environments, where they may occupy relatively specialized niches, but a number of species enter or live primarily in estuaries or freshwater rivers and streams (Nelson, 1976; Berra, 1981). Gobies are typically small but distinctive, being elongated and characterised by bulging eyes, two dorsal fins (one spiny, the other soft) and pectoral fins placed anteriorly and fused to form a sucker or grasping organ. Most are flat-bottomed and live on the substrate, often sheltering in crevices in rock or coral or burrows in sand (Berra, 1981; Moyle, 1993). Some, like the tropical mudskippers, can breathe air and regularly forage out of water for extended periods (Nelson, 1976; Berra, 1981).

The Breeding Centre, and in particular Christian Gross, made arrangements for expert identification of the Hatta goby through the good offices of Gordon McGregor Reid of the North of England Zoological Society (Chester Zoo). Peter Miller of Bristol University identified it as belonging to the genus *Awaous* Valenciennes, 1837 (Reid, pers. comm.). Ronald E. Watson, then at the Forschungsinstitut Senckenberg in Frankfurt, provided the final determination of *A. aeneofuscus* (Watson, pers. comm.).

According to Watson, the identification of *A. aeneofuscus* is problematic because some characteristics vary with overall size, and *A. aeneofuscus* can grow to be relatively large. A specimen from Madagascar in the Musee de l'Histoire Naturelle in Paris is said to measure 40-50 cm in length, making it reputedly the largest known goby. This, plus



A large freshwater goby, *Awaous aeneofuscus*



the disjunctive distribution of the species, has bedeviled taxonomists. Watson points out that *A. aeneofuscus* has been described as a new species at least eight times in the scientific literature (Watson, pers. comm.). A specimen from Muscat was described as *Gobius jayakari* by Boulenger in 1887.

*A. aeneofuscus* is well known from watersheds along the Indian Ocean coast of South Africa (Skelton, 1993) as well as Madagascar, East Africa, the Gulf of Aden and southern Arabia (Yemen and Oman) (Watson, pers. comm.; Beech, 1999). It occurs eastwards at least as far as Pakistan (Watson, pers. comm.). Krupp (1983) mentioned the occasional presence of gobies in wadis of the Arabian Peninsula but without identifying species or locations and without conveying the impression that these might constitute resident populations. *A. aeneofuscus* was observed and some were collected at a few sites in northern Oman in the late 1970s and early 1980s, including Wadi Jizzi, approximately 55 km south of Wadi Hatta. The specimens were tentatively identified as *A. jayakari* (now synonymised with *A. aeneofuscus*) by Brian Coad, then Associate Curator of Fishes in the

National Museums of Canada, but these determinations were never published (Gallagher, pers. comm.).

#### The Wadi Hatta Population

Apart from proper taxonomic identification, the discovery of an isolated goby population in the Wadi Hatta watershed raises questions about the ecology and lifestyle of this fish and the history of its arrival and persistence, since Wadi Hatta is an intermittent stream that flows continuously to the sea only after exceptional rains -- an event which occurs only every several years at best. Normal pluvial discharge is dispersed and absorbed as it transits the coarse gravels of the Batinah coastal plain, which here is some 12.5 km wide.

*A. aeneofuscus* is present for several kilometers in the middle reaches of the Wadi Qahfi tributary of Wadi Hatta, a few kilometers downstream from the popular "Hatta Pools," in an area of mixed bedrock and coarse gravel substrate with occasional large boulders and scattered permanent pools of a meter or more in depth. There it is most abundant in deeper pools that are somewhat isolated from the main surface flow. The site is centered at 24 deg. 45'23"N, 56 deg. 11'36"E, and is



Above, dorsal view, showing colour banding and pectoral fins, and, below, profile, showing shape of head and dorsal position of eyes. All pictures by Peter Cunningham





approximately 25 km inland, 15 km within the mountain front and 35 km upstream from the Gulf of Oman coast, at an elevation of about 250 meters. The area is relatively difficult to reach by vehicle but it is nevertheless regularly visited by local people, who use traditional techniques to harvest the endemic cyprinid fish *Garra barreimiae* which is eaten (Feulner, 1998). A smaller population has been found in a more limited section of a second, downstream tributary of Wadi Hatta, but has not been extensively observed and is not discussed here.

Although rare in Arabia, *A. aeneofuscus* is better known in South Africa, where it is called the Freshwater Goby (Varswater-dikkop) and is featured in several comprehensive popular guides on freshwater fish (Skelton, 1993; Smith and Heemstra, 1986). There it is said to be found in estuaries and rivers, in both "pools and running water, usually over sandy bottoms into which it may bury itself with only the head and eyes exposed. Preys on invertebrates." (Skelton, 1993). *A. aeneofuscus* has been reported up to 400 miles inland in the Transvaal (Jubb, 1967, cited in Hyslop, 1991).

Watson states more generally that "*A. aeneofuscus* is well adapted to a variety of habitats that range from large, muddy rivers with silty bottoms to fairly clear desert streams. It is an omnivorous feeder and is able to feed on small invertebrates. In desert streams it is known to ingest large amounts of fine sand and the

detrital and algal material surrounding each grain is digested and the remainder passed." (Watson, pers. comm.).

*A. aeneofuscus* has long been suspected to breed in freshwater (Pienaar, 1978, cited in Hyslop, 1991). Watson (pers. comm.) says that "Reproduction has never been observed but may be similar to other large species of *Awaous* in moving downstream to the mouth of streams, in freshwater, where males guard large rocks, stumps, etc., and numerous females lay eggs. Males do most guarding of eggs . . . . Eggs hatch in about 24 hours, becoming part of the oceanic plankton community for an unknown amount of time. Recruitment of fry into streams occurs during lunar high tides and after a significant amount of seasonal rains."

The population of *A. aeneofuscus* in Wadi Qahfi has been observed intermittently since April 1998 and is estimated at 100-200 individuals. Actual counts of 48 and 78 individuals were made, respectively, during visits for other purposes in January and March 2000. The population appears, impressionistically, to be stable or even increasing slightly, except in the deepest of the pools, where numbers seem to have declined. The largest individuals observed were approximately 22 cm ( $n = 6$ ) and the smallest were approximately 9 cm. The presence of gobies having a range of sizes suggests either multiple recent episodes of marine recruitment or the occurrence of breeding *in situ*.



*Ventral view, showing pelvic fins modified to form a grasping organ*



Wadi Hatta is not known to have flowed to the sea since the gobies were first observed in late 1997, but it might possibly have done so during wetter years such as 1992-93 and 1995-96. The winter months are statistically the rainiest in the U.A.E. but rainfall is highly variable from year to year, both in amount and time of occurrence. Mountain regions are susceptible to heavy but highly localised showers. The frequency with which Wadi Hatta discharges to the sea has undoubtedly been diminished by the construction of three dams in the watershed within the U.A.E., above the Wadi Qahfi tributary. Two of these have been constructed within the past decade. As a result, the existing goby population may now be unusually isolated and dependent on self-reproduction rather than recruitment.

Tilapia (*Oreochromis* spp.) were first noticed in Wadi Qahfi in the Hatta Pools area, a few kilometers upstream from the sites occupied by *A. aeneofuscus*, in April 1998. Their introduction may have been relatively recent, since no tilapia were seen in the goby area when *A. aeneofuscus* was first discovered in October 1997 and only one tilapia was seen there when goby specimens were first collected in April 1998. In January 2000, however, tilapia were present in essentially all of the pools containing gobies. A few individual tilapia reached an estimated length of c.30 cm - significantly larger than the largest gobies. *A. aeneofuscus* co-exists with the notoriously adaptable and resilient *O. mossambicus* in South African rivers, but it seems reasonable to be concerned that the presence of tilapia at such close quarters may have an adverse effect on the survival of *A. aeneofuscus*.

Why is *A. aeneofuscus* confined to the few kilometre stretch of Wadi Qahfi where it is found, whereas the other three resident fish species are found both above and below the goby area? Downstream the wadi is broader and flatter, and the deeper pools favoured by *A. aeneofuscus* are uncommon. Upstream, however, many seemingly suitable pools exist but few of these are as isolated from the main current as the favoured goby pools downstream. Physical barriers could also be responsible, especially if the gobies are relatively recent arrivals, since the gorge immediately below the Hatta Pools constitutes the most abrupt change in gradient from the head of Wadi Qahfi to the sea. There the wadi drops some 15 meters over less than 100 meters horizontally, through a system of falls and chutes in a narrow channel cut in bedrock.

Human disturbance could be another determining factor, as the pools upstream are accessible by a good graded track and are regularly visited. This is reflected in various measures including the amount of litter. Water samples taken by Peter Cunningham at the Hatta Pools and analyzed by Farouk Al Basit of the Water Department, Laboratory Unit, Abu Dhabi Water and Electricity Department, showed a coliform organism count of 38 per 100 ml versus nil for samples from the goby area downstream (Al Basit, pers. comm.). In addition to considerations of water quality, a relatively large and distinctive fish might suffer selectively from human attention.

Based on accounts of its observed habitats elsewhere, *A. aeneofuscus* must be presumed to have a broad tolerance for most measures of water quality (Whitfield, 1996; Watson, pers. comm.), although it is said in South Africa to favour water having a high concentration of dissolved solids and generally to breed in ephemeral pools (Hoffman, pers. comm.). It is also known to be intolerant of hypersalinity, i.e., salinity in excess of normal seawater (35 ppt) (Whitfield, 1996). Hypersalinity in the wadi environment would in any case exclude *Garra barreimiae*, which cannot withstand even 50% seawater concentration (Haas, 1982).

The authors wish to thank the individuals and institutions mentioned in the text for their contributions to the identification of *A. aeneofuscus* from the Wadi Hatta watershed and for the unpublished information provided

by them in connection with the preparation of this note.

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# Tick-host relationships as determined from wildlife in the United Arab Emirates (Acarina, Fam. Ixodidae) - a preliminary study

by Peter L. Cunningham and Kevin Thompson

## Abstract

Ticks of the family *Ixodidae* were collected from wildlife during live trapping for captive breeding purposes in the United Arab Emirates. *Rhipicephalus (rhipicephalus) sanguineus* Latreille, 1806 (Brown Dog Tick) was collected from Blanford's Fox *Vulpes cana*, Sand cat *Felis margarita*, Brandt's Hedgehog *Paraechinus hypomelas*, Ethiopian Hedgehog *Paraechinus aethiopicus*, Spiny Mouse *Acomys cahirinus dimidiatus* and Wagner's Gerbil *Gerbillus dasyurus*. *Rhipicephalus (rhipicephalus) turanicus* Pomerantsev 1936 (Turanian rhipicephaline) was also collected from Ethiopian Hedgehog *Paraechinus aethiopicus*.

## Introduction

The tick fauna of Arabia has been well documented for domestic animals (Hoogstraal, Buttiker and Wassef 1983; Papadopoulos, Buttiker, Morel & Aeschlimann 1991; Osborne 1996; Wassef, Buttiker & Gallagher 1997). Ticks associated with wildlife, however, are more difficult to obtain and are therefore relatively unknown. Information on tick fauna for the United Arab Emirates is limited, especially for wildlife.

This present study focusses on ticks obtained from a variety of wildlife during live capture for captive breeding purposes by staff of the Centre for Endangered Arabian Wildlife, Sharjah, UAE.

## Methodology

Ticks were collected from various mammals during trapping excursions throughout the UAE. Specimens were preserved in 96% alcohol for later identification. The ticks were identified with the use of dissection microscope and identification keys. The keys used were derived from Hoogstraal, Wassef and Buttiker (1981). Ticks were retrieved from the following mammal hosts: *Vulpes cana*, *Felis margarita*, *Paraechinus hypomelas*, *Paraechinus aethiopicus*, *Acomys (c.) dimidiatus* and *Gerbillus dasyurus*.

## Results and Discussion

Blanford's fox *Vulpes cana* are host to *Rhipicephalus (rhipicephalus) sanguineus*. Adult male and female ticks were collected on both sexes of *V. cana*. *R. r. sanguineus* have previously been collected on Red fox *Vulpes vulpes arabica*, Ruppell's sand fox *Vulpes rueppelli sabaea*, Domestic dog *Canis familiaris*, Domestic goat *Capra hircus* and human *Homo sapiens* (Hoogstraal, Wassef & Buttiker 1981; Papadopoulos, Buttiker, Morel & Aeschlimann 1991; Yates 1992; Fisher 1997; Wassef, Buttiker & Gallagher 1997). Due to the limited data available for *V. cana* from the UAE, external parasites have not previously been documented for this species. The discovery of *R. r. sanguineus* from *V. cana* does not come as a surprise, as *V. v. arabica* and other canine hosts can occur in habitat frequented by *V. cana*. Ticks identified from six mammal species are presented in Table 1. Sand cat *Felis margarita* are host to *Rhipicephalus (rhipicephalus) sanguineus*. Adult male and female nymph *R. r. sanguineus* ticks were collected from a male *F. margarita* specimen. *R. r. sanguineus* have been previously collected from *F. margarita*,

Arabian leopard *Panthera pardus nimr* and Domestic cat *Felis domesticus* (Wassef, Buttiker & Gallagher 1997).

Brandt's hedgehog (*Paraechinus hypomelas*) are hosts to *Rhipicephalus (rhipicephalus) sanguineus*. Adult male and female *R. r. sanguineus* ticks were collected from both sexes of *P. hypomelas*. *R. r. sanguineus* have previously been documented for Ethiopian hedgehogs *Paraechinus aethiopicus*, European hedgehog *Erinaceus concolor* and long-eared hedgehog *Hemiechinus auritus* (Hoogstraal, Wassef & Buttiker 1981; Schoenfeld & Yom-Tov 1985). No reference could be found confirming the presence of *R. r. sanguineus* ticks from *Paraechinus hypomelas*.

Ethiopian hedgehogs *Paraechinus aethiopicus* are host to *R. r. sanguineus* and *Rhipicephalus (rhipicephalus) turanicus*. Adult female *R. r. sanguineus* and adult as well as nymph stages of both sexes of *R. r. turanicus* were collected from male *P. aethiopicus*. *R. r. sanguineus* have previously been documented from *Paraechinus aethiopicus* (Hoogstraal, Wassef & Buttiker 1981). *R. r. turanicus* have not, however, been documented previously from *P. aethiopicus*.

*R. r. turanicus* have been previously documented to occur in the UAE on Cape hare *Lepus capensis omanensis* (Wassef, Buttiker & Gallagher 1997). *R. r. turanicus* have also been documented from King jird *Meriones rex* and Red fox *V. v. arabica* in Saudi Arabia (Hoogstraal, Wassef & Buttiker 1981 and Wassef, Buttiker and Gallagher 1997). Domestic species such as cat, dog, goat and sheep have also been documented as hosts to this tick species.

Spiny mouse *Acomys cahirinus dimidiatus* are host to *Rhipicephalus (rhipicephalus) sanguineus*. Adult female ticks were collected from both sexes of *A. (c.) dimidiatus*. *Rhipicephalus* sp. have previously been documented for *Acomys (c.) dimidiatus* subsp. in Saudi Arabia. They were not, however, identified, due to a lack of satisfactory studies to establish reliable diagnostic criteria (Hoogstraal, Wassef & Buttiker 1981).

Wagner's Gerbil *Gerbillus dasyurus* are host to *Rhipicephalus* sp. Adult female ticks were found on both sexes of *G. dasyurus*, although it was not possible to identify the *Rhipicephalus* species. *R. r. sanguineus* nymphs have previously been noted to occur on *G. dasyurus* (Hoogstraal, Wassef & Buttiker 1981). Further study of these ticks is necessary to positively identify the species.

## Conclusion

Although this study reports limited results, it is obvious that *Rhipicephalus (rhipicephalus) sanguineus* ticks are an important external parasite associated with wildlife in the United Arab Emirates. According to Reeve (1994), *R. r. sanguineus* are known to be vectors of serious disease in animals and humans, and it is, therefore, imperative to be aware of the risks involved when handling wildlife.

Many of the above-mentioned ticks and hosts are associations that represent new records for the United Arab Emirates, in some cases altogether new records, and they are, therefore, important both from an ecological and a disease control point of view.

It should be stressed that the study reported here was merely a preliminary investigation, and that the ticks were not verified taxonomically, but were identified using

the keys supplied by Hoogstraal, Wassef & Buttiker (1981).

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# || Dove *Oena capensis* in the UAE and its spread through the Arabian Peninsula

by Michael Jennings

On 17 July 1997 on a quiet back road of Ghayathi, western Abu Dhabi, I came upon a small party of **Namaqua Doves *Oena capensis***. There were two adults and two very young juveniles identified by their speckled and barred appearance. The juveniles were being closely attended by the adults and it was obvious that they had only recently fledged from a local nest. This was the first confirmed breeding record for the species in the UAE.

Twenty two years earlier in March 1975 at a similar eucalyptus fringed road in the irrigated farming district of Al Kharg, 80 km south of Riyadh, Saudi Arabia, I had seen my first Namaqua Dove. On that occasion there were 3 birds apparently picking up seeds in the dust beside the road. That observation was also a milestone in the species' dynamic recent history in Arabia, as it was the first recorded observation of the species away from south west Arabia. Between then and now this diminutive dove has done big things in Arabia, greatly expanding its range to every corner of the peninsula and beyond and exploding in number. Much of this story is recorded in the database of the ***Atlas of the Breeding Birds of Arabia*** (ABBA) project which I co-ordinate.

It is by no means certain that the Namaqua Dove is indigenous to south west Arabia. There is a possibility that the species has only colonised Arabia from Africa in recent historical times. It is known from Arabia for just over 100 years, but at that time it was apparently scarce and local everywhere. The oldest record I have been able to find comes from Bates and Philby (1940) who quoted Heuglin mentioning that they occurred around Aden in about 1860-70. The next record was from Socotra in 1881 (Ripley and Bond, 1966), but strangely there have been no records from that island since. The first breeding report is from near Aden in 1883 (Yerbury, 1886) when it had eggs and young in September but at the time was thought of as a summer and autumn visitor to the region. It was not reported from Jeddah until 1934 (Bates, 1936) but by the time Meinertzhagen put together his ***Birds of Arabia*** in 1954 he was able to say that it was known from 240 km north of Mecca, southwards to Aden and east to the Wadi Hadramaut. Unfortunately no original records for this period have been traced for the extreme northern limit mentioned by Meinertzhagen for the ABBA database.

In the south west of the peninsula, Namaqua Doves are a bird of dry acacia scrubland, frequenting cultivations and the vicinity of villages, especially animal pens. It is generally absent from the highlands above 1800 m, especially the more temperate situations like juniper forest and qat plantations in Yemen. However isolated records have been obtained from up to 2400m in Yemen (Brooks et al., 1987).

In the last 25 years it has dramatically broken out from the south west. The first records in other regions were; Dhofar, June 1975 (breeding 1987); Kuwait 1978; Eastern Province 1980, (breeding 1984); Tabuk 1980; Bahrain 1983; Qatar 1985 (breeding the same year); northern Oman 1987, UAE 1988 and Masirah Island, Oman 1992. However there is one old and enigmatic record of a specimen in a Doha museum, Qatar labelled 1970, For want of more information this specimen was always dismissed as an error or an escapee but, with hindsight, it could easily have been the first bird to be found outside of the south west. The expansion of the species range can be clearly seen from the time period maps [below]. Today in Arabia they are still quite scarce on the eastern and northern periphery but they are numerous and widespread on irrigated/inhabited areas

of central Arabia. Beyond Arabian borders they have been recorded in northern Egypt, Israel and Jordan (Snow & Perrins, 1998).

One major catalyst to their expansion is the widespread availability of the irrigated agriculture which has provided many new areas of optimum habitat but also the bridges and stepping stones by which even a short distance migrant can move on to new areas. (See map where central pivot irrigation has been noted during recent ABBA Surveys). In central Arabia and the recently colonised areas it is more or less commensal with man's environment; primarily being a farmland bird, frequenting stubble, farm buildings, cattle areas and straw and fodder stacks. It is not found in the open desert or in wadis in these new areas. Although it is widely present in arid lands it seems to prefer to have water nearby and will readily drink at any puddle and often small parties may congregate beside water. Namaqua Doves are mainly granivorous but their diet, which is not well known, can include insects (Snow & Perrins, 1998). In Arabia, it is most often seen quietly feeding on the ground at farms and near animals and presumably takes a variety of seeds and cultivated grains. It may be found amicably feeding with any of the ***Streptopelia*** doves.

Wherever the population becomes established, it appears to be resident but at least in the initial stages of colonisation of new areas occurrence is erratic and it is largely absent in the winter months. It is dispersive, but may only migrate over short distances and this might explain why it has not established itself on some outlying places such as Socotra or the isolated Empty Quarter town of Sharawrah. On the other hand it has now turned up almost annually on remote Das Island in the middle of the Arabian Gulf. Iran next stop? It seems quite possible that part of the population might regularly migrate, for example, some might return to the south west in the winter. Some might even go to Africa as it has been recorded on board a ship in the Red Sea during September (Elliot & Monk, 1952). The Arabian population is difficult to estimate. It probably now totals at least 36,000 pairs; comprising possibly 500 pairs in the Eastern Province, 500 pairs in the Arabian Gulf states and the whole of Oman, 10,000 pairs in central and northern Arabia and 25,000 pairs in western Saudi Arabia and Yemen (allowing for about 50 half degree atlas squares holding an average of 500 pairs each). The population could be higher than this as even in areas where they are not common, such as the Eastern Province, gatherings of 65 or more at Damman and 50 pairs estimated in the Harad area have been reported (Bundy et al., 1989), indicating potentially high local populations.

Pairs appear to share nesting responsibilities. In Arabia the male is involved in collecting nesting material and as well as incubating. The species' nesting habits differs in a number of ways from the other doves of Arabia. For example, it makes a well made nest of twigs and rootlets, lined with softer material, including grasses and the nest has a shallow cup. It lays two eggs (like the other doves) but they are creamy yellow, not white. Breeding observations from Arabia show that the nest is placed low down, sometimes only 50 cm above ground level but can be up to about 1.5 m, usually in a bush. However there is no apparent preference for a nest site and it may nest in an acacia or citrus bush, a palm or even an annual plant. Once it nested in a bush over water and nests have been found on brush wood, bales and, precariously, on a date palm frond. The breeding season in the south west is quite extensive. Eggs and

nestlings have been recorded from March to September. The season also starts with eggs in March in central Arabia but there are no eggs or nestlings reported later than June. Of the records available, breeding is slightly later in the Eastern Province and the Arabian Gulf region, with eggs from May to August. There are insufficient records from the Tabuk and Dhofar areas to work out when they breed but juveniles have been recorded at those sites in May and August respectively. Today in the UAE this species has been found from extreme western Abu Dhabi, around all the major cities, isolated oil camps and north to Ras al-Khaimah, east of the Hajar mountain 'divide' at Dibba on the Gulf of Oman coast, in irrigated areas, and offshore on Das. No other breeding has been confirmed since July 1997, but it probably does so in several areas. The projected UAE population is probably about 8 pairs. Although still a rare bird in the UAE, it is not thought to be subject to any threat or to be of particular conservation concern.

### Acknowledgements

This article draws upon records collected by the ABBA Project which includes records from a large number of individual observers and a survey of published material. I am grateful to Simon Aspinall and Peter Hellyer for up to date information on the status of the species in the UAE and to David Sargeant, the Oman Bird Recorder, and the Oman Birds Records Committee for information on recent records from Oman. Further information on the ABBA project is available from the author.

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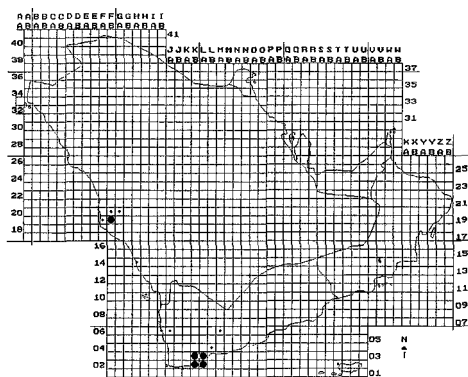
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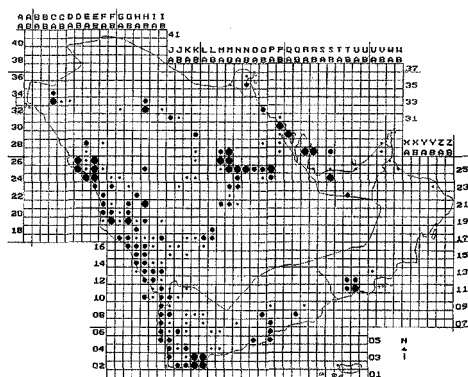
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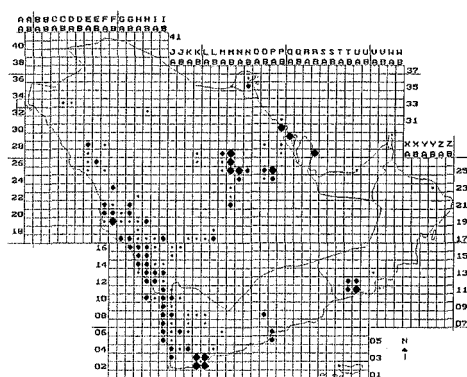
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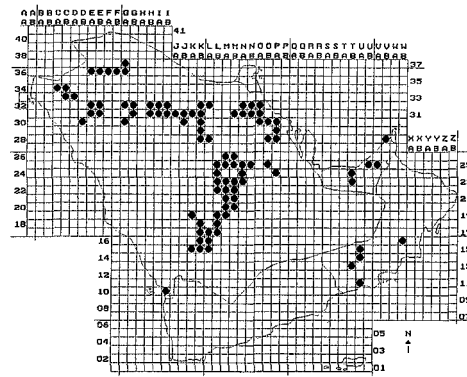
All records to 31 December 1974



All records to February 2000



All records to 31 December 1989



Distribution of pivot irrigation schemes, noted during recent ABBA survey

## NOTES & QUERIES

### ENHG Award for Thesiger

British explorer Sir Wilfred Thesiger, author of 'Arabian Sands,' the classic description of travel in Arabia's Empty Quarter, was presented with Honorary Life Membership of the Emirates Natural History Group on 7th March 2000.

Thesiger, 90 in June, was on a special visit to the UAE, during which he was invested with the country's Order of Independence, in recognition of his services to knowledge of the heritage of the Emirates.

In remarks read on his behalf on the occasion, ENHG Patron Sheikh Nahyan bin Mubarak Al Nahyan, Minister of Higher Education and Scientific Research, described the award as "richly deserved."

The full text of his remarks follow.

"Ten years ago, almost to the day, it was my great pleasure to inaugurate here in the Cultural Foundation the first exhibition ever held of your photographs of Arabia and the Emirates before the coming of oil.

Those photographs represent a stunning vision of the way of life of our people over half a century ago. Your book ARABIAN SANDS recorded for us all a way of life that has now disappeared for ever.

You not only preserved for us knowledge of our heritage that would have otherwise been lost, but you did so in a

way that the world now knows of the hardships that our forefathers survived, of the harsh crucible in which the essential spirit of our people was forged. Your description of the nobility of the Bedu with whom you travelled inspires us and humbles us.

I regret that I am unable to be here today for this presentation to you of Honorary Life Membership of the Emirates Natural History Group. This award is presented to you in acknowledgement of your contributions to our heritage. It is richly deserved.

You have recently been invested with the decoration of the UAE's Order of Independence, one of the country's highest honours, for your service to the Emirates. Tonight's Award is less formal, but it is offered to you with the same feelings of gratitude for what you have done for us.

Your old friend President HH Sheikh Zayed bin Sultan Al Nahyan has reminded us frequently of the need for us to study our past. 'A people that does not know its past has neither present nor future,' he has said.

Through your travels, your writings and your pictures, as well as through the inspiring example you have set, the heritage of the people of the Emirates will never be lost. For ourselves, our children, and our children's children, I thank you."

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### Desert Truffles *Tirmania nivea* in the Emirates

Truffles were a mystery to the ancient world of the Greeks and Romans but this did not prevent their culinary enjoyment and a knowledge of several varieties from various locations (1). The north African provinces were famous for their white truffles, called **terfez**. This name was adopted as the scientific name for a family of underground fungi, loosely classified as truffles. They are distributed around the Mediterranean and Middle East and have some structural differences to the true truffles of Europe, *Tuber spp.*

Most historical accounts invest them with significant value as a food item for the native populations. As with other fungi, it is the fruit body of the plant which is harvested and consumed.

I first encountered desert truffles in Kuwait in the early 1980s. The local name is **fugaa** (*Tirmania nivea*) (2). On a subsequent posting to Iraq, I encountered them for sale in Baghdad in the autumn; the Iraqi name is **kamaa**, **kima** or **chima** in some local dialects. They were a seasonal luxury food in Iraq (3) and were peeled and either boiled or sauteed. Samples consumed in Kuwait were a culinary disappointment, having little flavour and a gritty texture due to sand inclusions in the fruit body. These fungi develop underground in the desert. They are usually found in close proximity to members of the **Cistaceae** family (4), *Helianthemum lippii*, *H. salicifolium* and *H. ledifolium* with which they appear to have a symbiotic relationship. Gatherers rely on memory and experience of the lie of the land, hollows being a common habitat. An additional help is the fact that the growth of the fungal fruit body often causes the ground surface to crack.

Desert truffles, **fugaa**, **faqah**, **fig-aa** or **zubadee** are also found in the UAE. These subterranean mushrooms belong to the **Terfezia** (5) species and live principally in symbiosis with *Helianthemum lippii* (6), as in Kuwait. They are not true truffles, but are still a popular traditional food, sought by nationals after early rains. The one recipe available is highly flavoured and spiced,

similar to published Omani recipes. Sizes up to 10 cm. in diameter (oblate) are quoted.

The first fresh truffles I found in Al Ain in 1997 were imported from Tunisia, whence the Romans obtained their supplies. These were 3-6 cm. in size, pale creamy white darkening with storage. They had an irregular knobbly shape, were quite dense and had a slight mushroom aroma. There was a stronger fungal aroma on cutting them open and they had no appreciable skin. The flesh was of medium density and smooth, white with slightly darker glands and some pinhole voids.

A year later, at the end of January 1998, I saw truffles in the Al Ain souq, said to be from Oman. They were selling for 50 Dh/Kg which proved to be a typical price. Only one trader had them and even with the reduced clientele due to Ramadan they sold quickly. They were quite firm and similar in main features to the Tunisian and Kuwaiti samples.

A friend reported Pathans combing the desert areas near Jebel Ali on the coast, harvesting something he could not recognise and selling them in bags by the roadside for 200 Dirhams. His description identified them as truffles, in good supply that year. In February and March 1998 they were in scarce but regular supply in the Al Ain souq on my Friday visits. In contrast after a very dry winter in 1999 I had only one sighting in the market and they were almost certainly from Oman where they had had more rain.

On 27 February 1998 I purchased a kilo. There were 18 truffles, cream to pale brown in colour, roughly spherical and 5-8 cm. across. They were quite dense, only just floating in water as they were washed and scrubbed to remove mud and sand. Some had a definite stalk attachment and they appeared to have bruised to varying degrees due to harvesting and handling. Some were frozen fresh as an experiment. The majority were peeled of skin, damage and any potentially sandy folds, cut into cubes and soaked for half an hour. The flesh was creamy-white, uniform in some, marbled and veined

in beige in others, probably representing different stages of development. They were cooked in a simplified version of **kumba muqashad**, an Omani recipe (7), and served up to dinner guests as a surprise dish. They were quite a revelation. There was no evidence of sand or grit, the texture was smooth and they had a good fungal flavour. Voted a very acceptable food. I can appreciate the appeal of this traditional and local foodstuff.

The frozen specimens were made into an Emirati dish called **saloona** or **laham murraq** (9). They were not adversely affected by freezing and after peeling and washing were briefly boiled. They had a intense fungal flavour and a soft texture. The dish is a simple lamb stew with spices and after cooking on a low heat for ninety minutes the **fugaa** had taken on a red-brown colour throughout the flesh and had a strong and attractive meaty fungal flavour, presumably absorbed from the meat and fresh meat stock in the dish.

Local folklore relates that the growth of the **fugaa** is initiated by thunder and lightning, evidence of the association of truffle growth and rain. Whilst the white and brown specimens are considered good eating, for instance fried in oil, any coloured specimens are viewed as being poisonous. The fungi also occur in Bahrain and Saudi Arabia and are eaten in both countries.

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## The use of burrows by Hoopoe Lark *Alaemon alaudipes*

The **Hoopoe Lark *Alaemon alaudipes*** (Desfontaines 1789) is found throughout desert and semi-desert areas of North Africa, parts of south-west Asia and the Arabian Peninsula (Hollom, Porter, Christensen & Willis 1988; Richardson 1990; Aspinall 1996; Porter, Christensen & Schiermacker-Hansen 1996). It is deemed the most widespread breeding species of the United Arab Emirates (Aspinall 1996; Osborne, Norton & Aspinall 1996). This large lark with its long decurved bill and male's characteristic "song-flight" (vertical ascent, twist and spiral descent accompanied by song) is unmistakable. During the summer, with ambient temperatures regularly between 40-C and mid 50-C, and soil temperatures in excess of 60 C, they are one of the few birds about.

During recent excursions into the desert I witnessed a Hoopoe Lark utilising the burrow of the **Spiny-Tail Agamid *Uromastix aegyptius microlepis*** for shade. This behaviour was observed in June 1999 between 11.00 and 15.00 with ambient temperatures between 40-C and 47-C. The bird disappeared down the burrow for up to 5 minutes, to emerge suddenly and view the surrounding area for danger before descending again. Temperatures below ground are known to be stable (c.30°C in summer) at a depth of about 30 cm (Lovegrove & Knight-Eloff 1988) resulting in many desert organisms exploiting this underground retreat for survival. This observed behaviour is not new as Lloyd (1999) states that Hoopoe Lark as well as **Bar-tailed Desert Lark *Ammomanes cincturus***, **Dunn's Lark *Eremalauda dunnii*** and **Black-crowned Finch-lark *Eremopterix nigriceps*** utilise the shade of burrows for thermo-regulatory purposes. However, in February 2000, I flushed a Hoopoe Lark at night from a shallow burrow at the edge of a coastal *sabkha*. This occurred at approximately 20h00 with the ambient temperature at 15-C. I have since noticed similar shallow burrows in exposed sandy areas, which I previously thought to be old excavations by **Desert Monitor *Varanus griseus***. It is, however, possible that Hoopoe Lark utilise excavations by other species, for roosting places,

although they seem to be ferocious diggers (*pers.obs.*) capable of excavating their own burrows. Due to the low (<18°C) night temperatures experienced at the time it is expected that Hoopoe Lark utilise burrows for thermo-regulatory purposes at night as well. It has yet to be determined if they utilise burrows as roosting places frequently or only in cold spells.

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# NOTEBOOK

## Reptile Records

*(Editors' note: This report represents a summary of recordings, and is in no way comprehensive. It is intended both to provide simplified data on habitat and to prompt further reports and recordings. The reptiles of the Emirates remain little studied, and there is a need for further research, and notes on random sightings, in order to extend understanding of their geographical distribution).*

The following sightings were made, primarily by the writer, at different locations throughout the UAE during the last year. Most were made in the Al Ain and eastern Abu Dhabi area as the writer resides in this region.

### Agamidae

#### **Uromastyx aegyptius microlepis** (Spiny-tail Lizard)

Occurs throughout the UAE in suitable burrowing habitat. A well known, and regularly visited, colony exists at "Dhub Valley" approximately 35 km north-east of Al Ain. This population seems to be hard hit by the "drought" conditions as a study group of 20 individuals have diminished to 9, resulting in a 55% mortality rate between May 1999 and April 2000. A scattering of individuals is also known from the Jebel Hafit foothills northwards towards the Al Ain Cement factory. This population is under heavy pressure from construction and other human activity in the area.

#### **Agama sinaita** (Blue Rock Agamid)

Recorded on the lower eastern (350m) and northern slopes (650m) as well as from the summit wadis (1000m) of Jebel Hafit from May to September.

#### **Phrynocephalus maculatus** (Banded Toad-head Agamid)

Recorded at an elevation of 1m on coastal sabkhas from the Sila'a area.

#### **Phrynocephalus arabicus** (Yellow Toad-head Agama)

Generally occur on softer substrate than the previous species, being recorded in the Jabeeb area, between Al Ain and Dubai and in sandy dunes south-west of Al Ain.

### Varanidae

#### **Varanus griseus** (Desert Monitor)

Ubiquitous. Sightings of individuals and tracks have been observed throughout the year ranging from coastal sabkha in the far west (Sila'a area) to inter-dune flats and dune desert North-West of Al Ain as well as "wet wadi" areas between Al Ain and Hatta (Oman). Individuals have also been observed utilising Spiny-tail lizard burrows during the heat of the day when soil temperatures rise to 60 deg.C during summer.

### Gekkonidae

#### **Pristurus rupestris** (Dwarf Rock Gecko) and **Pristurus celerrimus** (Banded Rock Gecko)

Common throughout the mountains from the Ru'us al-Jibal (Ras al-Khaimah) to east of Al Ain in Oman. *P. rupestris* and *P. celerrimus* have not been observed on Jebel Hafit during the last 12 months, although *P. rupestris* have previously been documented from this

area. Both have been recorded from between 450m to 1600m throughout the year, at higher elevations favouring sunny windless areas during cooler months.

#### **Bunopus tuberculatus** (Stone Gecko)

One of the more common geckoes. Recorded at sites as diverse as under rubbish on inland sabkha from the Sila'a area to sandy desert areas south of Al Ain. During the cooler winter months they were most often observed under human-related litter.

#### **Stenodactylus khobarensis** (Khobar Gecko)

Recorded during nocturnal observations on coastal sabkha areas in the Sila'a region.

#### **Stenodactylus doriae** (Desert Gecko) and **Stenodactylus arabicus**

*S. doriae* and *S. arabicus*, the latter one of the smallest sand geckoes, were recorded at night in sandy dune areas North-West & South of Al Ain.

#### **Ptyodactylus hasselquistii** (Fan-footed ) and **Hemidactylus** (house )

Recorded from houses and forts within the Al Ain residential area with first mentioned also recorded from caves in the Ru'us al Jibal (East of Ras al-Khaimah) and Wadi Wurrayah (West of Khor Fakkan).

#### **Teratoscincus scincus** (Scaly Gecko)

This beautiful and unique gecko, with its bright reflective eyes, was recorded from Ras Ghanadah and Qarn Nizwa (between Dubai and Al Madam) areas (MJ).

### Lacertidae

#### **Acanthodactylus schmidtii** (Fringe-toed or White-spotted lizard)

Recorded throughout the sandy desert areas of the UAE, being locally common in suitable habitat.

#### **Acanthodactylus opheodurus** (Spiny-footed lizard)

Locally abundant between Jebel Hafit and the Cement Factory. This is the only site in the UAE where they are known to occur at present.

#### **Mesalina adramitana** (Desert race-runner)

Recorded on gravel plains around Jebel Hafit.

#### **Mesalina brevirostris** (Short-nosed Desert lizard)

Recorded between the high tide mark and coastal sabkha in the Sila'a area. Utilises the strip of land, often only 2-3 metres wide, between the sea and sabkha.

#### **Lacerta jayakari** (Jayakar's Lacertid)

Recorded throughout "wet wadis" to the east of Al Ain in Omani territory as well as Wadi Tayyibah (between Dibba and Masafi) (MJ).

### Scincidae

#### **Scincus mitranus** (Eastern Sand Skink)

Recorded North-West & South of Al Ain and Jabeeb area, in suitable sandy habitat, always with dunes.

### **Chalcides ocellatus** (Ocellated Skink)

Recorded from gardens in Al Ain and described as locally common in Fujairah (MJ).

### **Boidae**

#### **Eryx jayakari** (Sand Boa)

Tracks and burrowing tunnels are common throughout sandy areas of the UAE. Two specimens collected South of Al Ain while hunting sand geckoes on the soil surface.

### **Colubridae**

#### **Coluber rhoddorhachis** (Wadi Racer)

Commonly seen in "wet wadis," often submerging to escape attention and hunt fish and tadpoles. Wadis in the UAE and adjacent areas of Oman where specimens were observed include Wadis Wurrayah, Shuwayhah, Qahfi and Muqalit.

#### **Malpolon moilensis** (Arabian Rear-fang)

Seen at Sharjah Natural History Museum / Desert Park.

#### **Psammophis schokari** (Sand Snake)

Seen less frequently than Wadi Racer although a yellow

phased individual was seen at Wadi Shuwayhah in the Hatta area. Another specimen seen in Wadi Wurrayah crossing a pool while an interesting sighting of one preying on a small bird was recorded and photographed at Tawam hospital in Al Ain (DH).

### **Viperidae**

#### **Echis coloratus** (Carpet viper)

Four individuals recorded in Wadi Wurrayah (West of Khor Fakkan) and one in Wadi Shawkah (South of Dhaid). Known to occur throughout isolated wadi areas.

#### **Cerastes cerastes** (Sand Viper)

Tracks were observed throughout the sandy desert areas around Al Ain, especially during the early morning before wind activity disturbs the tracks. No live sightings.

### **Acknowledgement**

I am grateful to Marijcke Jongbloed (MJ) and Debbie Handy (DH) for contributing records for this summary.

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## **A short note on Blanford's Fox *Vulpes cana* in the mountains of Ras al-Khaimah**

The **Blanford's Fox *Vulpes cana*** avoided discovery in the UAE until 1995, when the first live capture was made in Wadi Zikt in Fujairah's Hajar mountains (Stuart & Stuart 1995). Subsequent field surveys by researchers working for the Sharjah Captive Breeding Centre have shown Blanford's Fox to occur in other wadis in the Hajar mountains (P. Wright, *pers. comm.* 1999).

In October 1999, fieldwork by the Arabian Leopard Trust (ALT) resulted in the first photographic evidence of Blanford's Fox occurring in the Ru'us al Jibal mountains in the Emirate of Ras al-Khaimah.

The photographs were obtained using a commercially available infrared camera system (Trailmaster Inc., USA) placed in various wadis. Local tribesmen from the Habus tribe helped the ALT as volunteer rangers, and assisted with the photo-trapping exercise. The work complements earlier efforts by the ALT to investigate the presence of wildlife with a view to presenting habitat conservation proposals to the Government of Ras al-Khaimah.

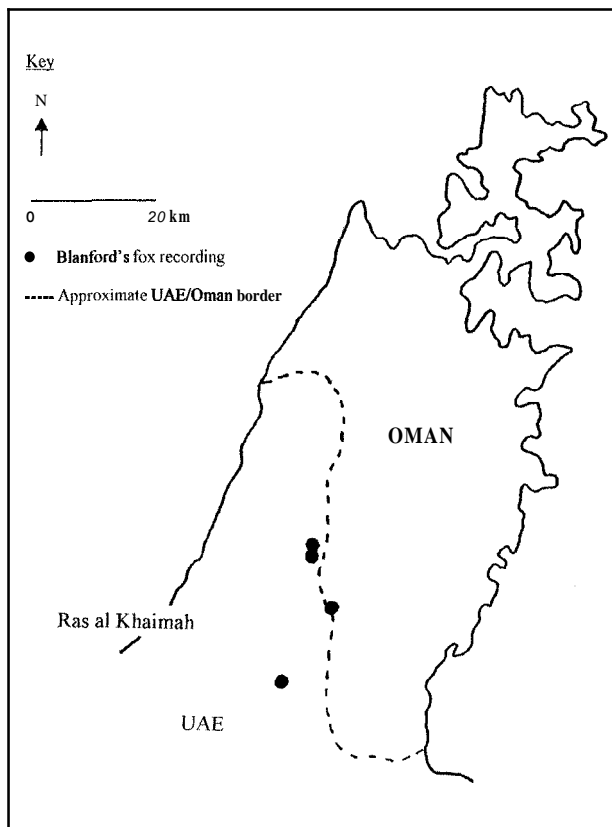
All photographs were taken during darkness between 19.36 hours and 04.08 hours. Although the camera was set to operate over a 24 hour period this suggests nocturnal behaviour for the species. The habitat at each location consisted of a narrow wadi with steep cliffs either side and numerous boulders in the wadi floor.

Further research may reveal that Blanford's Fox occur in many more wadis in the Ru'us al Jibal, where the habitat of the species is little disturbed. The ALT detected no evidence of hunting during 1999. The species does not appear to have suffered persecution like the **Red Fox *Vulpes vulpes*** from poisoning and trapping. The Habus were not aware of the existence of Blanford's Fox prior to the production of photographic evidence. It may have eluded detection due to its nocturnal behaviour and specific ecological niche in high mountain wadis.

### **References**

Stuart C. & Stuart T. (1995). Minute to Midnight. Report of a scientific survey on the status of indigenous wildlife in the UAE executed on behalf of the Arabian Leopard Trust.  
*pers. comm.*, P. Wright (Breeding Centre for Endangered Arabian Wildlife) 1999.

Location of Blanford's Fox recordings in the mountains of Ras al-Khaimah



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Different tail colourings of Blanford's Foxes. Above: with white tail-tip, (record 2: 30.10.1999), and Below: with black tail-tip (record 3: 02.11.1999). Pictures courtesy of Arabian Leopard Trust.



### Photo-trapping data for Blanford's Fox in the mountains of Ras al-Khaimah

1. 07.10.99 Wadi Zibat; Alt. 600 m. Black tip to tail
2. 30.10.99 Wadi Ghubbas; Alt. 200 m. White tip to tail
3. 02.11.99 Wadi Ghubbas; Alt. 200 m. Black tip to tail
4. 04.11.99 Wadi Ghubbas (approx 300 m north of 2,3); Alt. 250 m. Faint white colouring in otherwise black tip to tail
5. 09.12.99 Wadi Nuqab; Alt. 200 m. Black tip to tail

# Archaeological Review

The following is a selection of reports received, covering work during the course of the 1999-2000 winter/spring season. Reports from other archaeological teams and Departments are always welcome.

## Excavations at Jebel Buhays

The Directorate of Antiquities of the Sharjah Department of Culture and Information and an archaeological team from the University of Tübingen (Germany) conducted further excavations at Jebel Buhays, near Al-Madam, in the early part of the year.

The work shed new light on the beginnings of human settlement in the interior of south-eastern Arabia.

It now appears that nomadic tribes first came to the area around Jebel Buhays more than 7000 years ago. They left traces in the form of 'roasting pits,' shallow holes in the ground filled with burnt cobblestones and black ash. Around these pits, small splinters of animal bones were found, the remains of meals which have been dated to between 5200 - 4300 BC. Stone knives used for cutting the meat and other flint tools have also been recovered, and indicate a particular Late Stone Age technology typical for this area and period of time.

Most remarkable of the Jebel Buhays finds is a graveyard which contains the remains of more than 300 people in a very small area, measuring less than 20 m. square. Skeletons are closely packed, while later burials were often cut into earlier ones, making it extremely difficult for the skeletal remains to be separated. Many skeletons had personal adornments. Women appear sometimes to have worn a carnelian bead or a pearl on a nose ring. Even children were buried with jewellery, like necklaces, armlets and anklets, often consisting of strings of more than a hundred beads.

Casts of several burials have been made, which are on display in the Sharjah Archaeological Museum.

Laboratory analysis of the bones, both human and animal, carried out in Germany has revealed that the Jebel Buhays site was only occupied by the Late Stone Age inhabitants in spring, during a period from c. 8000 to 4000 BC, when the climate in south-eastern Arabia was slightly moister than it is today. Further studies of a dried-up spring identified in an earlier season suggest that it dried up towards the end of the Fifth Millennium BC. This climatic change probably forced the inhabitants to leave the interior parts of the peninsula and to retreat to the coasts of the Gulf, where they survived into the Fourth and Third Millennia BC, forming the basic stock of the area's population.

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## Further studies at Muwailah

Between March 1st and April 15th 2000, the Australian Archaeological Mission to Muwailah (University of Sydney) conducted a sixth season of research at the Iron Age settlement of Muwailah, near Sharjah University City. The settlement was previously produced the earliest evidence of writing yet known from the Emirates.

The work was supported by an Australian Research Council Small Grant and by the Directorate of Antiquities, Sharjah Department of Culture and Information, which, through its Director Dr Sabah Jasim, provided much of the necessary support to make the work possible. The results obtained are testimony to the interest and support of H.H. Sheikh Sultan bin Mohammed al-Qasimi, Ruler of Sharjah.

The aims of this season were largely dictated by the geophysical results obtained in the previous seasons which indicated that the Area C settlement consisted of a walled compound with a perimeter of 360m. Our attention was focussed on this area and several other extra-mural anomalies indicated by the geophysical survey.

Test trenching of several of the extra-mural points revealed evidence for campsites or fireplaces, most of which were buried under 1-2m of sand and were less than 1 m in size. In addition to fine ash, blackened sand and shells, a number of these firepits revealed evidence for Iron Age II pottery. When considered in light of the Area B excavations conducted in 1994-5, these results suggest that the walled compound (Area C) was surrounded by temporary campsites, perhaps occupied by nomads travelling to and from the coast. Of prime importance for future research is the date of these features: Are they contemporary with Area C or do they represent an initial use of this landscape which transformed into the more complex settlement in Area C?

In Area C two areas were targeted for excavation. In one area we sounded where the geophysical survey had indicated the presence of the surround wall. This excavations confirmed the existence of this feature. Of more interest was the fact that inside the wall was a series of rooms which had clearly been destroyed by a fire - just like the excavated areas to the west. This would appear to confirm the hypothesis that the entire settlement of Muwailah was destroyed by a single fire. Also within Area C, we focussed on part of a building which we had exposed in the 1998 season.

After five weeks of excavation, it was clear that this building was a columned hall which contained within the central room the bases for twenty columns and several large storage jars sunk into the ground. In the ancillary rooms, large quantities of imported ceramics and numerous iron artefacts were recovered. The shape and associated finds of the building suggest that it must have formed the economic and social centre of the entire settlement and it is tempting to see it as an ancient form of a 'majlis'.

The Australian Archaeological Mission intends to continue research at Muwailah for several more seasons. The finds of the 2000 season suggest that the site is of singular importance in understanding settlement dynamics during the Iron Age. It has provided the first evidence for social hierarchies and provided an insight into the mechanisms by which these were maintained.

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## Sharjah Miscellany

Besides the work reported upon in the two previous items, two other overseas archaeological teams worked in Sharjah during the last season. One, a British team directed by Carl Phillips, continued work at the major settlement site at Kalba, which has produced evidence of continuous settlement for a period of at least 2000 years, from as early as 2500 BC. The earliest levels of the site have yet to be reached.

A summary of work by the second team, from Spain, at Al Thuqaibah, follows, and is adapted from the preliminary report submitted to the Sharjah Directorate of Antiquities.

## Al-Thuqaibah

Between 13th February and 10th March 2000, a Spanish team from the Universidad Autonoma de Madrid, led by Prof. J.M. Cordoba continued studies in the Al-Thuqaibah area, on the Madam plain, not far from Jebel Buhays, and the site of a major Iron Age settlement.

The work included both excavations and a continuation of geographical surveys carried out in previous seasons, utilising both geo-magnetic and electro-magnetic methods.

The excavations included several soundings in an area outside the protective fence around the site. These produced evidence of walls, probably a new house, which has provisionally been dated to the second phase of the village. Numerous late Iron Age II period potsherds and stone objects were also recovered.

Stratigraphical soundings inside the complex formed by houses H1 & H2 have permitted confirmation, in principle, of the different typologies of Phases I and II at Al-Thuqaibah, which appears to have a greater extent of stratigraphy than any other settlement of the period in south-eastern Arabia.

## Abu Dhabi Archaeological Round-up

*(The following review, by Peter Hellyer, summarises some recent fieldwork by the Abu Dhabi Islands Archaeological Survey, ADIAS, and C14 dating results. See Page 7 for a report on the dating of ceramics from two sites on the island of Abu Dhabi).*

## Shoreline studies and new island sites

As part of continuing work to investigate the evolution of the shorelines of Abu Dhabi over the past few thousand years, along with evidence for changes in sea levels, Professor Graham Evans of Southampton University and Dr. Tony Kirkham paid visits to Marawah, Balghelam and al-Aryam (Bu Khushaishah) islands in mid-November 1999, and also carried out studies under the aegis of ADIAS on the shoreline to the north east of Abu Dhabi. As part of their work, they also visited several **Qasasir** (rock outcrops) in the shallow lagoon between al-Aryam and Futaisi.

Their investigations confirmed that Marawah has the most complete sequence of Pleistocene and Holocene geology yet recorded anywhere in the Arabian Gulf. Fossil corals recorded on Marawah have not been identified anywhere else in the region.

The research has been of considerable use to ADIAS in terms of understanding the evolution of the shoreline and coast over the last few thousand years. Clear evidence has been found of a higher sea level,

approximately 80 cm. higher than the present, around 4,000 years ago, while studies on Marawah have also showed that the shape of the island has changed considerably over the same period as a result of changes in shorelines and the infilling of bays and inlets. Evidence was also found on Marawah and on the **Qasasir** of the former presence of forests of large mangrove trees, whose fossilised root casts were identified on the surface of wave-cut platforms.

The results of this work have helped in the interpretation of archaeological sites on Marawah, in particular their location.

During the examination of the **Qasasir**, groups of small cairns were identified on the top of three of the outcrops. No sites of this type had previously been identified by ADIAS anywhere in the coast and islands of Abu Dhabi.

Further work was then undertaken by ADIAS in the area in late December, directed by the ADIAS Academic Director Dr. Geoffrey King.

The short season of work showed that four of the **Qasasir** between al-Aryam and Futaisi contain a total of 36 individual small cairns, three in groups of 8, 10 and 17, and one single cairn. There are also a number of water catchment systems, comparable to that found on a small **Qassar** in the Dabb'iya area.

The initial conclusion was that all of the cairns were man-made, although in the absence of any pottery or other finds nearby, it was impossible to suggest a date. Although small, it seemed possible that they might represent pre-Islamic graves. A test excavation of the largest cairn showed that it was certainly man-made, but that there was no burial, and it was not possible to determine its purpose. Further work is planned at a later date, to see if the reason for their construction can be established.

The discovery of the cairns represents an interesting addition to knowledge of the archaeology of Abu Dhabi. Of particular interest is the fact that they are all a considerable distance away from areas of possible settlement.

During the process of the December work, significant new data was also gained on the pattern of settlement on the al-Aryam / Bahrani group of Abu Dhabi's offshore islands.

With the permission of Sheikh Hamdan bin Zayed Al Nahyan, a survey was first undertaken on the northern and western coasts of al-Aryam. Two groups of sites were identified, one a collection of four shell middens, of probable Late Islamic date, and the other the remains of a large Late Islamic village site on the eastern side of al-Aryam, overlooking the lagoon. Pottery from the village suggests occupation from the 17th or 18th Centuries until the early 20th Century.

One discovery at the site was the presence of a number of shells of the large edible marine gastropod **Terebralia palustris**, which now survives in the UAE only on the East Coast, at Khor Kalba and Khor Fakkan.

**Terebralia** is well-known from archaeological sites in the northern Emirates, from sites ranging in date from the 1st Millennium AD back to the Late Stone Age, but has never before been reported from sites in the Emirate of Abu Dhabi. It is also very rare for **Terebralia** to be found on Islamic sites, an indication, perhaps, that it was over-exploited by the former coastal inhabitants of the Emirates.

Studies into the distribution and dating of **Terebralia** in the UAE are currently being carried out by ADIAS environmental archaeologist Mark Beech and by Gary Feulner, Chairman of the Dubai Natural History Group, and the discovery of the species on al-Aryam is a major extension of its previously-known range.

It is not possible, however, to determine whether the **Terebralia** were collected locally, or whether they were imported to al-Aryam from further afield.

Following completion of the work on al-Aryam, a preliminary visit was also made to the western shoreline

of the island of al-Bahrani. A total of four sites from the Late Islamic period were identified, including an area of occupation, although the extent of the site was noticeably less than at the al-Aryam village site. A preliminary interpretation is that the al-Aryam village was the major centre of occupation in and around the lagoon between the three islands. Further work is planned.

The results of the work are not dramatic, but show, once again, that there are still many archaeological sites on the coast and islands of Abu Dhabi that have yet to be recognised.

Logistic support for the onshore work was provided by the Abu Dhabi Company for Onshore Oil Operations, ADCO, while Sheikh Mohammed bin Zayed, Sheikh Hamdan bin Zayed and Sheikh Surour bin Mohammed granted permission for work to be undertaken on Marawah, al-Aryam and Balghelam, respectively.

## Wide range of results from C14 dating of Marawah & Balghelam hearths

Surveys by ADIAS on the coast and islands of Abu Dhabi have identified a large number of sites characterised by rectangular stone-lined hearths, or by low, roughly circular, mounds with evidence of burnt stone on the top and evidence of ash below.

These hearths, the vast majority of which have been identified on islands, have been found both in small groups of five or less, and in larger groupings. The two largest yet identified are on Balghelam (over 30) and on Marawah (a group of more than 150 at Site MR-9).

Dating of the hearths has proved in the past to be problematical. In some cases, Late Islamic pottery has been found in the vicinity - on Balghelam, for example - while in others, as on Marawah and Rufayq, pottery from the early 1st Millennium AD has been identified in the area. A few hearths of this type identified on the island of Ghanadha in the early 1980s by a team from the Department of Antiquities and Tourism in the Diwan of the Ruler's Representative in the Eastern Region were assigned an Iron Age date. On Marawah, dating of a hearth from MR-9 undertaken by ADIAS last year provided a date of between 320-200 BC.

Further study of these hearths was clearly necessary in order to assess their age, or their range of ages. In order to permit this, carbon samples were taken in early 1999 from the main groups of hearths on Balghelam and Marawah, and were submitted to the radiocarbon laboratory of the Scottish Universities Research and Reactor Centre, SURRC, at Scotland's University of Glasgow. The results provide important new evidence on patterns of occupation on Abu Dhabi's islands.

Four samples were taken from hearths on Balghelam. Of these, one, at Site BG 516, produced a calibrated radiocarbon date of 2100 +/- 170 BC, i.e. around the beginning of the Second Millennium BC, 4,000 years ago. Pottery from the Barbar period in Bahrain, of roughly the same date, has also been recovered in the area.

Of the other three Balghelam hearths, one from Site BG-3 produced a date of 595 +/- 195 BC, and two more from Site BG-516 produced dates of 1705 +/- 175 BC and 580 +/- 180 BC.

Five samples were taken from hearths at Site MR-9 on Marawah. These produced calibrated dates of 2080 +/- 200 BC, 600 +/- 200 BC, 300 +/- 100 BC, 250 +/- 150 BC and 260 +/- 130 AD.

Together, these indicate that the hearth sites were used in the following periods:

Late Umm al-Nar / early Wadi Suq period (c. 2100 BC to 1700 BC), the late Iron Age, (c. 600 - 580 BC), the 'Hellenistic' period (c. 250 BC) and the late pre-Islamic period (c. 175 BC).

The results show that the simple, but effective, technology represented by these hearths was not only

used over a very long period, but extended back much further than had been suspected, to around 2,000 BC, or 4,000 years ago. Use is also suspected to have extended into the Islamic period, although as yet there are no C14 dates to confirm this. Further samples have been taken for dating from other groups of hearths on the island of Rufayq. Results are expected later this year.

### ADIAS Academic Director Dr. Geoffrey King comments:

"The coast of the UAE was known to Classical authors like Strabo as the land of the Ichthyophagi, the fish-eaters. Increasingly archaeology is giving concrete form and chronological evidence, based on Carbon 14 (C14) analysis, to date the great antiquity of the fishing tradition in the economy of the coast. The quality and quantity of the fish and shell-fish in the waters of the Gulf is such that in all periods since very ancient times, the harvesting of the sea has persisted by man using technologies which survived down to the onset of the modern oil period. Indeed, some older inhabitants of the UAE still know exactly how to use the stone-lined fish baking hearths of a type that we now know were in use at least as early as 4000 years ago.

This is supported by the new C14 results, which show that small stone-lined hearths for baking fish have continued in use and virtually unchanged since very ancient times through the Islamic period.

This new evidence should be seen against ADIAS's broader archaeological research in the Western Region of Abu Dhabi over the past decade which has found very widespread evidence of Late Stone Age settlements and smaller sites, concentrated mainly on the islands off the coast. These have been dated so far principally by finely-made stone tools and weapons and sometimes ceramics of types known elsewhere in the Arabian Gulf and Iraq, and all dated to the Late Stone Age, about 5000 BC. There are also a very large number of sites which are dated by pottery to the Later Islamic period, from about 15th-16th C. These are very widespread in the coastal region of Abu Dhabi.

All of this is now quite well known in terms of UAE archaeology but the new data provided by the C14 results from Balghelam and Marawah offers an entirely new range of dating for occupation on the islands off the Abu Dhabi coast.

The Carbon 14 analysis by the SURRC has been applied to burnt ash and wood samples taken from archaeological sites on the islands of Marawah, west of Abu Dhabi, and of Balghelam, east of Abu Dhabi which hitherto have lacked any obvious means of dating such as ceramics or flints. The C14 results, however, offer a whole new range of dating that demonstrates settlement on these islands across a considerable period of time.

The results are of great interest as they represent evidence of periods which have been markedly absent in Abu Dhabi coastal archaeology so far. It is only the use of C14 analysis that has allowed us to recognise the extent of human activity during these periods, although further data is now becoming available as a result of the study of the pottery assemblages from a number of the sites.

These results indicate a far broader range of dating for the Abu Dhabi islands than hitherto suspected."

**G.R.D. King**

# MISCELLANY

## MARINE ENVIRONMENT LAW

A new federal law on the protection of the marine environment, Law no. 23 for 1999, came into effect in April 2000. The law, prepared in consultation with bodies such as the Federal Environmental Agency, FEA, and the Environmental Research and Wildlife Development Agency, ERWDA, prescribes the imposition of stringent penalties for marine pollution and lays down the framework for tighter control of fisheries in the country, as part of plans to conserve marine resources.

The law was swiftly followed by the issuing of a decree by Abu Dhabi's Crown Prince, Sheikh Khalifa bin Zayed Al Nahyan, banning the use of '*hayali*' fishing nets, whether drifting or fixed. The nets have been identified as causing severe damage to endangered marine life.

ERWDA Deputy Chairman Sheikh Hamdan bin Zayed Al Nahyan noted in a comment on the decree that "these nets catch and drown endangered species like dugongs, dolphins, porpoises and turtles. For some of these species, Abu Dhabi's waters are home to some of the most important populations in the world. it is our duty to protect them."

"These nets also damage our commercial fish stocks. They are a wasteful form of fishing, catching fish that are never brought to market and also catching fish that are of no commercial use," Sheikh Hamdan said.

Penalties for those caught breaking the terms of the new decree include confiscation of nets and boats, financial penalties and jail terms.

## ENVIROTECH-2

The Commission of Environmental Research of the Emirates Heritage Club held its second annual conference at the Abu Dhabi Officers' Club between 8th-12th April. focussing on the conservation of the coastal zone.

Papers presented at the event included the results of survey activity sponsored by CER in late 1999 and early 2000 on the marine habitat, mangroves, dugongs, cetaceans (including film of the first killer whales, **Orcinus orca**, ever recorded in the UAE), turtles, corals, seagrasses, birds, fisheries and the relevance of archaeology and heritage to coastal zone management.

A presentation was also made on the Al Jizya-I oil spill which hit islands and lagoons north east of Abu Dhabi at the end of January.

CER is to publish the papers presented at the conference, and plans a second series of fieldwork expeditions later this year.

## AN EAGLE FOR THESIGER

Explorer and author Sir Wilfred Thesiger, on a visit to the UAE in February and March, paid a nostalgic visit to the edge of the Empty Quarter, south of the Liwa, as guest of the Abu Dhabi Company for Onshore Oil Operations, ADCO.

According to the weekly 'Twitchers' Guide' bird report, (on website [www.uaeinteract.com](http://www.uaeinteract.com)), during his visit, Thesiger had the opportunity of seeing something he had not seen during his epic crossings of the desert half a century ago - a nest of a golden eagle, with a parent on the scene and a chick in the nest. The ornithologist who located the nest was, naturally, delighted. Not only did he get to visit the Empty Quarter with Thesiger, but got to show him something new as well.

## SLUGS AND SNAILS WANTED

Regular **Tribulus** contributor Gary Feulner is working on the preparation of an account of the terrestrial and freshwater snails and slugs to be found in the Emirates (many of which, no doubt, may prove to be introduced species). A number of surprises have already turned up. Further details available from Gary, at E-mail: [gfeulner@agico.co.ae](mailto:gfeulner@agico.co.ae)

## COLLECTING CRABS

Environmental archaeologist Mark Beech of ADIAS and Dr. Peter Hogarth of the Department of Biology at Britain's York University, carried out a short programme of biological fieldwork sampling in April to collect crabs for a scientific reference collection of comparative specimens for the United Arab Emirates. This will facilitate the identification of ancient crab material excavated from a number of archaeological sites in the UAE. It will also be of value for modern biological studies.

Samples were collected (from west to east) on Ghagha' island, Ras Ghumays peninsula, Sabkhat Matti, the mainland jetty for the Dalma ferry at Mugharraaq, near Jebel Dhanna, Ruwais Housing Complex outlet pool, Marawah island, Tarif and at Maqta Bridge (Abu Dhabi). Preliminary reports from Beech and Hogarth indicate that species new to the UAE were collected during their fieldwork.

## ENHG ON THE MOVE

The library and collections of the Emirates Natural History Group have moved house - to the purpose-built facilities of Abu Dhabi's Centre for Documentation and Studies, which is part of the President's Office. A temporary display of items will be established at the Centre, pending the completion of a major new building for research and display.

The Group acknowledges, with thanks, the use of facilities provided in the past by the Environmental Research and Wildlife Development Agency, and looks forward to further collaboration with the Agency.

## WEBSITE SELECTION

The text of **Tribulus** is now available on the websire of the Ministry of Information and Culture, <http://www.uaeinteract.com>

This site is maintained by Trident Press, publishers of a number of books on UAE history and natural history, and also carries the weekly UAE **'Twitchers' Guide**. Linked to this site is that of Arabian Wildlife magazine, (to be relaunched in printed form later this year).

<http://www.arabianwildlife.com>

Information on the fishes of the UAE can be found on the site maintained by ADIAS's Mark Beech, who is affiliated with the Departments of Archaeology and Biology at York University.

<http://www-users.york.ac.uk/~mjb117>

More websites in the next issue (suggestions welcome).



# Reviews

## Recent Publications

**Fossil Vertebrates of Arabia. Edited by Peter J. Whybrow and Andrew Hill. Yale University Press (1999). xxv + 523 p. (+ 40 unnumbered pages of Arabic summary). ISBN 0-300-07183-3. illus. Cloth, \$125.00.**

The presence of important vertebrate fossils from the late Miocene period in the Western Region of Abu Dhabi should be no secret to readers of *Tribulus*. A preliminary report on the work by the Natural History Museum (London) and Yale University, in association with Al Ain's Department of Antiquities and Tourism, was carried in the first issue of *Tribulus*, while there have been occasional updates over the years. Indeed, Group members have, in the past, had the pleasure of being conducted around the areas concerned by the editors of this volume, who co-ordinated the work and carried out much of the investigation themselves. Now, after a long period of gestation, this book presents in scientific form the results of their work to a broader academic audience.

*Fossil Vertebrates of Arabia* is, in essence, the collected papers from a conference of the same name held in Jebel Dhanna a number of years ago under the patronage of Group Patron HE Sheikh Nahayan bin Mubarak Al Nahyan, and reports in detail on the results of the several years of fieldwork carried out in an area stretching from Mirfa, in the east, to the edge of the Sabkhat Matti, at Jebel Barakah, in the west. Besides the UAE-related papers, there are also papers relating the discoveries in the Western Region to other areas.

This book, by virtue of its nature as a detailed study of aspects of the palaeontology of the Baynunah district of the Western Region, is designed for the specialist and the layman, therefore, will find many of the terms used somewhat difficult to comprehend. Within its 36 chapters, written by 49 contributors from 12 countries, however, is information of major importance not merely for an understanding of the late Miocene period within the Emirates (around 6 - 8 million years ago), but also for the place of the UAE within the geology and palaeontology of the region. The separate studies of the types of fauna to have been found, such as large land mammals like ancestors of today's elephants and horses, and freshwater dwellers such as fish and turtles, along with geomagnetic studies of the two geological formations, Baynunah and Shuweihat, have permitted the editors and authors to develop the now well-known model of Late Miocene Abu Dhabi. At the time, for example, a large freshwater river, perhaps 100 metres or so wide, flowed into the Gulf in the Mirfa area, while the surrounding habitat, as far as the eastern edge of the Sabkhat Matti, was more like an African savannah than the arid desert of today.

Several formerly unknown species of vertebrates are described as well as other discoveries such as fossil eggshell of a large ancestor of the ostrich - all helping to build up a picture of a very different fauna and flora, while there is also discussion on the regional geologic setting, palaeo-ecology and palaeo-geography.

Evidence is also presented that the UAE in the late Miocene period acted as a kind of land-bridge between Africa and Asia, and with Arabia still connected to Africa, and the Red Sea not yet formed, it was possible for animals to migrate between the two continents. In this sense, the Baynunah region is of significance not merely locally but internationally, for examination of its fossil fauna permits a greater understanding of the evolution of species from both Africa and Asia during this period. Indeed, the editors have suggested that the Baynunah fossils are the best representatives of terrestrial

vertebrate fossils of their period from anywhere in the world.

This is not the appropriate place for a detailed scientific review of this book, although it should be noted that it has received considerable critical acclaim from specialists.

It is, however, appropriate to note that much of the work reported on in the book was made possible only as a result of several years of dedicated financial and logistic support from the Abu Dhabi Company for Onshore Oil Operations, ADCO, as part of its continuing commitment to the study and recording of the country's natural heritage. The company's commitment to the NHM/Yale research programme was initiated by former General Manager Terry Adams, also a former Vice Chairman of the ENHG, and while the palaeontological research programme has now been completed, continuing support is being provided for an NHM research programme into marine ecology.

ADCO, one of the Group's corporate members, has also supported much other research over the years, both environmental and archaeological, and deserves credit for the way in which it has devoted substantial funds to science.

Many of the fossil discoveries reported upon in this book are shortly to be returned to Abu Dhabi, where it is hoped they will eventually go on display, in order to introduce the wider public to some of the results of the work of Whybrow, Hill and their colleagues.

In the meantime, this book is highly recommended for anyone with even a passing interest in the topic of the origins of the Emirates. Scientific terminology notwithstanding, it contains much that will fascinate not merely the specialist, but also the general reader with a basic familiarity with the topic.

**Peter Hellyer**

**The Natural History of Oman: a Festschrift for Michael Gallagher. M.Fisher, S.A. Ghazanfar & A. Spalton (eds). [1999]. 206 pp, 31 figs., 18 tables, hdbk. ISBN 90-5872-050-1. US \$ 48 plus US \$ 10 p & p. Backhuys Publishers, PO Box 321, 2300 AH Leiden, Netherlands.**

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For readers who may not be familiar with the term, a *festschrift* (apart from being the only word I know that contains six consecutive consonants) is "a volume of articles, essays, etc. contributed by many authors in honour of a colleague, and usually published on the occasion of the person's retirement." This particular festschrift is exactly that: it honours Michael Gallagher and his achievements during his long association with the natural history of Oman.

It is an unpretentious book, containing a wealth of information and its compilation is not only a fine tribute to Michael Gallagher but also to the authors and those responsible for putting it together. The book could easily have been larger format, with bigger maps and more photographs, and it would no doubt have been very much more expensive. Confining the weighty content to the modest size of the final book was no doubt an important factor in seeing the project through to completion, and it has kept the price down. The result is an outstanding publication, which everyone interested in the natural history of Arabia will want to own.

Michael Gallagher began his involvement with the natural history of Oman in 1970. He took part in numerous surveys and assisted many people in other surveys; he collected countless specimens and dispatched them to the world's experts. His contribution

to knowledge of flora and fauna in this part of the world is immense. From 1985 until his retirement in 1998 he was the Director of the Oman Natural History Museum. It is a fine tribute to his talents and energies that no fewer than thirty species have been named after him, i.e. they carry the specific or subspecific name *gallagheri*. The range of groups involved is an indication of his breadth of interests. They comprise two arachnids, one isopod, 19 insects, two marine molluscs, one bat, one rodent, two lizards, one fish and one plant. In view of this record it is perhaps unfortunate that the book does not contain a section on insects, but there is clearly a limit to the amount of quality information which can be compiled in one book.

Without exception, the chapters in the book are all masterly expositions of the current state of knowledge of different aspects of Oman's natural history. They cover plants, reptiles, sea turtles, birds, terrestrial mammals, the Arabian Tahr, the Arabian Leopard and cetaceans. The whole book has of great relevance to the UAE, providing an invaluable source of archival information, much of which has not been published before, and each chapter includes a long and authoritative bibliography. This can be particularly important in a country where it is not easy to come across all the literature which the naturalist requires.

The interest of the book is enhanced by inclusion of the results of "photo-trapping." This technique of setting self-triggering cameras in suitable places in remote areas is proving invaluable in the study of rare and sensitive mammals. The (black and white) photographs achieved in this way for the Nubian ibex, Arabian leopard, Arabian tahr and striped hyaena are magnificent. In the case of the leopard, the pattern of spots permits the identification of individuals, a very important tool in the study of this highly elusive and endangered species.

It is invidious to pick out particular contributions for praise when all are so worthy, but those on plants, reptiles and cetaceans are of great general interest (did you know that Oman supports no fewer than 25 species of gecko, six skinks, six vipers and nine sea snakes?). These chapters will undoubtedly be used by professionals for many years to come. The account of the history of herpetological studies in Oman makes very interesting reading. Studies continue, and a new species of *dhub* was discovered as recently as 1998!

The chapter by Martin Fisher on the conservation status of the terrestrial mammals is particularly relevant to us in UAE, as we share (or once shared) many of the same species, and many have declined in the two countries for the same reasons. The application of the criteria take a bit of deciphering but it is worth persevering. For example the Arabian leopard is regarded as Critically Endangered in Oman on the basis that it meets criteria B1+2a, C2a and D. I think this means that its range has suffered severe fragmentation and continues to decline; its population is less than 250 individuals and continues to decline, and the population contains less than 50 mature individuals. This could have been made a little more transparent!

This paper contains an interesting comparison with the National Red List of Mammals for the UAE (*Tribulus* 6.1). Martin Fisher correctly points out some errors in the IUCN Red List as regards mammals in Arabia, but I must point out that the reason he gives for the incorrect number of threatened artiodactyls in the UAE paper actually concerns the wild goat (a single published record on the Oman/UAE border which he regards as an escapee) rather than confusion over *Gazella subgutturosa*.

Apart from this quibble, the article contains some important updates on the status of the ten threatened mammals in Oman: the Nubian ibex, mountain and sand gazelle, Ruppell's fox, caracal lynx, striped hyaena, Arabian tahr, oryx, wolf and leopard. It is depressing that these magnificent animals are all threatened, but also

depressing that a further 31 species are Data Deficient (not counting the 17 species of Least Concern). We are all desperate for more information!

Throughout the book there is an emphasis on conservation, and this is very welcome in view of the significant threats facing wildlife in this part of the world. Even Oman, which has, in addition to its low population density, a longer history of taxonomic and ecological studies, and a better developed national framework for environmental protection than the UAE, is facing severe threats to its wildlife. Knowledge is a vital pre-requisite for conservation and this book will play a key role in future conservation strategies because it has pulled together so much information in a readily assimilable form.

The UAE can learn much from this book. The Sultanate of Oman benefited enormously from the dedicated and systematic approach adopted by Michael Gallagher over many years. His knowledge did not disappear with him, as he published profusely (over 100 such references being cited in the bibliography of his work), and helped to build a series of collections and databases which are still being maintained today. Clearly we need the same sort of infrastructure and co-operation in the UAE. I sincerely hope that Emirates Natural History Group, and *Tribulus* in particular, will be playing their part in this endeavour for many years, and that ERWDA and the federal agencies will learn from the fine example set by Oman.

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**Birdlife in Oman. By Hanne & Jens Eriksen. Al Roya Publishing, Muscat (1999). iv + 99 p. Available from the authors: E-mail: hjoman@omantel.net.om (UK Pounds 19.95, US \$32, inc. p&p)**  
**Sponsored by Shell Marketing Oman Company**

If ever you have wanted to know what a really good bird photograph looks like, this is the book for you. Hanne and Jens Eriksen have been guilty for years of stimulating the deadly sin of envy among their friends and fellow birdwatchers, collecting prizes galore (winners four times in the last decade of the coveted *British Birds* Photograph of the Year award), and having their images published around the world. Now, with this book, they have provided more images of avian beauty than even the most avid of ornithologists will be able to absorb at a single sitting.

Frequent visitors to the UAE, the Eriksens have been resident for nearly 15 years in Muscat, and this book celebrates the birdlife of Oman, and the varying habitats in which it can be found. Dividing Oman into nine regions, from Musandam to Dhofar, they introduce each briefly, and then plunge into pages and pages of colour photographs (around 150 of them and all of remarkable quality). Bee-eaters are an Eriksen speciality, and they figure prominently, (including front and back covers), along with a host of other species, large and small, rare and common, drab and colourful. Some of the shots are quite simply stunning - the red-billed tropic-bird, for example, or some of the soaring raptors, while I particularly liked the final picture, the wading pheasant-tailed jacana, a visitor to Dhofar from the Indian sub-continent and South-East Asia.

Many of the birds, though, are species that can be seen in the UAE, making the book a helpful introduction to some of the UAE's birds, as well as throwing down a challenge to our home-based bird photographers. Anyone taking them on will find the Eriksens a hard act to beat!

**PH**



# تريبلوس

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