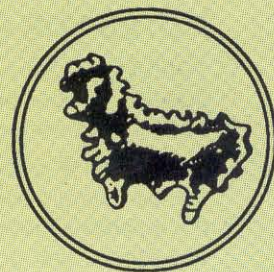


TRIBULUS



Bulletin of the Emirates Natural History Group

Vol. 5.1

APRIL 1995



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.

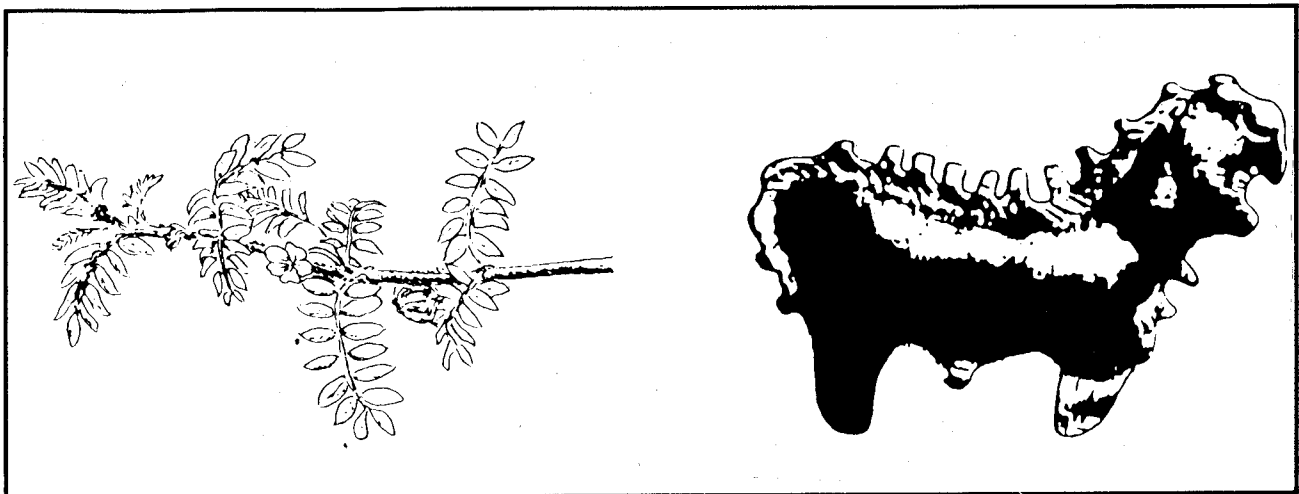
TRIBULUS is published twice a year, in April and October. The aim of the publication is to create and maintain in standard form a collection of recordings, articles and analysis on topics of regional archaeology and natural history, with the emphasis focussing on the United Arab Emirates and adjacent areas. Articles are welcomed from Group members and others, and guidelines are set out below. The information carried is as accurate as the Editorial Committee can determine, but opinions expressed are those of the authors alone.

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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 may be submitted in either English or Arabic. A short abstract should precede the article, with the address(es) of the author(s) at the end. For Arabic contributions, a short summary in English, of not more than 200 words, should also be supplied.

Photographs may be submitted and should be either glossy black-and-white 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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TRIBULUS

Vol. 5.1 April 1995

Contents

	Page
Editorial	4
Important wildlife sites of Fujairah and the east coast of the UAE..... <i>by Simon Aspinall, Colin Richardson & Peter Hellyer</i>	5
Fujairah Archaeological Survey — An Interim Report	11
<i>by L. Brass, R. Painter, G. Britton, L. Hill</i>	
Scarab Dung Beetles in the Al Ain Region of the UAE and	14
Neighbouring Areas of Oman (Coleoptera: Scarabaeidae) <i>by Michael P.T. Gillett</i>	
Notes and Queries	24
Guidelines for a wetland management plan for Khor Kalba; Blanford's Fox, Arabian Tahr found in Fujairah; Safavid and Sassanian Coins in Fujairah; Arabian coins from the Sharjah Museum; Conference on Fossil Vertebrates; The Flora of Arabia; Records of freshwater fish from Hatta area; How to distinguish between grazed <i>Panicum turgidum</i> and <i>Pennisetum divisum</i> grass?	
Group Meetings / Corporate Members	29
Recorders' Reports	30
Archaeology ; Birds; Mammals	
Editorial (in Arabic)	33
Contents (in Arabic)	34
Cover illustrations:	

English : Terns and fishermen in the Bay of Dibba.

Picture by Simon Aspinall

Arabic : High Tide in Khor Kalba.

Picture by Peter Hellyer

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 29, 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.

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Editorial

It is heartening to see all three branches of the Emirates Natural History Group thriving these days. The latest issue of **Gazelle** (Dubai's monthly Newsletter) highlights recent field trips to Liwa, Al Ain, and snorkelling on the East Coast, while upcoming events include a star-gazing evening and a visit to the Ras al Khaimah desert. The Al Ain branch in a recent Newsletter brings the spotlight on safety during field trips, bearing in mind the different ages and physical capabilities of group members. I remember during my mainland days how 'Bish' Brown was a stickler for safety, checking and double-checking items such as water, food and camping gear, besides ensuring that the vehicle was always well-serviced and prepared for an expedition. The old adage that it can never happen to you has been proven wrong often enough; while the Emirates is a small country with emergency services on hand in most towns and many villages, parts of the country (of particular interest to the ENHG) are relatively remote with tricky terrain. Recently an American woman was airlifted to safety after suffering cramps on Jebel Hafit, and many 'near misses' must go unreported. An adequate first-aid kit is a prerequisite, as is somebody in the group knowledgeable and experienced in dealing with minor medical cases. After all, an hour or two in the mountains without first aid could be the difference between life and death.

The latest Newsletter from the London-based Society for Arabian Studies contains an update on the UAE, including a review of the country's museums by Michael Rice and Shirley Kay. Beginning with Al Ain (opened in 1971) there is now a museum in every Emirate except Umm al Qaiwain. Al Ain remains the most comprehensive archaeological museum in the UAE as it contains objects and artefacts from all the other emirates besides Abu Dhabi. Dubai Museum opened in the old Fahidi Fort in 1972 but was greatly extended in 1993-94 to include an underground exhibition hall. The main sites represented are the third millennium BC Al Qusais tombs, Jumairah and Hatta. The first museum in the Northern Emirates was opened in Ras al Khaimah in 1987, though a collection of local artefacts had been on unofficial display in a house in Al Nakheel since the late 1970's. As in Dubai, the Ras al Khaimah museum is sited in the Ruler's old fort. The emphasis again is on archaeology, though there are also ethnographic and natural history sections. Ajman Museum opened in 1991, again in a renovated fort. Being a small Emirate, Ajman is not so richly endowed with archaeological sites, yet there is an interesting display of third millennium finds from the outskirts of the town, including good examples of Umm an Nar type deep red jars with black decoration. The main focus of this museum is ethnographic, and recorded songs of seafarers and cultivators bring the past to life. Fujairah Museum also opened in 1991, next to the ruins of the old fort, and contains a display of finds from third and second millennium grave sites along the East Coast. Outside this museum is a collection of 'shashas,' the small

palm-frond boats that are fast becoming a rarity in this part of the world. Finally, Sharjah Museum opened in 1992 in a modern building and is concerned mainly with archaeological finds from sites excavated in the 1980's, such as the Hellenistic caravan town of Mileiha.

The Society for Arabian Studies Newsletter also gives an update by Remy Bouchardat on the 1985-92 joint France-Sharjah expedition projects on the coasts and plains, and specifically at Mileiha. Meanwhile, joint London University-Sharjah excavations took place in 1993-94 at Kalba. Sites include shell middens (the earliest some 6000 years old), a cemetery and cairns. The most exciting find was a large tower structure apparently similar to those at Tell Abraq (Umm al Qaiwain) and at Hili (Al Ain).

The latest issue of **Oryx**, the magazine of the Fauna and Flora Preservation Society, contains the latest news of a project to restore the houbara bustard population in Saudi Arabia. The present range of houbara in Arabia is poorly understood, though the main breeding areas seem to be in the far north, on the border with Jordan. This area is now delineated as a protected reserve, while another site has been set aside for captive-bred birds. Unfortunately, attempts at release into the wild have been largely foiled by foxes. In 1993 Saudi Arabia hosted an international workshop to review progress and to plan the future. Last year 40 captive-bred birds were released; this year there are plans to release 150, and in 1996 nearly double this number.

This edition of **TRIBULUS** meanwhile continues to offer a variety of local topics. Simon Aspinall, Colin Richardson and Peter Hellyer have produced a list of key sites in Fujairah and along the East Coast covering fauna, flora and archaeology. This is intended as a model for further study, and includes the first ever complete East Coast bird list. The Ruler of Fujairah, H.H. Sheikh Hamad bin Mohammed al Sharqi, has special interest in the ENHG and in recent years has consistently encouraged more scientific research in his Emirate. To date Fujairah has not received much coverage in **TRIBULUS**, and this issue also helps to redress the balance with an interim report from the Sydney University archaeological team on a survey of the Tawiyayn and Dhadnah/Dibba areas. Over in Al Ain, Michael Gillett gives an insight into the life and behaviour of Scarab Dung Beetles, a subject that has not been touched on before in **TRIBULUS**. There is also a full quota of Notes and Queries. Members are reminded that we depend greatly on the Group's own observations and records to complement those of the experts in various fields, in order to continue to accumulate a fund of knowledge covering as many aspects as possible of the UAE's wildlife and heritage.

ROB WESTERN

Important wildlife sites of Fujairah and the east coast of the UAE

by Simon Aspinall, Colin Richardson
& Peter Hellyer

This special feature, the first of several such regional accounts from within the UAE, deals specifically with Fujairah emirate and areas east of the watershed leading down to the Gulf of Oman coast, and thus includes enclaves of Sharjah. All the sites described are presently known to be of importance for their natural history and also in some cases are of value on archaeological grounds. Such an account cannot be exhaustive, not least because new information is still being collected, but may serve the purpose of cajoling those with an inquiring mind and some degree of wanderlust within to explore new ground or document new finds.

The following accounts draw very largely on material collated by the authors for two important publications, one dealing primarily with birds and the other with wetlands, in the broadest sense of the word. These volumes are respectively 'Important Bird Areas of the Middle East' and 'A Directory of Wetlands in the Middle East'; both are referenced fully later.

DIBBA BAY

The main site is in Oman, at the eastern base of the Musandam Peninsula, but accessible without border controls from the UAE.

Location: 25° 37'N 56°17'E. Dibba, the most northerly town on the East Coast of the UAE, faces a deep semi-circular bay, approximately 15km in diameter, located in the Gulf of Oman.

Area: 27,780 hectares (only half lies in UAE territory, the other being in Oman)

Altitude: Sea level to six metres below. Centre of bay exceeds this depth.

Overview: A sheltered deep water bay, with a long fairly undisturbed sandy beach. The bay is popular with fishermen and several species of terns and gulls are regular throughout the year. The beaches are used by seabirds for roosting and turtles probably nest, or used to nest, on the beach.

Physical features: 3km. sandy beach, shelving quickly to a deep water bay. One end of the bay is guarded by the beginning of the Musandam cliffs, which stretch a further 50km northwards to the Straits of Hormuz. A small wave-cut platform to the south of Ras Dibba is a rare and unusual geomorphological and ecological feature for the UAE (*pers. obs.*).

Ecological features: Not known.

Land tenure: Southern half by Government of Fujairah (Dibba Municipality), northern by Government of the Sultanate of Oman (Musandam Development

* تبرز الفجيرة وباقي مدن الساحل الشرقي في الإمارات العربية المتحدة عدد من المناظر تبين الأهمية العالمية لحياتهم البرية. وقائمة شاملة لطيور الساحل الشرقي، ووصف كامل لخمس من هذه الطيور.

Committee) and a central 'pocket,' Dibba al Hisn, by Government of Sharjah.

Conservation measures taken: None.

Conservation measures proposed: The Dibba-Bayah plain has been nominated as an Important Bird Area of the Middle East. The site boundary includes part of Dibba Bay. Not considered at risk presently.

Landuse: Fishing and recreation.

Possible changes in landuse: Not known.

Disturbances and threats: Fishermen and other local people still disturb birds and kill turtles. Development as a deep water port and associated facilities remains a possibility. Holiday chalets have recently built and leisure activities and associated disturbance will doubtless increase accordingly.

Hydrological and biophysical values: Not known.

Social and cultural values: Recreational usage.

Noteworthy fauna: Dibba Bay is an important feeding area for at least 16 species of terns, gulls and other seabirds. The bay is sheltered and used as a night time roost by gulls. **Sandwich Tern** *Sterna sandvicensis* and **Yellow-legged Gull** *Larus cachinnans* are common in winter with **Lesser Crested Tern** *Sterna benghalensis*, **Common Tern**, *S. hirundo* and **White-cheeked Tern** *S. repressa* present in various numbers from September to March. **Bridled Terns** *S. anaethetus* are abundant offshore from May to October. There are smaller numbers of **Armenian Gull** *Larus armenicus*, **Little Tern** *S. albifrons*, **Saunders' Little Tern** *S. saundersi* and **Swift Tern** *S. bergi*. **Sooty Gull** *Larus hemprichii* is regular from March to September and **Persian Shearwater** (*Puffinus lherminieri persicus*) is regular offshore in summer. Other species likely to occur include **Wilson's Storm Petrel** *Oceanites oceanicus*, **Pomarine Skua** *Stercorarius pomarinus* & **Arctic Skua** *S. parasiticus* and **Great Black-headed Gull** *Larus ichthyaetus*. **Crab Plover** *Dromas ardeola*, probably from Iranian populations, use the beach as a roost or as a migratory stopover in spring. **Sooty Falcon** *Falco concolor* have been seen regularly in late spring and may breed on the nearby cliffs.

Green Turtles *Chelonia mydas* are regular on the beach (mostly dead) although may breed irregularly. Successful breeding is now, however, considered unlikely.

Noteworthy flora: Not known.

Scientific research and facilities: None other than a limited amount of archaeological survey and excavation. Dibba was a port at least as early as the beginning of the Christian era.

Conservation education: Not known

Management authority and jurisdiction: As 'Tenure.'

References:

Evans, M. 1994 *Important Bird Areas of the Middle East*. (Dibba-Hisn (Sharjah/Musandam)). Birdlife International.

Reasons for inclusion: Ramsar criteria: 1c. Unusual configuration of shallow bay rapidly deepening toward the centre. Proximity of relatively deep water close in attracts pelagic seabird species close inshore, not witnessed elsewhere in UAE.

WADI SHIH RESERVOIR, KHOR FAKKAN

Location: 25°20'N, 56°20'E Located in the mountains 10km inland from Khor Fakkan town.

Area: c.500 hectares.

Altitude: 350-400 metres

Overview: Man-made reservoir and dam. When filled, the water area occupies about 150 hectares, average depth estimated at 3-7 metres. Surrounded by steep, desolate mountains rising to 900 metre peaks.

Physical features: See above.

Ecological features: Minimal vegetation on water's edge, due to rather steep banks. Small patches of *Phragmites* growing in shallower areas.

Land tenure: Government of Sharjah.

Conservation measures taken: None.

Conservation measures proposed: None.

Landuse: Water reservoir for agriculture use and flood prevention.

Possible changes in landuse: Not known.

Disturbances and threats: Edge of reservoir fenced off to prevent intrusion by visitors. No apparent threats.

Hydrological and biophysical values: If any, not known.

Social and cultural values: Water supply for human consumption and irrigation purposes.

Noteworthy fauna: 25-30 species of birds, including indigenous species **Hume's Wheatear** *Oenanthe alboniger*, **Pale Crag Martin** *Hirundo obsoleta*, **Sand Partridge** *Ammoperdix heyi*, **Grey Francolin** *Francolinus pondicerianus*, **Lichtenstein's Sandgrouse**, *Pterocetes lichtensteinii* **House Bunting** *Emberiza striolata* and **Desert Lark** *Ammomanes deserti*. **Blue Rock Thrush** *Monticola solitarius*, **Desert Lesser Whitethroat** *Sylvia minula* and **Plain Leaf Warbler** *Phylloscopus neglectus* are regular in winter. Good mix of breeding wildlife: at least 4 pairs of **Little Grebe** *Tachybaptus ruficollis*, possible nesting **Moorhen** *Gallinula chloropus* and a pair of **Bonelli's Eagles** *Hieraetus fasciatus* in surrounding mountains. The reservoir is full of fish, with toads (*Bufo* spp.) to be found in the shallow area. Young terrapins of an unknown species have been introduced into the reservoir (Jongbloed pers. comm.).

Noteworthy flora: All the perennials and annuals common to the surrounding hills and mountains. *Nerium mascatense* forms conspicuous stands, with *Forsskaolea tenacissima*, *Trichodesma* sp. and *Sida urens*. Species also likely are *Adiantum capillus-veneris*, *Bacopa monnieri* and *Oxalis corniculata* and the tiny fern *Onychium divaricatum*.

Scientific research and facilities: None.

Conservation education: None.

Management authority and jurisdiction: Government of Sharjah (Khor Fakkan Municipality).

References:

Jongbloed, M. 1987. *The Living Desert*. Motivate, Dubai.

Western, A.R. 1989. *The Flora of the United Arab Emirates*. United Arab Emirates University.

Reasons for inclusion: Ramsar 2b. One of the country's largest perennial reservoirs, with associated developing ecosystem.

WADI SAFAD, FUJAIRAH

Location: 25°15'N 56°18'E. Located inland from the Arabian Sea coast in the Hajar mountains of Fujairah Emirate and reaching the sea at Qurayyah 10km north of Fujairah town, and lying immediately to the north of Fujairah Port.

Area: c. 1500 hectares.

Altitude: Sea level to c 500m+.

Overview: A typical wadi system with permanent water. Approximately 15km long it terminates in a deltaic fan at the seaward end. Cultivations with traditional falaj system remain in the valley. The village of Qurayyah is situated within the boundary of the site. Upper reaches of wadi rock-walled and narrow and inaccessible by motorised transport. Wadi pool system persists all year.

Physical & Ecological features: A classic mountain wadi with permanent, at least standing, water. The coastal fan, bay bar, spit and lagoonal system at the seaward end is an unmodified geomorphological development (up to 1km wide & c 6km long), unique in the UAE, with mainly pristine saltmarsh and saltflat plant communities. The water bodies on site range from freshwater, through brackish to saltwater. **Ghaf** *Prosopis cinerea* and dense **Mesquite** *Prosopis juliflora* occupies drier ground, particularly around Qurayyah.

Land tenure: Government of Fujairah and local farmers.

Conservation measures taken: Biological and archaeological value of site presently being evaluated.

Conservation measures proposed: Maintenance of undisturbed and unmodified system. This site may be recommended for visitors interested in the heritage of the UAE. As such, it is likely to remain in a relatively natural unchanged state.

Landuse: Low intensity pastoral use and cultivation.

Possible changes in landuse: None planned; some fields falling into disuse.

Disturbances and threats: Construction of a road for eight kilometres along the wadi will bring increased human disturbance and has damaged part of the

traditional agricultural system, though to a limited extent. Oil pollution must be a serious risk in the lower, tidal part of the site. The port facilities of Fujairah already use some reclaimed land and impinge on the present southern boundary of the site. Further housing development especially on the coastal strip is a potential threat.

Hydrological and biophysical values: Permanent standing water, a rare commodity anywhere in the UAE. Storm water dissipates rapidly over the braided lower course of the wadi thus preventing damage to fields, buildings and main coast road. Coastal development and storm berm protects Qurrayah from marine incursion.

Social and cultural values: Archaeological sites considered important, dating from pre-historic to late Islamic times. The historical and cultural material is regarded as having high value. There is an important local fishery, with fishing boats putting out from the beach.

Noteworthy fauna: Rare mammals are reported to survive within the catchment, these include **Wolf** *Canis lupus arabs*, **Lynx** *Caracal caracal schmitzi*, **Arabian Gazelle** (Idhmi) *Gazella Gazella arabica* and possibly **Ibex** *Capra ibex* and **Wild Goat** *C. aegragus*. Freshwater fish populations require surveying, together with invertebrate groups. **Arabian Toad** *Bufo arabica* is abundant.

A typical mountain avifauna includes **Desert Lark** *Ammomanes deserti*, **House Bunting** *Emberiza striolata*, **Arabian Babbler**, *Turdoides squamiceps*, **Yellow-vented Bulbul**, *Pycnonotus anthopygos*, **Scrub Warbler**, *Scotocerca inquieta* and **Indian Silverbill** *Euodice malabarica* which visit to drink and breed locally. **Grey Francolin** *Francolinus pondicerianus* occurs around cultivations.

A variety of Palaearctic passerine migrants occur in winter and spring. The coastal lagoons attract regionally important numbers of **Great Black-headed Gull** *Larus ichthyaetus* in winter, many terns *Sterna spp.* on passage and a variety of other waterfowl including **Greater Flamingo** *Phoenicopterus ruber* and resident **Western Reef Heron** *Egretta gularis* and passage **Grey Heron** *Ardea cinerea* in particular. **Kentish Plover** *Charadrius alexandrinus* breeds.

Three new species of mollusc (sp. nov.) have been collected and have been described in **Tribulus Vol. 2.2** October 1992.

Noteworthy flora: Presents a good example of typical mountain wadi flora and associations. The mainly pristine saltmarsh and saltflat plant communities at the seaward end of the wadi are especially noteworthy and represent the best undisturbed examples of this floral zonation and habitat in the UAE.

Scientific research and facilities: Surveys of the flora, fauna and archaeology of the area are ongoing presently, at the Ruler's request.

Conservation education: There has been education of some residents on site as to the value of the traditional agricultural methods and as a now rare example of a unspoilt mountain community in harmony with the local wildlife. The significance of, and external interest, in this

wildlife may result in the site being maintained as an example of a typical mountain community with immense value for its outstanding natural heritage.

Management authority and jurisdiction: Government of Fujairah.

References: Unpublished. personal observations.

Reasons for inclusion: Ramsar criteria: 1a & 2c. A excellent example of a mountain wadi system with permanent water and which reaches the sea with mainly unmodified natural plant communities.

WADI HAYL, FUJAIRAH

Location: 25°01'N 56°13'E The cultivation and settlement at Hayl, located around an old palace (now derelict but scheduled for restoration) is situated 10km up an unmetalled track, 20km from Fujairah.

Area: Including the main wadi system, cultivations and village, the area is approximately 500 hectares.

Altitude: 100-300 metres.

Overview: The wadi is important as water flows throughout the year, (except during drought). Therefore it contains a typical perennial wadi flora and fauna, including amphibians, fish, reeds, cultivated fruit trees and palms.

Physical features: Wadi Hayl is a shallow sided ravine of 20-200 metres width. Traditional cultivations flank the water course and pumps supplement a falaj system.

Ecological features: The perennial water has created a healthy freshwater eco-system. Fruit trees, including mango, papaya, banana and date, line the watercourse and other vegetables and animal fodder are grown on levelled platforms along the wadi side. Insects are abundant and most resident bird species can be found in the wadi area including larger birds of prey. Toads (*Bufo spp*) are plentiful and fish breed in the permanent pools.

Land tenure: Ruler of Fujairah and private citizens.

Conservation measures taken: The Ruler has invited a conservation assessment to be done on the wadi and the palace and village.

Conservation measures proposed: Under preparation. This site may be recommended for visitors interested in the heritage of the UAE. As such, it is likely to remain in a relatively natural and little modified state.

Land use: Agriculture.

Possible changes in landuse: There have been discussions on mining mineral ore at a higher level, meaning large access roads through the wadi, although these are currently in abeyance.

Disturbances and threats: Large access roads graded through the wadi could be very detrimental and should be discouraged. Advice should be sought to route quarry access sensitively through the area without causing damage to the ecosystem.

Hydrological and biophysical values: Water supply is used exclusively for local agriculture.

Social and cultural values: The old Palace and associated graveyard and village are of historical importance and interest. Other archaeological finds

have also been documented from the area.

Noteworthy fauna: Fauna currently logged includes 25 species of birds, several species of mammals and two amphibians. The most important of these include *Gazelle gazella* sp., **Bonelli's Eagle** *Hieraetus fasciatus*, (Arabian) **Red Fox** *Vulpes vulpes arabica*, **Dhofar Toad** *Bufo dhofarensis* and **Arabian Toad** *B. arabicus*.

Noteworthy flora: *Nerium mascatense* is common in such wet wadis as this, with *Forsskaolea tenacissima*, *Trichodesma* sp. and *Sida urens*. Species also likely are *Adiantum capillus-veneris*, *Bacopa monnieri* and *Oxalis corniculata* and the tiny fern *Onychium divaricatum*.

Scientific research and facilities: None.

Conservation education: None.

Management authority and jurisdiction: The Ruler of Fujairah, H.H. Sheikh Hamad bin Mohammed al Sharqi, via Fujairah Municipality.

References: All unpublished personal observations.

Reasons for inclusion: 1b & 2c. Perennial wadi system with rich fauna and flora, and old fields system.

KHOR KALBA (INCLUDING FUJAIRAH BEACH)

Location: 24°59'N 56°22'E Khor Kalba is situated on the Gulf of Oman coast and straddles the UAE/Oman border.

Area: 7750 ha.

Altitude: Sealevel to 3m above.

Overview: A tidal inlet with ramifying channels formed by the outlet of Wadi Rumh, lined with ancient-looking mangroves. The site also encompasses intertidal flats, sabkha, former mangrove now dead from isolation from tidal influence and halophytic vegetation. The intertidal area within Khor Kalba itself is small (less than a few tens of hectares). The beach separating the khor from the sea is mainly sandy with gravel in places. Fujairah beach is a typical seafont beach.

Physical features: Tidal.

Ecological features: Mangal development with typical faunal associations. Mangroves to 8m high are possibly the oldest in the UAE and certainly appear healthy. This is the type locality for the endemic subspecies *kalbaensis* of **White-collared Kingfisher** *Halcyon chloris* (alternatively *Todirhamphus chloris*).

Land tenure: Khor Kalba is an outlying dependency of Sharjah emirate and is overseen by a local representative. The southern part of the site spills over into Omani territory at Khatmat Malahah. Fujairah beach falls in Fujairah Emirate.

Conservation measures taken: Khor Kalba is recognised as an Important Bird Area.

Conservation measures proposed: Representation is to be made to the Ruler of Sharjah and his local representative regarding the conservation importance of this site, which would qualify for Ramsar status. Restoration and extension of the mangrove woodland is desirable, in order to increase and protect the integrity of the site. Nestboxes in younger mangrove may allow the **White-collared Kingfisher** *Halcyon chloris*

population to increase. Co-operation with Oman is required to restore the southern part of the site which is drying out. A management plan should be drawn up promptly.

Land use: Crabs and fish netted for human consumption and camel grazing in the mangrove. A popular site for recreation including the mangrove areas but primarily the beach (and for wildlife relatively unimportant) side of the main channel. Fishing takes place along the beach and in the intertidal channels.

Possible changes in landuse: Encroachment of recreational facilities and perhaps agriculture would be detrimental. Reclamation is a possibility in places.

Disturbances and threats: Disturbance, persecution and trapping of birds and turtles (both accidentally and deliberately). Fujairah beach is heavily used by beach fishermen and for recreation as is the seaward side of Khor Kalba. Four wheel drive vehicles damage the beach top vegetation and cause erosion. Pollution is clearly a threat throughout the site. Fire and cutting of mangrove is localised. Camel grazing of the mangrove itself is not deemed a threat.

Hydrological and biophysical values: The only such khor on the UAE's Gulf of Oman coast and thus unique for the UAE.

Social and cultural values: Traditional grazing and harvesting in the mangroves.

Noteworthy fauna: The entire population of the endemic *kalbaensis* race of **White-collared Kingfisher**, which numbers a minimum of 44 pairs (May 1995), lives here; nesting in natural holes in mangrove trunks and branches. **Booted Warbler** *Hippolais caligata* breeds only here within the UAE, with 10-20+ pairs (and is rare breeder elsewhere in Arabia, perhaps only the Batinah of Oman). Both species, together with **Little Green Heron** *Butorides striatus*, are confined to the mangroves. **Indian Pond Heron** *Ardeola grayii* occurs regularly in winter, the only such site in the UAE. Up to 3% of the estimated world population of **Sooty Gull**, *Larus hemprichii* take up residence in April and May each year, while there is a large passage stopover of terns in spring, late summer and autumn.

Green Turtle *Chelonia mydas* and **Hawksbill Turtle** *Eretmochelys imbricata* are regularly seen feeding in the Khor or along the outside of the beach and may also nest (unfortunately the 4WD vehicles driven by the fishermen on the beach reduce the likelihood of any young surviving). Many large specimens of the former species are caught in fishing nets and drown or are turned over and left to die above high-water.

Noteworthy flora: The oldest and best preserved area of **Black Mangrove** *Avicennia marina* in the country, individual trees reaching to 8m high. The advanced age of the mangroves allows natural holes to form, a feature absent from any other mangrove stand in the UAE and vital for the kingfishers. *Limonium axillare*, *Suaeda* sp. and *Atriplex leucoclada* grow above the high-water mark. Above the beach line *Heliotropium kotschyi* is abundant along with a variety of *Caryophyllaceae* spp. in spring.

Scientific research and facilities: Archaeological excavations in the Kalba area have produced sites

dating as far back as c.4000BC, although details have yet to be published. Other sites are known on the plain on which the town of Fujairah is located.

Conservation education: None. Possibly soon to change.

References:

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Reasons for inclusion: Khor Kalba is of a grade eligible for designation as a Ramsar site under criteria 1a, 2b & 3c.

APPENDIX

RAMSAR CRITERIA

Criteria for representative or unique wetlands.

1a. It is a particularly good representative example of a natural or near-natural wetland, characteristic of the appropriate biogeographical region.

OR

1b. It is a particularly good representative example of a natural or near-natural wetland, common to more than

one biogeographical region.

OR

1c. It is a particularly good representative example of a wetland, which plays a substantial hydrological, biological or ecological role in the natural functioning of a coastal system.....

General criteria based on plants or animals.

2b. It is of special value for maintaining the genetic and ecological diversity of a region because of the quality and peculiarities of its flora and fauna.

2c. It is of special value as the habitat of plants or animals at a critical stage of their biological cycle.

Specific criteria based on waterfowl.

3c.....it regularly supports 1% of the individuals in a population of one species or subspecies of waterfowl.

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Aspinall S.J. (in press). *Wetlands in the United Arab Emirates*. In: Scott, D.A. (ed). *A Directory of Wetlands in the Middle East*. IWRB, Slimbridge.

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CHECKLIST OF BIRDS FOR FUJAIRAH AND THE EAST COAST (as at the end of April 1995)

Little Grebe	Wigeon	Hobby
Great Crested Grebe	Gadwall	Sooty Falcon
Black-necked Grebe	Teal	Lanner Falcon
Sooty Shearwater	Mallard	Saker Falcon
Wedge-tailed Shearwater	Pintail	Peregrine Falcon
Audubon's Shearwater	Garganey	Barbary Falcon
Jouanin's Petrel	Shoveler	Chukar
Wilson's Storm Petrel	Pochard	Sand Partridge
Red-footed Bobby	Ferruginous Duck	Grey Francolin
Masked Booby	Tufted Duck	Quail
Great Cormorant	Black-shouldered Kite	Moorhen
Socotra Cormorant	Black Kite	Coot
White Pelican	Egyptian Vulture	Common Crane
Little Bittern	Griffon Vulture	Oystercatcher
Night Heron	Lappet-faced Vulture	Black-winged Stilt
Little Green Heron	Short-toed Eagle	Crab Plover
Indian Pond Heron	Marsh Harrier	Stone Curlew
Cattle Egret	Pallid Harrier	Cream-coloured Courser
Western Reef Heron	Montagu's Harrier	Collared Pratincole
Little Egret	Sparrowhawk	Black-winged Pratincole
Great White Egret	Long-legged Buzzard	Little Ringed Plover
Grey Heron	Spotted Eagle	Ringed Plover
Purple Heron	Steppe Eagle	Kentish Plover
White Stork	Imperial Eagle	Lesser Sand Plover
Glossy Ibis	Booted Eagle	Greater Sand Plover
Spoonbill	Bonelli's Eagle	Pacific Golden Plover
Greater Flamingo	Osprey	Grey Plover
Shelduck	Lesser Kestrel	Red-wattled Lapwing
	Kestrel	Sociable Plover

White-tailed Plover
 Lapwing
 Great Knot
 Sanderling
 Little Stint
 Temminck's Stint
 Curlew Sandpiper
 Dunlin
 Broad-billed Sandpiper
 Ruff
 Jack Snipe
 Snipe
 Black-tailed Godwit
 Bar-tailed Godwit
 Whimbrel
 Curlew
 Spotted Redshank
 Redshank
 Marsh Sandpiper
 Greenshank
 Green Sandpiper
 Wood Sandpiper
 Terek Sandpiper
 Common Sandpiper
 Turnstone
 Red-necked Phalarope
 Grey Phalarope
 Pomarine Skua
 Arctic Skua
 Long-tailed Skua
 Sooty Gull
 White-eyed Gull
 Great Black-headed Gull
 Black-headed Gull
 Brown-headed Gull
 Slender-billed Gull
 Lesser Black-backed Gull
 Yellow-legged Gull
 Armenian Gull
 Lesser Noddy
 Gull-billed Tern
 Caspian Tern
 Swift Tern
 Lesser Crested Tern
 Sandwich Tern
 Common Tern
 White-cheeked Tern
 Bridled Tern
 Little Tern
 Saunders' Little Tern
 Whiskered Tern
 Black Tern
 White-winged Black Tern
 Lichtenstein's Sandgrouse
 Chestnut-bellied Sandgrouse
 Rock Dove
 Collared Dove

Turtle Dove
 Palm Dove
 Namaqua Dove
 Rose-ringed Parakeet
 Cuckoo
 Striated Scops Owl
 Little Owl
 Long-eared Owl
 Short-eared Owl
 Common Swift
 Pallid Swift
 Alpine Swift
 Little Swift
 White-collared Kingfisher
 Kingfisher
 Pied Kingfisher
 Little Green Bee-eater
 Blue-cheeked Bee-eater
 European Bee-eater
 European Roller
 Indian Roller
 Hoopoe
 Wryneck
 Black-crowned Finch Lark
 Desert Lark
 Bimaculated Lark
 Short-toed Lark
 Lesser Short-toed Lark
 Crested Lark
 Skylark
 Sand Martin
 Pale Crag Martin
 Swallow
 Red-rumped Swallow
 House Martin
 Richard's Pipit
 Blyth's Pipit
 Tawny Pipit
 Long-billed Pipit
 Tree Pipit
 Meadow Pipit
 Red-throated Pipit
 Water Pipit
 Yellow Wagtail
 Citrine Wagtail
 Grey Wagtail
 White Wagtail
 White-cheeked Bulbul
 Yellow-vented Bulbul
 Rufous Bush Chat
 Nightingale
 Bluethroat
 White-throated Robin
 Redstart
 Black Redstart
 Whinchat
 Stonechat

Isabelline Wheatear
 Northern Wheatear
 Pied Wheatear
 Black-eared Wheatear
 Desert Wheatear
 Red-tailed Wheatear
 Eastern Pied Wheatear
 Hooded Wheatear
 Hume's Wheatear
 Rock Thrush
 Blue Rock Thrush
 Blackbird
 Song Thrush
 Graceful Warbler
 Scrub Warbler
 Savi's Warbler
 Sedge Warbler
 Marsh Warbler
 Reed Warbler
 Clamorous Reed Warbler
 Olivaceous Warbler
 Booted Warbler
 Upcher's Warbler
 Menetries' Warbler
 Desert Warbler
 Orphean Warbler
 Lesser Whitethroat
 Desert Lesser Whitethroat
 Common Whitethroat
 Blackcap
 Plain Leaf Warbler
 Chiffchaff
 Willow Warbler
 Spotted Flycatcher
 Arabian Babbler
 Purple Sunbird
 Golden Oriole
 Isabelline Shrike
 Red-backed Shrike
 Great Grey Shrike
 Lesser Grey Shrike
 Woodchat Shrike
 House Crow
 Brown-necked Raven
 Starling
 Rose-coloured Starling
 Common Mynah
 House Sparrow
 Pale Rock Sparrow
 Yellow-throated Sparrow
 Indian Silverbill
 Goldfinch
 Siskin
 House Bunting
 Ortolan Bunting
 Black-headed Bunting
 Corn Bunting

The checklist has been compiled from the database of the Emirates Bird Records Committee, C/o P.O. Box 50394, Dubai, to whom any new records should be submitted.

Fujairah Archaeological Survey

An Interim Report

by L. Brass, R. Painter, G. Britton, L. Hill

Introduction

At the beginning of 1995, a team from the Department of Archaeology at the University of Sydney, Australia, carried out a preliminary archaeological survey of parts of the Emirate of Fujairah, under the direction of Professor Daniel Potts. The survey, conducted under the terms of an agreement with Fujairah's Department of Antiquities and Heritage, focussed on areas not covered by the Swiss-Liechtenstein Foundation for Archaeological Research Abroad, which ended several years of field work in Fujairah at the beginning of 1994.

Synopsis

The first Australian archaeological field season in the emirate of Fujairah produced some interesting results and provided a basis for further research, both archaeological and ethnographic, over further seasons.

The preliminary surveys of the inland mountain region around the village of Tawiyayn, and along the coast between Dibba and Dhadnah have recorded a total of 67 sites. Several of these are of special interest, and detailed maps and drawings have been made of these sites. Proposed research for the future includes excavation of one or more of the sites found by the survey, and a detailed ethnographic study of the abandoned village of Wamm (Site 1).

Many of the sites found during the survey are in danger of being destroyed by development. We recorded as much detail as possible during the survey, but it is important that research is continued during later field seasons. In cases where sites are threatened by continuing activity, such as the tombs along Jebel Wamm, it may be necessary to put up protective fences around the sites to prevent destruction.

Other work completed during the season included three weeks of artefact conservation carried out at Fujairah museum. Objects suffering from bronze disease have been preserved and initial training in basic conservation practice was provided for workers at the museum.

A series of artefacts from the museum collection were photographed to provide a permanent record of the material, as well as illustrations for use in displays.

A detailed report of the survey and a Site Inventory for the area covered, will be given to the museum later this year. The Site Inventory will detail location, type, interpretation (ie. possible age) and recommendations for each site, and the report will include maps and plan drawings, as well as descriptions and photographs of the artefacts collected.

We appreciate the interest and support given to us by

* لقد قامت جامعة سيدني في استراليا بمسح شامل للآثار في أجزاء من إمارة الفجيرة في أوائل عام ١٩٩٥ م. وقدمت تقرير أولي عن ذلك.

the Fujairah Museum, and look forward to further work by teams from the University of Sydney in the future.

Introduction

This season we surveyed two areas in Fujairah — the inland mountain region of Tawiyayn, and the coastline between Dibba and Dhadnah. We were interested in these areas firstly because they had not been previously surveyed, and secondly because they represent two distinct geographical zones and as such provide for an interesting comparison of site types and density. A total of 67 sites were recorded in our survey. This report details our methods and briefly discusses the results of our work. The final report will include site maps, plans and photographs, as well as a catalogue of surface finds.

1. The Tawiyayn Survey

This survey covered the area around Jebel Wamm and the wadis surrounding Tawiyayn:

Wadi Wamm

Wadi al F'ay

Wadi al Khurus

Wadi Tawiyayn

Wadi Awsaq

Wadi Khabb

Wadi Sayraq

Wadi Mihnah

We recorded 58 sites during this survey. A brief description is given in the following table:

Site #	Location	Description
1	Jebel Wamm	82 cairn and mound-type tombs
2	"	recent abandoned village
3	Wadi al Fay	tombs and abandoned houses
4	Wadi al Khurus	2 mound-type tombs
5	Wadi Awsaq	abandoned houses and Islamic graves
*6	"	isolated tomb
7	"	poorly preserved tomb

8	Wadi al Khurus	Beehive-type tombs
9	Wadi al Tawiyayn	large circular tomb and islamic graves
10	Wadi Awsaq	isolated beehive-type tomb
11	Wadi Khabb	isolated cairn-type tomb
*12	"	large rectangular tomb with oval wall and Islamic graves
13	"	circular tower (fort)
14	Wadi Sayraq	small circular graves
15	Wadi Mihnah	cairn-type tomb
*16	"	cave
17	"	abandoned houses and small oval graves
18	Wadi Sayraq	tombs
19	"	abandoned village and small oval graves
20	"	abandoned houses and small oval graves
21	"	small oval graves
22	"	small oval graves
23	"	circular and oval tombs
*24	"	abandoned houses and possible graves/tombs
25	"	cave
26	"	abandoned houses and tombs
27	"	poorly preserved tomb and structures
28	Wadi Khabb	farm where bronze coins and Iron Age sherd found
29	"	well preserved abandoned settlement
30	"	unidentified circular structures
31	"	recently abandoned settlement
32	Wadi Riyamah	abandoned settlement including small oval graves
33	"	unidentified circular structures and possible oval grave
34	Wadi Tawiyayn	small circular mounds - possible graves
35	Wadi Riyamah	extensive area containing dwellings and tombs
36	Riyamah	Islamic cemetery with mound tomb site
37	Wadi Riyamah	abandoned settlement & unidentified circular structures
38	"	unidentified circular structures
39	"	extensive abandoned settlement & associated tombs
40	"	two graves on jebel & well-preserved settlement in wadi
41	"	small abandoned settlement
42	"	three mounts in wadi, probably tombs
43	"	two unidentified circular structures
44	"	abandoned village including storage areas & animal pens

45	"	circular structures and mounds (possibly tombs)
46	"	well-preserved abandoned village
47	"	3 oval mounds and disturbed scatter of stones
48	"	5 areas contained dwellings, animal/storage areas & tombs
49	"	7 circular mounds, probably tombs
50	"	well-preserved abandoned settlement
51	"	3 circular structures and 1 oval mound
52	"	7 circular structures, mounds and ring of stones
53	"	3 areas of oval and circular mounds - possibly tombs
54	"	7 circular structures, probably animal enclosures
55	"	abandoned houses and animal enclosures
56	"	abandoned houses and circular graves
57	"	abandoned houses and circular cairn tombs
58	"	stone artefact scatter in Islamic cemetery

The sites marked with an asterisk were selected for further analysis — either through test excavation or detailed plan drawing of specific structures. Two test excavations, at Site 6 and Site 16 were undertaken. Site 6 has also been planned, and a contour map has been provided for Site 16. Detailed plans of features at Site 12 and 24 were drawn in order to provide examples of the different types of structures recorded during this survey.

All sites were recorded in detail, photographed, and a sample of the surface artefacts have been collected. A 1:25,000 mapsheet of the area, showing the location of each of the sites, was also prepared.

2. The Dibba Survey

We completed a short two week survey of the coastline between Dibba and Dhadnah, including the inland area of Saih Dhadnah. Sites were recorded using a similar system to that for the Tawiyayn area, although much of the coast has been developed and sites have almost certainly been destroyed by quarrying activities, roadworking, modern buildings and cultivation. We relied therefore on local knowledge of sites and largely focussed on the coastal towns, where modern houses seem to have been built over and around archaeological sites.

We recorded 9 sites during this preliminary survey, which are listed in the table below.

Site#	Location	Description
59	Al Kubus	large oval mound with two circular tombs
60	Rul Dibba	oval tower constructed of farouj and mortar

61	Ras Dibba	abandoned houses and small circular mounds
62	"	small oval mounds - possible graves
63	Saih Dhadnah	small oval mounds in 3 areas, possible graves
64	Dhadnah	tower and abandoned settlement
65	Rul Dhadnah	tomb and poorly preserved tower
66	Al Ghurfah	mudbrick fort and 6 associated structures
67	Dibba	2 large circular mounds - probably tombs

Additional Work

Mary Gissing spent three weeks conserving artefacts at the museum. This has ensured the survival of several objects in danger of complete disintegration through "bronze disease," and has provided workers with basic instruction on the principles and practice of artefact conservation.

Georgia Britton photographed a selection of objects from the museum collections, and colour slides of this material were given to the museum for display. Slides are the most effective way of keeping a permanent record of the material as colour prints become discoloured and fade over time.

Discussion

The 1995 Australian archaeological field season in Fujairah was a successful one. We recorded 67 sites in the northern area of the emirate, an area not previously surveyed and have provided a basis for further archaeological and ethnographic research by Australian teams in future seasons. Future work will include an ethnographic study of the abandoned village of Wamm and excavation at selected sites in the area surveyed this season.

We have recorded sites in considerable detail and will use this information to provide the museum with a Site Inventory for the northern region of Fujairah. The following is a list of the site features recorded.

Site Number

GPS (Global Positioning System) reading

Location (descriptive e.g. Wadi Khabb)

Description (e.g. number and dimensions of structures, method of construction etc.)

Interpretation (whether the structures are tombs, houses, what period the site dates to etc.)

Disturbance / Threat to site (proximity to roads, development, quarrying activities, etc.)

Recommendations (whether the site has the potential

for excavation, if the site is in danger of destruction what could be done to best protect it, etc)

Surface finds

Photographs

Plan drawings

Most sites recorded during the 1995 survey have been disturbed through human activity or natural erosion. Some sites however are in considerable danger from quarrying and building activities. The tombs at Jebel Wamm (Site 1) fall into this category. Quarrying activities in this area have almost certainly destroyed some of the tombs.

It is vital that the importance of this site as part of Fujairah's national heritage be recognised and that it be protected from further damage. We recorded the tombs at Jebel Wamm in as much detail as possible but we stress the importance of continued work in this area. The sites along the coast between Dibba and Dhadnah are also under threat and while we recognise that there is often little that can be done to halt large scale development it is important to record sites and know as much about them as possible before that information is lost.

A site inventory will provide the museum with a record of the types of sites recorded during our survey and information about the state of preservation of structures within those sites. This is an important record which is useful firstly as an indication of what ethnographic and archaeological sites exist in the emirate of Fujairah and secondly as a starting point for further work in the Emirate.

We would like to thank Saif Al Attar, the Director of Antiquities & Heritage and Salah Ali Hassan of Fujairah Museum for all their help and interest. The generosity and support we have received from the Fujairah Museum is greatly appreciated.

We also acknowledge with thanks the interest in our work taken by Fujairah Ruler and Supreme Council Member His Highness Sheikh Hamad bin Mohammed al Sharqi, who gave instructions for us to be permitted to carry out the work, as well as the efforts of Peter Hellyer, Co-ordinator of the Abu Dhabi Islands Archaeological Survey Project, who initiated talks with the Fujairah Government and undertook the necessary negotiations leading to the conclusion of the agreement between the Government and the University of Sydney.

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Scarab Dung Beetles in the Al Ain Region of the UAE and Neighbouring Areas of Oman (Coleoptera: Scarabaeidae)

by Michael P.T. Gillett

A preliminary account of the scarabaeid dung beetles from the Al Ain region of the UAE and neighbouring areas of the Sultanate of Oman is given, based upon recordings made during the period September 1991 to November 1992. Most collecting was done during springtime, but no extensive field trips were undertaken. Nevertheless, a total of 18 species, representing 10 genera of coprophagous (dung-eating) beetles of the Laparosticti division of the family Scarabaeidae were recorded as follows: *Scarabaeus cristatus*, 2 species of *Gymnopleurus*, *Catharsius inermis*, *Chironitis osiridis*, *Onthophagus nitidulus*, *O. variegatus*, *O. transcaspicus*, 2 species of *Onticellus*, 5 species of *Aphodius* and one species each of *Psammotus*, *Ryssemus* and *Saprosites*. Drawings of 13 of these species are presented. In addition, a further 14 species of phytophagous (plant-eating) scarabs or chafers representing the Pleurosticti division of the family were also found, suggesting that the family, in general, is extensively represented in the area. The species belonging to the Pleurosticti are not listed here and will be treated separately elsewhere, although one species, *Maladeira castanea*, is illustrated to highlight differences and similarities between beetles from the Laparosticti and Pleurosticti series.

Introduction

The 'Leaf-horned' or lamellicorn beetles of the superfamily Scarabaeoidea represent the most easily recognised natural grouping of species within the huge order Coleoptera. The superfamily includes such familiar insects as the Stag Beetles (Lucanidae) and others, which are more obscure to the general naturalist, such as the Scavenger Beetles (Trogidae) and the tropical Passalid Beetles (Passalidae). However, the overwhelming majority of scarabaeoid species belong to the nominal family Scarabaeidae and include the well known scarab dung beetles and the phytophagous (plant-eating) chafers. Some of the latter are amongst the largest and heaviest insects known, reaching 9 cm in length, 5 cm in width, 4 cm in height and over 30 g in weight for the neotropical species *Megasoma actaeon* (Klausnitzer, 1983).

The scarabaeid beetles are often divided into two series called the Laparosticti, which includes the coprophagous (dung-feeding) species described in this article, and the Pleurosticti, which contains the phytophagous chafers to be described in a forthcoming article. This division, once thought to be based on firm phylogenetic differences, is now reckoned to be artificial (Ritcher, 1969), but it is retained for convenience to avoid having to repeatedly list the numerous subfamilies included in each series (Woodruff, 1973). Although beetles belonging to the Scarabaeidae are usually easily recognised in the field and in most cases can be intuitively assigned to either the Laparosticti or the Pleurosticti, members of both series show considerable variation and overlap in

*توضح المقالة نوع من الخنافس السوداء الموجودة في مدينة العين وضواحيها.

body form. In both series, beetles of the two sexes may be very similar or quite dissimilar in appearance; males of many species often display cephalic and/or thoracic horns and projections (Arrow, 1951). In Figure 1, two representative local species from the different series are shown: *Onthophagus nitidulus* Klug (Laparosticti: Scarabaeinae) and *Maladeira castanea* (Arrow) (Pleurosticti: Melolonthinae). The classification of the superfamily Scarabaeoidea down to the tribes and genera of scarab dung beetles found in the Al Ain region is shown in Table 1.

Some of the subfamilies of the Laparosticti have frequently been raised to the status of separate families (e.g. Crowson, 1955). This is, however, of little importance with regard to the Al Ain fauna since the subfamilies concerned, Acanthocerinae and Geotrupinae, are apparently unrepresented, although several Arabian species in the latter group are known from the Yemen (Paulian, 1980). A more important point to consider, especially for the study of the little-known Gulf fauna, is the fact that the family Scarabaeidae is one of the largest in the animal kingdom. There are at least 21,000 described species worldwide, a number about equal to the combined total of known amphibians, reptiles, birds and mammals! Two of the genera of scarab dung beetles found in the Al Ain region, *Onthophagus* and *Aphodius*, each have well over 1,000 described members (Woodruff, 1973). Such large numbers make identification very difficult and in the present report identification of Al Ain scarabs is, in most cases, taken only to the generic level.

Feeding habits and brood provision

Whilst coprophagy is the rule in the Laparosticti, there are many exceptions which will be described below. Some scarab species may utilise the dung from a wide variety of different animals, but there are many obligate scarabs which are restricted to the dung of a particular species of animal. Also among the dung-feeders there are a great variety of different habits in the manner of adult feeding, but more especially so in the provision of food stores for the larval stages. In fact, scarabaeid

dung beetles are one group of beetles in which brood care is highly developed; other notable groups being the related Passalid Beetles (Passalidae) and the Sexton or Burying Beetles (Silphidae).

The most spectacular behaviour is seen in members of the tribe Scarabaeini, whose ball-rolling activity is well known. In the Al Ain region the tribe is represented by *Scarabaeus* and *Gymnopleurus*, both of which have been recorded as ball-rollers (Arrow, 1931), but this behaviour in the local species has only been observed for *Scarabaeus*. This beetle seems to be mainly nocturnal and I have never recorded it as occurring in dung, but I have seen ball-rolling during the late afternoon in May in the sand dunes near to Ain al Fayda and also in the desert near to Umm al Qaiwain. A general account of this activity has been given (Gillett, 1992). The balls, composed of dung from fresh camel droppings and perfectly spherical with a fairly smooth appearance and a diameter of 3-5 cm, are propelled backwards by the beetle, which stands on its front legs. The path followed is quite tortuous and may exceed distances of 100m; obstacles are overcome by trial and error and detours made where necessary.

The journey usually ends up at a bare area of sloping hardpacked sand where the interment process begins. Having found a suitable spot, the dung ball is at first superficially buried to a depth of 2 or 3 cm and covered up; the beetle then sets to work excavating a sloping tunnel in the sand and reappears periodically to push out the spoil. After about 5 to 10 minutes the scarab begins a rather frantic search for the buried ball, making trial excavations in the general area where it was buried. The terminal lamellae of the antennae are flared open at this time and apparently are used to detect the hidden prize.

Once it is refound, the ball is quickly steered into the tunnel and a few minutes later the tunnel is sealed off some way in from the entrance, leaving a little cave-like structure in the side of the sand dune. The balls are of two types: those intended for immediate consumption by the beetle and those intended for brood provision. In the first case male and female beetles work independently, but for brood provision there may be active co-operation between the male and female, although this has not been observed with the Al Ain species of *Scarabaeus*. After burial each brood ball is broken up and remade into a pear-shaped (pyriform) mass, in the top of which a single egg is deposited. The female then abandons the tunnel and reseals the entrance.

Typically in *Scarabaeus* only a small number of eggs (4-6) are produced, each being deposited in a single isolated brood ball. Breeding success of the species is guaranteed by the sophisticated provision of a safe food store for just a few larvae, rather than as in most species of insects by the production of large numbers of eggs, few of which eventually develop into adults.

Other scarab dung beetles have evolved different strategies, both for feeding and for brood provision. Many species actually feed directly in dung and make no effort to move portions of it away or to bury it. This seems to be the general rule in the species found at Al Ain since 5 species of *Aphodius*, 3 species of *Onthophagus*, 2 species of *Gymnopleurus* and one species each of *Oniticellus*, *Catharsius* and *Chironitis* were most often found inside the faecal pellets of camels or goats. Other

dung beetles bury small portions of dung immediately beneath the site of deposition and feed from this store. Although this would seem to be a good strategy in an arid climate such as that of Al Ain, since burial would delay desiccation of the dung, this behaviour was uncommon. Only *Catharsius* was found feeding on camel dung in shallow burrows below the main faecal mass. *Onthophagus nitidulus*, although mostly found inside camel droppings, was found several times just below the surface of the soil under human dung and this is a common place to find other tropical members of the genus. The beetles mentioned probably show more variation in brood provision than they do in adult feeding habits.

Many members of the tribe Coprini, to which *Catharsius* belongs, bury large amounts of dung and store it in an underground chamber deep beneath the source, the male and female co-operating in this task. The male is then driven away and the female sets to work kneading the dung into half a dozen or so pyriform brood cells, in the top of each of which a single egg is placed. The female remains underground tending the brood chamber and eventually perishes there. Similar behaviour occurs in the Onitini, but the eggs may be placed at intervals in a single sausage-like mass of buried dung. Other species such as *Onthophagus* and *Oniticellus* excavate one or more twisting vertical tunnels, often with several branches, at the ends of which are positioned small masses of dung each containing a single egg.

Less specialised species of dung beetles (e.g. *Aphodius*) often breed directly in exposed dung masses, but whilst this is common in temperate climates, it has not been observed at Al Ain. The aridity of the climate would probably lead to complete dessication of the dung before larval development could be completed. Such species must utilize other strategies in order to breed, either by burying dung themselves or by invading the buried stocks of other species. Such "cuckoo parasitism" (kleptoparasitism) is known for *Aphodius* spp in the burrows of Dor Beetles (Geotrupinae) in Europe (Chapman, 1869; Klemperer, 1980) and because the Al Ain *Aphodius* beetles occur in association with all of the above mentioned genera of Scarabaeini, it may occur in this region too. I have occasionally found in the desert abandoned dung balls made by *Scarabaeus*, in which exist holes caused by smaller dung beetles may be clearly seen; these may be caused by "Cuckoo" *Aphodius* beetles escaping as the ball dries out, although *Onthophagus* spp are also known from these balls in India (Arrow, 1931).

Four species of Laparosticti from the Al Ain area were not found associated with dung. One species of *Oniticellus*, although most likely a dung-feeder, is known to me only from 2 specimens taken from an Al Ain hotel swimming pool in the early morning during September (the beetles presumably having blundered into the pool during nocturnal flights). Three species have only been taken at light (at Rest Station 1 on the Al Ain - Dubai road). One was a species of *Psammodytes*, a genus thought to feed on the roots of halophytic plants (Woodruff, 1973). Another was a species of *Ryssemus* and, whilst little is known about the life history of beetles in this and related genera, they may feed in soil on humus or plant roots (Woodruff, 1973; Jessop, 1986). The third has been provisionally recorded here as a species of

Saprosites.

Root feeding has also been reported for other scarabs, including some species of *Aphodius*. Several other species do not feed on dung, but mimic the dung beetles by providing and burying brood balls composed of humus or cut vegetation. Some scarabs also frequent rotting vegetation (saprophagous), including fruits, or feed on fungi (fungicolous).

Many species show a necrophilous or sarcophagous (carrion feeding) tendency; this occurs mainly in the Scarabaeinae, particularly in neotropical species, but also in such sub-families as the Geotrupinae (Dor Beetles). In pursuing this habit the beetles may be attracted to the corpses of both large and small mammals as well as to dead birds, reptiles, fish and invertebrates, including crabs and locusts. At least one species is known in which the coprophagous and necrophilous habits have given way to parasitic behaviour — the species in question, *Macroprocopris symbioticus* (Hawkeswood, 1987), being an obligate parasite in the rectum of marsupials. One scarab species (*Saprosites mendax*) is known to occur in the borings of stag beetles in dead timber, but details of its biology are lacking (Jessop, 1986). Finally some scarabs are found within the nest of social insects, such as termites (Isoptera) and ants (Formicidae), although again the exact nature of their feeding habits within the nests is unknown.

Economic and medical importance

The economic importance of the family Scarabaeidae can scarcely be exaggerated. The phytophagous Pleurosticti includes many species whose activities are prejudicial to the interests of mankind. Roots, foliage, flowers and fruit of crop plants and trees may be destroyed and even timber damaged by the feeding activities of these beetles. By contrast, the legions of mainly dung-feeding species belonging to the Laparosticti are, with a few exceptions, clearly beneficial to agriculture. Although a few species may be minor pests of lawns or cultivated mushrooms (e.g. *Aphodius*), the habit of removing and burying animal dung has an enormous impact on the quality of pastureland. In many fairly arid areas where naturally occurring large herbivores are absent, dung beetles tend to be scarce both in numbers of species and of individuals.

When domestic animals, especially cattle, are introduced into such regions, there are few effective natural agencies for dung removal. The quality of the pastureland is quickly degraded as more and more of the available grass is literally smothered, perhaps for months at a time. The large amounts of unremoved dung may serve as breeding grounds for a multitude of noxious species, especially flies, some of which can be serious cattle pests (e.g. Horn Fly - *Haematobia irritans*). In regions having an abundant scarabaeinid fauna, these problems are minimised and the burial of large amounts of dung in the soil, together with aeration caused by the burrowing of scarabs, actually helps to maintain the fertility of pastureland. For this reason, suitable scarab species from Africa have been introduced into other regions of the world, either to control pestiferous flies as in Hawaii (Bournemissza, 1970) or to improve range-lands as in Australia (Woodruff, 1972).

From the public health perspective, dung beetles are of tremendous importance, especially in overpopulated

tropical countries where the populace may lack even basic sanitary facilities. In such countries, enormous quantities of human ordure are buried beneath the soil by scarab beetles each day, a process which not only help to maintain the countryside clean, but also limits the breeding opportunities of many species of flies. There is also good evidence to suggest that the eggs or cysts of many important parasitic organisms such as *Ascaris*, *Entamoeba*, *Giardia* etc. are destroyed by passage through the scarab beetle's gut (Miller et al, 1961). It is easy to speculate that without the activities of these beetles, the incidence of both fly-borne and parasitic human diseases would be far greater than is the actual case.

However, not all of the effects of the dung-feeding habit are beneficial to mankind. Although many parasitic organisms may be destroyed by the beetle's digestive processes, other types of parasites actually require ingestion by scarabs in order to complete their life cycle (Halffter & Mathews, 1966). These include *Ascarops*, *Gongylonema* and *Macrocanthorhynchus*, which are mainly parasites of domestic animals, but are occasionally reported as human infestations (Smith, 1973).

The presence of beetles themselves in the human body is a condition known as cantharasia and usually follows the ingestion of the eggs or young larvae of beetles that are pests of stored products. However, there is a special case, known as scarabiasis, in which dung beetles invade the rectum of small children and cause pain and discomfort along with diarrhoea. The condition is associated with inadequate housing conditions in rural areas and has been most frequently recorded from the southern part of the Indian sub-continent (Fletcher, 1924). The species involved are small members of the genera *Caccobius* and *Onthophagus*, and are quite closely related to some species found in the Al Ain region.

Collecting areas and techniques

The main areas where scarabaeid dung beetles were collected during this study included territory in both the UAE and in the Sultanate of Oman. In the UAE these areas included: Ain al Fayda park and environs, desert sites along the Al Wagan road out to about 20 km beyond Sha'ab al Gaaf, Al Oha and the three Rest Stations along the Al Ain - Dubai road. Additionally, some collecting was made at Dhaid and in Al Ain city. In Oman, collecting was confined to the countryside around and between the towns of Buraimi and Mahdah. Collecting and recording of scarab dung beetles began in September 1991, continued through to early June 1992 and was resumed during the period of August - November 1992. The most intensive period of collecting was during the spring (March - May) of 1992, when weekly or twice-weekly short field trips were made to the areas described above.

Most species were collected by examining relatively fresh dung (camel, goat, donkey and, more rarely, cow and human) and by digging underneath it. Completely dessicated dung never yielded scarabaeid beetles. On a number of occasions in December, several types of traps were operated in the Buraimi area, including unbaited pitfall traps and can traps baited with fermenting yeast suspensions or carrion. Whilst these were successful in catching various ground beetles (Carabidae) and darkling beetles (Tenebrionidae), they failed to yield

any scarabs. Similar, on each occasion that naturally occurring carrion has been examined, the beetles found included larger beetles (Dermestidae) and chequered beetles (Cleridae), but not scarabs. Desert fungi were also examined for scarabs, but without success. Many species of scarabs were found, however, at night underneath lights — these included many members of the Pleurosticti, but also dung-feeders, most notably *Scarabaeus*, which was hardly ever found alive in any other situation. Just a few specimens of common specimens of common species were found casually in Al Ain city, whilst one species is known only from two drowned specimens found in a swimming pool.

Genera of scarabaeid dung beetles represented in the Al Ain region

A total of 32 species of beetles belonging to the Scarabaeidae were encountered, of which 18 belong to the Laparosticti and represent the 2 sub-families, 8 tribes and 10 genera recorded below. The remaining 14 species of chafers belonging to the Pleurosticti are not recorded here.

Sub-family: Scarabaeinae

Tribe : Scarabaeini

Genus : *Scarabaeus* Linnaeus 1758

Beetles of this genus often occur as closely related pairs of species such as *Scarabaeus sacer* - *S. gangeticus* and *S. cristatus* - *S. andrewesi*. The first three of these species have been recorded from Arabia, but have in fact a wider distribution, being found in North Africa and the Indian sub-continent (Arrow, 1931). *S. cristatus* is specifically recorded from South Arabia. Over 1000 specimens of beetles belonging to this genus from around Al Ain have been examined in the field and they all represent the same species, which, whilst it fits the description of *Scarabaeus cristatus* Fabricius 1775 actually appears to more closely coincide with *Scarabaeus andrewesi* Felsche 1907, a species known from Karachi. For convenience, this species is recorded here as *S. cristatus*, but until comparative specimens are available for study, the identity of the Al Ain species remains doubtful. Figure 2 shows a habitus drawing of this beetle. Both sexes completely lack the tarsal joints of the front legs.

These large dull black beetles have been found in all months of the year (except July, when no collections were made), but were most plentiful during the summer months. Scores of beetles were seen on some nights in April, May and August around lights at Ain al Fayda, Al Oha and the three Rest Stations. The beetle has also been found in Al Ain city (December). At "Fossil Valley", Jebel Huwayyah, (Buraimi) in April and May, the beetle was occasionally encountered during daytime and large numbers of dead and dismembered beetles were found beneath several trees and appeared to be the victims of birds. Remains of this species have also been found in unidentified bird pellets from the Mahdah area. Specimens of *Scarabaeus* from areas further afield, including Jebel Ali and Umm al Qaiwain were identical to those taken around Al Ain. Although this species is clearly very abundant in the Al Ain region, it has never been found in dung by me, although on two occasions I have observed the insect rolling balls of dung as described above. Abandoned dung balls, probably made by this

species, have been found at Fossil Valley, Umm al Qaiwain and in the desert along the Al Wagan road.

Genus: *Gymnopleurus* Illiger 1803

Paulian (1980) lists 6 species of this genus as found in Arabia, but no descriptions are given. In the present study, 2 species are recorded, one of which seems to be fairly common, whilst the other is represented by a single specimen. The common species is completely black and convex and the upper surface is heavily punctured with the intervening regions very shiny (Figure 3A); it has been recorded in April and May from inside camel droppings near to Mahdah and in the desert near Ain al Fayda. Ball rolling activity has not been witnessed and the insect has not been found in other situations. The single specimen representing the second species is of similar size and shape to the more common species, but is a much duller black and differs in the shape of the head and forelegs. It too was taken from camel droppings at Mahdah in May.

Tribe : Coprini

Genus : *Catharsius* Hope 1837

The species occurring at Al Ain is *Catharsius inermis* (Castelnau 1840) and fits perfectly the description given by Arrow (1931). It is rather widespread, being found in West Africa and Pakistan as well as in Arabia. Paulian (1980) also lists *C. sesostris* as an Arabian species. *C. inermis* is a shiny black, convex beetle (Figure 3B) and is fairly common in the Al Ain region. It has been recorded at lights at the Al Ain - Dubai road Rest Stations (November, February, April), Ain al Fayda (May) and at km 30 along the Al Ain - Abu Dhabi road (December). It has also been frequently collected in or below fresh camel droppings at Mahdah and along the Al Wagan road (both April, May). At Dhaid (April), the beetle was found in fresh cattle dung and one female was discovered with a store of dung at the bottom of an "L"-shaped burrow about 35 cm below a cowpat.

Tribe : Onitini

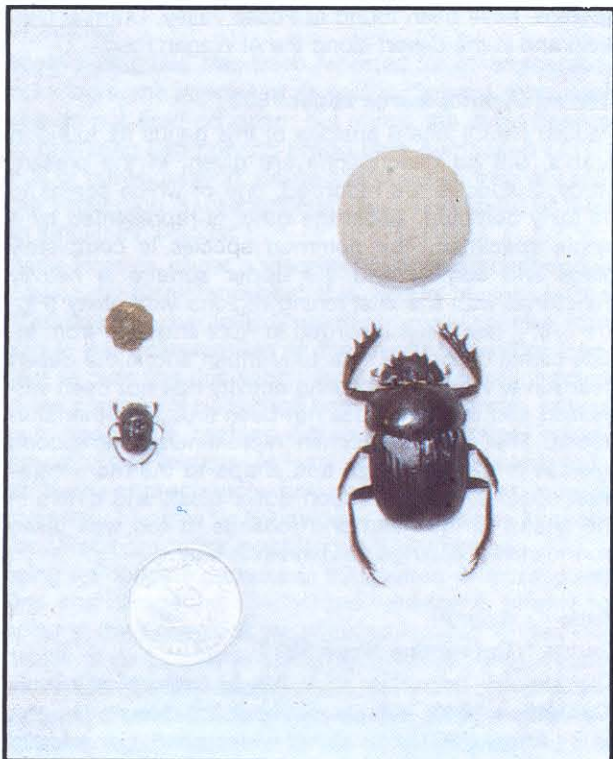
Genus : *Chironitis* Lansb. 1875

In this genus, only the female possesses the tarsal joints of the front leg, these being quite absent in the males. Only one species has been recorded for Arabia (Paulian, 1980). This is *Chironitis osiridis* Reiche 1856; the beetles found in the Al Ain region fit the description of this species given by Arrow (1931) and are formally recorded as such here. This is an entirely dull black beetle (Figure 3C), which has been found in small numbers in camel droppings at Mahdah (April, May) and in the desert alongside the Al Wagan road (May). It has never been found by me in other situations, but parts of the beetle's exoskeleton have been identified in bird pellets at Mahdah (April).

Tribe : Onthophagini

Genus : *Onthophagus* Latreille 1802

This is the largest animal genus described and its 1,500+ members have a wide distribution, but are less common in cold, damp climatic regions. Zunino (1979) listed 17 species as belonging to the Arabian fauna, but to these must be added a further 5 species cited by Arrow (1931). The 3 species collected to date in the Al Ain



Scarabs from Al Ain with their dungballs. Left *Gymnopleurus* sp., and right *Scarabaeus* sp.

Photographs, above and right, by Michael Gillett



Scarabaeus sp. rolling an irregular shaped ball of dung at Jebel Huwayyah (Fossil Valley), Oman. Note the presence of several parasitic flies attached to the elytra and pronotum of the beetle. (See P.14)



A view of the Wadi Safad in Fujairah, part of an important wetland and wildlife site. (See Page 5)



A falaj in Fujairah's Wadi Hail — typical of the irrigation systems to be found in important wetland systems on the East Coast. (See p5)



The unique mangrove-lined lagoon at Khor Kalba, the only one on the UAE's East Coast. (See p5)

region have been identified from Arrow's specific descriptions as *Onthophagus nitidulus* Klug 1845, *O. variegatus* (Fabricius 1798) and *O. transcaspicus* Koenig 1889.

The first species is shown in Figure 1A and is a small shining beetle, easily recognised from the oblique row of 3 black markings on each bright yellow elytron (wing-case). The female lacks the cephalic horn shown for the male beetle. The insect is fairly common and has been found in camel droppings at Mahdah, Fossil Valley and alongside the Al Wagan road in April and May. It is much more scarce in February and March. It has also been found in the soil underneath human dung at Ain al Fayda (May).

O. variegatus is the smallest *Onthophagus* recorded here. The beetle is mostly brown with yellow elytra showing a definite pattern of brown markings. A male is shown in Figure 4A; the female lacks the twin cephalic horns. In late February and early March, this species is extremely common in camel and goat droppings at Mahdah and along the Al Wagan road. Often a single goat pellet will contain a dozen or so individuals together with unrelated species. At other times of the year it is much more scarce or even absent, but it has been recorded in camel droppings (Mahdah) in April.

O. transcaspicus is the largest species of *Onthophagus* recorded in the present study. It is a dark brown/black species with the elytral intervals dull yellow, although in many specimens the elytra are suffused with dark brown to a greater or lesser extent. A male is shown in Figure 4B; the female lacks the long parallel cephalic horns of the male, but is armed with a short pair of conical processes in their place. This is an elusive species. It has been captured in small numbers in camel dung in the Mahdah area on two occasions in April. At other times and localities it has not been found, except for a single specimen recently taken at light at Rest Station 1 (27 February 1993).

Tribe : Onticellini

Genus : *Onticellis* Serville 1828

Three species of this genus are listed as Arabian by Paulian (1980) and in the Al Ain area 2 species have been discovered, but not yet positively identified. The larger of these is shown in Figure 3D and resembles *Onticellis pallipes* (Fabricius) as illustrated by Balthasar (1964); this is a species which does not occur in Arabia. Single individuals have been collected from camel dung at Mahdah on just a few occasions in April. The second species is similar, but is slightly smaller and paler; the 2 specimens known to me were fished out of a swimming pool in Al Ain during one early morning in September.

Sub-family: Aphodiinae

Tribe : Aphodiini

Genus : *Aphodius* Illiger 1798

Five different species of *Aphodius* have been recorded from the Al Ain region and these are shown in Figure 5; but none has yet been specifically identified. Paulian (1980) listed 19 species for Arabia, of which 3 were newly described. The largest species (Fig. 5A) is basically a brown insect with indistinct brown markings on the dull yellow elytra; occasionally specimens which are either completely dark brown/black or have unmarked

dull yellow elytra have been collected. The beetle has been recorded from camel droppings at Mahdah and along the Al Wagan road in April. The next species (Fig. 5B) is yellow and black as shown with two pairs of vague dark markings on the elytra; it is recorded in goat droppings from Buraimi and Mahdah in March and has been taken at light at Rest Station 1 in February. The third species (Fig. 5C) is light red-brown with the thorax, head and first elytral interval darker; it is the commonest species and has been taken February-April in animal droppings along the Al Wagan road, at Mahdah and Fossil Valley. Two specimens of this species have been taken indoors at Al Ain (November, March). The fourth species (Fig. 5D) is straw-yellow with brown markings as shown; it has been found in camel dung during along the Al Wagan road and at light at Al Oha in April. The last species (Fig. 5E) is known from a single specimen taken at light at Rest Station 1 in April and another taken in dung at Mahdah in the same month; it is dark brown with the second interval and the apex of the elytra dark yellow.

Tribe : Psammodiini

Genus : *Psammodius* Fallen 1807

Three individuals belonging to this genus were collected at light at Rest Station 1 in November. They measure about 5 mm long by about 3 mm wide and are completely dark brown.

Genus : *Ryssemus* Mulsant 1842

A single specimen belonging to this genus (recognised by the wrinkled thorax or pronotum) was collected at light in November at Rest Station 1. It is a completely brown insect and about 3 mm long.

Tribe : Eupariini

Genus : *Saprosites* Redtenbacher,

Two beetles collected at light at Rest Station 1 in April belong to the Eupariini and are here provisionally assigned to *Saprosites*, a genus known from Arabia (Paulian, 1980). They are shiny black and about 4 mm long; their status remains to be evaluated.

Discussion

Although dung beetles may appear to represent a very unglamorous side of Natural History, they are by no means an unpopular group of insects for study by amateur naturalists. That this is so is not due primarily to their economic importance, but rather to the remarkable industry shown by these beetles in providing for their brood and also to the often bizarre morphology of certain species, commonly exemplified by the possession of cephalic and thoracic armatures in male specimens. None of the Arabian beetles mentioned in this article could, even by the most ardent enthusiast, be considered as truly beautiful or extraordinarily bizarre, but this is not always the case. South American scarabs of the genus *Phanaeus* are exquisitely sculptured and have beautiful metallic colours which few other insects can rival. Even the common Dor Beetles (*Geotrupes*) of Northern Europe have on their underside a remarkable amethyst sheen, whilst the thoracic horns of the related Minotaur Beetle (*Typhaeus*) are equally as impressive as those of tropical species.

All-in-all, this group of insects is so interesting that, for many naturalists, their unsavoury habits are more than compensated for by admiration for their physical form and social behaviour. Whilst the present report can only be considered as a very preliminary look at such an interesting group of beetles from the UAE and neighbouring Oman, some immediate points of interest can be discussed.

To be able to live and breed successfully, scarabaeid dung beetles require not only dung from the right kind of animal, but also dung that is in the right condition, especially with regard to having a sufficient moisture content. They are quite unable to survive on desiccated animal droppings. The extremely arid nature of the Arabian climate would seem to conspire against the success of these beetles, especially since the main domestic herbivores, camels and goats, excrete droppings containing relatively little water (Wilson, 1984). Nevertheless, during the course of one year which included only a small number of short field trips, 18 species of scarabaeid dung beetles have been collected from a relatively limited area centred around Al Ain. Several species were recorded in large numbers and a few such as *Scarabaeus cristatus*, *Catharsius inermis* and *Chironitis osiridis* are of large size, but most are small species and must await specific identification.

How representative of the scarabaeid fauna are the records given here? If one considers the ratio of numbers of beetles belonging to the two sub-families recorded from Al Ain, Aphodiinae and Scarabaeinae, and compares this with the ratio for Arabia as a whole and with the same ratio for other faunal regions having a similar total number of species, it is obvious that the ratio for Al Ain is closely similar to that for Arabia, which itself is markedly different from that of the other regions (Table 2). This suggests that the material recorded around Al Ain is representative of the scarabaeid fauna as a whole. However, this does not mean that the records are exhaustive. There are bound to be other species in the region that have yet to be recorded. However, these unknown species are likely to have more specialised habits than the bulk of the species so far encountered. Future collecting trips may add new species if they are conducted in new habitats (mountains, wadis etc.) or at different times of the year (e.g. July). There may be species associated with the dung of indigenous species of mammals and reptiles, or associated with their nests and burrows. Investigations of the nests of ants and termites may also add other species to the list.

All the scarabaeid genera recorded here from the Al Ain region are represented in the review of Arabian species by Paulian (1980), but at least two of the Al Ain species, *O. variegatus* and *O. transcaspicus* were not recorded by that author, although they are given as Arabian by Arrow (1931). This review listed 73 species, but at least 6 more should be added to this based on citations by Arrow. From this, the total of Al Ain scarabs recorded here would seem to represent only a small fraction of the total Arabian fauna. However, about half of all species cited by Paulian are recorded only from the western mountains (Hijaz, Asir and Yemen), so that the present recording of 18 species from just one limited area probably accounts for nearly half of all scarabs which might, on the basis of published data, be expected

to occur throughout Central and Eastern Arabia.

During the course of the present study, a further 14 species of scarabaeid beetles belonging to the chafer division of the family (Pleurosticti) were collected. Many of these are quite small species and have yet to be identified, but several are of large size and are almost certainly of economic importance as pests of agriculture and horticulture around Al Ain. At least one of these species, *Maladeira castanea* - the Asiatic Garden Beetle - (illustrated in Figure 1), appears to have been accidentally introduced into the UAE. A review of these beetles from the Al Ain region will be presented as a separate report.

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Table 1. Classification of the superfamily Scarabaeoidea down to the tribes and genera of dung beetles found in the Al Ain region.

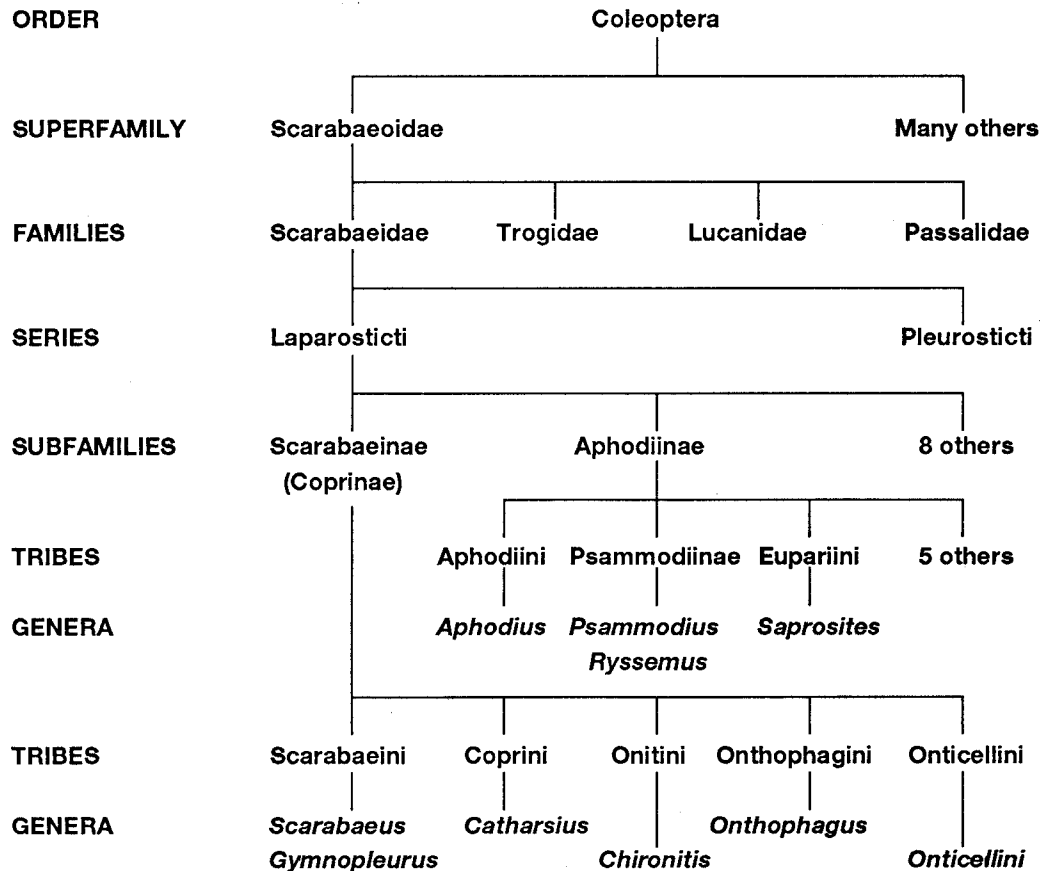
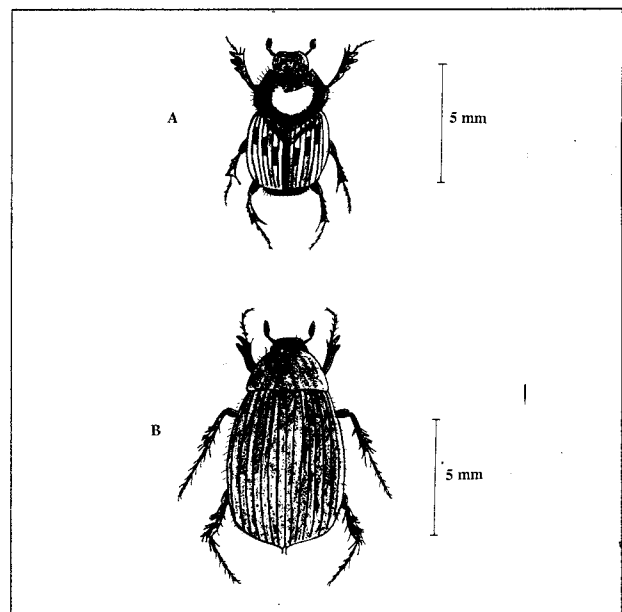
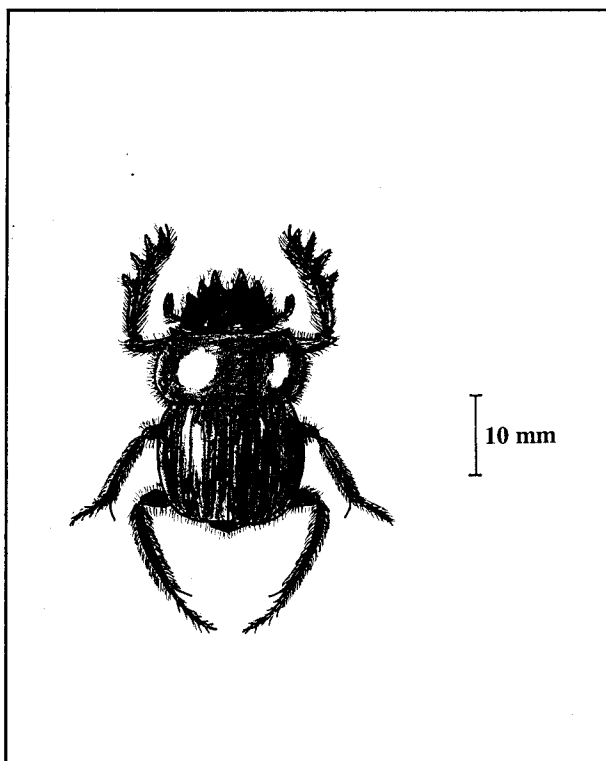


Table 2. Numbers of species of Aphodiinae and Scarabaeinae dung beetles and their ratio in different faunal regions of the world.

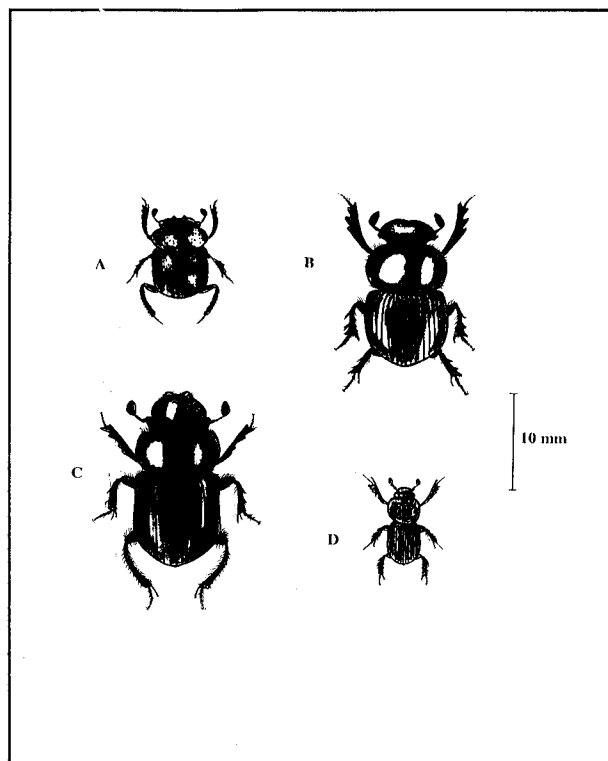
Region	(Reference)	Aphodiinae Species	Scarabaeinae Species	Species Ratio
Britain	(Jessop, 1986)	59	9	6.55
Florida	(Woodruff, 1973)	62	34	1.93
Arabia	(Paulian, 1980)	29	37	0.78
Al Ain	(Present study)	8	10	0.80

Representative examples of scarabaeid beetles from the Al Ain region: **A** *Onthophagus nitidulus* (Lapros-ticti: Scarabaeninae: Onthophagini); **B**. *Maladeira castanea* (Pleurosticti: Melolonthinae: Sericini). →

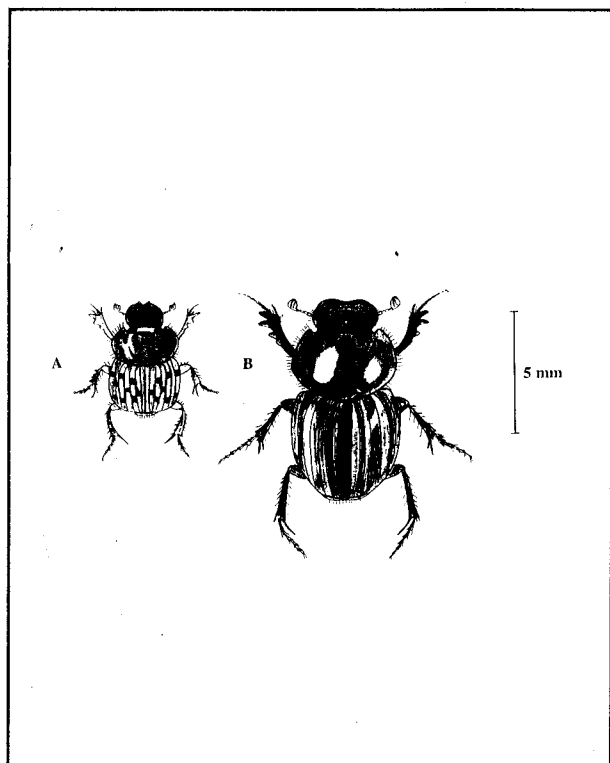




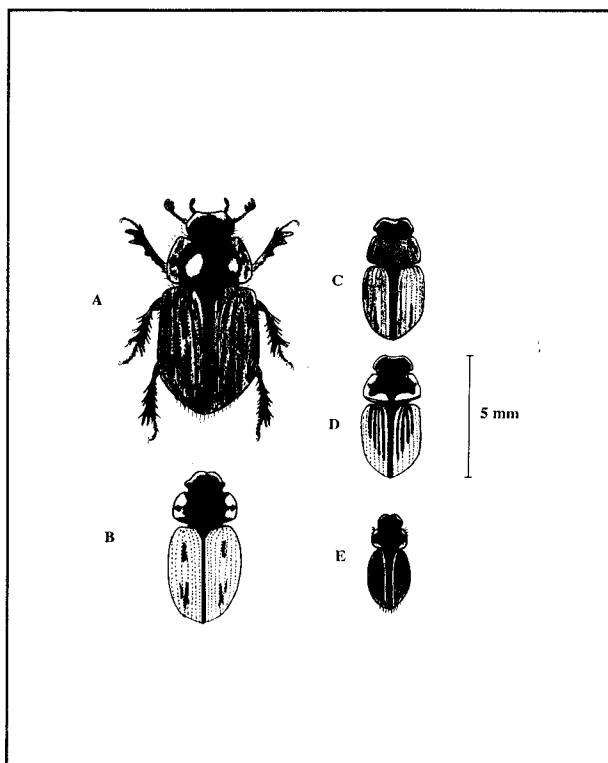
Habitus of *Scarabaeus cristatus* from the Al Ain region.



Habitus of scarabaeinid beetles from the Al Ain region: A. *Gymnopleurus* sp; B. *Catharsius inermis*; C. *Chironitis osiridis*; D. *Onticellis* sp.



Habitus of scarabaeinid beetles from the Al Ain region: A. *Onthophagus variegatus*; B. *O. transcaspicus*.



Habitus and markings of five species of *Aphodius* from the Al Ain region.

NOTES AND QUERIES

Guidelines for a wetland management plan for Khor Kalba

Khan (1982a; 1982b) and Western (1987) have provided information on the value and status of mangroves in the UAE. Böer & Griggs (1994) pointed out that only two wetland systems exist between Khor Kalba and Dibba on the East Coast of the United Arab Emirates. In January 1995 the authors observed one of these wetland systems, the mangrove-lined creek at Khor Kalba.

The wetland consists of a mangrove community dominated by *Avicennia marina* (Forssk.) Vierh. This species predominantly is found fringing the Creek and is the only mangrove species to occur at the site, or, indeed, anywhere in the UAE. To the south and west of the mangrove is a large *Halocnemum*-dominated salt marsh community consisting of a variety of plants, such as *Suaeda vermiculata* Forssk., *Suaeda fruticosa* Forssk. ex J.F. Gmel., *Limonium axillare* (Forssk.) O. Kuntze, O. Kuntze, *Halocnemum strobilaceum* (Pall.) M.B., *Tamarix* sp. and *Aeluropus lagopoides* (L.) Trin. ex Thwaites.

The hydrology of the creek is mainly regulated by tidal waters, via an entrance to the sea at the northern extent of the wetland. There is possibly also an underground freshwater supply originated from the mountains, as the salinity in the creek (3.0 - 3.5%) is lower than seawater salinity (3.8-4.3%).

The wetland community is bordered in the east by a beach berm adjacent to the sea, and a settlement area to the north. The overall area extends from 24°58'38"N/56°22'28"E in the south-east to 25°01'32"N/56°21'21"E in the north-east, to 24°59'07"N/56°21'37"E in the south-west, forming a triangle stretching for ca. 6 kilometres, and covering an area of approximately 5km².

The mangrove forest and the salt marsh are of high value for the area. Hundreds of visitors use this site for recreation purposes, as the blue waters of the Gulf of Oman, the pleasant lush green mangrove forest, and the barren brown Hajar Mountains provide a unique scenic opportunity not found elsewhere in the Emirates. In addition, the area is easily accessible by car and has ample space for picnickers.

The wetland community is of major importance for wildlife conservation (Khan 1982a; 1982b; Western 1987; Böer & Griggs 1994), and a value for the fishing industry, as mangroves are known to contribute considerably to marine primary productivity (Gwada & Slim 1993).

Despite the ecological and recreational value of the area, there are distinct signs of wetland destruction. In the north an area of ca. 3 hectares of mangrove forest has been destroyed. A road has been constructed through the area without supplying adequate piping to allow continuation of sufficient flooding and draining of

the landward mangrove. Only one drainage pipe was observed by the authors, and this one was blocked by rocks and soil. The mangroves in this area could be easily regenerated by installing a number of drainage pipes underneath the road dam, and sowing mangrove seeds every October/November at the northern side of the road.

Additional threats result from grazing by camels, in both the mangrove and the surrounding salt marsh. Furthermore, trials to reclaim salt marsh land for agricultural purposes by ploughing and draining has been previously attempted, as a result of which several hectares of salt marsh were temporarily destroyed. There are, however, signs of vegetation recovery, with salt marsh species colonising the agricultural fields.

The wetland is also used as a site for illegal rubbish dumping, and this will eventually result in the destruction of the area's unique scenic beauty. Apart from litter there was no sign of large scale damage by recreational use.

As the area is of such high ecological and recreational value, some simple management measures such as agricultural land use restrictions, controlled grazing, and the regeneration of the dead mangrove area in the northern part of the wetland should be undertaken. The removal of garbage and prevention of future dumping should also be carried out. These simple management actions would result in the improvement of the only mangrove area along the UAE East Coast, and provide future benefits for wildlife, recreation and the local fishing industry.

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Blanford's Fox, Arabian Tahr found in Fujairah

During the wildlife survey carried out by Chris and Tilde Stuart of African Carnivore Research between March and May 1995 on behalf of the Arabian Leopard Trust, several specimens of a fox previously unrecorded in the UAE, **Blanford's Fox** *Vulpes cana* were trapped in Fujairah's Wadi Zikt.

The species is best known from its occurrence in Pakistan, north east Iran, Afghanistan and Turkmenistan. Previous records from the Arabian Peninsula have been few and far between: Sinai (1983), Jebel Samhan, Oman (1989) and recently from the Asir district of south western Saudi Arabia.

Harrison's *Mammals of Arabia* describes the Blanford's Fox as being the size of Rueppell's Fox, with a long, bushy, black-tipped tail. The muzzle is acutely pointed, and the face is slender. There is a striking mid-dorsal black band extending from the nape of the neck, along the spine, and becoming a very marked mid-dorsal crest throughout the length of the tail.

The species favours steep cliffs and rocky slopes.

Three animals were trapped, measured and released: one a lactating female, one a male that was captured three times (presumably in exchange for the free meal of quail on offer), and one a male with a white-tipped tail - an aberration that may require further study.

The records represent a considerable extension to the

known geographical range of the species, and confirm, yet again, that there is a substantial amount of information yet to be discovered about the wildlife of the UAE, even for mammals.

Another major discovery, in late April, was evidence of the continued presence of the **Arabian Tahr**, *Hemitragus jayakari*, in the UAE. While surveying a Fujairah wadi not far from Khor Fakkan, the Stuarts saw one female tahr, accompanied by a single youngster, probably three or four months old.

Villagers in the nearby Wadi Safad last year reported the presence of 'wa'el,' which were assumed to be either ibex or Tahr, and the sighting confirms the tahr's presence.

The Arabian Tahr was previously known to exist in the UAE only on Jebel Hafit, near Al Ain, where they were seen by Wilfred Thesiger in the late 1940s. The last known record was of a carcass found in 1982, and the species was believed extinct in the Emirates.

Regrettably, the tahr is still hunted by villagers, and, like the Arabian Leopard, its continued survival in the wild must be considered highly unlikely unless tough legislation is implemented to curb hunting.

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Safavid and Sassanian Coins in Fujairah

In *Tribulus* Vol. 2.1 (April 1992), Page 25, the discovery by a farmer in Mirbah, Fujairah, of a pot containing several hundred coins was reported.

After cleaning undertaken by the Department of Tourism and Antiquities in Al Ain, the hoard was found to contain a total of 381 coins, all of which were copper or copper-bronze, minted in Persia (Iran) during the Safavid dynasty, and covering the period A.H. 1075 - 1135 (AD 1668 - 1722).

A representative selection of the coins are now on display in the Fujairah Museum.

In the third decade of the eighteenth century, Oman and the area now comprising the United Arab Emirates was engaged in the conflict between the Hinawi and Ghafiri tribal alliances, in which Rahmah bin Mattar of Julfar (Ras al Khaimah) was involved.

It is reasonable to assume that the coins were buried by their owner because of the civil disturbance prevailing in the area during the years immediately following A.H. 1135 (AD 1722).

The contents of the hoard suggest active trading, even if on a small scale, between the Fujairah area and Iran in the late seventeenth and early eighteenth centuries AD.

Another, smaller, hoard found on the outskirts of Fujairah city has also now been examined by a member of the staff of the Al Ain Department.

A report submitted to the Fujairah Museum notes that the hoard, comprising 18 silver coins and some bangles, dates to the late Sassanian period, shortly before the coming of Islam to the region.

Although the coins have not yet been formally studied by a numismatist, all of them are ascribed to the reigns of two of the later Sassanian emperors, Hormuz IV (579-590) and Khusrau II (590 - 627).

The coins came from several mints, which the report from Al Ain identified as including Nehawand, Peshabor, Abrashahr, Marro, Al Rayy, and also Samarkand (one) and Astakhar or Azerbaijan (one). Where weights were given in the report, they varied between 2.91 and 2.99 grams.

Sassanian coinage continued to be used after the coming of Islam until around the middle of the Omayyad Caliphate, circulating alongside copies produced by Muslim governors, which were struck with Arabic inscriptions. The Fujairah hoard has no such inscriptions, suggesting that it was perhaps buried around the time of the arrival of Islam in the UAE and certainly prior to the Omayyad currency reform of AH 78 or 79, (AD 698-699).

I am grateful to the Fujairah Museum and the Director of Fujairah's Department of Antiquities and Heritage, Saif Al Attar, for permission to publish the above note.

Peter Hellyer

Arabian coins from the Sharjah Museum

by Olivier Callot

The Museum of Sharjah possesses a collection of 112 coins which come from the archaeological excavations at Mileiha, from private collections bought in London, and from the police apprehension of an antique dealer in Abu Dhabi, under the provisions of the Sharjah Antiquities Law. I was invited by the Department of Antiquities of Heritage to study this coin collection and to create a catalogue of the coins for future publication.

83 of these coins originate from workshops in Arabia. All of them depict the same images on the avers and reverse:

- obverse: the head of Heracles, wearing the jaws of a lion, and generally facing to the right.
- reverse: a person, probably the god Shamash, sitting on a throne or small stool, generally facing the left, but sometimes to the right. He holds a long sceptre in his extended arm, with a horse just above it. In front of him is a stylised palm tree, and behind him is a degenerated Aramaic inscription.

Originally, at the end of the third century B.C., these coins imitated the Hellenistic type minted after the death of Alexander the Great. This type of coin remained fairly unchanged throughout the manufacture of replicas and imitations of these copies until the third century AD, but did undergo certain important stylistic changes.

These coins belong in three precise categories:

tetradrachms	average weight 14-16 grams
drachms	average weight 4 grams
obols	average weight 1 gram

Despite certain alterations, all of the coins retain the Attic standard of ancient Greece (approximately 17 grams), adopted by Alexander the Great, maintained by the Seleucid kings who succeeded him, and used for the earliest Arabian coinage found in North-Eastern Arabia, Failaka and Bahrain.

These coins have been known for several decades, and until now have mainly been studied in North-East Arabia, Failaka, and Bahrain, published by O. Morkholm, G. Le Rider, O. Callot, and recently by D. Potts.

Among the coins from the Sharjah museum, it is possible to identify three distinct categories:

- Coins probably minted in North-eastern Arabia: They are mainly obols, some of which depict on the reverse a vertical *shin* (South Arabian script), typical of the coinage found in Bahrain and Saudi Arabia (Thaj, Jebel Kenzan etc.). Also present are obols with a face on the avers and an eagle on the reverse, which have previously been found at Jebel Kenzan and also Failaka-Ikaros. Some of these may date to 3rd/2nd C. B.C., and others appear to be more recent.
- Coins from the Oman Peninsula: These are naturally the most abundant in the collection, accounting for 64 of the coins. The attribution of these coins to this region is almost certain. Examples of the same types, which are often cast from the same die or the

same mould have been found in Ad Door and Mileiha. So far, we have evidence of only one minting site, with the fragments of three coin moulds found at the fort in Mileiha.

Coins of uncertain origin: these are mostly bronze tetradrachms, stamped only on one face, showing the seated God, in a very stylised manner. This type of coin has been found on sites in North-Eastern Arabia, and was thought to originate there, although the great number of this type of coin recently found in Ad Door and Mileiha have highlighted the need to re-evaluate this assessment.

It is still premature to propose a specific typology for the coins of the Oman Peninsula, but it is possible to recognise a distinct local style throughout several different series where the coins have been obviously been minted using the same die or mould. This indicates that certain issues were not very large, which reinforces suggestions of the local character of this coinage.

The discovery of three fragments of coin moulds at Mileiha indicates that not all coins were die cast. It is sometimes difficult to differentiate between the two techniques. Generally, while the drachms and obols all appear to be die cast, certain series of tetradrachms appear to be moulded. The method of manufacture may be related to the metal used; silver being die cast, and bronze occasionally moulded. In effect, drachms and obols generally contain a large percentage of silver, but silver tetradrachms are rare, as they are generally made in bronze. This seems to indicate that the value of the coins was no longer related to the metal they contained, but rather retained only a face value. We may deduce that this coinage was only used in local transactions, and not in long-distance commerce. The fact that this type of coin is only found in the Oman Peninsula seems to confirm this hypothesis.

The presence of early issues of Arabian coins probably originating in North-Eastern Arabia at Mileiha indicates the use of coinage from the 3rd/2nd C. B.C. at the site. It is still too soon to ascertain whether there was a mint there that early, although certain possible indications do exist: two obols in the early style were found in an area occupied at the earliest period of the site, cast from the same dies on both faces. Although this is not absolute proof, this seems to suggest that there could have been coin minting at Mileiha in the 3rd/2nd C. B.C. The excellent quality of the design of the die could be explained by the trade that existed at this time between Mileiha and North-Eastern Arabia.

The majority of the coins found on the site are of a much later style, and, when they come from stratified levels, can be dated to the 1st c. B.C.-2nd C. A.D. The variety of issues shows that the coinage of this region lasted quite a while, but it is still too early to establish a definite chronology.

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Conference on Fossil Vertebrates

The first ever international conference on the fossil vertebrates of Arabia took place in Jebel Dhanna, in the Western Region of the Emirate of Abu Dhabi, from March 3rd - 11th 1995, with its focus being on the discoveries made by the joint Natural History Museum (London) and Yale University research project in Abu Dhabi's Baynunah region.

The conference was held under the patronage of Minister of Higher Education and Scientific Research (and ENHG patron) Sheikh Nahayan bin Mubarak al Nahayan, and was jointly sponsored by Group Corporate member the Abu Dhabi Company for Onshore Oil Operations, ADCO, and the Ministry of Higher Education and Scientific Research, with the support of the Abu Dhabi National Hotels Company, another Group Corporate member.

The conference, attended by scientists from Britain, the United States, France, Austria and Belgium, concluded that the fossil discoveries were consistent with a date of between 6 to 8 million years ago, in the late Miocene period.

The summary of the conference discussions that follows was prepared by **Sally McBrearty**, of the University of Connecticut, USA.

The Baynunah River and its animals

The fossil animals of the Baynunah Formation were deposited in a large ancient river system that drained an area of aeolian dunes in the interior of the Arabian peninsula to the north and west of the modern Emirate of Abu Dhabi. This river may have been part of a larger system that includes the modern Tigris and Euphrates Rivers. At this time (between 6 and 8 million years ago) sea level was substantially lower than today, and the marine coastline was about 300 km. to the east of its

present location.

The Baynunah River itself had a low gradient, and was made up of numerous small channels separated by low sand banks. The channels were probably no more than 3 metres deep, but the entire braided river network was tens to hundreds of metres wide.

A permanent flow of water in this river is clear from the presence of large freshwater turtles and crocodiles, including the gharial, but the presence of catfish suggests that flow was intermittent or sluggish in some channels. Occasional flow of a higher velocity is indicated by coarser conglomerates in some of the channels, and by the disarticulated and fragmented state of some of the fossil bones.

Temperatures were warm during the period, and calcretes preserved in the sediments indicate that the climate was semi-arid, with an annual rainfall of no more than 75 millimetres. The vegetation consisted on a mixture of grass, shrubs, and trees, including palms and Acacia. Trees and shrubs were probably concentrated near the river bank, while a more open grassy vegetation grew farther away from the river itself.

This habitat supported a rich and diverse group of land animals, including ancient forms of elephant, hippopotamus, horse, antelope, wolverine, hyaena and sabretooth cat. Some of the animals, such as the hyaena, were twice as big as their modern relatives.

The Baynunah Formation fossils most closely resemble animals known from this time period from North Africa, East Africa, Pakistan and perhaps China, while relationships with European fossil animals are less close. This suggests that during the period, animals could migrate freely in an East-West direction (*the Red Sea had not yet been formed - ed.*), but that North-South movement may have been restricted by barriers presented by an-

The Flora of Arabia

At a lecture delivered at London's Institute of Archaeology to the Society of Arabian Studies on 22nd March 1995 Dr. Anthony Miller, of Edinburgh Botanical Garden, concentrated on the importance of Southern Arabia as the crossroads of several phyto-geographic zones. Despite the general title, Dr Miller dwelt on those areas with which he is most familiar, from Musandam through Oman, Yemen and Socotra. The Musandam region has clear affinities with the vegetation of the Zagros Mountains in Iran, as typified by *Gladiolus italicus*. Further south, Oman's Jebel Akhdar is home to a juniper woodland habitat with distinct species associated with other zones. *Juniper exelsior*, for example, is also found in an arc stretching from the Himalayas through into Iran; a relict species, *Dionysia myrra*, is also found in Afghanistan and Iran; while these Omani uplands are also home to a Mediterranean juniper. Inland Oman is botanically poor, but the central and western coastline contains many endemics, especially in the monsoon-affected area of Dhofar. A good example is the *Combretum*. Most of these

endemics represent a relict flora from a more humid era, and are related to East African and Indian species. There are also several disjunctive species, i.e. species which are found in Oman and either in East Africa or India, but not in between. As a result largely of Miller's own work, many new species have been discovered in Oman in recent years. Nine species of *Caralluma* are now recorded there (compared with two in UAE) and seven orchids (one in UAE). However, the recent impact of extended cattle ranching is acute in some areas, as witnessed by the expanding range of species such as *Solanum incanum*, a classic indicator of overgrazing.

Yemen, too, is suffering from land degradation and there is now very little natural woodland left anywhere. Some succulents, such as the prickly pear (*Opuntia*) have become naturalised and are expanding their range sufficiently to be classified as an agricultural nuisance. Much of the flora of Yemen has affinities with Africa but there are also European species, such as Primulas.

Dr Miller reserved the final part of his lecture to describe

the island of Socotra. He noted that approximately 17% of all plant species in the world originate from islands, and Socotra, having been cutoff for so long, is perhaps the world's finest island, botanically-speaking, with nearly 30% of its flora being endemics. Here is found the Cucumber tree (the only tree in the gourd family) and other rarities such as *Caralluma edithcolia grandis* and *Punica protopuntia*, the Socotran pomegranate.

Edinburgh has been working on the Flora of Arabia for many years and the first of five volumes of Flora Arabica is due out in mid 1995. The survey for the whole of Arabia, including Socotra, has counted 144 families, 1105 genera and 3463 species, with 597 endemics (17%). This compares with a species total for Great Britain of less than 1500, of which well under 1% are endemics. As an example of classifying endemics, Dr Miller cited *Ochradenus baccatus*, a prickly shrub which was assumed to range from Libya through Arabia to

Sind. Recent research, however, indicates that the southern Arabian version is sufficiently different to be renamed *O. arabicus*.

(The Plant Recorder notes that the Group's first record of *Ochradenus* to be identified by Edinburgh was a specimen from Al Ain in 1982, which was called *O. austroarabicus* sp. nov. A specimen collected from near Khatt in Ras al Khaimah in February 1985 was still identified as *O. baccatus*, but since then all our UAE specimens have been called *O. arabicus*.)

Dr. A.G. Miller is co-author with M. Morris of 'Plants of Dhofar: the Southern Region of Oman — Traditional, economic and medicinal Uses,' published by the Diwan of Royal Court, Sultanate of Oman, 1988.

R.A. WESTERN
Plant Recorder

Records of freshwater fish from Hatta area

by Benno B. Böer, Matthew Love
and William Mitchell

Introduction

AlKahem & Behnke (1983), and Krupp (1983) have provided information on previous studies of freshwater fish in Arabia. Much is still yet to be learnt, however, every new record will provide useful information.

In August 1994, in the mountainous region of Hatta, the authors observed several wadi systems. Those wadis studied consisted of small streams and deep pools, up to 5m depth, which are constantly fed by freshwater throughout the year. Two species of fish were caught and identified.

Species	Site caught:
<i>Garra barreimiae</i>	Waterfall Wadi between Hatta and Hatta Pools
<i>Garra barreimiae</i>	Hatta Pools
<i>Garra barreimiae</i>	Al Shumaya
<i>Cyprinion macrophthalmum</i>	Al Shumaya

Both species are new records for the Hatta area. Further information on ichthyological aspects of Arabian freshwater ecosystems is required. The geographical distribution of the sub species of *Garra barreimiae* occurring in the U.A.E./Oman border region is not fully known. Thus it is of special scientific interest.

Acknowledgements

Thanks to Dr Friedhelm Krupp, Jubail Marine Wildlife Sanctuary and Senckenberg Research Institute Frankfurt, for identifying the species.

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How to distinguish between grazed *Panicum turgidum* and *Pennisetum divisum* grasses?

During our vegetation surveys in the UAE we faced difficulties with the identification of *Panicum turgidum* Forssk and *Pennisetum divisum* (Gmel.) Henr. grasses. In suitable conditions these are both large, tussock — forming grasses, and occur in the same ecosystems, namely sandy areas or sand over limestone layers. Both species were found growing side by side in areas protected from grazing, where identification is straight

forward for flowering plants. Both species are palatable and important food source for livestock, and are both known as *Thammam* and *Ithmam* among local Bedu. Due to the intense pressure from grazing, the grass tussocks are often grazed down to the ground, leaving only the basal parts of the stems visible above the sand. However, we found that by removing the sand from the base of the plant, or uprooting a small part, the growing

bases of the grass stems could be revealed. We found that both the leaf sheaths above ground (when present) and the young non-green sheaths around the bases of the stems, below ground, could be checked for a single distinguishing feature, the presence of hairs, allowing correct identification to be made. Table 1 summarizes the features of the two species.

	<i>Panicum turgidum</i>	<i>Pennisetum divisum</i>
Flowers and fruits	Different	
Leaves	Similar	
Habitat (soils)	Similar; on sands, sometimes over limestone	
Nodes under leaf sheaths	With obvious hairs; distinct disc shaped feature at place where leaves insert stem	No obvious hair; no distinct disc shaped feature at place where leaves insert stem
Bases of the stems below the surface	Relatively thin stem; obvious hair at nodes when leaves are removed	Relatively thick stem; no obvious hair at nodes when leaves are removed
Stems	Relatively thin stem; stem forms distinct angles at each node; stem not curved	Relatively thick stem; stem forms only slight angles at each node; stem slightly curved

As Mandaville (1990) points out, *Panicum turgidum* and *Pennisetum divisum* are so similar when grazed that it is extremely difficult to distinguish between the two species. However, a botanical lens (x10 or greater magnification) is necessary to see the hairs properly. Using this method, we believe that it is possible and relatively easy to distinguish between *Panicum turgidum* and *Pennisetum divisum* plants without flowers or fruits, throughout the year, and even under heavy grazing pressure. Samples of both species will be sent to Prof. Chaudary, Ministry of Water and Agriculture, Riyadh, who described Arabian grasses in detail (1989) for further investigation.

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GROUP PROGRAMME - July-December 1994

- September 5th : Nature in the Bialowiesza primeval forest,' by Tadeusz Stawarczyk
 September 19th : The Last Caravan: The Bedouin economy in Northern Arabia, 1910-1950,' by Tony Toth
 October 3rd : Films 'Liwa - Birthplace of Abu Dhabi,' & 'Qarnein - Island of Birds '
 October 17th : An Introduction to the History of Abu Dhabi, by Peter Hellyer
 November 7th : Secrets of Wildlife filming, by Mike Shepley
 November 21st : Professor Geza Fehirvari, The origins of Islamic Pottery
 November 28th : Dr. Asad Rahmani, grasslands and Conservation of Bustards in India
 December 5th : Update on Archaeology in the Western Region, Jakub Czastka.
 December 19th : The Mount St. Helen's Volcanic Eruption, by Denny Bond.

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RECORDERS REPORTS

Archaeology

Last winter, as usual, saw extensive archaeological activity, carried out both by local teams and by foreign expeditions, working under the terms of agreements with the various Emirates. Once again, the UAE has been probably the most active country, in an archaeological sense, in the whole of the Arabian Peninsula.

So much so, indeed, that a full review of the activity would require substantially more space than is available. A summary of key work will have to suffice.

The University of Sydney, Australia, team led by Professor Dan Potts undertook work, as usual, in several Emirates. In collaboration with the Sharjah Directorate of Antiquities and Heritage, the Third Millennium site at Jebel Emalah was completed, (see Vol. 4.1, April 1994, Page 12). In Dubai's western suburb of Umm Suqeim, an Umm an Nar tomb discovered by Group member Carolyn Lehmann and partially excavated by Dubai Museum in the summer of 1994 was completed, providing the first evidence from the Umm an Nar period in the Emirate. Finally, as reported on Page 11, a preliminary survey was carried out in parts of the Emirate of Fujairah.

The French team led by Michel Mouton continued work in the Mileiha area of Sharjah, where work by Sharjah's own archaeologists, led by Dr. Sabah Jassem, also made a major discovery, the largest graveyard of camel skeletons ever found in the Arabian Peninsula. Containing the first-known skeletons of Bactrian camels to be discovered in Arabia, the graveyard, which also included horse skeletons, dates back to the early centuries of the Christian era.

In Ras al Khaimah, another French team, led by Claire Hardy-Guilbert, carried out its final season of work on the fort at the late Islamic site of Julfar, while a Ras al Khaimah Museum team under the direction of Derek Kennet excavated the remains of a fort that appears on maps produced at the time of the British invasion of 1819-1820.

Extensive surveying by Kennet and others, with the help of a number of volunteers, produced evidence of a number of major new sites in the hinterland of Ras al Khaimah town, while excavations and restoration work were also undertaken on the remains of the Islamic fortress known as the Qasr az Zubba (Sheba's Palace).

In Fujairah, besides the Sydney expedition, an active programme included the excavation of a further Second Millennium tomb at Qidfa, undertaken with the collaboration of the Al Ain Department of Antiquities and Tourism, while further surveying work was undertaken in the

Wadi Safad by Sal Garfy of the Abu Dhabi Islands Archaeological Survey Project.

In Abu Dhabi, the Abu Dhabi Islands Archaeological Survey Project carried out its longest-ever season of activity, from mid-November until late April. The first phase involved study of the Late Stone Age site on the island of Merawah and surveying there and on the neighbouring island of Liffiyah, during which extensive evidence of possibly pre-Islamic settlement on a raised ancient shoreline was identified.

Further surveying from late December to late February was undertaken by a Project archaeologist, together with the Recorder, on a number of other islands, including Balghelam, South Muhayimat, Bu Khushaisheh and Jubayl, during which other evidence of settlement from the late pre-Islamic period was identified. The Jubayl work was carried out at the request of Group Corporate member ADCO as part of an environmental baseline study, the first time that such a study has involved an archaeological component.

The March-April period, as usual, saw further excavations on the early Christian site on Sir Bani Yas (see Vol 4.2, October 1994, P. 5), to be covered in a subsequent issue, as well as additional mapping and detailed surveying on the islands of Ghaghah, Yasat and Al F'zaiyyah, this work being supported by a number of Group Corporate members, including ADNOC, ADCO, ADPPOC, the Al Fahim Group, the National Bank of Abu Dhabi and Union National Bank.

Useful discoveries as a result of coastal surveying included the first mainland site from the first centuries of the Christian era to be found in Abu Dhabi, at the Sheleala resthouse of Group Patron Sheikh Nahayan bin Mubarak al Nahayan, and a possible Fourth Millennium BC flint site, together with late Islamic occupation, near Abu Dhabi International Airport.

The results of the winter preliminary surveying along the coast and islands has confirmed that there is a very substantial amount of information still to be collected about the UAE's archaeology. Group members can play a useful part in this process, simply by keeping their eyes open when out and about. Don't, please, collect anything, but notes showing location, with, if possible, pictures, can always be followed up.

PETER HELLYER
Archaeology Recorder

Birds

Late autumn birdwatching is probably the most exciting time in the Emirates. After the end of the monsoon which just touches the edge of our region until late September, the side effects of this dramatic weather system disappear by early October. A high pressure system then builds up over eastern Asia which has the effect of providing southbound migrant birds a wind assisted, straight run for Arabia, whether they like it or not.

While the monsoon-affected **Lesser Noddy** remained in place on its buoy off Ras Dibba until mid October, allowing most to see it, two **Forest Wagtails** arrived, well off course, one at the Emirates golf course from 10-21 October and another on Merawah Island on 16th, being the 5th & 6th records. Three **Egyptian Nightjars** were reported in the Abu Dhabi area 7-15 October and 2 **Olive-backed Pipits** were also in Abu Dhabi's Bateen wood from 12 October, only the 12th UAE record.

Due to an exceptionally dry spell in early winter, when no rainfall was measured in the country, many winter visitors simply moved on and left birdwatchers with very few birds to watch. However, having said that, a number of rarities did turn up, reinforcing the old adage that it's quality not quantity that counts. An **Intermediate Egret**, the first record of this species, was found at Ramtha lagoons on 23 December where it remained until 13 January, while a **Ruddy Shelduck** also at Ramtha from late November 1994 was punctuated by seven others, 100 miles away at Al Ghar Lake, which stayed from 25 January to mid-March 1995 (12th & 13th records). A **Cotton Teal**, the 4th record, turned up at the Emirates golf course from 24-25 November, (on the same date as last year's individual there) while **Ferruginous Ducks**, normally rare, were in relative abundance with over nine reported at five sites from late November, with one still present at Ramtha on 17 February.

Meanwhile on Das Island, a **White Pelican** on 26 December was only the 5th certain record since 1981.

Of birds of prey, it was a record winter for **Spotted Eagles** with up to eight seen over Khor Dubai mudflats most days in January and another 15 seen at five other sites country-wide. A **Lesser Spotted Eagle** at Khor Dubai for several days from 7 February was only the 2nd record, while pale-phase **Booted Eagles** were at Zabeel from 1-7 February and at Al Wathba on 15 February. Single **Imperial Eagles** showed well at Hamranyah 5 December, Ramtha 31 December and at Khor Dubai from 29 December - 6 January. At Jebel Ali a **White-breasted Waterhen** was a good 3rd record on 20 January.

Up to eight **White-tailed Plovers** returned again to winter at Ramtha tip from 1 December, while a **Sociable Plover**, the 8th record, was found at Dibba on 11 November. A **Golden Plover** was found at Al Ghar lake on 15 February, a possible return of last year's bird which was then the country's first documented record.

54 **Great Knot** were counted during the annual waterfowl census on Merawah Island on 18 January (though down from a spectacular 607 in mid-September!) A **Great Snipe** was at Al Ghar lake on 2 February while up to five **Pintail Snipes** were still present at the end of February at the Emirates golf club, wintering for the fourth year running beside the 7th green. An offshore survey in January revealed a record 1,600 **Sooty Gulls**

on Qarnain Island, unusual as this species is generally believed to winter outside the Gulf.

An **Alpine Swift** was seen at Al Ain on 12 February (9th record) and a **Pied Kingfisher** spent several weeks at Zabeel fish ponds from 21 January (8th record).

A **Calandra Lark** was found lurking amongst a flock of **Bimaculated Larks** at Al Wathba camel track from 2-5 February, providing the country's first record. This turned out to be February's most popular 'twitch,' in a country with only half-a-dozen keen birders! One or two **Oriental Skylarks** were reported throughout the winter from fields at Al Wathba and Dibba, while flocks of up to 40 **Lesser Short-toed Larks** were found at Khor al Beidah on 20 January and Al Ghar lake from 2 February. Up to two **Blyth's Pipits** were regularly heard (if not always seen!) at Al Wathba from 16 December to mid April and at Dibba on 14 February (11th & 12th records) while two **Hypocolius** were in Dubai on 25 October and eight on Das Island 30 October.

An **Eversmann's Redstart** was on Zirku Island (20th record) along with a **Mourning Wheatear** and a **Hume's Lesser Whitethroat** on 23 January while a **Black-throated Thrush** was on Arzanah Island on 21 January. At Arabia's only known breeding site (**Syke's Booted Warblers** were seen at Khor Kalba from 3 January, with several already in song by 12 February.

Probably resulting from hard winter weather in Turkey and Iran, a **Goldfinch** (2nd record) was found at Dibba on 12 February and 180 **Spanish Sparrows** were at Hamranyah on 4 December. Two **Little Buntings** (8th record) at Das Island from 20-27 October were quickly followed by a first ever **Pine Bunting** there on 8 November.

Contrasting with 1994, 1995 had the wettest March for many years and temperatures were below average, ranging from 22-28°C, dipping to 18°C during rainstorms. The heaviest rain was between 12-14th March which had the effect of temporarily halting migration, resulting in a sudden flood of birds arriving on 16th.

The build up of wintering **Cattle Egrets** continued in Abu Dhabi, peaking at 160 on 7 March with flocks on Abu Dhabi Island and at Al Wathba, (only 7 birds recorded in the whole of 1988!). Of raptors, a **Lesser Spotted Eagle** (3rd record) was at Khor Dubai on 11th and a **Black Vulture** which flew into a goatherd's mountain hut near Ras al Khaimah on 20 February entered the history books as the country's first record. At the Emirates golf course, a **Little Crane** (10th record) remained for several days from 29th, while at Khor al Beidah, the main attraction were up to 22 **Great Knot**. An **Egyptian Nightjar** was found on the summit of Jebel Hafit on 25 February and two were at Al Wathba on 11th March. A **Little Swift** (7th record) and an **Alpine Swift** on 2nd March, with two of the latter at Al Ain camel track in mid-month (10th & 11th records). A record 80 **Bimaculated Larks** were also at the camel track on 26 February. The stars of the month were 60 **Hypocolius** which remained at Al Wathba camel track throughout the month, for the second consecutive year. Single **White-throated Robins** were at Tayibah on 16th and Das Island on 22nd while a **Finsch's Wheatear** was rather elusive at Jebel Faiyah on 27 February. Boring for some, a male **Blackbird** on Merawah Island on

24th was only the 7th record! Usually scarce, **Rose-coloured Starlings** turned up in good numbers in March, up to 25 per flock at Hamranyah, Al Ain camel track and Zabeel but were soon overwhelmed by a massive influx of **Pale Rock Sparrows**, which could be seen in flocks of several hundred in the foothills and in agricultural areas. A **Little Bunting** at Hamranyah on 4 March, was the 9th record.

This report could not have been compiled without the dedicated input from observers, so keeping our birding

'hotline' active. I would particularly like to thank Simon Aspinall, Steve James, Jon Buxton and Peter Hellyer, not forgetting Len Reaney and Mike Wood on Das Island. Please keep up the excellent work!

COLIN RICHARDSON
Bird Recorder

(Colin Richardson is Secretary of the Emirates Bird Records Committee.)

Mammals

Just as the intensification of ornithological study of the Emirates over the past few years has led to a steadily growing list of bird species for Emirates, so scientific work on mammals has begun to add to the list.

Increased identification skills, coupled with more scientific work, have been primarily responsible, and the last few months have seen progress both in terms of terrestrial mammals and offshore.

The first scientific study of the local population of **Dugongs**, *Dugong dugon* got under way at the beginning of March, in association with the work of the Arabian Seas Expedition, which is preparing two films on the marine life of the Emirates.

The first survey by the ASE group, accompanied by cetacean specialist Robert Baldwin, and by dugong expert Dr. Vic Cockcroft of South Africa's Port Elizabeth Museum, involved a trip to the island of Merawah.

During an examination of skeletons and carcasses of cetaceans on the coasts of the island they confirmed for the first time the presence of two species of cetaceans previously unrecorded in the Emirates.

The most interesting was the carcass of a young **Finless Porpoise**, *Neophocaena phocaenoides*, around 1.08 metres long. The species is believed to grow to around 1.8 metres.

Although one specimen has been claimed from the coast of western Saudi Arabia, the Finless Porpoise is one of the world's least known cetaceans, with only around half a dozen skeletons of the species having been collected anywhere in the world.

Flesh collected from the carcass will provide the first data ever examined of the genetic makeup of the species.

The second discovery was that of the skull of a **Spinner Dolphin**, *Stenella longirostris*, which is known off the coast of Oman, but has never before been recorded inside the Arabian Gulf.

The trip also produced the carcass of a **Common Dolphin**, *Delphinus delphis*, again very rarely recorded in the Emirates, where the **Bottle-nosed**, *Tursiops truncatus*, and **Humpback Dolphins**, *Sousa chinensis*, are the common species.

In the case of these UAE records, the animals concerned may well have been caught in nets and drowned. It is also possible, however, that they may have simply been stranded, or have died and have been washed up on the shore. Such beached carcasses and skeletons are major sources of records for many of the world's rarer cetaceans, and the Merawah records un-

derline the fact that examination of skeletons can add to knowledge of the UAE's dolphins too.

From dugong skeletons collected on Merawah and the neighbouring island of Liffiyah, an estimate was made of 28 animals being caught over the last two years.

Samples were collected from the most recent carcasses, sufficient to treble the genetic material so far known from the dugongs of the Western Indian Ocean, and Baldwin and Cockcroft now believe that the dugongs of the UAE may be the second largest population in the Indian Ocean.

On land, the second record for the UAE of **Wagner's Gerbil**, *Gerbillus dasyurus gallagheri*, was made by NARC Head of Ecology Dr. Patrick Osborne, who trapped two individuals in a small wadi in the site of the planned Arabian Leopard Trust breeding centre near Fili. Although its range covers the whole of the peninsula, as well as rocky steppe desert further north, the only previous UAE record was of one seen from Masafi in the early 1970s.

The presence of the **Blanford's Fox** *Vulpes cana* has also been confirmed. (See Page 25).

A somewhat prickly highlight of the period under review was the confirmation of the UAE's third species of hedgehog, the **Long-eared Hedgehog**, *Hemiechinus auritus*.

Widely distributed throughout the rest of the peninsula, one was claimed in Al Ain in July 1994, though not confirmed, and then a single specimen was found run over on the Sweihan - Al Ain road on November 17th 1994 by Dr. Jaime Samour, head of the Veterinary Department of the National Avian Research Centre.

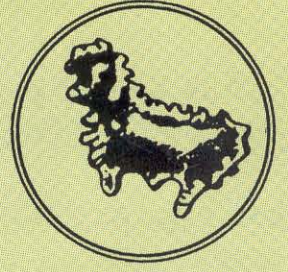
According to a recent article in *Arabian Wildlife*, (Vol 2.1), the species is the one of Arabia's three hedgehogs which is most associated with man, living on the desert margins. However, since the article in question, *Arabia's Hedgehogs: primitive but successful*, has a map of the distribution in the peninsula of the three species that doesn't show a single hedgehog record at all from the UAE, its accuracy must be open to question.

The **Ethiopian Hedgehog**, *Paraechinus aethiopicus*, and the **Brandt's Hedgehog**, *P. hypomelas*, as reported in successive issues of *Tribulus*, are widely distributed in the UAE, in towns, mountains and desert margins.

Clearly, further research is still required into our hedgehogs. Would any Group member like to take on the task?

PETER HELLYER
Mammal Recorder

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