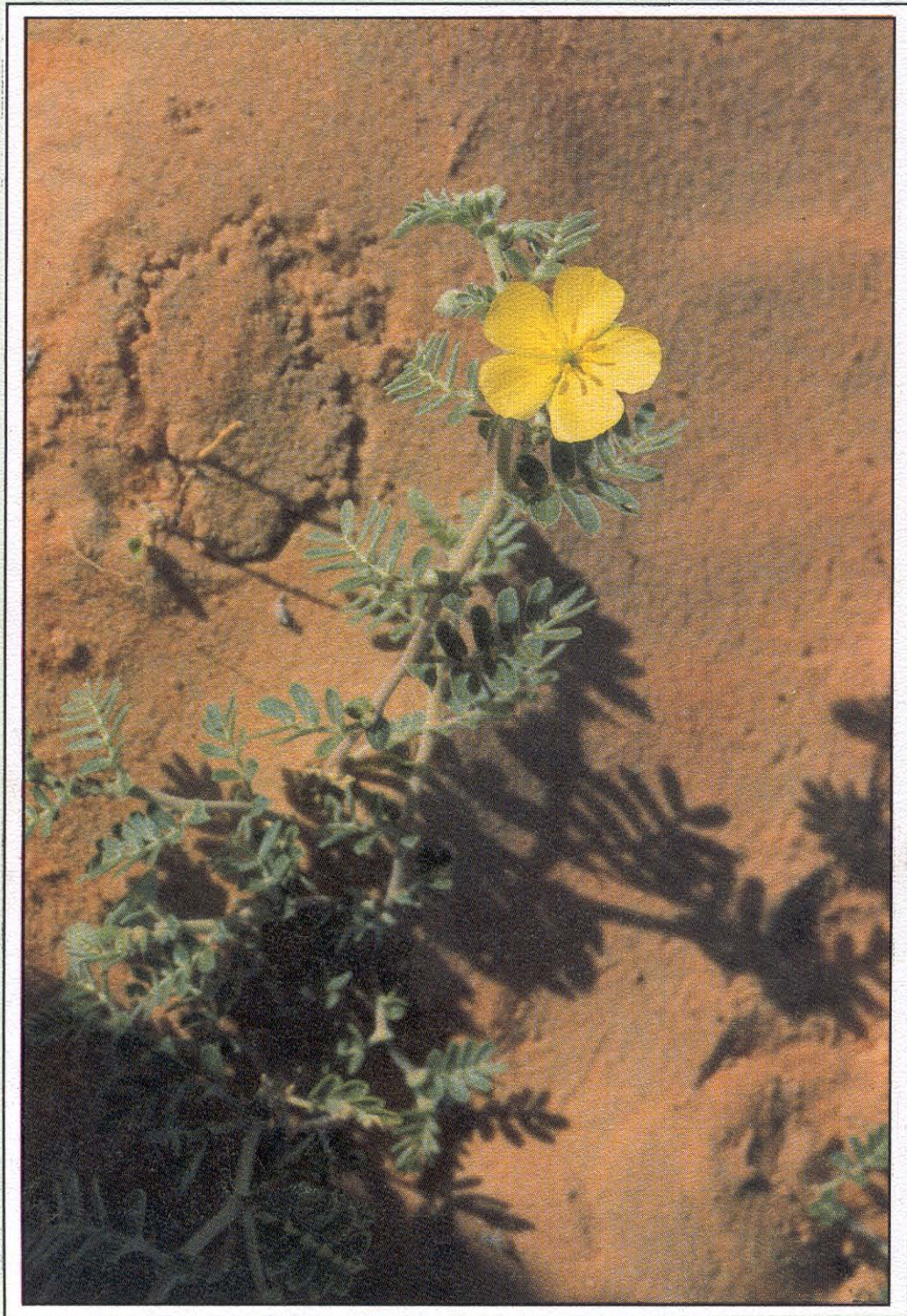


TRIBULUS

Bulletin of the Emirates Natural History Group

VOL. 1.1

APRIL 1991



NOTES FOR CONTRIBUTORS

TRIBULUS is the new name given to the Bulletin of the Emirates Natural History Group. The group was founded in 1976, and over the next fourteen years, 42 issues of the Bulletin were published. The revised format of TRIBULUS 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, as for the Bulletin, is to create and maintain in standard form a collection of recordings, articles and analysis on topics of regional history 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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P. Hellyer.



The plant motif above is of the genus *Tribulus*, of which there are five 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 about 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.

TRIBULUS

VOL. 1.1 April 1991

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Editorial

This first issue of TRIBULUS continues the work of the Group's Bulletin which has been published regularly since 1977. The Bulletin sought to provide articles on as many natural history topics of local and regional interest as possible. Over the years there have been some excellent articles, some broadly-encompassing and others of more esoteric subject matter. I recall, for example, Dave Corfield's "Archaeology in the UAE" in the very first Bulletin. In those days our archaeological knowledge was limited to Geoffrey Bibby's excavations at Umm an Nar and Beatrice de Cardi's surveys of the Northern Emirates. Since then, however, there have been numerous expeditions, both internationally- and locally-led, with the result that we now have a broad overview of the past five thousand years in this part of eastern Arabia. Recent excavations at Ad Door in Umm al Qaiwain, at Mileiha in Sharjah and in the Wadi Qawr in Ras al Khaimah have specified detailed evidence of settlement and occupation within this long time scale. Most of the significant events are documented in the Bulletin.

In the realm of Botany, the country was extensively surveyed by the Plant Recorder in the decade 1978-88 and the main vegetation groups and habitats are known. Although the UAE has no endemics, several species exclusive to Arabia have turned up over the years. Past Bulletin articles have documented detailed surveys of specific areas, including the offshore islands. TRIBULUS will now concentrate on individual families and sub-species. The Group is indebted to Ian Hedge and his colleagues at Edinburgh Royal Botanic Garden for the vast majority of determinations. The Emirates University published an Introduction to the Flora of the UAE by the Recorder, in 1989, under the auspices of the ENHG.

Articles on the general geography of the country have not been numerous but many of them are now of particular historical interest. Tony Harris' journey to Umm Az Zamul, Asab and Liwa in 1976 reads now more like a page from Wilfred Thesiger while the Al Ain described by Abdulla Dawood in Bulletin No. 4 will never be seen again. In a two part series, Andy Best gave us an insight into the formation and movement of local fogs and the 40 Day Shamal, both of which are of crucial importance to the survival or otherwise of desert life in its myriad forms. Elizabeth Aston gave us two fine articles on geology, one a general introduction to the UAE and the other a deeper look at Sir Bani Yas Island.

Insect recording has not been one of the Group's strongest areas but nevertheless the Bulletin has published informative articles on bees and wasps (Ian Hamer and Giles Roche), butterflies and moths (Tony Pittaway, 'Bish' Brown, Len Reaney and Dave Heath) and on Solifugae (Mike Southey). There remains plenty of scope for further research in this field.

Apart from Archaeology of more distant times there have been several articles on more recent, particularly Islamic, history. John Nisbet wrote several pieces on coins, particularly a hoard from Ras al Khaimah. The medieval copper mine at As-Safarir near Hatta was surveyed and documented by Group members, and

Dave White Cooper wrote an overview of UAE rock engravings. John Hansman's excavations in Ras al Khaimah town and Julfar are reflected both in the Bulletin and in the show cases of the recently opened Ras al Khaimah Museum.

Mammal recordings by Group members have come from both sea and land. Roger Brown and Dave Rowland co-ordinated the local branch of International Dolphin Watch in which the Group was active in the mid 1980's, with results published in Bulletin No. 23. The very first Bulletin article, back in 1977, was on Dugongs, by Professor Colin Bertram, a subject that has been of particular concern since. As for land mammals, Chris Lurley and Peter Dickinson of Al Ain Zoo wrote some very detailed articles on oryx, gazelles and the red fox. 'Bish' Brown has also made a study of desert rodents.

Roger Brown wrote a dozen Bulletin articles in the 1980's dealing with different fish species in the waters of the Gulf and Indian Ocean. There have also been many records of shells, corals, leeches and barnacles, all documented. In view of recent events in the Gulf and the threat of widespread oil pollution, there is more than ever a need for accurate observation and recordings of aspects of marine life.

One of the Group's recording strengths is, and always has been, ornithology. Bird records over many successive years have been collated and computerised, while Colin Richardson in Dubai has very recently published a book on the status of birds in the UAE. The Group's recorders have always been active in regular surveys and it is principally due to them that the Group is in a position to contribute a body of data to the Atlas of the Breeding Birds of Arabia (ABBA) project.

Finally, we should not overlook the world of reptiles, where 'Bish' Brown has been a leading and sometimes lone recorder since the formation of the Group. He has written extensively on snakes, lizards and various amphibians of both salt and fresh water.

From humble beginnings, the Bulletin grew in stature to the extent that articles began to be accepted more for their scientific and technical content than for recording purposes only. Accuracy has always been a positive aim since many of the Bulletin records are to be found nowhere else. Some articles have consisted of systematic lists and in the past there has been some criticism of this policy from members who did not have the depth of interest in the subject. It is important to remember, however, that we are striving to create a body of data which will provide a credible base for future scientific research.

TRIBULUS will continue with a policy of providing scientific information in an interesting way. The Editorial Board will continue to provide a cross section of topics in the hope that TRIBULUS will be warmly welcomed by the membership and by individuals and institutions outside.

Rob Western
April 1991

Distribution of TRIBULUS species in the UAE

by R.A. Western

TRIBULUS, the name chosen for this magazine, is that of a genus of plants to be found in the United Arab Emirates and elsewhere in the Arabian Peninsula. This paper summarises the status of *Tribulus* species known in the area.

Tribulus is the name given to a genus of annual and perennial herbs, mostly prostrate and characterised by buttercup-like yellow flowers. There are 5 free petals, 5 sepals and 5 or 10 stamens. The fruits are mostly hard and dry, usually rounded and bearing wings, tubercles or spines, sometimes in combination. On maturity the fruits split into (usually) 5 segments. Leaves are opposite with pinnate leaflets.

The name comes from Greek "tri-bolos", three prickles, a reference to the fruit. In English the genus is known as Caltrop, derived from the name given to the four-spiked iron balls thrown onto the ground to impede cavalry in classical times. Whichever way the ball fell, at least one spike would be facing up. So too the fruits with spines are easily attached to footwear and, presumably, the feet of animals.

Tribulus is a genus within the family *Zygophyllaceae*, a largely tropical and sub-tropical group of plants that includes such valuable timber trees as *Lignum vitae*. In the UAE the family is represented by 4 genera. *Fagonia* is a shrub represented throughout the country by at least 3 species, one found predominantly in mountain regions, the others in less restricted habitats. *Seetzenia* is represented in the UAE by just 1 species, *S. lanata*, an uncommon, prostrate perennial herb with trifoliate leaves, minute pale flowers and spherical fruits. *Zygophyllum* is represented by at least 3 species of which the bright green, shrubby *Z. hamiense* is one of the conspicuous 'salt-bush' along the Gulf Coast and further in land. The rare *Z. qatarense* is found mostly in the Western Region bordering Qatar and Saudi Arabia, while the annual *Z. simplex* is common in a variety of coastal and inland areas, with plants sometimes colonising large sweeps of sand gravel.

In the UAE, *Tribulus* bears by far the most showy flowers of these local genera of the family. Apart from very saline areas such as the coastal sabkhas, various species may be found throughout this part of Arabia, including open sand dunes, gravel flats and the higher mountains. Records for the Arabian Peninsula are incomplete but at least 10 species have been identified in addition to a number of subspecies and varieties.

The following Arabian records are from data in the author's possession and, though not complete, give an indication of present distribution :

Saudi Arabia

1. *T. arabicus* H. Hosni
2. *T. bimucronatus* Viv.
3. *T. kaiseri* H. Hosni
4. *T. longipetalus* Viv. = *T. alatus* Del.
5. *T. macropterus* Boiss = *T. pentandrus* var. *macropterus*
6. *T. omanense* Hosni Ex. Hadidi

تريبولوس.. الاسم المختار لهذه المجلة هو جنس من النباتات التي وجدت في الامارات العربية المتحدة وفي مكان آخر من شبه الجزيرة العربية. هذه الورقة تلخص حالة أنواع «التريبولوس» المعروفة في المنطقة.

7. *T. parvispinos* Presl
8. *T. pentandrus* Forssk.
9. *T. pterocarpus* Ehrenb. ex. Koern.
10. *T. terrestris* L.

Qatar

1. *T. arabicus* H. Hosni
10. *T. terrestris* L.

Bahrain

No *T. species* are recorded in the annual flora survey of the Bahrain Natural History Society for 1978-79.

Oman

1. *T. arabicus* H. Hosni
6. *T. omanense* Hosni ex. Hadidi
7. *T. parvispinos* Presl
8. *T. pentandrus* Forssk.
10. *T. terrestris* L.

United Arab Emirates (E.N.H.G. records)

5. *T. macropterus* Boiss. (perennial)
6. *T. omanense* Hosni ex. Hadidi (perennial)
7. *T. parvispinos* Presl (annual)
8. *T. pentandrus* Forssk. (annual/perennial?)
10. *T. terrestris* L. (annual, occasionally biennial)

It should be noted that individuals within a species, especially with regard to general appearance and flower size, can be variable according to habitat and local conditions. The most reliable guide to identification is to examine the fruits.

Tribulus macropterus Boiss.

Several of the Group's early records are of this species and it is possible that some may be mistaken determinations of *T. omanense*, as these two can be very confusing in the field. The Group's records are all from the Al Ain region and further north around Shuwayb/Madam/Hatta with the odd record from near Al Khazna on the Abu Dhabi-Al Ain road. One of the Shuwayb records, from May 1982, bears atypical small flowers. Flowering and fruiting is between April and June. This species is a robust but short-lived perennial with ascending branches in favourable locations, particularly on hard-packed sand and gravel. Along the Abu Dhabi-Al Ain road it reaches a height of 80 cms through the wire fences of plantations. Petals are up to 1.5cms long, bright yellow, tending to turn pale as they get older. The fruit is up to 1 cm long; rounded and hairy, with 5 toothed wings but no spines. Second year specimens can be very bushy, but the whole plant dies back in late summer and autumn.

Tribulus omanense Hosni ex. Hadidi

The Group's records of this perennial are predominantly

from the Liwa, collected by J.N.B. Brown and Muller-Hohenstein, and from the Oman border area north of Al Ain. It has also been collected near Mahdah, Oman, a few kms NE of Buraimi. In the Liwa shrubs can grow to 60cms in large, conspicuous clumps on open dune sides but north of Al Ain they tend to be more prostrate and smaller, on gravel and pebble plains. Very small, single plants, just a few cms high, may also be found in gravelly patches around Habshan and Bu Hasa, north of Liwa. The species is generally very similar to, but less hairy than, *T. macropterus*, though the flowers and fruits tend to be a little smaller. Leaves are in 5 or 6 pinnate pairs. Close examination of the fruit reveals a broad entire wing down each side of the carpel valve; the wings are less obviously dentate than in *T. macropterus*. *T. omanense* has been recorded in flower and fruit from April through to September (Shuwayb, 1984) and is clearly capable of flowering during the hottest summer months.

Tribulus parvispinos Presl

The Group's only record is from Kalba on the East Coast, south of Fujairah and next to the Oman border, comprising a small collection dated November 1982. This species is closely allied to the *T. terrestris* group, and is the smallest by far of the UAE species. The plant is completely prostrate with stems up to 18 cms only, almost grey in appearance with its covering of silky hairs. Leaflets are much shorter and the flowers extremely small, with the petals apparently freer than in other local species. The fruit is roughly spherical, woolly grey, with the segments and wings indistinguishable under a covering of long and short hairs. The six specimens found were in the middle of a recently-constructed roundabout at Khor Kalba, amongst other ruderals on disturbed sand and gravelly soil. Flowers were abundant on each plant, and the fruits were just forming in late November. It is likely that these were late annuals following summer or early autumn rains on the East Coast and consequent germination of seed set earlier in the same year.

Tribulus pentandrus Forssk

Only when in fruit is this species readily distinguished from *T. macropterus* or *T. omanense*, though it is more prostrate than either of these. Stems are up to 30 cms long and distinctly hairy. Leaflets are grey-green and the flowers generally smaller and paler. Fruits are bright green and hairy, with the wings less definite down the side of each carpel valve. Two soft spines per carpel are sometimes, but not always, present. In general the fruit appears softer and more fleshy than that of other local species, though it is in fact hard. E.N.H.G. records are from the Umm al Qaiwain-Falaj al Mu'alla road in late February 1985 (flowers and mature fruits), and from the Al Ain area. Edmondson collected this species from a wadi close to the Al Ain Cement Factory in 1980. *T. kaiseri*, though not found in the UAE, has similar fleshy-looking fruits, but they are quite hairless and smooth.

Tribulus terrestris L.

Though usually an annual, the *T. terrestris* group is found in a wider variety of habitats than any of the other

Tribulus species in the UAE. It is invariably prostrate, often with very small leaflets and flowers. As a group it is easily distinguished by its fruit, which is fairly small and hairy, but with 4 distinct hard spines per carpel wing, 2 long and 2 short. The plant is sometimes silvery in appearance. Depending on habitat the leaves may be light or dark green, but usually darker in mountain areas. Most of the Group's records are from the more hilly regions, particularly the Fujairah mountains, Hatta and Huwailat, and Jebel Hafit near Al Ain. However, it is also found in relatively open sandy areas, such as Umm al Qaiwain, where it was found in association with *T. pentandrus* in late February 1985. Muller-Hohenstein has recorded the species in Dubai city in early March 1986. Most flowering records are from March to May but it has been found in flower in Hatta in August and in the Musandam mountains of Northern Oman in September (1984).

T. terrestris L. var. *parvispinus* was collected in a plantation at Lulayyah in the East Coast just north of Khor Fakkan at the end of April 1987. Stems were up to 40 cms long and quite smooth between leaf branches; the whole plant was obviously hairy, with spines as long as the slightly furry fruit.

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U.A.E.

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Fig. 1

Distribution of 5 Tribulus Species in the UAE

- Tribulus macropterus o
- Tribulus omanense ●
- Tribulus parvispinos #
- Tribulus pentandrus *
- Tribulus terrestris +

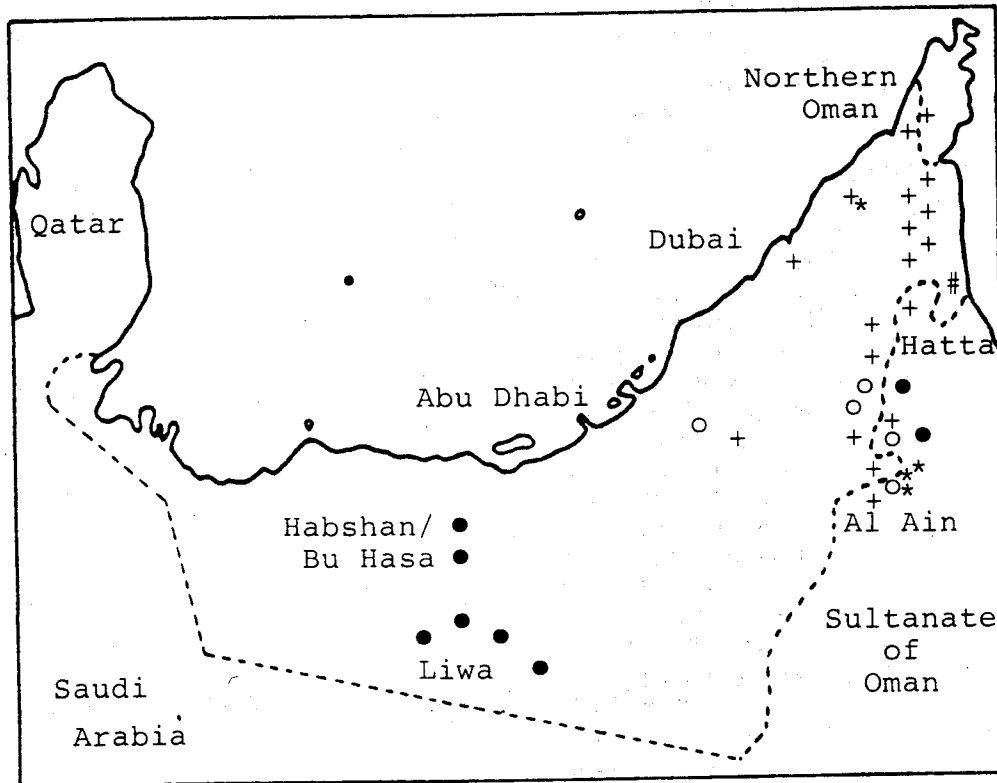
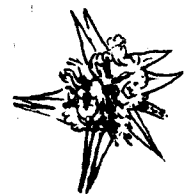


Fig. 2

Fruits of Tribulus species found in the UAE, approx. x 2

- T.
macropterus
- T.
omanense
- T.
parvispinos
- T.
pentandrus
- T.
terrestris



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Miocene Fossils From Abu Dhabi

by Peter J. Whybrow, Andrew Hill and

Walid Yasin al Tikriti

A palaeontological survey of the Western Region of the Emirate of Abu Dhabi has turned up substantial numbers of Late Miocene terrestrial vertebrate fossils in what is probably the largest exposure of its kind in the world. Now named the Baynunah Formation, the rocks are proving of substantial importance in helping to understand the origins of the Arabian Peninsula and its flora and fauna, as well as the geological relationship between Arabia, Africa and Asia. The following paper outlines results of surveys up to the beginning of 1990.

Foreword

Life and Earth have evolved together - Leon Croizat

The crust of the Earth consists of oceanic and continental plates. They are on the move. Throughout Earth's history their movement has prompted earthquakes and mountain building in regions where the plates collide, and caused rifting of the crust where they move apart. These changes to the geography of the Earth obviously affects climate that, in turn, affects the distribution and nature of the flora and fauna. The sedimentary rocks of the continental plate contain the fossil record of the animals and plants that inhabited the ancient environment, itself varying from place to place and, of course, with time.

Today, palaeontology has few connections with the historical image of an aged academic obsessed with measuring countless bones and teeth. Today palaeobiology (to use a modern and more appropriate word) seeks to interpret palaeocommunities and their relationship to palaeoenvironments. With the acceptance of plate tectonic theory (continental drift) in the early 1960's, palaeobiogeographies can now be constructed to help explain the distribution of palaeocommunities. Such information can produce palaeoecological ideas concerning the extinction of animals or of their adaptation to changing climates on a regional or a global scale.

The themes we have outlined show that palaeobiology is currently in an exciting and challenging phase, in part because both palaeontologists and geologists are moving away from the machine-led researches of the 70's and 80's. During this period we have continued our researches mainly on the ground, literally, and have had little contact with trends of the time.

Here we will explain the challenges and discoveries we have experienced while attempting to understand the palaeoenvironment of Abu Dhabi some eight million years ago.

Introduction

Not to know what has gone on in the past keeps one always in the infancy of knowledge - Cicero.

Geologists divide the history of the Earth into named segments of time. For example, the 140 million years old rocks that lie thousands of feet below the Western Province, and which are Abu Dhabi's main source of oil,

كشفت مسح باليونتولوجي تم في المنطقة الغربية في إمارة أبوظبي النقاب عن أعداد كبيرة من الفقريات المتحجرة التي تنتمي إلى العصر الميوسيني المتأخر وربما يعتبر هذا الحدث أكبر كشف من نوعه في العالم. وتكتسب الصخور، التي تعرف الآن بتكوين بينونة، أهمية بارزة في المساعدة على فهم أصل شبه الجزيرة العربية ونباتاتها وأزهارها وحيواناتها وكذلك العلاقة الجيولوجية بين شبه الجزيرة العربية وأفريقيا وآسيا. يعرض البحث التالي نتائج أعمال المسح، التي تمت حتى مطلع العام

١٩٩٠

belong to the Cretaceous Period - the age of dinosaurs.

The Miocene Epoch, from 23 to 5 million years ago, provides evidence of dramatic events in Earth history, especially in the Middle East. The Arabian continental plate consists of the Arabian peninsula, Jordan, Syria and, roughly, Iraq West of the Tigris. It occupies an area of the Earth almost as large as the Indian subcontinent.

Prior to Miocene times, Arabia, Africa and Asia consisted of low relief topography and, importantly, Afro Arabia was separated from southwestern Asia by a narrow seaway through Mesopotamia and the Arabian Gulf. The seaway - the Tethys - linked areas now occupied by the Mediterranean and the Indian Ocean. It formed a physical barrier to the distribution of terrestrial mammalian communities between AfroArabia and EurAsia. On the other hand, it provided a route for the sub-tropical oceanic currents from the Atlantic to the Indian Ocean. The currents not only allowed the free passage and distribution of marine organisms that, after fossilisation are important to the search for oil, but also gave a climate that produced rainfall throughout the year in northern latitudes and in equatorial Africa.

About 30 million years ago, continental rifting commenced between Africa and Arabia to form the Red Sea basin. The Arabian plate, moving more quickly northeastwards relative to Africa, terminally disrupted the Tethyan seaway in the region of Qatar and coastal Iran (Fars). For the first time, and at the latest about 17 million years ago, an AfroArabian-EurAsian land connection was formed. Mountain building (in Saudi Arabia and the Taurus-Zagros and Himalayan ranges) commenced and continental rifting (the African and Levant rifts) resulted from Arabian plate movement. These tectonic events caused radical changes to the climatic patterns of the region and archaic terrestrial animals had to adapt or perish.

The Miocene, therefore, documents important changes to land animal communities and, although rare, their bones recognisably belong to modern groups such as elephants, horses, apes, birds and reptiles.

Fossils - a Recent History

The wrong view of science betrays itself in the craving to be right - Karl Popper.

Before the mid-1970's, the main thrust of research

about the relationships of Miocene animals to their living relatives was carried out in East Africa and Southwestern Asia. Work in East Africa started in 1902 when bones of an early elephant ancestor were sent to the British Museum (Natural History) as it was then, The Natural History Museum of today, for identification. In Asia, fossil vertebrates have been collected from the foothills of the Himalayas since 1930.

Arabia during this early period of discovery appeared to be completely barren of vertebrate fossils. This gap in our knowledge was vast both in terms of geological time and the geography of the Old World during the Miocene. Everything changed in 1974 when staff from The Natural History Museum found a whole fauna of early Miocene fossil mammals in eastern Saudi Arabia. One of the fossils was recognised as a primitive type of elephant previously identified (1933) from early Miocene rocks of the Sulaiman mountains, Pakistan.

Following this discovery, one of us (Whybrow) decided to examine the rocks cropping out in Qatar and in the United Arab Emirates. In the UAE, the rocks were, according to the USGS geological maps, described as lateral equivalents to those occurring in Saudi Arabia. Further, two Shell geologists had briefly visited the Western Region in the late 1960's and found a fossil elephant tooth in what they believed to be fossil desert sands and wadi gravels.

When Whybrow arrived at Jebel Barakah in 1979, overland from Qatar, he found some crocodile and bovid (a cattle-like mammal) bones and was impressed by the large numbers of 'root' casts preserved in the sandstones. Because the form of the roots appeared similar to those of mangroves, radiating out from the trunk, he described them (in 1981) as Miocene mangroves and dated the rocks at about 11 million years, mainly because of the evidence provided by the geological maps.

Returning to Jebel Barakah in 1981 though liaison with the Emirates University, he found four horse teeth which totally changed previous ideas. They came from an equid called *Hipparion* that is unknown from the Old World before 11 million years. Consequently, the Barakah rocks had to be younger than that. Also, an almost complete lower jaw of a hippopotamus was found that was not unlike one described from rocks in Kenya dated at about 5.5 million years ago. As neither horses nor hippos are known to inhabit mangrove swamps, the palaeoenvironmental interpretation became, at best, suspect! Walid Yasin al Tikriti visited the Baynunah region in 1983 with German archaeologists and they found and mapped new fossiliferous sites and collected another hippopotamus jaw.

Andrew Hill was invited by the Department of Antiquities & Tourism, Al Ain, in 1984 to evaluate this material and visit the sites. He arrived at Jebel Barakah just two weeks after Whybrow had left there after having completed another survey through collaboration with the Emirates University. The hills were alive with the sounds of happy palaeobiologists!

In January 1989, we examined sites to the west of Jebel

Dhanna, made a survey of others to the east and to the south, collected fossils and measured two sections. Phil Crabb took many beautiful photographs, not only of fossils but also of the red-brown cliffs contrasting with the aquamarine sea. Notable discoveries were a carnivore jaw and a primate tooth (see below). Our work prompted much interest by the Arabic press both in the UAE and in London, and by the English press (including *The Times*) and an article appeared in the international scientific journal *Nature*.

In December 1989 we returned to our base camp, the Ramada Hotel, Jebel Dhanna, for seven weeks. We found the sabkhas flooded, cutting off some routes to our distant sites. The torrential rains had cleaned the exposures however, and by the time Ernie Hailwood (Southampton University) arrived to sample rocks for palaeomagnetic analyses, we had discovered many newly exposed fossils; elephants, giraffes and horses for example. The survey to the east of Jebel Dhanna continued and Andrew Hill and Walid found several productive sites.

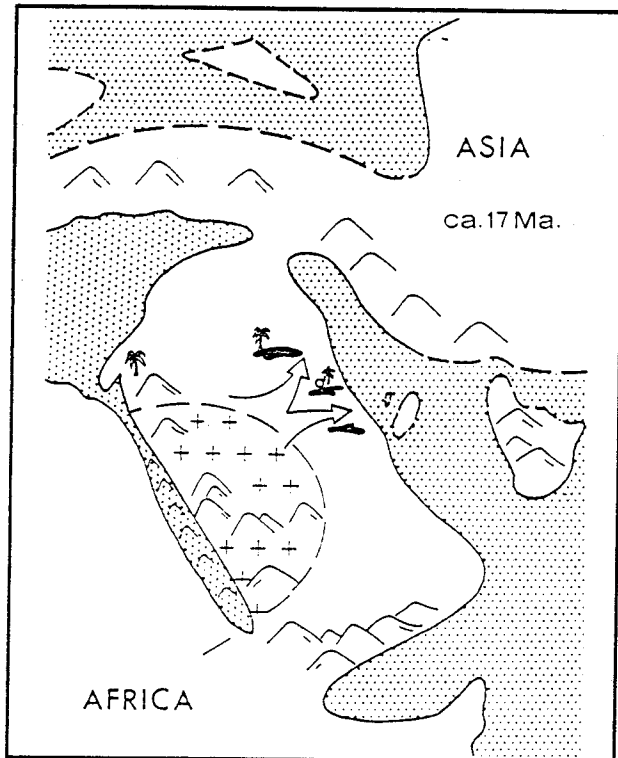
We have five aims for the project, (1) to obtain palaeoenvironmental and depositional evidence from the rocks in the Western Region so as to define a Late Miocene history of the region; (2) to measure and describe sedimentary units at the fossil bearing sites and to correlate these units; (3) to collect, identify, conserve and curate the fossil flora and fauna; (4) to sample rocks so as to develop a Late Miocene magnetic polarity stratigraphy for Arabia and obtain palaeomagnetic evidence about the rotation of the Arabian plate; (5) to link the palaeontological and sedimentological evidence from the UAE to sites of a similar age in Africa and Asia. We also hope to produce a book for UAE school children about the fossil heritage of Abu Dhabi and have a temporary exhibition of the fossils in London. Afterwards, the exhibit will go to the Al Ain Museum.



*The tooth of a Hipparionid found near Jebel Dhanna.
(P. Hellyer)*

Preliminary results of the 1989 and 1990 Field Seasons

I have steadily endeavoured to keep my mind free, so as to give up any hypothesis, however much beloved (and I cannot resist forming one on every subject) as soon as facts are shown to be opposed to it - Charles Darwin.



An arm of the Indian Ocean covers the Western Province. Qatar and part of Oman are islands. Erosion of the Western Saudi Arabian hills provides sand to Eastern Arabia where palms live near shallow lakes. Elephants, rhinos, gazelles, fish and reptiles were present. The first land connection with Asia existed.

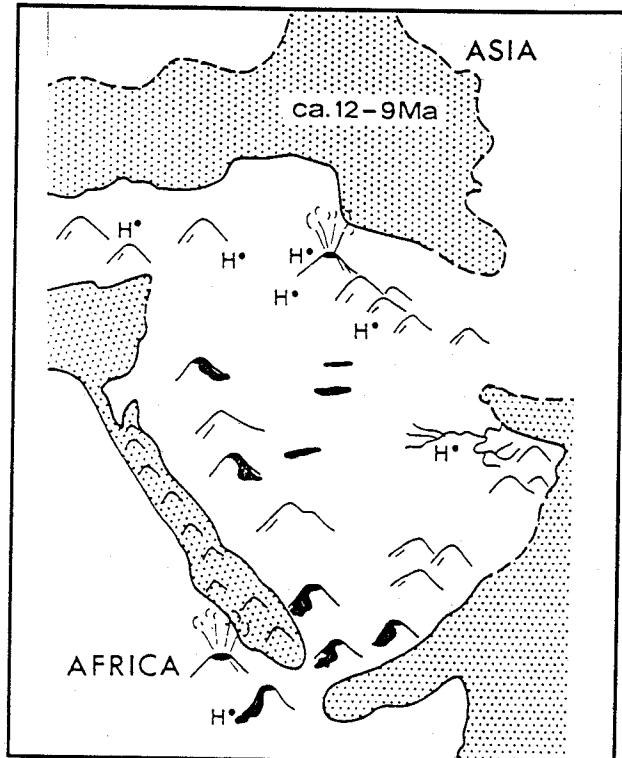
The two intensive surveys carried out so far have been a major and rewarding step forward in the brief history of Miocene studies in Arabia. Firstly, we were delighted to be able to collaborate with the Department of Antiquities, Al Ain, through the generous invitation of His Excellency Saif Ali al Dhab'a al Darmaki. Secondly and in comparison with the, at best, subsistence money previously granted by The Natural History Museum to Whybrow, we received major financial assistance from British Petroleum Exploration.

We record our special thanks to Joe Davies, BP Chief Representative in Abu Dhabi for agreeing to the project and to Julie Davies for her hospitality; also to Dudley Coates and Lyn Madden, BP, Britannic House, for their support. British Petroleum's grant, together with a contribution from Grindlays Bank and a grant for Andrew Hill's travel from the Leakey Foundation, enabled us to carry out our studies professionally and have two field seasons. Phil Crabb, Principal Photographer at The Natural History Museum, was with us early in 1989, and Ernie Hailwood, Reader in Geology at Southampton University, joined us in 1990.

Terry and Caroline Adams and Nabil Zakhour, ADCO,

were extraordinarily helpful in providing logistic support, upgraded to very substantial financial support in 1991. Peter Hellyer used his special skills to make certain that the project received the attention it deserved both in Abu Dhabi and in London, and 'Bish' Brown was, as always, a rewarding source of knowledge about Abu Dhabi's natural history.

Lastly, we thank N.S. Panikkar, General Manager, Ramada Hotel, Jebel Dhanna, Ali and all the staff of the hotel for making our stay enjoyable and for their help with our requests for boxes, sticky tape and typing.



The Western Arabian hills and the Taurus-Zagros regions were becoming mountainous and erosion provided sediments to many river systems. Volcanic activity gave basaltic lava flows in the Yemen and ash in Iran. Horses entered the Old World from Asia (sites = H). Baynunah Formation deposited.

Probably the most challenging aspect of our work so far has been to recognise that the fossiliferous deposits extend along the coast for over 150 kilometres, and there is every reason to expect sites nearer to Abu Dhabi. To the best of our knowledge, it is the most extensive area in the World that has Late Miocene terrestrial vertebrates preserved in horizontally bedded rocks. It is unique. From the extent of the deposits, we now recognise that their depositional history is more complex than evidence from first impressions of the sequence at Jebel Barakah. Andrew and Walid made a brief survey of rocks at Ras Ghemeis, Ras Mushayrib and those near the Sila'a Customs Post. Samples of limestone collected from Ras Ghemeis by Andrew Hill will be thin sectioned at The Natural History Museum for evidence of marine invertebrates. These sediments are situated on the flank of the Qatar arch and oil company

reports state they disappear beneath Sabkha Matti. They may be equivalent to sub-surface rocks east of Sabkha Matti, but they appear to have little dip, there are red coloured sands present and they seem to be at the same topographic height as the continental deposits to their east.

The torrential rains in the winter of 1989 cleaned the exposures at Jebel Barakah exhibiting in fine detail the strong lateral diversity of sedimentation in Miocene times. A thin bank of siltstone was rediscovered (from 1981) that contained tiny crustacean fossils (ostracods). Identification of them will help interpret their habitat, as certain species thrive only in freshwater or in brackish waters of varying salinity. Beautiful laminations in the soft sands indicate deposition in calm conditions and a sample of a black, 1 millimetre thick layer has been identified by X-ray spectroscopy in The Natural History Museum Mineralogy Department as the oxide of iron and titanium. This mineral, ilmenite, is a constituent of igneous rocks and, in small quantities, found in certain copper veins. The source area for this mineral might be the salt diapiric structure of Jebel Dhanna, or igneous rocks of the Yemen, Oman or Saudi Arabian highlands.

A broad picture of the lithostratigraphy indicates a riverine environment with periods of high energy, perhaps seasonal. Towards the top of the depositional sequence, evaporitic conditions, with gypsum and celestine (Strontium sulphate) indicate dessication of the water table. From the lithologies we have seen, no

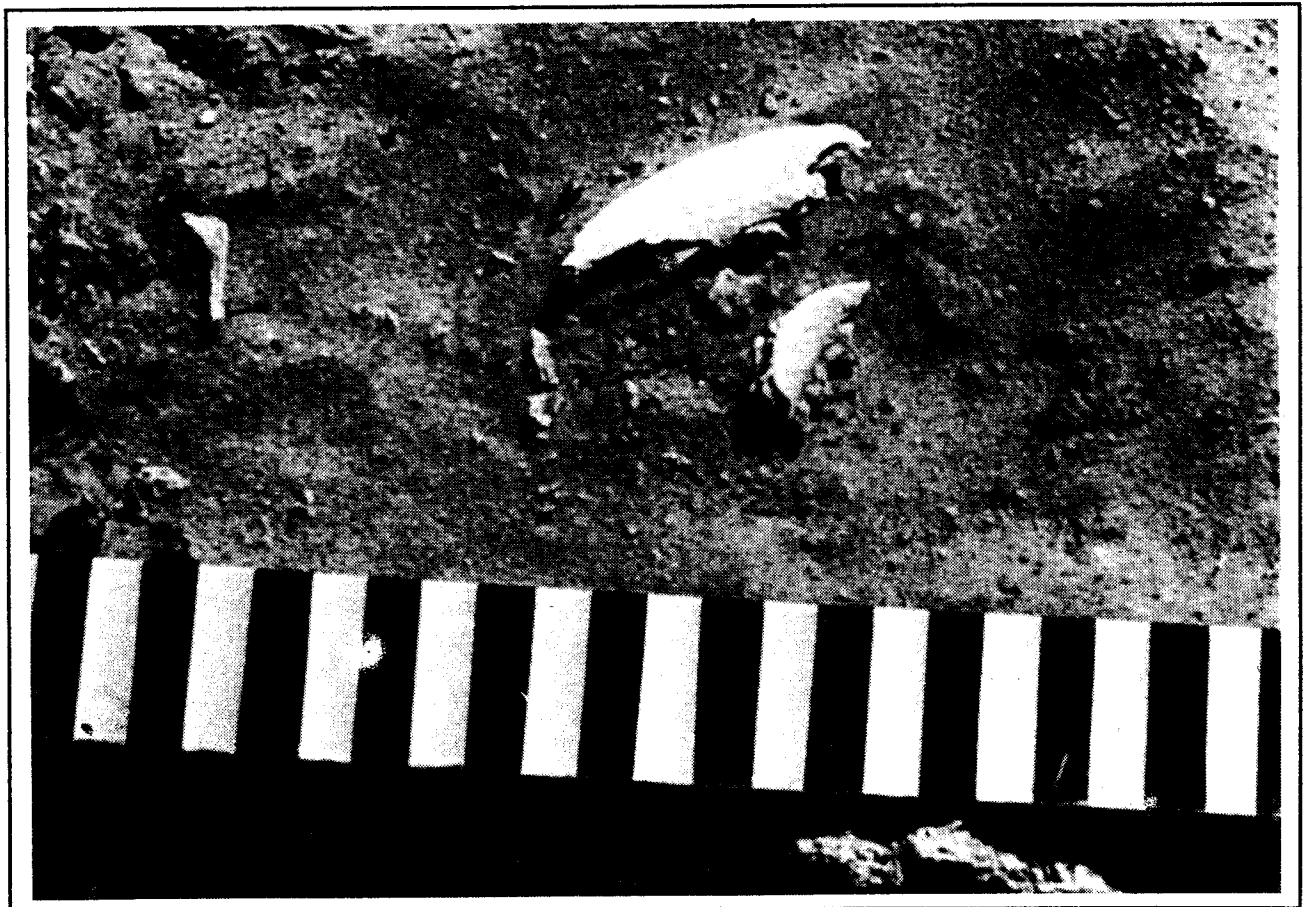
evidence of any marine influences are present. The 'root' horizons may be the remains of reed beds (like the *Phragmites* swamps of the Tigris/Euphrates delta) or roots of the fossilised leguminous wood we have found.

Andrew Hill has stated that the fossils we have found have a major role to play in elucidating the dynamics of change in bio-geographical zones in the Old World. Unfortunately, one of our first problems concerning the fossils was that the Western Region outcrops had no name. The USGS maps called them 'Tertiary, undifferentiated' and publications on Arabian Gulf geology indicated that they were not lithostratigraphically the same as, nor as old as, known formational units which are mostly marine. Therefore, Whybrow has proposed the name Baynunah Formation for these Late Miocene, continental deposits in Abu Dhabi (Newsletters in Stratigraphy, 1990).

So far, we have collected 266 identifiable fossils and they can be divided into four groups, plants, invertebrates, terrestrial and aquatic vertebrates.

Plants

Numerous pieces of fossilised wood, some branching, occur at many localities often in close association with vertebrate fossils. Concentrations of twig-like pieces are also preserved. Cross sections of the wood suggest that the cell structure has been preserved, but at high magnification these are merely voids filled with



The jawbone of a Miocene carnivore (Mustelid).

(P. Hellyer)

sediment and filamentous algal material is also present. One sample was identified as belonging to the Leguminosae, a family that includes modern lianas, laburnums and acacias. The breakdown of the woody cell structure is probably the result of rotting in water, hence the presence of algae. Filamentous algae also occur in limestones secondarily replaced by silica.

Invertebrates

Two kinds of molluscs occur. One is a bivalve referable to **Anodonta**, a freshwater group that includes pond mussels. The other is gastropod, referable to the modern genus **Mastus** of the family Enidae. Modern representatives of this tiny 8 millimetres in height land mollusc inhabit shrubs and trees, perhaps the 'fossil forest'. The ostracods await identification.

Aquatic vertebrates

By far the most common group are freshwater fish. Skull bones of **Clarias** and **Bagrus** catfish occur with the tiny pharyngeal (back of throat) teeth of two **Barbus** species. Modern Arabian **Barbus** are found in the Hadhramaut and Hodeidah regions of the Yemen. The genus is essentially African and the Arabian group are thought to have been isolated following Red Sea rifting.

Isolated crocodile teeth are commonly found on the surface with the fish remains, the apparently large assemblages probably concentrated by recent wind action, winnowing. We recognise two crocodiles, a long snouted form similar to **Gavialis** and the more typical **Crocodylus** with a massive, short skull. The bony scutes that form the dermal armour are common and we have some postcranial bones such as vertebrae and parts of the pelvis.

Two turtles are represented by fragments of plastron and carapace, part of a lower jaw and some leg bones. They cannot be identified below family rank - Testudinidae and Palomedusidae.

The 'aquatic' mammal is, of course, a hippopotamid of which we have two lower jaws (one from Walid's 1983 collection), and some isolated teeth. In comparison with modern **Hippopotamus** the jaws are smaller, more slender and six incisors are present. Thus, the Baynunah hippo belongs to the genus **Hexaprotodon**, the genus of the modern West African pygmy hippopotamus, and previously known from the Miocene of Libya, Kenya and Pakistan.

Terrestrial Vertebrates

One humerus of an egret, **Egretta**, has been collected but the avian interest concerns the large amount of struthionid eggshell pieces. Compared with the shell thickness of modern ostrich (1.2mm), the Baynunah eggshell is unusually thick (3.56mm). Harry St. John Philby was the first (in 1933) to find fossil 'ostrich' eggshell in Arabia and the one piece he found is in The Natural History Museum collection. Found some 400 kilometres to the southwest of Sabkha Matti in Saudi Arabia the piece, despite recent weathering, compares well with the Baynunah examples.

The discovery of any primate is an extremely rare event during a project such as ours. We were incredibly lucky

to find one canine tooth mixed up with the downslope wash of fish and crocodile teeth. This is only the second time a Miocene primate has been found in Arabia and is important because it tells us (1) there should be more primate fossils, (2) it adds a rare animal to our lists of the fossil fauna and (3) its origins appear to be African. As is often the case, we have found the wrong tooth for accurate identification. The rear, molar, teeth are more diagnostic. We can say it is a cercopithecine monkey and probably a papionine an ancestor of baboons. These monkeys still inhabit Arabia near the Saudi Arabian/Yemen border. Alternatively, it may be from a macaque.

The only carnivore found, by Walid, is the left lower jaw, probably of a mustelid. Carnivores are also rare in the fossil record and to find this small badger-like animal is unusual as we might have expected remains of larger animals like big cats or hyaenas.

The largest herbivore from the Baynunah sediments is a gomphothere, an early relative of elephants. A tooth was found by Ken Glennie and Brian Evamy (Royal Dutch Shell) in the late 1960's at Jebel Barakah and we have a smashed lower jaw, vertebrae and ribs from the same locality. Walid yet again found a complete tooth from another locality and it was shown to His Highness Sheikh Zayed bin Sultan al Nahyan at Jebel Dhanna. The tooth is now at The Natural History Museum receiving conservation treatment. We have also located, but not excavated, one badly eroded elephant skull and two nearly complete lower jaws. Another proboscidean present has been identified, from just a tooth fragment, as a deinother. This animal had downturned and backward curving tusks in its lower jaw (and probably no trunk). Its rear teeth were adapted for shearing, thus the wear pattern of our tooth fragment differentiates deinother teeth from gomphotheres that chewed their food differently.

Bones and teeth of the three-toed horse **Hipparion** are relatively common. A lower jaw with very worn teeth was found by Walid and it was not until last year that we found any examples of upper teeth. The tooth morphology suggests similarity with **Hipparion sitifense**, a small equid known only from isolated teeth and originally described from the Late Miocene of Algeria. Dr. Vera Eisenmann, Museum d' Histoire Naturelle, Paris, who is an expert on hipparionines, has examined part of the Baynunah collection and she believes the horse to be a new species. If this notion is proved, it will be named after the region in which it was found - Baynunah.

Early in 1989, we believed that some very scrappy material could be from a rhinoceros. Last year one tooth not only proves its presence but the specimen might be identifiable to genus.

Identification of the suids, pigs, are currently causing us problems. Whybrow found a lower jaw with very worn teeth in 1984 at Jebel Barakah. The pig appeared 'primitive'. Andrew Hill recently found an unworn last lower molar (these are good for generic identification) that suggests a Miocene suid known from North Africa called **Nyanzachoerus devauxi**. The Barakah pig does not now appear to be **Nyanzachoerus** and we still have

to unpack a complete lower jaw (its teeth appear smaller than the other two pigs and it may be a juvenile) collected by Andrew Hill last year. If three suid species are identified, then their presence in Baynunah times may give more clues about the palaeoenvironment.

Bovids are cattle-like animals but, to confuse that generalisation, the Bovidae includes 12 tribes ranging from sheep to gazelles. All have horns but it is usually only the bony core that is fossilised. At least three Baynunah bovids are recognised; one, **Miotragocerus**, from several oval cross-sections of horn cores and the remainder from their foot bones.

Part of a giraffid skull found, showing the horn pedicel and part of the eye socket, does not at present appear to fit with any known fossil giraffe. We collected part of a lower jaw with teeth last year and this specimen may help the identification.

The Future

A great man of science..... knows everything about everything, except why a hen's egg don't turn into a crocodile, and two or three other little things - Charles Kingsley, The Water Babies.

We have now obtained funding from ADCO for a five year study of the Baynunah rocks and fossils. We firmly believe that the extent of the fossiliferous deposits, and

their Arabian location, is of prime international scientific importance and studies will aid our understanding of Old World palaeocommunities and environments.

The conservation, curation and identification of the fossils will take some time. Specimens have to be compared with described fossils sometimes housed in other museums and Andrew will take replicas of the suid teeth to Nairobi for comparative studies. The rock samples will take Ernie Hailwood six months of analysis using his cryogenic magnetometer. We hope to have a Cambridge University sedimentologist join us as we need to know more details about the depositional environment and its local and lateral variability. Rodents are virtually unknown from our collection and a programme of sieving the sediments for their tiny teeth needs to be started.

We look forward to carrying out this work in the company of the many friends we have made during our last two years of study.

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Andrew Hill, Department of Anthropology, Yale University, P.O. Box 2114, Yale Station, New Haven, Conn. 06520, U.S.A.

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Prospective new bird species for the UAE

by Colin Richardson and John Bannon

Well over 350 species of birds have now been recorded in the United Arab Emirates, evidence of its importance at the crossroads of east-west and north-south bird migration. This paper predicts that a number of new species have yet to be discovered, and gives a list of 51 of the most likely.

Introduction

The UAE is situated on the migratory crossroads of north-south and east-west migration. The Arabian mainland culminates in the Musandam Peninsula, a position ideal for pulling in east-west migrants, while the narrow Straits of Hormuz (50km at shortest mainland crossing) separating Arabia from Iran, funnels north-south travellers.

Western Palaearctic migrants which breed in Asia Minor (Turkey and the countries of the Eastern Mediterranean) overfly the region on the way to wintering grounds on the Indian subcontinent, often following the Iranian coastline, many make landfall in the Emirates but are unrecorded by a lack of coverage.

Southbound migrants, from breeding grounds in Central Soviet Asia, occasionally overshoot their usual Iranian wintering quarters. Already species such as **Great Crested Grebe, Whitefronted Goose, Ruddy Shelduck** (and some other ducks), **Lapwing, Hume's Lesser Whitethroat, Plain Leaf Warbler, Eastern Pied**

تم حتى الآن تسجيل ما يربو على ٣٥٠ نوعاً من الطيور في دولة الامارات العربية المتحدة وهذا يدل على أهمية الدولة كملتقى طرق للطيور المهاجرة من الشرق الى الغرب ومن الشمال الى الجنوب. ويتوقع هذا البحث اكتشاف عدد من الأنواع الجديدة يحدها بـ ٥١ نوعاً من الأكثر احتمالاً لاكتشافها.

Wheatear, Robin, Redwing, Mistle Thrush, Black-throated Thrush, Blackbird, Ring Ouzel, Reed Bunting, Yellowhammer, Brambling, Chaffinch, Goldfinch, Siskin, Linnet and Spanish Sparrow have occurred in the UAE at least once, though most less than a dozen times.

Afro-tropical species which venture north from Africa to breed in Southern Arabia may overshoot or disperse northwards, crossing the vast sand deserts of the Empty Quarter (eg. **Black-winged Kite, Grey-headed Kingfisher**) or some may undertake 'reverse migration' after breeding (eg **White-throated Bee-eater**).

Shorebirds which breed from Scandinavia to Siberia, head south to the shores of equatorial Africa and the Far East using the UAE as an important rest and refuelling stop. The sheer volume of migrants flying over such vast distances makes the occurrence of virtually all palaearctic waders a distinct possibility. Already **Dotterel, Long-toed Stint, Pintail Snipe and Great**

Knot have been recorded.

Seabirds too are likely to occur, particularly the exclusively pelagic species. Young birds can get disorientated and head north into a dead-end like the Gulf of Oman ending up in UAE waters. Some species follow the annual monsoon and the plentiful food supply associated with upwellings in the Arabian Sea, such as **Flesh-footed and Wedge-tailed Shearwater, Leach's Storm-Petrel, Masked, Brown and Red-footed Booby, Great Skua, Long-tailed Skua and Roseate Tern.**

A few 'sedentary' species resident in nearby areas wander erratically outside the breeding season. Some have occurred in the UAE (usually in winter), and include several species from Iranian breeding grounds: **Indian Pond Heron, Griffon Vulture, Finsch's Wheatear, Hooded Wheatear, Moustached Warbler, Bay-backed Shrike and Tree Sparrow.**

The following list is a prediction of 51 species which may be found in the years to come.

The Predictions

Intermediate Egret *Egretta intermedia*

Nearest range includes Africa and India, where most are resident. Already recorded in Oman several times between late November and early May and one was found at Khasab, on the Musandam Peninsula from 24-26th November 1988. A likely scarce winter visitor to the UAE.

Some have already been claimed but have been mistaken for the rather small race of Great White Egret *E. a. modesta* which does occur in the Emirates.

Sacred Ibis *Threskiornis aethiopicus*

Resident in the Euphrates delta area of Iraq. Vagrant to Bahrain, the Eastern province of Saudi Arabia and Oman from July to November. However due to its popularity in free-flying collections locally it is difficult, if not impossible, to be certain of their origins. Two were found and photographed at Khor Dubai in October 1982 (M. West).

Lesser Flamingo *Phoenicopterus minor*

Seen at Sur and Sohar on Batinah coast of Oman, September 1986 and December 1990 respectively. A widely dispersive African species likely to stray even further north to the UAE. May also have occurred in Iran.

Falcated Duck *Anas falcata*

Winters in eastern China, southern Japan, fewer in India and Bangladesh, from breeding grounds in north-east Asia. This long-distance migrant has occurred in Jordan, Turkey and Iran and must be considered a potential vagrant to the UAE. There are some earlier claimed records, including four on Abu Dhabi Island mid October 1972 (J.D. Wellings & J. Stewart-Smith) and one at Dhayah, Ras al Khaimah late November 1980 (C.M. Saunders).

White-headed Duck *Oxyura leucocephala*

Widespread breeding range includes central Asia and winter range reaches the Indian subcontinent, although

it remains as yet generally unrecorded in Arabia. It was reported "once only" in the UAE without detail by John Stewart Smith in the early 70's.

Black Vulture *Aegypius monachus*

There are several reports of this vulture occurring in the UAE, usually in the mountain areas, though many appear to be mistakenly identified Lappet-face Vulture. All reports lack sufficient detail to confirm identification. Considered a vagrant in Oman following the discovery of dead bird on Masirah Island on 7th December 1977. Likely to occur from the Iranian population just across the Straits of Hormuz.

Shikra *Accipiter badius*

Nearest breeding areas northern Iran, and regularly winters SE Iran. Some may be resident in (formerly North) Yemen (Hollom, Porter et al 1988). Surprising there are no records yet for the Gulf, although it may have been overlooked due to its similarity to Sparrowhawk.

Manchurian Red-footed Falcon

Falco amurensis

Breeds in eastern Asia, winters Southern Africa, making direct sea crossing of Indian Ocean. Recorded regularly in Oman November to December and February to May, mostly in South.

A "Red-footed" Falcon reported from a helicopter in mountains east of Sharjah in March 1989 could have been this species.

Little Bustard *Tetrax tetrax*

Breeds across Central Asia. Winters Iraq, Iran and NW India. One found on Oman's Batinah coast in mid December 1964. No other Arabian records known.

Pheasant-tailed Jacana

Hydrophasianus chirurgus

Breeds southern Oman, some winter central Oman. One undetailed report from a wadi 'east of Buraimi' c. 1985 (per M. Jongbloed) suggests wider dispersal.

Spotted Thick-knee *Burhinus capensis*

African species, breeds southern Oman, and three reported inland of Batinah coast (east of Buraimi) in autumn 1961-3 (M. Gallagher pers. comm). Reports from UAE coast (J. Stewart-Smith 1978) unconfirmed.

Great Stone Plover *Esacus recurvirostris*

Breeds directly across the Straits of Hormuz on the coastline of Southern Iran and is considered a prospective vagrant to UAE, particularly to the East Coast. One was recorded in Oman late January to early February 1989.

Golden Plover *Pluvialis apricaria*

Breeds Arctic regions, winters Mediterranean countries, North Africa, Turkey and Northern Iran. Rare in Arabia, recorded July to May in Oman, November to April in the Eastern Province of Saudi Arabia. Also reported Bahrain.

Existing UAE claims of this species do not make sufficient distinction between it and Pacific Golden Plover (*P. fulva*). However it probably does occur in



small numbers and a well described sighting is eagerly awaited to put this species firmly on the UAE list.

Spur-winged Plover *Hoplopterus spinosus*

Resident and dispersive on Red Sea coast of Saudi Arabia. Also breeds in Turkey and Greece, with some passage Cyprus and Malta. Individuals have occurred in Oman in November 1985 and December 1986. Also vagrant to Iran and Eastern Province of Saudi Arabia. One claimed in Abu Dhabi mid January 1988.

Pectoral Sandpiper *Calidris melanotos*

A dynamic migrant from NE Siberia. Reported several times in the Eastern Province of Saudi Arabia mid August to April and is confirmed as a rare visitor to the Arabian Gulf in The Birds of the Middle East and North Africa (Hollom, Porter et al). Should be considered a potential for the UAE list.

Asiatic Dowitcher *Limnodromus semipalmatus*

Breeds in Asia. Listed as vagrant by Marchant et al (1986), which records its occurrence in Aden and Kenya. Hollom, Porter et al (1988) list it as vagrant in UAE. This is based on a report of flocks in Sharjah in March 1945, subsequently rejected (Richardson 1990). However its status as a long distance migrant makes its occurrence a possibility, though 'flocks' seem unlikely.

Slender-billed Curlew *Numenius tenuirostris*

A rare and almost extinct species from Siberia. Wintering range stretches from Morocco to Oman, with vagrants scattered across the Middle East (possibly from relict population). Similar in size to Whimbrel, and in other ways to eastern race Curlew *N. t. orientalis*, both of which are regularly mistaken for it. Habitat includes shallow inland waters and tidal mudflats. Recorded in Northern Oman April - May 1976, and in January 1990 at Barr al Hikman (an extensive area of mudflats on the mainland facing Masirah Island), and some may reach eastern Arabia regularly. Claimed in late September 1971, and published as December 1971 in ENHG Bulletin 4:12. However no details are on record and another report from Qarnein Island is also unsubstantiated.

South Polar Skua *Catharacta maccormicki*

Breeds in southern summer in and around Antarctica. As with some other southern skuas (viz. Long-tailed and (Southern) Great Skua), strays are likely to occur in the Arabian Sea (Harrison 1987 & Dr. W.R.P. Bourne pers. comm), although none yet reported from UAE waters. Disperses from Antarctic breeding areas February to April. Hard to tell apart from Great Skua.

Little Gull *Larus minutus*

Nearest breeding areas Siberia and South east Europe, winters south to Caspian, Black and Mediterranean Seas, occasionally northern Gulf. One found late September 1979 in Eastern Province of Saudi Arabia. Recorded in Bahrain less than a handful of times in February and March. Few recorded in southern Iran, including one at Bandar Abbas in late March 1973.

Three former records of single birds in Abu Dhabi area in 1972/3 subsequently withdrawn from UAE list several years ago, following review.

Black Tern *Chlidonias niger*

Rare autumn migrant in Northern Gulf, on passage from breeding grounds in central Russia to wintering areas in west and south west Africa. Less than a dozen records September to December in Eastern Province of Saudi Arabia. Two records of it in distinctive breeding plumage in Oman, including one in the north in late March 1976. Also recorded Bahrain.

May have occurred in the UAE, but existing reports have so far failed to satisfactorily distinguish it from other marsh terns in non-breeding plumage.

Common Noddy *Anous stolidus*

Uncommon summer visitor to Gulf of Oman, including Musandam peninsula (Gallagher and Woodcock 1980). May regularly reach UAE territorial waters from normal summer range which includes the Arabian Sea.

Pin-tailed Sandgrouse *Pterocles alchata*

Resident and nomadic in Saudi Arabia (Hollom, Porter et al, 1988). Seems prone to winter vagrancy (or partial migration), being recorded in a number of neighbouring areas including Kuwait and NE Iran and should be considered as a possibility in the UAE.

Woodpigeon *Columba palumbus*

Local resident in Jebel Akhdar area of Northern Oman, and has wandered in winter to interior and Batinah coastal plain. Considered a likely vagrant and potential coloniser of cultivations.

Great Spotted Cuckoo *Clamator glandarius*

One occurred on Masirah Island, Oman in early April 1979, indicating easterly vagrancy across the Arabian Peninsula (and possibly over the UAE) from Kurdish breeding grounds.

Oriental Cuckoo *Cuculus saturatus*

Breeds widely across boreal forest zone from central Russia to South-east Asia, and winters in India. No known records in the Middle East although passage probably includes Iran. Very similar to Cuckoo *Cuculus canorus* and could be overlooked, even in usual range.

White-breasted Kingfisher *Halcyon smyrnensis*

Breeding resident southern Iran and along its whole Gulf coast line. Some disperse locally in winter. Nearest Arabian records include single birds in Dhahran (Saudi Arabia) October 1984, and winter November 1985 to March 1986. Probably the most likely candidate of all for the UAE list.

Dunn's Lark *Eremalauda dunni*

Breeds in Saudi Arabia and Southern Oman, and is nomadic outside the breeding season. As with number of lark species its movements on the Arabian Peninsula are not well understood. It is likely to be overlooked.

Bar-tailed Desert Lark *Ammomanes cincturus*

Resident in Saudi Arabia and southern Oman, although local movements reported in spring, when it has occurred in Northern Oman. Often associates with Dunn's Lark in ground feeding parties. Nested on Bahrain in 1987.

One dead bird was found in the UAE at Jebel Ali in March 1971. A live bird is eagerly awaited!

Hume's Short-toed Lark
Calandrella acutirostris

Breeds eastern Iran, Afghanistan and northern Pakistan. A record at Eilat in February 1986 indicates wider dispersal or winter vagrancy (British Birds 83:7 pp. 262-272). Difficulties in separating some of these *Calandrella* larks may be the reason for so few records outside its known breeding range, but like many Asian larks its potential occurrence in the UAE is a possibility.

Indian Sand Lark *Calandrella raytal*

Resident southern Iran, from Bandar Abbas eastwards and might be expected to stray to East Coast of UAE, although it is not yet recorded in Arabia.

Small Skylark *Alauda gulgula*

Also known as Oriental Skylark and resident in southern central Asia, (including southern Iran) and makes short distance seasonal movements. Recorded as a winter vagrant to Eastern province of Saudi Arabia (five present October 1984 to March 1985). Recorded in Bahrain winter 1990. No confirmed sightings in Oman. The proximity of its breeding grounds and its wandering nature makes it a good prospective visitor to the UAE. Important to separate it from Skylark in winter.

Shore Lark *Eremophila alpestris*

Mainly resident, range including mountains of southern Iran, from where it disperses to lower levels in winter. No records in Arabia though the very small numbers that might occur could easily be overlooked. One claimed on Das Island in autumn 1990.

Radde's Accentor *Prunella ocularis*

Nests in mountainous areas of Iran, migrating to lower areas in winter. Not recorded in Arabia. Might be expected to extend its winter movements to suitable wet mountain wadis in the Northern Emirates during rainy winters.

Black-throated Accentor *Prunella atrogularis*

Altitudinal migrant whose scattered breeding range includes northern Siberia, east and central Asia. Some winter in eastern Iran, and one was found on Masirah Island (Southern Oman) in November 1975. It has also turned up accidentally throughout Europe.

Pied Stonechat *Saxicola caprata*

Resident and partial migrant breeding from Iran to the Far East. One male of race *S. c. bicolor* was found in Khasab, Musandam in April 1983. Skin in British Museum (Natural History).

Cetti's Warbler *Cettia cetti*

Breeds north east and central Iran, some wintering in the south east. This species is expanding its range worldwide although as yet it has not been reported in Arabia.

Fan-tailed Warbler *Cisticola juncidis*

Resident in its range, which includes Northern Gulf (Iran)

and Yemen. Occurred in Salalah, Southern Oman on 1st June 1980.

River Warbler *Locustella fluviatilis*

Breeds across eastern Europe and Central Soviet Asia, wintering in East Africa. One found southern Oman mid September 1978. Also reported Bahrain. Occurs, rarely, on passage throughout Middle East (Hollom, Porter et al 1988).

Paddyfield Warbler *Acrocephalus agricola*

Breeds Central Asia, including northern Iran, and has regular passage through SE Iran, where some may even winter (Harrison 1982). One found dead on Masirah Island in early November 1979, and one occurred in southern Oman in October 1984.

Blyth's Reed Warbler
Acrocephalus dumetorum

Breeds northern and central Soviet Asia, regular on passage eastern Iran. Winters in the Indian Region. One under review in southern Oman 8th April 1986, and one reported in Bahrain. Probably overlooked, though undoubtedly rare in Eastern Arabia.

Green Warbler *Phylloscopus nitidus*

Breeds in northern Iran and Armenia, wintering in southern India. Scarce and irregular northern Oman August to November. Two records in the Eastern Province of Saudi Arabia, in November and May. Also recorded Bahrain. UAE claims so far lack enough detail for 1st record criteria.

Greenish Warbler *Phylloscopus trochiloides*

Has widespread breeding range across Central and Northern Soviet Asia, wintering India and the Far East. Singles recorded in Southern Oman August 1985 and on Masirah Island October to November 1988. Careful consideration required to separate this species from other confusing *Phylloscopus* types. Unaccepted claims in late November and late March.

Arctic Warbler *Phylloscopus borealis*

Long distance migrant from the sub-Arctic to South-east Asia. Accidental in Oman (one late August to early September 1983) and in the Eastern Province of Saudi Arabia (including one in April).

Radde's Warbler *Phylloscopus schwarzi*

An almost regular autumn migrant to Western Europe, and sympatric with Dusky Warbler which has already been recorded in the UAE in autumn.

Pallas's Warbler *Phylloscopus proregulus*

Long distance Far eastern migrant, strays often recorded in Europe. Similar range to Yellow-browed Warbler which occurs fairly regularly in UAE on passage and in winter.

Penduline Tit *Remiz pendulinus*

Resident breeder Iran. Recorded in Bahrain in winter 1970/71 and in early April 1990; also in Oman (near Muscat) in late March 1971. Other winter records central and eastern Arabia.

Long-tailed Shrike *Lanius schach*

Breeds central and eastern Asia, including SE Iran,

wintering in western Himalayas. Several odd reports of vagrancy westwards. Singles reported near Salalah, Oman in February 1983 and 1984.

One claim mid March 1988 on Abu Dhabi Island not acceptable.

Magpie *Pica pica*

Resident Iran, with small Saudi Arabian population in Tihama. Currently expanding worldwide, and future occurrence in the UAE considered a distinct possibility.

Pine Bunting *Emberiza leucocephalos*

Breeds north east Asia, winters from Pakistan to China. Strongly migratory, one reported Eastern Province of Saudi Arabia 24th August 1979, only Gulf record.

Grey-necked Bunting *Emberiza buchanani*

West-east migrant, nesting Turkey and Iran, wintering Pakistan to western India. Passage recorded SE Iran, although strangely no known Gulf records. Must be high on the list of potential vagrants.

Red-headed Bunting *Emberiza bruniceps*

Nests central and eastern Asia, winters Pakistan and India. Records of this species in Eastern Arabia are clouded by summer plumaged males, which are known to be traded and favoured as caged pets. However should occur on passage.

We are grateful to Bob Richardson, Bird Recorder of the ENHG, for his advice and comments on our draft thereby providing further fuel for the inclusion of a number of additional species.

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* * *

Sand Dunes in the Emirates

by K.W. Glennie

One of the most important features of the landscape of the United Arab Emirates is its deserts. This paper explains the nature of the deserts of the Emirates, and the areas of sabhka to be found along in the coast and in the interior.

Despite the changes wrought by the use of bulldozers and desalinated water, the Emirates is still very much a desert. What is a desert? Why do they exist? And what is special about the Emirates desert? These questions are answered below.

Definition of a desert

A tropical desert comprises almost barren land over which rainfall is too limited and spasmodic to support vegetation adequately. Perhaps more importantly, it is an area where the potential rate of evaporation far exceeds precipitation. In the Emirates, much of the desalinated water used to irrigate plants is lost by evaporation.

The reasons why deserts exist

Tropical deserts results from the interaction of several global phenomena.

1. In equatorial areas hot air rises and attempts to reach the poles at high altitude; low-level cold polar air flows back to replace it as part of a giant convection cell.
2. At about 30° North and South of the Equator, however, the high-altitude tropical air becomes denser and heavier because it has to occupy a shorter circumference; the heavy air sinks and warms as it descends in a cloudless sky, and thus

لا شك ان صحاري دولة الامارات العربية المتحدة تشكل أحد أهم السمات البارزة لطبيعتها. ويلقي هذا البحث، الذي كتبه اختصاصي عالمي من الطراز الأول، الضوء على طبيعة الصحاري في دولة الامارات ومناطق السبخة المتواجدة على طول الساحل وفي الداخل.

becomes capable of absorbing more moisture. Some of that air flows polewards where colder conditions lead to cloud and the wet climate typical of NW Europe. The rest of the air flows back towards the Equator, warming as it goes, and is thereby capable of absorbing even more moisture from the ground over which it passes; that ground becomes increasingly arid.

3. The air moving at ground level towards the Equator is left behind by the increasing velocity of the equatorial land surface relative to the poles (where it is zero), leading to winds that characteristically blow from the NE in Northern hemisphere deserts and from the SE South of the Equator (they are the Trade Winds of ocean sailors) (Fig. 1A)

One important factor has occasionally affected older deserts. Especially during the last two million years or so, some high latitude land areas (e.g. North America, NW Europe) have been subjected to glaciations with ice sheets up to 1000m or so thick. There were at least five major episodes, some of which had several sub-stages. The exceedingly cold air above each ice sheet became a centre of very high atmospheric pressure, which had the effect of squeezing all the other air pressure belts towards the Equator (Fig. 1B). This brought the world's belts of high and low pressure closer together, which, in turn, resulted in strong global winds. The most recent

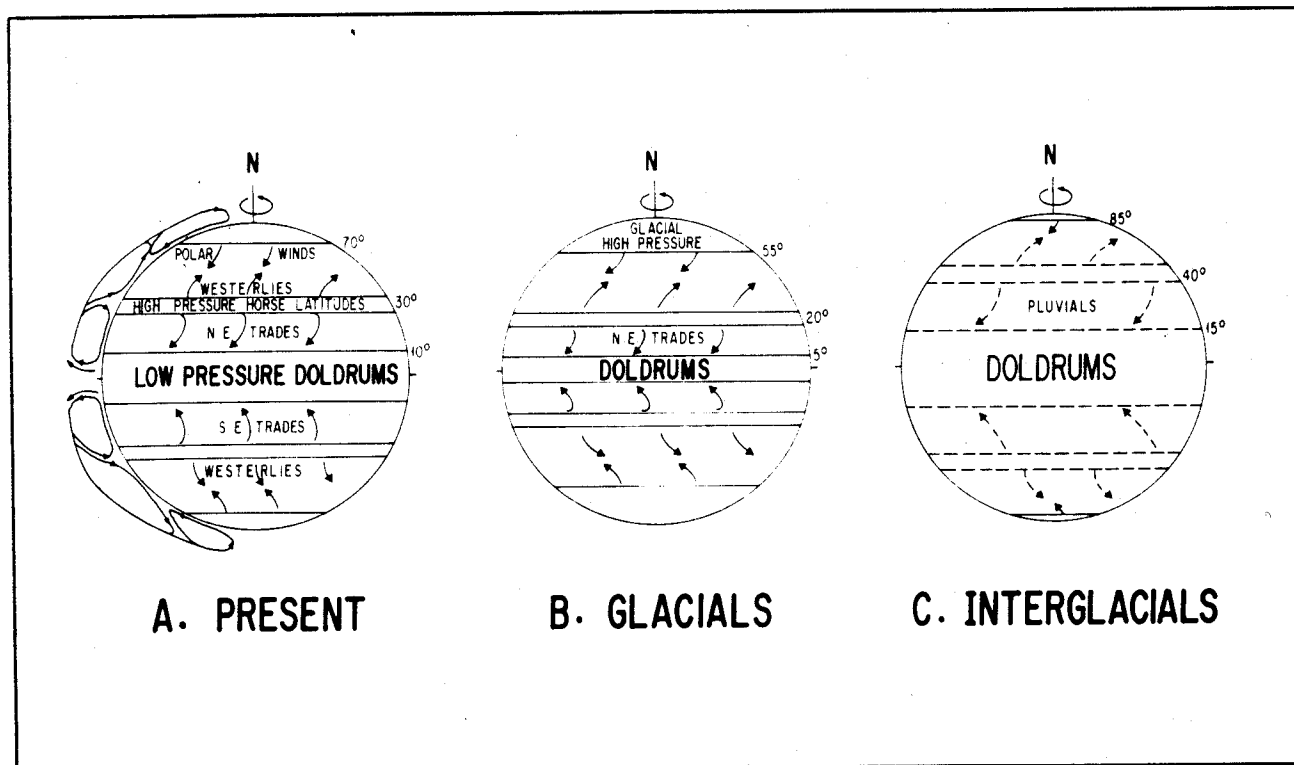


Fig. 1

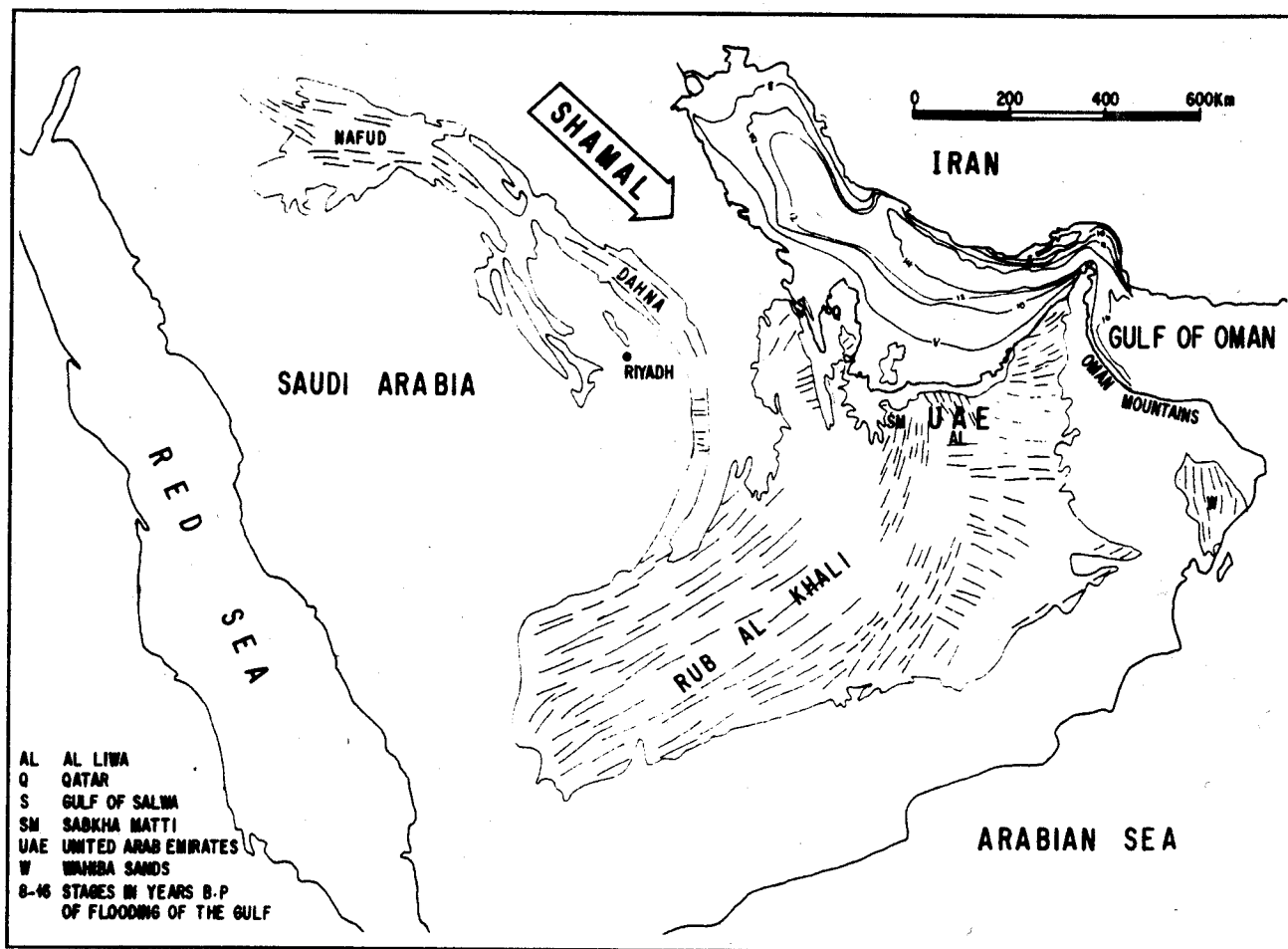


Fig. 3

glaciation, which lasted some 15,000 years and nominally ended only 10,000 years ago; the strong winds associated with that glaciation are thought to have given rise to the systems of large dunes now found in many desert areas, including the Emirates.

By contrast, the (interglacial) periods between major glaciations (we are in one now) are thought to have been times of weaker wind systems (Fig. 1C). Indeed, during the so-called **Climatic Optimum** around 6000 years ago, the average temperature of NW Europe was several degrees warmer than now, most of Arabia apparently had a much higher rainfall than now, and many areas of sand dunes were probably largely stabilised by vegetation.

Another very important effect of glaciations results from the amount of sea water locked up in ice caps. During the last glaciation, global sea level fell by as much as 120 m, so that at its peak the Arabian Gulf was dry and the combined Tigris/Euphrates river flowed directly into the Gulf of Oman. As will be explained later, this, and the post glacial rise in sea level, have had profound effects on the desert features in the Emirates.

Water in Deserts

Despite their aridity, it does occasionally rain in deserts. Within the Emirates, this is experienced most frequently when air is cooled as it is forced to rise over the Oman

Mountains and can no longer hold its contained moisture. After rain the water-filled wadi channels transport sand and clay particles towards the coast, but so often there is insufficient water to reach the sea. South of Ras al Khaimah, only one wadi channel, Wadi Lamhah, extends all the way to the coast. The channel of the only other important wadi, Wadi Yudayyah, loses itself among sand dunes while still over 20 km. from the coast; there, the wind has obviously been a more active sediment transporting medium than water in recent years. If the flow of wadi water is stopped by a barrier of dune sand, a temporary lake forms, with water-borne clay being the last sediment to settle. On drying out, the clays curl and crack in a characteristic polygonal pattern.

The most obvious signs of the action of water are the large boulder-strewn alluvial fans that spread westward away from the mountain edge. Although at present we have no direct means of measuring when these alluvial fans were deposited, several lines of evidence indicate that they are old. For example, there have been no storms within living memory that caused floods capable of transporting boulders of such large diameter and, in any case, the distal extremities of many of these fans are overlain by large and relatively old sand dunes (see **Action of Wind**, below). The fan surfaces lack the finer sands and clays that should be expected in such a location; apparently the "fines" have long since been

blown away (deflated) by the wind, leaving a 'lag' of boulders and pebbles that is too heavy for the wind to move. Many of these boulders seem to have split as the result of rapid temperature changes, especially in the evening, when the exterior of the sun-heated rock cooled and contracted more rapidly than of the sun-heated rock cooled and contracted more rapidly than its interior; a slow spasmodic process. And evidence from similar gravels in Saudi Arabia indicates that their deposition could have been as much as two million years ago.

When water is evaporated, any contained salts are concentrated and eventually precipitated as crystals. A salt commonly found on some desert surfaces is **Sodium chloride** (table salt), which forms a crust over damp areas of sand or clay desert known as **Sabkhas**. The forces of crystallisation of such salt are confined laterally, giving rise to salt polygons, whose edges can only grow upwards. A sabkha can form in both coastal and inland areas. The coastal sabkhas of the Emirates are world-renowned in geological circles and are described in greater detail below. Sabkha Matti on the western border of Abu Dhabi is a giant inland sabkha, and many small interdune sabkhas occur in the Al Liwa. Another salt prevalent in desert areas is calcium sulphate or gypsum, which grows within the sediment; it commonly forms a hard band some 10 to 50 cm below the sabkha surface.

The Action of Wind in Deserts

To the layman, perhaps the most characteristic feature of the desert is the sand dune. Under the action of the wind, sand saltates across the desert surface in a series of parabolic leaps and bounds, the wind impelling the grain onward each time it hits the ground and bounces back up.

Sand will start to accumulate when the velocity of the wind becomes too low for saltation to continue. The wind transports sand over a hard rocky surface more rapidly than over a patch of soft sand, thus creating a velocity gradient, so sand tends to be added to existing sand patches. First a low mound is built with its highest point down wind from centre then, as it increases in height, a point is reached where turbulence creates a slight back-flow at ground level, and an avalanche slope or slip face is created. On desert dunes, dry sand has a maximum angle of repose of 34°. Any tendency for saltating sand grains to increase the angle above 34° causes sand to slip, or avalanche, down the slope, thereby reducing the angle to some 30-32°.

Because wind transports sand more readily over a hard surface than over the soft sand-covered dune, the flanks of the dune tend to get drawn out in a down-wind direction, thereby creating the typical crescentic shape of a **barchan** dune.

Barchans form where the supply of sand is limited. With a more plentiful supply, Transverse Dunes form with their long axes at right angles to the dune-forming wind. Such dunes are well developed in eastern Abu Dhabi SW of Al Ain (Figs 2, 3), where they are separated by long interdune corridors or **Saruq** ("easy travel").

Transverse dunes are not stable at high wind velocities. In such circumstances they develop rather like the horns of a barchan with their long axes parallel to the main sand-transporting wind and are known as longitudinal dunes. Just how longitudinal dunes form is the subject of some debate, but it seems likely that they are built by horizontal contra-rotating wind spirals that develop because of the differences in drag at ground level between the relatively soft dune and the harder interdune area; this is exemplified by the parallel rows of longitudinal dunes of the Rub al Khali whose **saruq** are swept clean of sand. Unlike transverse dunes, whose avalanche slopes dip down wind, the slip faces of longitudinal dunes are directed almost at right angles to the prevailing wind.

Desert Coastal Sediments

The bulk of the Gulf coastline of the Emirates comprises lying lagoons and associated coastal sabkhas.

Most of the sand-size material found today along the Emirates coastline comprises carbonate particles. In the clear warm waters of the Arabian Gulf, organisms manufacture large quantities of calcium carbonate in the form of shells, especially minute **Foraminifera**, bryozoa fronds and coral heads. Larger fragments are reduced to sand or smaller particles by the action of wave-induced grinding and by boring algae. Tidal currents, especially when enhanced by the **Shamal**, carry sand-size and finer particles along the Emirates coast and build submarine banks. These banks eventually build up to sea level, where they shorten the coastline by crossing indentations and thereby create lagoons behind. The bars are capped by narrow beaches from which onshore winds blow sand into the newly created lagoon beyond.

Carbonate sedimentation eventually builds the lagoonal areas up to sea level, forming tidal flats. High spring and storm tides carry carbonate clay (much in the form of faecal pellets) many kilometres across the tidal flats where it is trapped by black, sheet-like gelatinous algal mats to create a typically laminated sequence. The surface of the tidal flat is thereby raised above the level of normal high tides to form what may be described as a supratidal environment. After the tidal water has receded, the clay and algae dry out, shrink, and crack to form polygons.

The coastal area of the Emirates is a highly arid environment. As each spring or storm tide recedes, shallow pools of water evaporate to leave a thin crust of halite on the surface while a layer of gypsum crystals grows within the carbonate clay at the level of the permanent water table. These salt-covered supratidal mud flats are coastal sabkhas, and locally have an active width that approaches 20 km.

Another feature of the near-coastal environments of the Emirates is the presence of carbonate-rich cemented dune sands. These sands were probably deflated from marine sediments of the Gulf that had been exposed during the last or earlier glaciations, and locally were deposited over older sabkha surfaces. Cementation into a rock occurred when the ground water became saturated with carbonate ions.

History of the Emirates Desert

As already mentioned, global sea level was some 120 m lower than present at the height of the last glaciation, and the Arabian Gulf was then dry land. It is that glaciation, and the succeeding flooding of the Gulf, which controlled most of the present distribution of desert sediments in the Emirates.

With strong Shamal winds and no water in the Gulf, sand dunes had an unhampered passage from Iraq and Northern Saudi to the Emirates and beyond to the Rub al Khali, following a semicircular route dictated by the global air-pressure systems. On Landsat imagery, this route can be readily followed within the eastern Emirates from the distribution of large transverse dunes that radiate clockwise like the spokes of a wheel. The pattern is more complex further west, however, where the orientations of several different dune types have slight angular differences between them. These conflicting patterns were probably controlled by the progressive late-glacial flooding of the Gulf (Fig. 3). This reached its peak only some 6000 to 7000 years ago and effectively cut off all supplies of dune sand to the Emirates with the exception of carbonate deflated from the sabkhas.

The dune patterns indicate that as the Gulf became flooded, so the prevailing wind's direction shifted slightly. In central Abu Dhabi, an older pattern of large SE trending dunes and intervening saruq is partly overlain by a younger system of smaller transverse dunes migrating to the SSE and, nearer to Sabkha Matti, by longitudinal dunes aligned NNE-SSW. These younger systems of smaller dunes also encroach on the northern crescentic edge of the giant dunes of the Liwa. Almost everywhere in the Emirates, small, modern dunes are derived from, or are parasitic on, older dunes that have an axial orientation differing by as much as 45°. And in some cemented dune sands, the wind direction deduced from their bedding attitudes can differ by up to 90° from the present direction.

The inland sabkhas of the Liwa result from the intersection of the interdune surface with the water table. The large (up to 100 m high) Liwa dunes are of transverse type and have slip faces oriented to the south. Under the prevailing wind regime, the windward surfaces of these large dunes are being reworked into smaller forms, but southward migration of the major slip faces is not obvious. Desert roses form locally at the interface between dune and sabkha by the incorporation of dune sand into the lattice of growing gypsum crystals.

The effect of the late glacial marine flooding has had a very clear and profound effect in Sabkha Matti. At the height of the glaciation, dune sand was able to cross the Gulf of Salwa from Saudi to Qatar and thence to a dry Sabkha Matti, where it migrated on into the Rub al

Khali. Following flooding of the Gulf of Salwa, the dunes of Qatar are now all concentrated close to the country's SE coastline, where they are slowly migrating into the sea. Sabkha Matti, on the other hand, has not only lost its supply of dune sand from the NW, but the water table rose in conjunction with the marine flooding and has converted the area into a vast inland sabkha whose surface is still only about 80 m above sea level some 100 km south of the coast.

In northern Sabkha Matti the distribution of the SE oriented former sand dunes can now be recognised on both Landsat imagery and on the ground from their stubs, which project only a metre or two above the sabkha surface; further deflation is resisted by the damp surface of the sabkha and, on the dune stubs, by capillary assisted gypsum cementation. The deflated uncemented upper parts of these northern dunes has sourced other dunes further south, where transverse sand dunes with south facing avalanche slopes become the standard form.

With late-glacial flooding, the coastline of the Emirates has been modified quite drastically. In many areas the creation of coastal sabkhas has either kept pace with the rise in sea level or has built out to sea at a very rapid pace since it reached its peak some 6000 years ago. In the more gently sloping areas such as around Abu Dhabi island, the coast has probably prograded into the Gulf by as much as 30 km during the past 8000 years or so. Where the land slopes more rapidly, as around Umm al Qaiwain, for instance, progradation is only a third of that and between there and Ras al Khaimah is a strip where sand dunes are being eroded by the sea because they lack the protection of a coastal sabkha.

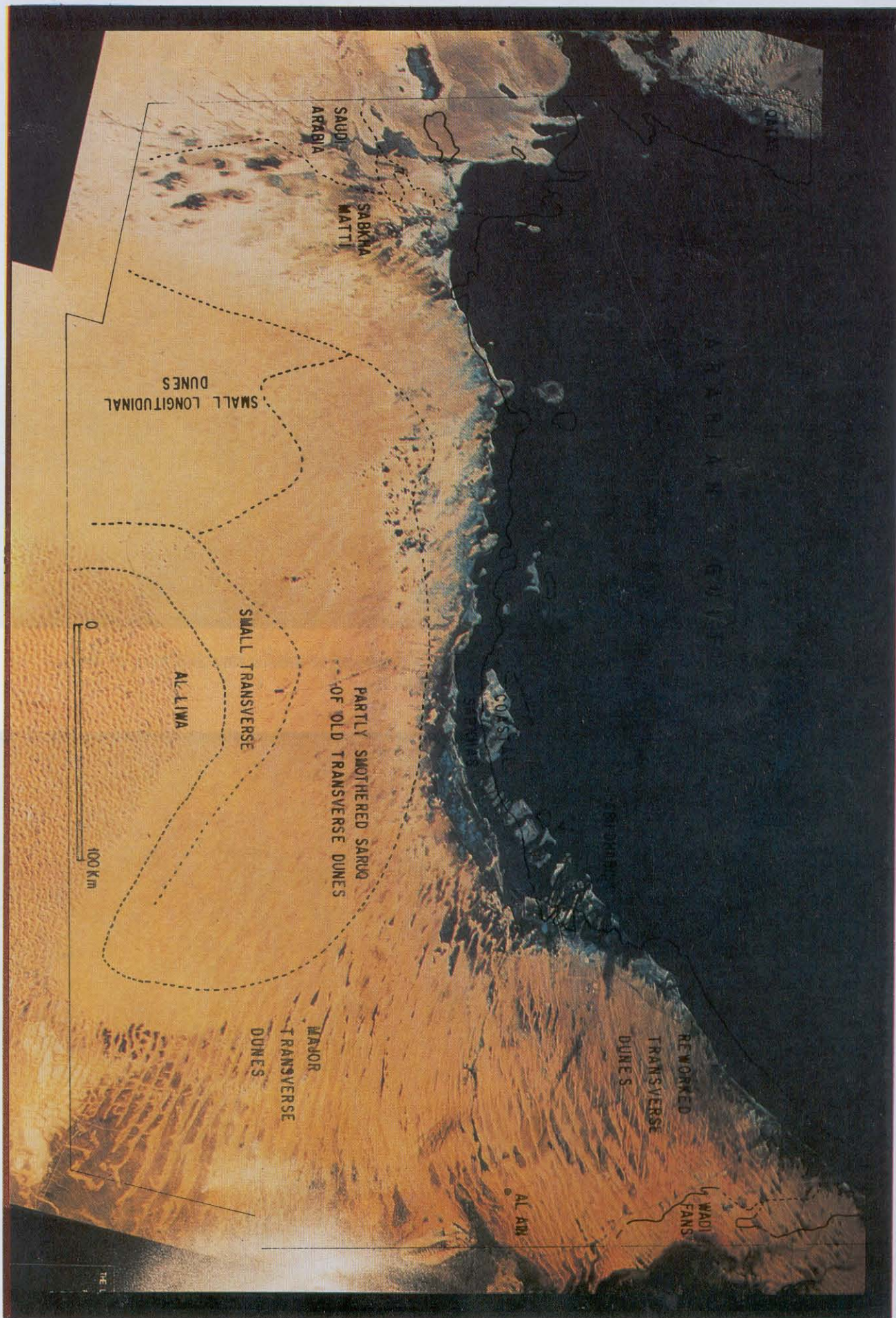
The Emirates is an area where not only is its sub-recent history fascinating, it also provides geological evidence that is either lacking elsewhere or is not nearly so well displayed. It is therefore scientifically important, and should be the subject of more intensive studies before man destroys that evidence.

Figures

1. A Diagram illustrating the origin of the Earth's air pressure belts, and the areas of tropical Trade Wind deserts. 1B & 1C. The differences, shown schematically, between the global wind systems of glacial and interglacial times.
3. Map of the main dune systems of Arabia together with the approximate coastlines within the Gulf at different stages during post-glacial flooding.

(Figure 2 on colour centre pages)

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Landsat image of the Emirates on which the distribution of the main types of desert environment, wadi, dune, inland and coastal sabkha, can be discerned, Image by courtesy of Abu Dhabi Company for Onshore Oil Operation.

(Figure 2 for "Sand Dunes in the Emirates," see Page 16.)



*The Al Ghar Lake near Abu Dhabi - site of a breeding colony of Black-winged Stilts in 1990 and 1991. (P. Hellyer)
(See Page 26).*



*Roman glass uncovered during the winter 1990 excavations at Ad Door, Umm al Qaiwain. (P. Hellyer)
(See Page 18).*



*The first family of Egyptian Geese to breed ferally on Abu Dhabi island, in 1989. Another pair bred in 1990.
(J.N.B. Brown)*



Tribulus omanense (R.A. Western)



A dugong photographed in the Abu Dhabi fish souq prior to the introduction of a conservation order on the declining species. See Page 20. (J.N.B. Brown)



A leech moving in a falaj at Aboule. See page 26. (J.N.B. Brown)

Winter Excavations at Ad Door

by Peter Hellyer

A fourth season of archaeological excavation at the Ad Door site in Umm al Qaiwain by a Belgian University team took place in October and November 1990.

The key discovery was an undisturbed rectangular covered tomb, dated to the First Century of the Christian era, in which fifteen burials were found, as well as iron weapons, bronze utensils, pottery and beads. Two camel skeletons were found just outside the tomb. A well was also discovered, which will be excavated in the 1991 winter season.

In the past four seasons, the Ad Door site has yielded a number of tombs as well as a temple building, but no houses or other domestic buildings have been found, and the exact function of the site remains unclear.

The fourth successive season of archaeological work at the Parthian era site of Ad Door in the Emirate of Umm

قام فريق تابع لجامعة بلجيكا في شهري أكتوبر ونوفمبر ١٩٩٠ بإجراء أعمال الكشف عن الأثار في موقع الدور في أم القيوين للفصل الرابع على التوالي.

وكان الاكتشاف البارز مقبرة مغطاة مستطيلة الشكل في حالة جيدة تعود الى القرن الأول بعد الميلاد تحتوي على ١٥ قبراً وأسلحة حديدية وأدوات برونزية وأواني فخارية وخرز. كما تم العثور على هيكلين عظميين لجمالين خارج المقبرة وكذلك على بشر سيتم الكشف عنها خلال فصل الشتاء من عام ١٩٩١.

al Qaiwain took place in October and November 1990, carried out by a team from the State University of Ghent



*The remains of the Parthian-era temple at Ad Door, Umm al Qaiwain, discovered by the Ghent University team.
(P. Hellyer)*

in Belgium, led by Professor Ernie Haerinck. In previous years, teams from the University of Copenhagen, (Denmark), the University of Lyons, (France), and the University of Edinburgh, (United Kingdom), have also taken part, with the four teams working throughout the winter months from October to April.

This account is largely based upon information provided by Professor Haerinck, in both the 1990 and previous seasons.

The Ad Door site lies on a range of sand dunes rising to a little over 12 metres above sea level, and adjacent to the shallow and largely silted inlet of Khor (Creek) Yfrah, itself an extension of the larger Khor al Beida, on the southern Arabian Gulf. The main road to Ras al Khaimah runs between the dunes and the Khor. Dated to between 100 BC and 300 AD, though with the main occupation in the First and early Second Centuries AD, the site covers an area of approximately two kilometres square. Evidence of much earlier Iron Age and Third Millennium BC occupation has been discovered from surface examination of surrounding areas, while the 'tell' of Tel Abra, around four kilometres to the South West, has yielded evidence of continual occupation from the Third Millennium until the middle of the First Millennium BC.

The first excavation, on the site of a fort, was carried out by an Iraqi expedition in 1973-74, but no further work was done until the arrival of the European teams in 1986-1987, despite the presence of very substantial numbers of potsherds on the surface of the site.

The name of the site in antiquity remains unknown. Unclear references in the literature of the period mention the existence of a port called 'Omana' on the Southern shores of the Arabian Gulf, and no other settlement of such a size has thus far been identified between the Qatar Peninsula and the Straits of Hormuz. Aerial and ground surveys have, however, so far failed to locate any evidence of a port near Ad Door, while the purpose of the settlement itself remains open to question.

Besides the fort and number of tombs, the site's most important find in previous years has been a rectangular temple, with plaster on its interior and exterior walls, which was discovered on the south western edge of the site three seasons ago by the team led by Professor Haerinck. Dated to the First and Second Centuries AD, the building is the finest remaining example of Parthian era architecture so far to be found in the lower Arabian Gulf. Four altars were subsequently discovered adjacent to the temple, together with a well.

The major discovery of the Ghent University excavation in 1990 was a previously undisturbed tomb, oriented in a North-South direction, with a vaulted roof, traces of which were visible on the surface of a shallow mound prior to excavation. When it was built, the tomb's roof was probably around 40 cm above the surrounding natural surface. The roof was removed to permit excavation.

The rectangular tomb was constructed of blocks cut from soft deposits on the nearby seashore. The inner measurement of the chamber was 1.70 metres by 2.70

metres, with a peak height of 2.2 metres. The door of the chamber was a single large block of stone, which still retained the shells of barnacles, and which was sealed with plaster.

A low rectangular enclosure extended from the North end of the tomb, sheltering the door, and open at the extreme Northern end, which, from examination of the stonework, had been clearly added at some time after construction of the tomb. Within this enclosure, but below the base of its walls, was a much smaller rectangular tomb, again undisturbed, while a small undisturbed circular tomb was found outside. Both, when excavated, proved to be of children.

When opened, the main tomb proved to contain 15 skeletons of adults, twelve male and three female. There was clear evidence of the tomb having been re-used in antiquity, the most recent burial being near the door, with the others pushed back into the tomb. A total of fifteen carved bone plaques, (one for each burial?), were found placed in a line on one side of the inside of the tomb-evidence of a local burial custom signifying something to do with a belief in the afterlife?

The grave yielded a substantial quantity of funerary goods, including glass bottles and vessels, all dated to the First Century AD, and, in some cases, very finely worked, in, for example, the shape of a bunch of grapes. The collection is the best so far found in the Emirates of glass from the period.

Other finds included iron swords, spearheads and daggers, and bronze sieves and bowls, as well as a strainer and ladle. The bowls were decorated with horse-shaped spouts. Of similar design to others found in the Arabian Peninsula, in north eastern Saudi Arabia and at Samad, in Oman, they are believed to have been made in the region. Both the ladle and the sieve, decorated with birds and floral designs, were of a style indicating they were imports from the Eastern Mediterranean area.

Other finds included around 500 beads, made of frits, quartz, cornelian, agate, natural pearls and amethyst, as well as one in the shape of a scarab, indicating an Egyptian origin. Only one coin was found this season, very debased, but of the typical Ad Door style. Excavations carried out near Mileiha, in the Emirate of Sharjah, have previously located the site of a possible mint.

Outside the tomb, but adjacent to it, the skeletons of two camels were found in a single pit, which were probably slaughtered as a part of funeral rites. A similar camel burial was found two seasons ago by the University of Lyon team working elsewhere on the Ad Door site, though in this latter case, a dagger was found between the ribs of the dead camel. No such weapon was found in the Belgian excavation.

Other finds during the 1990 excavations by the University of Ghent team included a well of around 1.70 metres in diameter, which will be completely excavated in the 1991 season. The other well found by the Belgian team near the temple a couple of years ago proved to be 1.2 metres across, and around 6 metres deep. Deposits on its sides indicated that the fresh water table

in antiquity was probably only around 4.5 metres above the prevailing sea level. This first well is now dry, suggesting a desiccation of the climate in the past 1,900 years.

A number of the small stone platforms typical of the site were also cleared. As on previous occasions, they were found to have no evidence of walls, while the surface is very uneven, unsuitable for the floor of a dwelling. Although no evidence has yet been discovered to prove their use, Professor Haerinck speculates that they may have had some connection with local burial customs.

The nature of the Ad Door site as a whole remains unclear. The extensive surface scatter of pottery suggests occupation over a considerable period, but the only structures so far excavated, apart from the 'fort' are tombs or the temple. No houses have yet found, although it is, of course, possible that the inhabitants used perishable materials, like 'barasti', for their dwellings.

Although adjacent to the sea, no evidence of a port has been found, while Khor Yfrah itself is silted up, and was probably too shallow for anything but the very smallest of craft at the time Ad Door flourished. Was it perhaps

primarily a necropolis for local tribes, who journeyed to it for burials, and some coastal trade? The evidence of imported goods, from the Roman Empire and from Baluchistan and Sind, as well as the sophistication of the building techniques used in the tombs and temple, suggest the existence of at least a partially settled, trading community, which, if the evidence is to be believed, at least minted its own coinage, even if it was subject to the nearby Parthians on the other side of the Gulf.

Many questions about Ad Door remain to be answered, while hypotheses developed one year by one team come under review or are discarded the next year by another. With a large area yet to be explored, the answers to the riddle, as with so many in Emirates archaeology, may yet lie beneath the sand.

The author is Chairman and Archaeology Recorder of the ENHG.

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* * *

Dugongs - a summary of their status in the UAE

by J. N. Bish Brown

Believed to be the origin of the legend of the mermaid, the dugong is one of the world's most endangered species of marine mammal. This paper reviews its status in the UAE and Arabian Gulf.

Almost five thousand years ago, the villagers who lived on the island of Umm an Nār, just over the Muqta Bridge from Abu Dhabi City, probably harpooned dugongs for food. Many dugong bones and tusks were found inside the village and tombs dating from 2,700 BC. The site was believed to have been inhabited for about three hundred years.

Dugongs, *Dugong dugon* (Muller, 1776) are large marine mammals measuring up to 3 metres long and weighing 170 kilos, rarely seen, but nevertheless present in small numbers over a large area of the Arabian Gulf. The males show 2 or 3 inches of tusk, but the females do not. They inhabit the warm, shallow, coastal waters and inshore Khors of the United Arab Emirates, from Sadiyat and west to Sila and the Qatar coast. Their diet consists almost exclusively of sea grasses, which grow in the fine sandy bottom sediments. They do not thrive when the water temperature falls below 18 degrees centigrade.

Other populations are known from north-west of Qatar, Bahrain and the Arabian Gulf coast of Saudi Arabia. The Meteorology and Environmental Protection Administration (MEPA) of the Kingdom of Saudi Arabia, recently carried out surveys of the dugong population in the Arabian Gulf. It was estimated that there are more than 7,000 in the area, including the United Arab Emirates, out of a world population of around 30,000

يعتبر حيوان الأطوم، الذي يعتقد بأنه أصل أسطورة حورية الماء، من أكثر أنواع الثدييات البحرية تعرضاً للخطر. ويعرض هذا البحث أحواله في دولة الإمارات العربية المتحدة والخليج العربي.

animals. During the survey in 1986, one herd of more than 600 was sighted and photographed between Bahrain and Qatar.

The massive oil spillage in the northern Gulf, which started towards the end of January 1991, could have disastrous effects on the dugongs. Very early on it was reported that more than thirty had been washed up dead on the coast of Saudi Arabia. They have to surface at regular intervals to breathe and will probably swallow oil at the same time. In addition, when the oil forms globules and drops to the seabed their food plants are likely to be damaged. Dredging in the shallow waters also destroys the seagrass beds.

During fishing operations a number of dugongs are caught in the nets and are drowned. Most are caught in the months from December to March, and there are probably a few in other months. This could mean that some of them migrate from the area at the end of March. Although the fishermen insist that they do not deliberately set out to catch them, many do end up in the fish suq. Following daily visits to the Abu Dhabi fish suq in the late 1970's, it was estimated that the annual catch delivered was between 50 and 70. More recently fewer have been seen in the suq, but it is difficult to judge whether this is because fewer are caught or because they are sold elsewhere. If fewer are caught, it could mean that numbers are decreasing.

Most of the dugongs caught originate in the Khor al Bazm and are landed at Mirfa or other small villages on that coastline. In 1989 a pile of more than 12 skeletons was discovered at Hamiya, west of Mirfa. For a number of years, one family of two adults and probably three younger animals inhabited the channels around Bahrani Island, just west of Abu Dhabi. In March 1989, it was discovered that one of the larger animals, probably the female, had been butchered on the beach. The family has not been reported in the area since. The skeleton was recovered, partially cleaned and now awaits reconstruction in the Old Fort.

Dugongs have a very low breeding rate and this makes them vulnerable to extinction. Indeed, they are listed on Appendix 1 of CITES (Convention on International Trade in Endangered Species of Fauna and Flora). Males and females have to be at least 9 or 10 years old before they start to breed. The gestation period for the female is believed to be 12 months, with only a single calf being born, rarely twins. Calves usually start eating seagrasses a few weeks after birth. The interval between births is likely to be a minimum of 2 years, but may range from 3 to 6 years. Individual dugongs can be long lived, with a life span of 60 years or more.

Dugongs have not been successful in captivity, only very few surviving more than a few months. None have been bred in captivity.

If dugongs are to survive in the Arabian Gulf, the ideal conservation measure would be a total ban on catching them for commercial purposes. Another comprehensive

study should be undertaken on the biology and status of dugongs in the Arabian Gulf. A marine Nature Park could be set up in a suitable area of the Khor al Bazm to give them, and other marine animals and seabirds, some protection from over-exploitation. Fishermen could be advised of the current precarious status of dugong, and be encouraged to release any live dugongs found in their nets. Dead dugongs could be reported to the relevant authority, without penalty or profit to the fishermen, and where possible the carcass could be recovered and used for scientific investigation.

To build up a picture of the current status of dugongs in the waters of the United Arab Emirates, anyone sighting a dugong, alive or dead, is requested to report it to the Group Mammal Recorder. Positive aerial sightings would also be appreciated. Remember, fast, noisy motorboats and dugongs do not make an ideal match and the dugongs will submerge and disappear, if not approached quietly.

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Birds of Dalma Island

The island of Dalma, in Abu Dhabi's Western Region, was visited by two Group, bird-watchers in October 1989. The descriptive note of the trip includes the discovery of a possible breeding population of Sooty Falcons, as well as a list of species seen.

Birds of Dalma Island, 19/20 October, 1989

by Adrian Chapman

An opportunity arose to visit an island in the Western Region of Abu Dhabi Emirate, namely the isle beyond Sir Bani Yas, Dalma, lying at 24 30'N, 52 18'E some 31 miles north east of Jebel Dhanna, and rising to about 96m in the central hilly area. The island falls in squares SA25/26 of the Atlas of Breeding Birds of Arabia project, ABBA. Although the island is remote and naturally arid, it has a considerable human population, stated to be about 5,000, complete with hospital, schools, roads, power station and desalination plant to support the people living there. Most of the population of working age appear to be employed either by the 'Municipality' or 'Dalma Co-operative Society'; though from the number of fishing boats seen in the dhow harbour it is clear that the main source of income for the community is derived from the sea. Most of the fish sold in Abu Dhabi suq comes from the boats of these fishermen.

قام فريق ينتمي الى الجمعية ويتكون من عاملين يهتمان
بمعاينة الطيور بزيارة جزيرة دالما في شهر اكتوبر ١٩٨٩.
ويشمل البيان الوصفي عن الرحلة اكتشاف ما يحتمل ان يكون
جماعات متكاثرة من صقور السخام وكذلك قائمة بالانواع التي
تمت معاينتها.

Our trip began at Mugharrak jetty, and we were to have had a speedboat for the trip across but things looked decidedly dodgy as the speedboat limped to the jetty with one engine 'finished'. We were advised to take the ferry, and this advice was readily heeded. The ferry is a wooden dhow-like craft with superstructure accommodation separated for women and men. It is a slow boat, but was even slower than usual on this occasion, towing a clapped-out speedboat as well. This was soon to have compensations.

As we left the mainland a few birds were seen in the vicinity of the peninsula and adjacent sandbanks, including Oystercatcher (*Haematopus ostralegus*), Curlew (*Numenius arquata*), Herring/Lesser Black Backed Gulls (*Larus ?*), Lesser Crested Tern (*Sterna bengalensis*), and White-cheeked Tern (*Sterna repressa*). About 20 minutes into the journey someone

noticed a bird flying on a path from Sir Bani Yas to Jebel Dhanna. At a distance it appeared all dark with wide wings and a lazy flapping motion. When examined with binoculars, we were stunned to find it was a Short eared Owl (*Asio flammeus*), having checked out its crescent shaped dark carpal patches and dark tips of its primaries. Watching this bird making the daylight trip across the sea from Sir Bani Yas to the mainland at what seemed a pitifully slow pace, one wonders how long it took to arrive at Sir Bani Yas across the sea from wherever it came.

The remainder of the three hour plus trip was spent watching various birdlife which was constant, though not particularly numerous. Of interest were Pomarine Skuas (*Stercorarius pomarinus*) chasing the terns, Saunder's Little Tern (*Sterna saundersi*), Swift Tern (*Sterna bergii*), and the ubiquitous Lesser Crested Tern. Also seen on the crossing were small parties of 30 and less of Socotra Cormorants (*Phalacrocorax nigrogularis*).

We arrived on the island just before sundown and were met by our host after police formalities and inspection of our belongings by the local customs. This was an experience we'll remember for a long time! A brief tour of the urbanised end of the island including a look around agricultural projects, fishing boat harbour etc. and then to our accommodation, a beautiful chalet set in a huge fruit garden. Although the light was failing fast it was clear that the island had a large migrant bird population, judging from the flycatchers, wheatears and warblers to be seen in this single garden.

We were up and out at daybreak the next morning, and as promised by the previous evening's sightings the birdlife abounded. We drove on the so called 'ring road' around the island at a leisurely pace, stopping to identify everything and to investigate every likely cultivation. The shoreline is basically rocky, so not many waders were seen, but the areas of cultivation and even the wildest hilly areas held migrants. I will list the bird species seen at the end of this note but our most spectacular and unexpected find was a predator of the migrant birds.

Dave Robinson spotted something perched atop a hill on the skyline, at least a kilometre away. Inspection with binoculars revealed it to be a falcon, species impossible to say at that range. We soon saw another., and another at much closer range. We even saw one or two in the air. Small, long winged falcons, uniform soft grey bodies, and grey head above and below, darker wing primary feathers, yellow legs and bill. it could only be a Sooty Falcon (*Falco concolor*). In total we probably saw six or seven, but it could have been up to ten individuals. Seeing our excitement Mohammed, our guide, went on to tell us that these birds were always here, and that in winter one old local inhabitant captures them for falconry. This cannot be true as Sooty Falcons are not used for falconry, being too small and they are summer visitors, leaving the nesting areas in October/November. So the birds caught in winter would probably be Peregrine and/or Saker Falcon and possibly these birds are a summer visiting breeding population. This will have to be confirmed in future but

by the numbers and behaviour of these birds we think it likely that Sooty Falcon (*Falco concolor*) have a breeding population on Dalma.

After brunch we were off again, this time complete with families, for a tour of the hinterland. About 80% of the island is low lying volcanic rocky hills criss-crossed with tracks. Even here wheatears and larks were seen and the occasional Sooty Falcon. From the track we noted some greenery and Mohammed told us this was where the island population's sewage was dumped. I'm sure he thought we were crazy when we headed straight for it.

An area of about two or three acres has been flattened and therein were found a variety of trees, plants and grasses, a veritable haven for birds well away from human disturbance save for the sewage dumping trucks. Other notable finds were an Osprey nest (*Pandion haliaetus*) on a rocky bluff at the northern tip of the island and the most beautiful male Hobby (*Falco subbuteo*) perched in a dead tree on the outskirts of the town at the southern end of the island.

Species seen 20 October, 1989, Dalma Island and adjacent Sea.

<u>English Name</u>	<u>Notes</u>
Cormorant	1 at North end of island
Socotra Cormorant	Numerous offshore
Reef Heron	c20
Grey Heron	c10
Osprey	Nest on rock at North end of island
Hobby	1 adult
Sooty Falcon	See narrative
Quail	2
Oystercatcher	2
Ringed Plover	1
Kentish Plover	several
Lesser Sand Plover	c250
Greater Sand Plover	2
Bar tailed Godwit	c10
Whimbrel	1
Curlew	2
Redshank	3
Terek Sandpiper	6
Common Sandpiper	2
Turnstone	1
Pomarine Skua	c10 at sea
Slender-Billed Gull	c300
Lesser Black backed gull	c10
Herring Gull	c10
Swift (Crested) Tern	2 at sea
Lesser Crested Tern	c300
White-cheeked Tern	Few at sea
Saunder's Little Tern	Few at sea
Palm Dove	c20

Rose ringed Parakeet	4
European Nightjar	2
Hoopoe	1
Black-crowned Finch Lark	2
Short toed Lark	c20
Crested Lark	c20
Sand Martin	6
Swallow	c20
Tawny Pipit	3
Long-billed Pipit	2 in hills
White Wagtail	Common around coast
Yellow Wagtail	1
Isabelline Wheatear	c20
Pied Wheatear	c20
Desert Wheatear	c40
Olivaceous Warbler	1
Menetries Warbler	3
Desert Warbler	c10

Lesser Whitethroat	6
Desert Lesser Whitethroat	1
Garden Warbler	1
Chiffchaff	3
Spotted Flycatcher	c20
Red-breasted Flycatcher	1
Isabelline Shrike	c10
Great Grey Shrike	5 L e pallidirostris 1 L e aucheri
Indian Silverbill	c20
Ortolan Bunting	2

This report would not be complete without expressing our gratitude to Mr. Eyad Said and Mr. Ghussain of Dalma Co-operative Society for organising the trip and providing such an excellent opportunity and much appreciated hospitality.

J A D Chapman
P.O. Box 997, Abu Dhabi, U.A.E.

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NOTES & QUERIES

Neolithic (?) Flint Hand Axe Or Scraper

- Collected : Friday 8 June 1990, by T D Adams, ENHG
- Location : Habshan; c.1 km south of Km 16 Bu Hasa road, lying on soft sand at eastern edge of exposed gravel surface, south of slip face of prominent dune.



Description

The flint implement has been formed from a single piece of originally weathered flint some 4.2" long at its leading cutting edge; 2.5" wide and 0.4" thick. The external surface of the flint is covered by a white silica carbonate skin. The cutting edge is formed of translucent grey flint. The upper sector of the flint is bounded by a weathered curved edge which forms a right angled triangle against the cutting surface. It is probable that the flint was especially selected because of its comfortable fit within the hand, to be held firm by the digit finger along the upper edge.

The blade is uniformly (c) 0.5" wide, and has been delicately worked, to obtain a particularly sharp cutting edge. Between 6 to 8 conchoidal fracture lines per 0.5" length confirm the precision of the work involved in creating the minimum serration of the cutting edge.

The scraper is a particularly fine specimen and has been donated to the Al Ain Museum, where it is now on display with the flint arrow heads previously collected from the same site by J N B Brown and R A Western.

Some interesting fossil lake deposits occur within the vicinity of this find. These are currently undated, but within the context of the Liwa sands, these beds reveal a dramatically different climatic past. They could be coeval with the hand axe culture, but this remains unproved. Equally they could be coeval with Pleistocene lake deposits reported from the deserts of Saudi Arabia. In this event, these fossil lake beds at Habshan could prove to be a fertile hunting ground, in the future search for early hominids within the Emirates.

DR T.D. ADAMS.

Saline Agriculture

Soil with elevated salt concentrations and groundwater that is too saline for irrigating conventional crops are increasingly alarming problems for arid regions of the world. Our largest source of water, seawater, is generally considered unsuitable for irrigation. The United Arab Emirates University recently hosted the **International Conference on High Salinity-Tolerant Plants in Arid Regions**. The conference focused on the unique problems associated with salinity concentrations at or above seawater.

Salinity levels in water vary from fresh water which might have a salt concentration of 125 ppm, to the Colorado River in the western United States with about 850 ppm, to seawater with a typical concentration of 32,000 - 45,000 ppm.

While salts occur naturally in all soils, the problem in arid regions is compounded because there is little rainfall thereby causing the dissolved salts to become more concentrated. In the UAE, some groundwater wells have salinity levels of between 12,000 ppm and 20,000 ppm.

Problems with conventional crops begin to appear when using even moderately saline irrigated water, i.e. 250 ppm - 500 ppm, and the problems are generally considered severe when water contains salt concentrations of 2,500 ppm to 5,000 ppm.

During the past twenty years, research has focused on the development of salt-tolerant plants and has resulted in some progress towards developing strains that can provide food, fuel, fodder, fiber, resins, essential oils, and pharmaceutical feedstocks. A few halophytes (plants that grow in soils or waters containing significant amounts of inorganic salts) such as *Suaeda maritima* actually show increased yield under elevated salinity conditions.

However, there is not yet a comparable body of

research on plants that are able to withstand, or indeed even flourish under conditions of very high salinity, i.e. +/- 35,000 ppm. The challenge facing scientists now is to develop research projects which address questions peculiar to these very high level salt concentrations.

Towards this end, the United Arab Emirates, under the directive of His Highness Shaikh Zayed bin Sultan al Nahyan, President of the U.A.E., established the **Zayed International Experimental Farms for High-Salinity Tolerant Plants**. The farms' objectives are dedicated to establishing and performing research on halophytes, the creation of saline irrigated agriculture, and to providing University extension services.

The Zayed International Experimental Farm site at Nahshalah is currently cultivating a variety of plants using water with concentrations of 20,000 ppm. Other research is being conducted with several species using direct seawater irrigation. Additionally, investigations are under way into problems such as those associated with poor drainage (and the subsequent build up of salts and other toxins).

The United Arab Emirates is set to become the international focal point for high salinity research and continues to develop its ties with other research projects around the world.

Persons interested in more details on this field would find the book : **Saline Agriculture : Salt-Tolerant plants for Developing Countries**, 1990, National Academy Press, Washington, DC, interesting and further local information can be gained by contacting Armin Lieth, Director of the Zayed International Experimental Farms at Box 17777, Al Ain, UAE, or by phone at 667-402.

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Ajman Archaeology

A team from Belgium's State University of Ghent headed by Professor Ernie Haerinck completed excavation of a late Third Millennium tomb at Muwaihat, in Ajman, during a three week season in December 1990. The tomb was first excavated by a team from the Al Ain Department of Antiquities and Tourism under the direction of Dr. Walid Yasin al Tikriti in 1986-1987, but the lower two of the six layers of the bone deposit were not excavated at that time.

The 1990 excavation yielded 60 skulls, only three or four of which were of children. Together with the 79 found in the previous excavation and the fact that one third of the tomb's area had been destroyed by trench-digging at the time of discovery in 1985, this suggests that the tomb must have contained in excess of 150 burials.

Also uncovered in 1990 were a substantial quantity of beads, bronze implements, including awls, daggers and rings, steatite vessels and pottery. Pottery found by Al Tikriti in the tomb was all dated to the Umm an Nar

period, between 2,300 - 2,000 BC.

The tomb, 7 kilometres inland from the present coastline, but 500 metres from the ancient shore-line, is rectangular in shape, 3.9 metres by 2.1 metres, below original ground level, and was built of rough limestone and paved with slabs. Three metres away is another Umm an Nar tomb, of typically circular shape, excavated in 1986 by Al Tikriti. A contemporaneous settlement area lies around 300 metres to the north east.

(A report on the earlier excavations may be found in :

Umm An Nar Culture in the Northern Emirates : Third Millennium BC Tombs at Ajman, by Dr. Walid Yasin al Tikriti, in 'Archaeology in the United Arab Emirates,' Vol. V. 1989, published by Department of Antiquities and Tourism, Al Ain, UAE)..

PETER HELLYER,
Archaeology Recorder

Annelida – Earthworms, Ragworms and Leeches.

Leech – Family : Hirudinidae

On 13th April 1990, one specimen of leech was found in shallow flowing water in a falaj below the fort at Aboule, near Mahdah, Oman. It was moving in a looping motion along the side of the channel keeping itself in the shade. In the same channel there was one toad, some tadpoles and a few very small fish. As leeches normally suck blood these are probably its source of food.

The leech was about 3 cms long, but at least twice that when extended for movement. The top of the body was mottled pale greenish yellow. There was a full length orange stripe along each side of the body with a blue-ish green line above it. The underside was black. The body appeared segmented into small rings like an earthworm. There were two small black dots on top of the head near the front, which could be eyes. The rear sucker pad was black and about 7 mm in diameter with another smaller one under the head. The underside of the body also seemed to act as a sucker to hold the animal against the flow of water.

I have assumed this species sucks blood for food, like most other leeches are reported to do. This is the first specimen recorded by the Group from this area. A distribution map for the Arabian Peninsula shows the nearest location of any species to be 1,000 kilometres west of Aboule. I have tentatively identified it as *Limnatis nilotica* (Savigny, 1822), but we may never know how nice or nasty it might be, unless we can find a specialist to positively identify it.

After discussing the leeches with Dr. Reza Khan, Director of the Dubai Zoo, he subsequently found ten more leeches in the falajes (afaj) at Aboule.

Reference :

Kinzelbach, R. & Ruckert F., 1985. The Leeches (Hirudinea) of Saudi Arabia. *Fauna of Saudi Arabia* 6 : 155-161.

BISH BROWN
Reptile Recorder

* * *

Black Winged Stilts at Al Ghar Lake

This large expanse of water, often covering several square kilometres, is situated to the west and below the hill on which the Mafraq Sewage Plant stands and is close to the Al Ain lorry road, some 45 kilometres south east of Abu Dhabi City. The area, known as Al Ghar [Map Square UB25], is mainly coastal sabkha, [salt flats], surrounded on three sides by low sand dunes with a sabkha bund on the fourth side. It is basically a manmade lake which fills up during the annual rains. Occasionally it is charged with surplus water from the sewage plant, but this is an irregular occurrence. When it does happen in large quantities, the treated water reduces the salinity and enables the growth of algae. The deepest part of the lake is never more than about two metres and quite often it dries up almost completely.

Following the substantial winter rains of late 1989 and early 1990, a level of water formed in the lake which attracted many wading birds that had stopped in the UAE, while on their migration flight northward. At the beginning of April, it was noted that a few Black-winged Stilts had arrived at the lake. The species, an uncommon winter visitor and passage migrant, is an opportunistic breeder, and was first recorded breeding in the UAE at the East Coast site of Kalba, [Map Square WA27] in 1988. It is only a scarce visitor to the Emirate of Abu Dhabi, where no more than twenty had previously been recorded at one time.

Observation of the lake made it clear that pairs were forming, and the first chicks were seen at the end of April, adjacent to the main road. This was a first breeding record for Abu Dhabi Emirate. Despite the presence of Brown necked Ravens (*Corvus ruficollis*), presumably seeking food, the temporary colony of Stilts continued to thrive over the next few weeks. A count at

the end of June showed around 300 Stilts to be present, almost two thirds of them juveniles, while as late as July 1st, three flightless chicks were still to be found on the main breeding site, an island by then reconnected to the land by the falling water level.

Owing to the extent of the lake, and the difficulty of access to some of its fringes, a detailed count of the number of pairs breeding was not possible, but available evidence during the summer suggests that as many as fifty pairs bred, with some either breeding much later than others, or laying a second clutch. This is the largest (temporary) breeding colony known for the species in Eastern Arabia.

Reports from late August showed that around 100 stilts were still present, even though the water level had by then dropped substantially. 125 were counted at the end of October, rising to nearly 250 by the end of November 1990, when some shooting occurred and they all departed. The shooting was quickly stopped by the authorities and a few stilts had returned by early February 1991.

The only other species to breed around the lake in 1990 was the Kentish Plover, with numbers in excess of 100 being counted and small chicks being found as late as the 1st of July.

The food content of the water must only be suitable for certain species of birds, as it is doubtful if there are any fish in it. A small fish called the Desert Pup (*Aphinius dispar*) is known to tolerate almost impossible conditions, but its nearest location is in the fresh water of the wadis. Flamingoes sift the water for algae and other small organisms, Red-necked Phalarope will be taking surface insects, but what are the wading birds finding around the edge of the water ?

List of Birds seen from April to November 1990.

- 0007 Little Grebe (*Tachybaptus ruficollis*)
0012 Black-necked Grebe (*Podiceps nigricollis*)
0147 Greater Flamingo (*Phoenicopterus ruber*)
0184 Teal (*Anas crecca*)
0186 Mallard (*Anas platyrhynchos*)
0189 Pintail (*Anas acuta*)
0191 Garganey (*Anas querquedula*)
0194 Shoveller (*Anas clypeata*)
0198 Pochard (*Aythya ferina*)
0202 Ferruginous Duck (*Aythya nyroca*)
0203 Tufted Duck (*Aythya fuligula*)
0260 Marsh Harrier (*Circus aeruginosus*)
0455 Black-winged Stilt (*Himantopus himantopus*)
0456 Avocet (*Recurvirostra avosetta*)
0470 Ringed Plover (*Charadrius hiaticula*)
0477 Kentish Plover (*Charadrius alexandrinus*)
0478 Lesser Sand Plover (*Charadrius mongolus*)
0501 Little Stint (*Calidris minuta*)
0509 Curlew Sandpiper (*Calidris ferruginea*)
0512 Dunlin (*Calidris alpina*)
0514 Broad billed Sandpiper (*Limicola falcinellus*)
0517 Ruff (*Philomachus pugnax*)
0534 Bar-tailed Godwit (*Limosa lapponica*)
0546 Redshank (*Tringa totanus*)
0548 Greenshank (*Tringa nebularia*)
0561 Turnstone (*Arenaria interpres*)
0564 Red-necked Phalarope (*Phalaropus lobatus*)
0582 Black-headed Gull (*Larus ridibundus*)
0592 Herring Gull (*Larus argentatus*)
0625 Saunder's Little Tern (*Sterna saundersi*)
0626 Whiskered Tern (*Chlidonias hybrida*)
0628 White-winged Black tern (*Chlidonias leucopterus*)
1020 White Wagtail (*Motacilla alba*)
1144 Isabelline Wheatear (*Oenanthe isabellina*)
1146 Northern Wheatear (*Oenanthe oenanthe*)
1149 Desert Wheatear (*Oenanthe deserti*)
1270 Desert Warbler (*Sylvia nana*)
1571 Brown-necked Raven (*Corvus ruficollis*)

Our thanks to Adrian Chapman for additional observations.

BISH BROWN and PETER HELLYER

* * *

The Official List of Bird Species Recorded in the U.A.E.

The title of this piece suggests such a list is already in existence but, in fact, no list has ever been proposed or adopted by the local groups or, indeed, by the Ornithological Society of the Middle East.

The time has now come when this should be done and, in Colin Richardson's 'The Birds of the United Arab Emirates' we have the ideal means of doing so.

There may not be universal agreement to all the species on the list or, even, whether some of them are species at all. The Lesser Whitethroat complex is, I think, generally agreed to comprise three species but the large *Larus* gull situation is far from clear. Colin has followed Meinertzhagen (*The Birds of Arabia 1954*) in the splitting of Yellow-Legged and Armenian Gull away from Herring Gull, which is not now recorded in U.A.E.

Regardless, the list in the book has become the de facto official List and will be deemed to be so by observers and organisations abroad.

In any event, such a list will be a dynamic entity and to

ensure that it is maintained in good working order I have proposed, after discussion with the Chairman and other birders here and in Dubai, that a Rarities Committee be established. The purpose of such a body will be to examine descriptions of rare birds seen and to review, if necessary, historical records. To that end a draft list of species for which descriptions would be required is in circulation and assistance in setting up the procedures necessary to operate the Committee has been sought from the British Rarities Committee.

I trust these proposals meet with the approval of the birders within the ENHG and the DNHG but any further suggestions would be welcome.

Regretfully, it has not been possible to include the details of the list, the list of rare birds, or the procedures to be adopted in this publication of *Tribulus* but the intention is to have all in place by the next issue.

BOB RICHARDSON
Bird Recorder

RECORDERS' REPORTS FOR 1990

ARCHAEOLOGY

The past year has been one of mixed fortunes for archaeology in the Emirates, not least because the invasion of Kuwait in August persuaded a number of foreign teams to cancel their plans to work here during the winter season, even though important finds have been made.

Earlier in the year, work continued at the Ad Door site in Umm al Qaiwain, by teams from Denmark, Belgium, Britain and France, while the Belgians returned in October and November. The Danes also continued their sounding at Tel Abraaq of a mound that has yielded evidence of occupation from the early Third Millennium BC to the Iron Age, in the middle of the First Millennium BC. The Belgians also completed the excavation of an Umm an Nar period tomb in Ajman, which was partially excavated in 1986-1987. Details of most of the excavations have been widely, (though often inaccurately) reported in the local press.

Work in Sharjah Emirate focussed mainly on the Mileiha and Madam regions, with evidence of a mint from the early years of the Christian era being found, while in Fujairah, the Swiss-Liechtenstein team continued its survey of the Emirate's antiquities. The Fujairah Museum opened during the year. In Ras al Khaimah, excavations continued at Julfar. The Group was pleased to welcome Dr. Geoffrey King, from London University, to speak on the Julfar excavations at a meeting in February, while a weekend trip to Ras al Khaimah included a visit to the National Museum of Ras al Khaimah, and a tour of the castle at Dhayah, near Rams. A surface scatter of pottery collected during the tour is awaiting identification, but appears to be of relatively recent Islamic date.

Other 'tours' have included visits to historical monuments in Fujairah and Kalba in the spring and autumn, while Vice Chairman Terry Adams led a successful weekend trip to the Miocene fossil sites in the Jebel Dhanna area in the spring. During the trip, some fossils were collected for the Group's display in the Old Fort, while at least one new site was located. Details have been notified to the Al Ain Museum. The foreign palaeontologists responsible for studying the area, Peter Whybrow and Andrew Hill, addressed a Group meeting early in the year.

Little archaeological work has been done by the Group or its members during the year. However an outing by Terry Adams, Caroline Adams, Bish Brown and Rob Western to the Habshan area to search for more evidence of Neolithic or Palaeolithic Man yielded a very fine flint scraper, now in the Al Ain Museum. A small collection of (probably recent) pottery was also made during a survey of Merawah Island.

At the very end of the year, approaches were made to the Abu Dhabi Municipality to seek protection for 'Site One,' the old camping ground for Bedouin camel trains just off the road to Al Ain, following reports that afforestation programmes might affect the site.

Finally, on behalf of the Group, your Recorder has been involved in preliminary plans for the holding of an international seminar on Emirates Archaeology in early 1992, which, it is hoped, will receive the sponsorship of both the Emirates University and of the Group.

PETER HELLYER,
Archaeology Recorder

* * *

BIRDS

This brief report summarises the 1990 activities of the small but enthusiastic group of bird-watchers belonging to the Group. Although the active members submitting records numbers no more than twenty at best, our coverage is wide ranging from Bu Hasa and Asab in the southern desert to the Jebels of the Northern Emirates where frequent exploratory trips have been made.

Coverage in the desert localities, and on Das Island has been exceptionally thorough and has contributed usefully to our understanding of migration patterns across the Southern Arabian peninsula. It is becoming clearer now that spring and autumn migration, of passerines at least, flows in a broad front across Arabia from Asia. Evidence of funnelling through the Straits of Hormuz into the Musandam peninsula and south of Fujairah, whilst anticipated, has still not been conclusively obtained.

Some of the off-shore islands have been further explored and we must record our thanks to their owners for permitting access and assisting in transportation. The significance of some of these islands for breeding populations of shore birds and sea birds, in Arabian terms, cannot be understated.

Our contribution to international ornithological surveys and organisations has been minimal but understandably so given our extremely limited resources. Colin Richardson in Dubai has continued to maintain the UAE's presence internationally with his quarterly Emirates Bird Report and publication of his book this year, the 'Birds of the UAE', is a landmark in national and regional ornithology. Our warmest congratulations are recorded here for his magnificent efforts.

Individual members have contributed information to the Atlas of Breeding Birds of Arabia survey and some limited records were sent to the IWRD during the mid winter Asian Waterfowl Census. Events in the Northern Gulf have curtailed our efforts to organise a more thorough coverage in 1991.

Perhaps one of our more notable achievements during the year was the transfer of bird records from 1988-1990 onto our computer database using the hardware generously provided by our patron. H.E. Sheikh Nahyan Bin Mubarak Al Nahyan. Our thanks must go to Hayley Gosling for setting up the database and in-putting over 10,000 records. We do now need, however, the means to fully utilize the raw data being

input which will require thorough knowledge of the DBASEIV programme used and a clear idea of the information we wish to extract from it.

Rather than produce a monthly synopsis of the bird records for 1990, which are in any case given in the Monthly News Letters, I have treated the year on a seasonal basis. Breeding records are small in number but it is worth recording here what information has been forthcoming with a request for more to be provided in future.

Four species were added to the UAE list in 1990, notably Grey-headed Kingfisher seen by Len Reaney at Asab in mid April. This bird, although found as close as Dhofar in Southern Oman, is a forest kingfisher and is a most unusual vagrant. More predictable were Lesser Spotted Eagles in Dubai in February and then again in March, a Little Crake in Saffa park in October and a series of Long toed Stint records in Sharjah, Dubai, and Abu Dhabi between mid September and early October.

Winter Period : January - March

Greater Flamingos, present in many localities, peaked at 1990 in Khor Dubai with over 300 present in the Eastern lagoon, Abu Dhabi. Cattle Egrets frequented Abu Dhabi in particular, with 32 being the highest count. The first wintering record of Grey Hypocolius, 17 on Dalma Island, was reported on 25th January. Regular winter visitors were reported as expected but it is disappointing to note that only one Houbara was seen, on Das Island from late February to early March. This is a species we should take particular interest in given its rarity and its status in the local culture. The Group should encourage consideration into how the species can be better protected, perhaps through reintroduction, to maintain firstly its existence in the wild and secondly to enable limited hunting for sport to continue without damage to the stock. Contacts have been established with the new National Avian Research Centre which is beginning work on this topic.

Rarities recorded in the period include second records only of Great Knot at Khor al Beidah, White Throated Bee Eater at the Emirates Golf Course, both in March, and Rustic Bunting on Qarnein Island in February. Namaqua Dove was recorded for the third time at Shah also in February. Bimaculated Lark, Finsch's Wheatear and Cinereous Bunting were also found, all species which have been rarely reported in the past.

Spring Migration

The boundary between spring and autumn migration can be hard to discern and, indeed, some birds already mentioned are as likely to be migrants as winter visitors.

From the end of February the numbers of birds and variety of species increased considerably, a phenomenon easily observed at places like Saffa Park in Dubai, or Bu Hasa and Asab in the interior. Warblers, and flycatchers were all seen as expected, but amongst the common Desert, Northern, Isabelline, & Pied Wheatears were seen Black-eared at Jebel Dhanna and Bateen Wood, Finsch's on the Dubai road and Mourning Wheatear at Dhabbiyah, all in March. Other

rarities include a Moustached Warbler at Saffa Park in May and a Grey Hypocolius at Al Wathba camel track in April.

Breeding Species

The significant discovery of the year was a breeding population of 700 Crab Plovers discovered by Bish Brown and Maarten Verhage on Abu al Abyad. This discovery is the only known breeding site for the species in the Southern Gulf. In the past the colony was considerably larger and the eggs and chicks were collected for food.

Red-wattled Plovers bred at Sweihan, an extension to their essentially East Coast range and Black-winged Stilts, always an opportunist breeder, raised perhaps as many as 200 young at Al Ghar Lake near Mafraq. This 'Lake' formed from effluent discharged from the nearby sewage treatment works has proved a wonderful habitat through the year for migrant waders, terns, and duck but has also supported breeding Kentish Plover. It appears likely that the surrounding dunes have been used as a roost by waders feeding on the coast during the day.

Eagle Owls bred at Qarn Nazwa and Long-legged Buzzards were seen in suitable habitat at the same place. Booted Warblers were in song at Khor Kalba during March but no other proof of breeding was obtained. Juvenile Rufous Bush Chats were seen in Bateen Wood, with the firmly established Olivaceous Warblers.

Egyptian Goose bred successfully in Abu Dhabi and increasing reports of escaped/released cage birds such as Red Avadavat and Streaked Weaver suggest they may be establishing viable breeding populations.

Red-billed Tropicbird nested as usual on Qarnein Island where 20 nests were found, although no Socotra Cormorants bred there this year.

Autumn Migration

A splendid Caspian Plover at Al Wathba in late June was probably moving south as they are particularly early migrants. Two more were seen in early September on the Emirates Golf Course.

Cinereous Bunting was recorded from Dubai for the second time this year and rarely recorded Egyptian Nightjars spent a few days on Das Island in September. Two rare snipe species were found in Dubai, Pintail at the Fish Farm in September and Great in Saffa Park for a week in October. The beautiful Demoiselle Crane gracing a beach in Abu Dhabi was present from late October to mid December and could possibly have been a wild vagrant. A later visitor was a Pied Kingfisher to Ramtha Tip in Sharjah which was still present to the year end and the presence of two Black Drongos in Ras Al Khaimah has led to speculation about their origins.

Winter : November - December

Lapwing, familiar to European bird-watchers but scarce in Southern Arabia, were seen in November at Al Wathba and December at Ramtha Tip. A notable record

was of an immature Golden Eagle at Jebel Hafit in late November, only the second record for UAE.

Again the interior produced some exceptional records, namely a Ring Ouzel at Bu Hasa from the end of November and 25 Bramblings at Wadi Al Reum in early December.

Finally, thank you to all the contributors of records to the ENHG Bird database whose names appear below, and particularly to Jenny Hollingworth who retired from her job as Bird-Recorder after ten years of considerable efforts in which time she has made a major contribution to the Group's ornithological section.

J N B BROWN,
J A D CHAPMAN,
L GRAHAM,

J M HOLLINGWORTH,
P HELLYER,
M VERHAGE,
R REQUESTED,
L REANEY,
D ROBINSON,
C RICHARDSON,
C SOFFE,
H WHITTALL,
M WOOD.

BOB RICHARDSON
Bird Recorder

* * *

GEOLOGY AND PALAEOLOGY

The Group's Geological Recorder, Dr. Charles Crausaz, left Abu Dhabi recently, so I have prepared this short report on his behalf.

On the 15th of February Drs. Peter Whybrow, [Natural History Museum, London], and Andrew Hill, [Yale University, U.S.A.], gave a lecture entitled "Fossil Discoveries in the Western Region". The lecture was well attended and thoroughly enjoyed by all those present.

The Group made a field trip to Jebel Dhanna on the weekend of the 22nd of March. Dr. Terry Adams gave a lecture entitled "Palaeontology and its relationship to the Baynunah Region of Abu Dhabi". The next morning, he led the Group around the various sites, explaining how they may have looked 6 million years ago. It was a wonderful weekend, but once again, we appeal to anyone who may have picked up interesting fossils to show them to the palaeontologists. They might just have "the missing link".

Dr. Kenneth Glennie gave a lecture entitled "Desert Environments" on the 15th of October. His ability to explain the subject, even to non-geologists, made his lecture a pleasure to listen to, and learn from. He had previously taken a group of geologists from the Society

of Emirates Explorers on a two day trip starting in Al Ain, then on to Hatta, Faiyah, Fujairah, the Musandam Peninsula and Ras al Khaimah. I was privileged, as a non-geologist, to join that trip and one to the Sabkha Matti in the Western Region. Dr. Glennie's infectious enthusiasm and dedication to his subject makes me wish it was a disease we all could catch.

Two geologic guidebooks to the northern Oman Mountains (Buraimi to Hatta area and Musandam), compiled by Dr. Charles Crausaz and printed by ADCO, are now in the Group's library.

Collecting specimens of rocks and fossils for the Group's collection is an on-going process. I would like to thank Carolyn Lehmann, a member from Dubai, for donating a very comprehensive labelled collection of marine fossils to the Group.

Thanks are also due to Gary Feulner for his gift of a substantial and labelled collection of rocks found in and around the Emirates. Gary has now left the UAE.

Sahib al Habshi has agreed to take over the duties of Geology Recorder in 1991.

BISH BROWN

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MAMMALS

There have been few mammal records over the past year, most of which have covered the commonly seen species. The following is a summary.

Offshore, there have been the usual reports of Humpback and Bottle-nosed Dolphins, from off Abu Dhabi, from further offshore, thanks to helicopter pilots and sea-going members, and, of course, from near Abu Dhabi. In the latter area, between 10 and 20 Humpback were seen on May 11th.

The endangered Dugong has also been reported occasionally, with three seen in the Khor Al Bazm/Umm Amin area on July 8th, and a decomposing one seen a

week later on Merawah Island. Salesmen in the Abu Dhabi fish souq told a Group member in late December that dugongs were no longer brought to market by the Mirfa-based fishermen who had previously provided the occasional carcass for sale. The catching of dugongs, the salesmen noted, was now illegal.

Onshore, of the few records received, most concerned foxes, rats and hares, none of which are rare. Of importance, however, was the wide geographical spread of the records, which will help eventually in the preparation of distribution maps.

Foxes were reported from the Hajar Mountains near

Masafi, Khor Kalba on the East Coast, near Sila'a in the Sabkha Matti, in Liwa and on the Sweihan road, and Hares from Jebel Ali, Jebel Gharain, near Ras al Aysh, Al Wathba Camel track, on the road to Bu Hasa, the Dubai Cement Plant, Site One and Yasat Island, the last being a particularly interesting record from this rarely visited spot.

Black Rats were reported from the Al Wathba Camel track, (one dead), and, frequently, from the Bateen Wood.

Of the smaller mammals, a Cheesman's Gerbil was found dead 1 kilometre from the Sweihan roundabout on the Dubai road, and a Jerboa was found dead 17 km down the Sweihan road.

Of the rarer mammals, the carcass of a Caracal Lynx was seen hanging on a tree in the Wadi Khabb Shamsi, in Oman's Musandam enclave, at the end of November, while there were unconfirmed reports from our Dubai colleagues of tracks of a Gordon's Wild Cat being seen near Al Aweer.

Any records would be gratefully received for 1991, however insignificant they may seem. The Group's knowledge of the country's mammals is still very scanty.

Thanks to our 1990 contributors : N & S Bengé, J.N.B. Brown, J.A.D. Chapman, M & D Francis, P. Hellyer, C. Van Riet, C & M Soffe, M. Verhage.

PETER HELLYER

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PLANTS

Being ensconced on Das Island for much of the year, the Plant Recorder again had limited opportunities for major surveys. The only lengthy expedition was between 6th and 10th April that took in the plains and mountains between Mahdah and Hatta, Wadi Hayl near Fujairah, the East Coast and a day in Oman North of Dibba. The main purpose of the trip was plant photography but one or two first recordings for the Group also turned up. *Micromeria biflora* was one rare species found in flower in the Musandam mountains, in association with the dwarf furry-green herb *Cymbolaena griffithii* (Labiateae) and the moss-like annual *Sedum hispanicum* (Crassulaceae). Among some of the darker, damper nooks and crannies of these limestone crags, particularly facing N and W, were various species of *Umbilicus* (Rosaceae), and this whole region should be explored further for its lesser-known vegetation.

Iphiona aucheri (Compositae) was for the second year in succession found in abundance along the UAE/Oman border and around Jebel Hafit. This bright yellow daisy is reported to be very poisonous to camels and in fact in some areas efforts have been made to root out large numbers of individual plants. In view of its

abundance and striking appearance, it is surprising that, apart from one observation, this composite was never recorded by the Group during the years 1980-89. In April, 1990 its close relative *I. scabra* was also fairly common on the plains around Mahdah.

The April trip was also noteworthy for turning up several mountain species North of Masafi which had previously been recorded by the Group only in the Musandam mountains of Northern Oman at higher elevations. The Masafi hills rarely exceed 600 m., Among the new records are *Senecio abyssinicus*, *Zoegea purpurea*, *Dianthus cf. crinitus*, *Crepis kotschyana*, *Callipeltis cucularis* and *Parietaria alsinifolia*. One new record for the UAE was the delicate yellow flowered herb *Linum corymbulosum* (Linaceae).

The diminutive annual *Agriophyllum minus* (Chenopodiaceae), previously known only from the Abu Dhabi Sweihan road, turned up near the Al Wathba camel track, and in huge numbers along the Asab track between Abu Dhabi and the Liwa.

R.A. WESTERN
Plant Recorder.

* * *

REPTILES

No new species were added to the UAE list, but one snake specimen from Sir Bani Yas Island still awaits confirmation for 1989. We now have 3 more specimens to work on.

The Emirates list currently stands at 59 species, made up as follows : 4 turtles; 37 lizards; 1 amphisbaenidae; 11 land snakes, 4 sea snakes and 2 toads. Not all the species have been recorded by the Group. It is possible that some additional species known to exist in Oman, Saudi Arabia and the Gulf will turn up here in similar habitats.

The majority of the reptiles recorded were seen alive and identified in the field, leaving them to continue doing the things they do best. The balance were recorded as a result of road deaths or being found dead

on the beach.

On short visits to the islands of Merawah and Dalma, small colonies of Dhubs [Spiny-tailed Agamids-*Uromastix microlepis*] were found. Footprints on the shore at Merawah could have been those of a Warral [Desert Monitor - *Varanus griseus*], but we will have to see an animal to be sure. Numerous other smaller reptiles also inhabit the offshore islands.

One Green turtle was obtained live from a fisherman on Sadiyat and released into the sea off Abu Dhabi Island. 2 others were found dead. 2 preserved Hawksbill turtles were being offered for sale at Mirfa by an elderly fisherman. A large Leathery turtle was reported dead on the beach at Jumeirah, Dubai. Turtle meat and shells have not been seen in the Abu Dhabi fish suq recently,

so maybe the ban on catching them is working. Anyone visiting the fish suq should report seeing turtles. Two species, the Hawksbill and the Loggerhead, feed on jellyfish, so any further reduction in turtles could lead to explosions in the jellyfish populations and the problems they cause.

We continued to receive live snakes from Shah and other outlying desert bases. After identification, they were returned to isolated areas of the desert, where others of their species were known to reside.

Large areas of reptile habitat along the Sweihan to Al Hayer (Al Hair) road have been flattened for agricultural purposes. It is possible that, in time, reptiles from undisturbed areas will recolonise these areas and it would make a useful study for a keen herpetologist over

the next few years.

ADCO used the theme of reptiles for their 1989 Annual Report. It is probably the most comprehensive collection of reptile photographs ever published in the United Arab Emirates.

Finally, I would like to thank the following members for their records and specimens : Carolyn Lehmann, Marycke Jongbloed, Adrian Chapman, Cindy & Mick Soffe and Maarten Verhage. Also, two non-members: Alan Dickson from Dubai provided records and Asif Rana rescued the turtle on Sadiyat.

BISH BROWN
Reptile Recorder

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ENHG 1990 Programme of Meetings

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|----------|--|-----------|---|
| 8th Jan | Annual General Meeting | 21st May | Shallow Water Marine Life off the Coast of Abu Dhabi by Marten Verhage |
| 15th Jan | An Introduction to Northern Cyprus by Peter Hellyer. | 4th June | Copper & Copper mines in the U.A.E. by David White-Cooper |
| 5th Feb | 1990 Excavations at Julfar by Professor Geoffrey King. (Introduction by Sheikh Nahyan bin Mubarak al Nahyan in the presence of Wilfred Thesiger) | 18th June | Introduction to the Reef Fish of Abu Dhabi by John Hoolihan |
| 12th Feb | Fossil Discoveries in the Western Region by Dr. Peter Whybrow and Dr. Andrew Hill. | 2nd Jul | Cancelled due to Eid al Adha holidays |
| 19th Feb | Films. "The Last Great Explorer-Wilfred Thesiger" and "Yemen, the Forbidden Country". | 6th Aug | No talk due to holidays |
| 5th Mar | Adaption of Man to the Environment: The Arabian Peninsula by Professor Paulo Costa | 3rd Sep | Film : "These Beautiful People" |
| 19th Mar | Camels across Australia by Robyn Wilson | 17th Sep | Orchids of Europe by Dr. Marycke Jongbloed |
| 22nd Mar | Palaeontology and its Relationship to the Baynunah Region of Abu Dhabi by Dr. Terry Adams (in Jebel Dhanna) | 1st and | Cancelled due to public holiday and |
| 2nd Apr | Insect Photography by Al Sherif | 8th Oct | mourning for HH Sheikh Rashid bin Saeed al Maktoum. |
| 16th Apr | Underwater photography on the East Coast by Tony Woodward | 15th Oct | Desert Environments by Dr. Kenneth Glennie |
| 19th Apr | A view of Al Ain by Dr. M. Craigmyle (in Fujairah) | 5th Nov | The Natural History of the Arabian Peninsula part 1. A film sponsored by Mobil. |
| 7th May | North Yemen by Dr. Robert Wilson | 19th Nov | Birds of the UAE by Adrian Chapman and Dave Robinson |
| | | 10th Dec | Members Slide Night |
| | | 13th Dec | Annual Dinner Dance, Abu Dhabi Marina Club |
| | | 17th Dec | The Natural History of the Arabian Peninsula part 2. |

القراد



النوع ACARINE
العائلة الكبرى IXODOIDEA
العائلة ARGASIDAE

منذ بضعة أسابيع وبينما كنت ألتقط صوراً لبعض أزهار شجيرة من النوع المعروف علمياً باسم لبيتادينيا بايروتكنيكا *Leptadenia Pyrotechnica* انتهت فجأة الى عدد من الكائنات الحشرية الصغيرة تزحف فوق الرمل متجهة نحوي مباشرة. وما ان اقتربت من قدمي حتى خطوت بعيداً عنها لمسافة متر واحد ولكنها عادت جميعها على الفور لتتشق طريقها نحوي. وحينما تحركت بعيداً عنها عدة مرات تبعثني في كل مرة، عندها أدركت أن لديها وسيلة للاستشعار وانها كانت تنتظر أي حيوان يمر بالطريق.

وبعد فحص دقيق تبين لي أنها حشرة القرادة. وكان أكبرها حجماً من بين مجموعة تعدادها ٢٠ حشرة يبلغ ٥ مم طولاً و ٣.٧٥ مم عند أقصى عرض لها. ولونها بني غامق ولها ثمان أرجل ذات لون بني فاتح.

والقراد كائنات تعيش على الدم الذي تمتصه غذاء لها من الحيوانات وتوجد أنواع مختلفة منها في هذه المنطقة حيث تعيش متطفلة على الثعالب والأرانب والقناسد والقطط البرية واليرابيع والعضال، والخفافيش والفئران الشائكة، والطائر الفاق (أبوجراب) وطيور بحرية أخرى، وقطط المنازل والكلاب والدجاج والأبل والأغنام والماعز والإنسان.

وتمت دراسة مجموعة ١٥ عينة في عمان وتحديد أنواعها ولسوء الحظ انه لا توجد تفاسير متاحة تساعدنا لتحديد أنواع القراد الموجودة في منطقتنا والتي احتفظنا بالعديد منها لتكون مرجعاً للدراسة. ولقد صادفت الكثير منها والتي اعتقد انها نفس الانواع الموجودة في منطقة جبل ظنا. ومرة تعرضت لثلاث عضات كبيرة في بشرة الخاصرة الرقيقة وان لم أكن واثقاً من انها عضرة

قراد... ولم يحدث من جانبي أي تفاعل خطير تجاه العضات. وتم اكتشاف قرادة من نوع أورنيثودوروس *ORNITHODOROS* في أعشاش طائر الفاق (أبوجراب) المعروف علمياً باسم سوكترا كوروموراننس *SOCOTRA CORMORANTS* منذ بضع سنوات. وكانت القرادة مصابة بعدوى فيروس زيركو *ZIRKU* والذي كان من المعتقد أنه المسئول عن حالات الحمى والصداع والحكة التي يصاب بها الذين يتعرضون لعضة هذا الكائن. كم عدد القراد الموجودة في دولة الامارات العربية المتحدة؟ كيف تكتشف الحيوانات التي تتغذى عليها؟.. ترى هل تتجه اليها عن طريق الاحساس بالحرارة أو الشم أو البصر؟.. اذا ما عثرت على أي نوع من القراد أثناء رحلاتك فاننا نرجو أن تحاول جمع بعضها كعينة في وعاء محكم لدراستها وتحديد نوعيتها.