

Heritage

Cultural

Resources in Abu Dhabi Emirate



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- بشكل عام، تم إعداد الأوراق القطاعية الأصلية بشكل جديد قدم فيها مجموعة قيمة من المعلومات
- لم تصل مشاركة الشركاء والجهات المعنية إلى الحد المخطط له
- تم أعداد الأوراق القطاعية بدون دعم كافٍ من الهيئة أو الشركاء والجهات المعنية، وبالتالي، كان على مؤلف الورقة القطاعية تحمل عبء إعداد ورقة هذا القطاع في وقت زمني محدود نوعاً ما

- البيانات
- الأدوات والأساليب
- التوعية
- بناء القدرات
- السياسة

الأوراق القطاعية

- في بعض الحالات كانت البيانات المستخدمة قديمة نسبياً
 - لم يتم إضفاء الطابع المؤسسي على عملية جمع البيانات وتبادلها
- تهدف مراجعة المبادرة في إطار المرحلة الثانية إلى معالجة هذه الثغرات، فضلاً عن غيرها من الثغرات التي تم تحديدها كجزء من الأوراق الأصلية. ولأن تنفيذ مهمة فرق العمل تم كجزء من المرحلة الثانية من البرنامج، فقد تم تقديم الدعم على جميع المستويات لمساعدة موظفي هيئة البيئة - أبوظبي والشركاء والجهات المعنية على معالجة وتحديد الثغرات، وجمع البيانات وإجراء التحليلات وتطوير مخرجات البيانات المكانية، وبناء العلاقات مع الشركاء والجهات المعنية، وفي نهاية المطاف، إعداد الورقة القطاعية وتنقيحها.

خلال السنوات الماضية قامت مختلف القطاعات المعنية بشؤون البيئة بتجميع كم من المعلومات المتنوعة بعدة صور تصف ما هو معروف عن البيئة في إمارة أبوظبي ودولة الإمارات العربية المتحدة والخليج العربي. خلال المرحلة الأولى لمبادرة أبوظبي العالمية للبيانات البيئية، تم تنظيم سلسلة من ورش العمل في عام ٢٠٠٥ لجمع المعنيين من هذه المنظمات، لتحديد القطاعات ذات الصلة، ووضع إطار العمل لكل ورقة قطاعية، ومعالجة الاحتياجات الاجتماعية والاقتصادية والبيئية الرئيسية في إطار كل القضايا المتعلقة في القطاع. من خلال هذا الورش، تم إعداد ثماني ورقات لقطاعية ونشرها:

وتشكل الأوراق القطاعية مصدراً قيماً للمعلومات البيئية والاجتماعية والاقتصادية لأبوظبي وتم استخدامها لمراجعة وتنقيح تقرير حالة البيئة لإمارة أبوظبي فضلاً عن إعداد الأطلس البيئي لأبوظبي (النسختين المطبوعة والتفاعلية).

ولمزيد من المعلومات حول المبادرة أو للوصول لنسخة الكترونية من الأوراق القطاعية، يرجى زيارة الموقع الإلكتروني في www.agedi.ae.

- التلوث وإدارة النفايات
- القوانين والسياسات البيئية
- الموارد المائية
- الجغرافيا الطبيعية لإمارة أبوظبي
- البيئة البحرية والساحلية
- التراث التاريخي والأثري والثقافي
- التطور الاقتصادي والسكاني
- التعليم والتوعية البيئية

وتم إعداد قطاع إضافي كجزء من البرنامج الأصلي، ومع ذلك، وسيتم نشرها للمرة الأولى كجزء من المرحلة الثانية:

- البيئات البرية وموارد الأرض

و لأن الأوراق القطاعية هي مجموعة من أفضل المعارف المتاحة المتعلقة بالقطاعات البيئية والاجتماعية-الاقتصادية الرئيسية وتمثل أساس كافة المخرجات التي سيتم إصدارها لاحقاً كجزء من المرحلة الثانية للمبادرة، تم مراجعة الأوراق القطاعية الأصلية. وتم خلال ورشة العمل الدولية التي عقدت في عام ٢٠٠٧ تحديد ما يلي:

ما هي مبادرة أبوظبي العالمية للبيانات البيئية ؟

تم إطلاق مبادرة أبوظبي العالمية للبيانات البيئية في الثاني من سبتمبر ٢٠٠٢ خلال مؤتمر القمة العالمي للتنمية المستدامة الذي عقد في مدينة جوهانسبرغ بجنوب إفريقيا من قبل دولة الإمارات العربية المتحدة، كمبادرة شراكة من الصنف الثاني، لتكون أداة مبتكرة لتنفيذ الأحكام المتعلقة بالبيئة والواردة في الفصل ٤٠ من جدول أعمال القرن ٢١ وفي الأهداف الإنمائية للألفية.

وفي أوائل عام ٢٠٠٧، نظمت بأبوظبي ورشة عمل دولية لاستعراض الانجازات التي حققها برنامج المبادرة ووضع خطة إستراتيجية لمدة خمس سنوات. وعلى هذا النحو، بدأت المرحلة الثانية من المبادرة في عام ٢٠٠٨ بناء على ما تم انجازه في المرحلة الأولى، في حين تم معالجة الفجوات التي تم تحديدها من خلال المعلومات التي وفرتها الجهات المعنية خلال ورشة العمل.

ولا تزال الرؤيا التي تعمل وفقها المبادرة في المرحلة الثانية هي "وضع وتنفيذ نماذج عملية يمكن تكرارها وتكييفها من أجل إنشاء هيكل أساسي للبيانات البيئية المكانية عالية الجودة، للمساهمة في توفير القاعدة العلمية لاتخاذ القرارات". وسيتم في المرحلة الثانية استخدام الدروس المستفادة لتحقيق نجاح أفضل في تنفيذ المبادرة في مرحلته الثانية.

وسيركز البرنامج الحالي على وضع سلسلة من المخرجات التي تتناول قضايا محددة في حين يتم تحقيق نتائج مؤسسية معينة، بما في ذلك:

١. توفير بيانات بيئية أكثر جودة
٢. تحديد الثغرات في البيانات والأدوات
٣. تنسيق أقوى وشراكات لتبادل البيانات
٤. أساليب وأدوات أفضل للمعلومات
٥. ربط الإستراتيجية والتشغيل بشكل أفضل
٦. تحسين البنية التحتية البشرية والتقنية
٧. مؤسسة أقوى بشكل عام

والمخرجات التي تم تحديدها في إطار عملية التنمية هي أمور مترابطة ومتعاقبة مع المخرجات الأولية لدعم المعلومات والتفاهات التي تصب في الأنشطة اللاحقة. وهي تشمل ما يلي :

- مراجعة الأوراق القطاعية وقاعدة المعرفة
- مراجعة وتنقيح تقرير حالة البيئة
- الأطلس البيئي التفاعلي
- تعزيز بوابة البيانات المكانية
- تحسين الموقع الإلكتروني
- مؤشر الأداء الحكومي لأبوظبي
- برامج وضع الإستراتيجية

ولضمان تحقيق نتائج إيجابية وتوفير الموارد التقنية الكافية للقيام بتطوير المخرجات، تم إنشاء مجموعة من فرق العمل بهدف تجميع الموارد لدعم فرق كل مخرج من المخرجات المبادرة. وتشمل هذه ما يلي :



What is AGEDI?



The Abu Dhabi Global Environmental Data Initiative (AGEDI) program was fashioned around the United Nations World Summit for Sustainable Development (WSSD) Type II Partnership, after 2002 as a tool to support the environmental provisions of Chapter 40 of Agenda 21 and the Millennium Development Goals.

In early 2007, an international workshop was conducted in Abu Dhabi to review the accomplishments of the AGEDI program and develop the next five-year strategic plan. As such, AGEDI Phase II began in 2008 building off of accomplishments of the initial phase, while addressing gaps identified through stakeholder input during the workshop.

The vision of AGEDI Phase II remains to be a “replaceable, networked, adaptive and working model for the development and use of high quality spatial environmental data by all users within the Emirate of Abu Dhabi that will support sustainable decision and policy making”. Phase II will use lessons learned to better guide the successful implementation of AGEDI in its second phase.

The focus of the current program is to develop a series of interrelated products that address specific issues while achieving certain institutional outcomes, including:

1. Improve the quality of existing environmental data
2. Identification of data gaps and priorities
3. Stronger coordination and data sharing partnerships
4. Better information methods and tools
5. Better links between strategy and operation
6. Improved human and technical infrastructure
7. Stronger organization overall

The specific products under development are interdependent and sequential, with early products yielding information and understandings that feed into subsequent activities. These include the following:

- Sector Paper Review and Knowledgebase
- SoE Review and Refinement
- Environmental Atlas
- Interactive Environmental Atlas
- Geospatial Portal Enhancement
- Website Refinement
- EPI for Abu Dhabi
- Programs Alignment Strategy

To ensure positive outcomes and adequate technical

resources for carrying out the product development, a series of task forces were established as pooled resources to support each product team. These include:

- Data
- Tools and Methods
- Outreach
- Capacity Building
- Policy

Sector Papers

Over the years, different organizations compiled a variety of information in many forms that describe what is known about Abu Dhabi, the UAE and the Arabian Gulf Region. Through the initial AGEDI phase, a series of workshops were developed in 2005 to bring together stakeholders from all these organizations, identify the sectors that were relevant, design a framework for each Sector Paper, and address the key environmental and socioeconomic issues relevant under each sector. Through this effort, eight Sector Papers were completed and published:

- Waste Management and Pollution
- Environmental Policy and Regulation
- Water Resources
- Physical Geography
- Marine and Coastal Environment
- Paleontological and Archaeological Resources
- Population, Development and Economy
- Environmental Education and Awareness

One additional sector was scoped as part of the original program, however, and will be published for its first time as part of AGEDI Phase II:

- Terrestrial Environment

Because the Sector Papers are a collection of the best available knowledge pertaining to key environmental and socioeconomic sectors and they serve as the basis for all subsequent products to be developed as part of AGEDI Phase II, a review of the original Sector Papers was conducted. What was already known through the international workshop held in 2007:

- Overall, the original papers were done well and provided a wealth of information
- Stakeholder participation did not reach the level originally intended
- Sector Papers were developed without much agency or stakeholder support, and therefore, became the burden of the Sector Paper authors under a fairly limited timeframe
- Outdated data was used in some cases
- Data collection and sharing did not get institutionalized

The review under AGEDI Phase II sought to address these gaps, as well as the other gaps already identified as part of the original papers. Because the Task Forces were implemented as part of the Phase II program, support was provided at all levels to assist EAD staff and stakeholders in addressing and identifying gaps, collecting data, conducting analyses and developing spatial products, building stakeholder relationships, and ultimately, developing a refined Sector Paper.

The Sector Papers are a source of valuable environmental and socioeconomic information for Abu Dhabi and were used to review and refine the State of the Environment (SoE) report for Abu Dhabi, as well as develop the Abu Dhabi Environmental Atlas (both hard-copy and interactive versions).

For more information and online versions

Additional information and online versions, please visit the AGEDI website at www.agedi.ae

EXECUTIVE SUMMARY



Photograph: ADACH

Project Description

The sector paper presented here provides a synthesis of knowledge concerning the cultural heritage resources of Abu Dhabi Emirate. Descriptions of the key components, main chronological periods represented and key management issues are provided. The report also details the cultural, scientific, educational and economic value of cultural heritage to Abu Dhabi Emirate. Major issues

discussed include legislation and infrastructure, the struggle for a balance between development vs. protection and management, and the importance of education and awareness.

This work forms part of a suite of sector papers intended to contribute to the State of the Environment Report as part of the activities of the Abu Dhabi Global Environment Data Initiative (AGEDI).

Findings

A wide variety of palaeontological and archaeological sites exist within Abu Dhabi Emirate. This Executive Summary highlights a selection of the most significant findings and sites/areas of relevance:

The earliest palaeontological sites contain Cretaceous fossils, dating from 145.5 - 65.5 million years ago (mya), found in the vicinity of Al Ain, in Abu Dhabi's Eastern Region. The late Miocene period fossils that date from between 8 - 6 mya, discovered along the coast and interior of Abu Dhabi's Western Region provide evidence of a dry savannah-type environment intersected by large but shallow rivers that supported a range of animals, in all more similar to the conditions of an environment like modern day East Africa.

Archaeological artefacts of probable Paleolithic date have been identified from Jebel Barakah in Abu Dhabi's Western Region, as well as from elsewhere in the UAE, in Sharjah. Five sites around Jebel Barakah; rich in stone Artefacts, have been recently discovered. These sites yielded artefacts of a type known as Levallois, a technique that was first identified at the site of Levallois in France. Apart from a number of diagnostic tools, a hand axe was discovered at one of these sites, confirming its date to the Middle Palaeolithic period (between 150,000 - 200,000 years ago).

Nothing has been discovered of the long gap between the Middle Palaeolithic and Neolithic period. The two earliest archaeological settlement sites so far known from Abu Dhabi Emirate date to about 7,500 years ago and occur on Marawah Island (sites MR1 and MR11). Traces of these early inhabitants of Abu Dhabi can also be found on the coast and islands such as Dalma, as well as within the desert interior in areas like Umm az-Zamul. Ubaid pottery is known from both Dalma, Marawah and a third island, Al-Aryam, demonstrating a clear sign of contacts with southern Mesopotamia at that time, or at least with traders in the central Gulf, who were themselves in contact with Ubaid cultural groups.

Little evidence of fourth millennium occupation has been found on the coast and islands of Abu Dhabi. The Hafit period (3200-2600 BC) is named after the well-built stone tombs present in the hundreds on the slopes of Jebel Hafit near Al Ain, and the Hajar mountains of neighboring Oman.

During the late fourth millennium BC, knowledge of a major technological innovation arrived in the region. Mining and smelting of copper ore found in the Hajar mountains commenced, marking the beginning of the local Bronze Age.

The island of Umm an-Nar (now also known as Sas al-Nakhl) gives its name to the chronological period known as Umm an-Nar (2700-2000 BC). A large settlement and a contemporary cemetery with 50 collective graves was investigated by Danish, Iraqi and local archaeologists. The port of Umm an-Nar acted as a terminal for copper exports to Mesopotamia. Evidence of Umm an-Nar civilization has subsequently been discovered throughout the UAE and Oman.

The largest Bronze Age complex in the UAE is located at Hili, just to the north of Al Ain. This includes important settlements as well as three tombs inside Hili Archaeological Park and several others outside. Some sites of this complex have been incorporated into the park, designed to highlight the archaeological sites and make them more accessible to the public.

Evidence of occupation during the middle Bronze Age, around 4,000 years ago, has been found on some of Abu Dhabi's islands. There is little evidence of occupation of the deserts during this period, perhaps due to climatic change and less rainfall, and some of the islands in the Western Region may have been used as temporary way-stations or trading settlements by sailors from Bahrain (ancient Dilmun), on their way to Hormuz.

The term "Iron Age" (1250-300 BC) is technically a misnomer, as the inhabitants of the UAE continued to use copper rather than switching to the new metal, presumably because of the readily available copper in the mountains. A large number of archaeological sites dating to this period have been discovered in the Eastern Region of Abu Dhabi; several of these were found associated with "*aflaj*" (plural of "*falaj*")- an underground irrigation system that was introduced in the region some 3,000 years ago. Only sparse evidence from this period has been found on the coastline and islands of Abu Dhabi, many appearing to be temporary campsites or way-stations relating to maritime trade, and perhaps occupied on only a seasonal basis.

Some of the most important sites from the Late pre-Islamic to Early Islamic period are located on Sir Bani Yas Island, where the pre-Islamic Christian monastery and associated settlement buildings discovered during excavations in the early to mid 1990s provide the only physical evidence yet known in southeastern Arabia of the presence of Christian communities before Islam.

From the City of Al Ain a *falaj* dated to the beginning of the Islamic period has been discovered and partly excavated. A near-by mosque built of mud-bricks perhaps contemporary

with the *falaj* was also discovered. Important Late Islamic period remains found in the Al Ain area include a number of forts (some of which are restored by the Department of Antiquities and Tourism, now called The Historic Environment Department) and associated date palm oasis gardens and *falaj* systems. The same department restored or re-built a number of forts in the Liwa oases. These were originally constructed by the local tribes several centuries ago mainly for defensive purposes. Buildings from the recent historical period are rare on the coastline and islands of Abu Dhabi. Key sites include the Bayt al-Muraykhi (a pearl trader's house) and the al-Dawsari, al-Muraykhi and al-Muhannadi mosques, all on Dalma Island. The stonewalled mosques on Liffiya, Marawah and Bu Sharah, as well as a number of stone outline mosques on coastal islands also form an important architectural group.

Major Issues

A major issue relating to the cultural heritage resources of Abu Dhabi Emirate is the lack of policy and regulation of legislation to enforce protection of sites. A team of legal and archaeological specialists from the Abu Dhabi Authority for Culture and Heritage (ADACH) has been involved for the past two years on the drafting of a new law, which is close to being finalized. This is especially critical with the modern pace of development and landscape transformations underway. Data gathering and sharing of knowledge concerning the cultural heritage resources of Abu Dhabi Emirate should be better coordinated and the data distributed in a correct manner. Regular monitoring is now carried out of key palaeontological and archaeological sites on a regular basis, but still more is required.

There is a distinct lack of UAE nationals trained in archaeology, palaeontology, cultural heritage and museum studies. Although there are a small number of UAE nationals currently studying or who have graduated in archaeology abroad from such countries as the UK, USA, Australia and Jordan, these are still insufficient in number for the demand. Future mentoring or in-house training of UAE nationals perhaps formalized as partnerships with existing university archaeology departments, should be urgently considered. There is a problem of lack of awareness of best practices in heritage management, and a need for training in appropriate practices carried out following internationally recognized standards.

Unlike a number of other professions, there is no formal professional association of archaeologists or cultural heritage specialists within Abu Dhabi Emirate, or indeed within the Emirates as a whole. The establishment of such a body in the future may introduce a more professional approach and help to develop best practices.

Increased awareness of heritage issues is vital for educating the general public about the importance of palaeontological, archaeological and historical sites within Abu Dhabi Emirate.

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1 INTRODUCTION



Photograp: ADACH

A wide variety of palaeontological and archaeological sites exist within Abu Dhabi Emirate. Palaeontological sites range from Cretaceous fossils found in the vicinity of Al Ain, in Abu Dhabi's Eastern Region, to late Miocene fossils discovered along the coast and interior of the Western Region and Pleistocene marine fossils found on the island of Marawah. The earliest known archaeological site from the Emirate dates to the early phase of the Middle Palaeolithic (some 200,000 years ago). An important collection of stone artefacts dating to between 150,000 to 200,000 years ago have been made from Jebel Barakah in Abu Dhabi's Western Region. Traces of the Early Holocene period (9000-6000 BC) can be found on the coast and islands, as well as the desert interior.

The sector paper presented here provides a synthesis of the knowledge concerning the palaeontology and archaeology of Abu Dhabi Emirate. Descriptions of the key components, main chronological periods represented and key management issues are provided. The report also details the cultural, scientific, educational and economic value of palaeontology and archaeology to Abu Dhabi Emirate. There is some discussion concerning the importance of Intangible Heritage. Major issues which are discussed include legislation and infrastructure, the struggle for a balance between development vs. protection, the importance of education and awareness, and the issue of the trade in antiquities.

This work forms part of a suite of sector papers intended to contribute to the State of the Environment Report as part of the activities of the Abu Dhabi Global Environment Data Initiative (AGEDI).



Figure 1 - Satellite image of the UAE (Landsat).



1.1 GEOLOGICAL OVERVIEW

The geological history of the Emirates and adjacent areas of Arabia over the past 600 million years or so seems to have been mostly one of relative stability (Glennie, 2002). Following tropical shallow-marine conditions of sedimentation in the late Precambrian, the area was largely terrestrial during much of the succeeding Palaeozoic time span (2). Deep erosion preceded the Permian separation of a micro-continent from the eastern margin of Arabia; the following marine transgression was associated with the successive creation of Neo-Tethys 1 and 2. Throughout most of the Mesozoic era, the Emirates was the site of shallow-marine sedimentation except in the two branches of Neo-Tethys, where deep-marine deposition took place. This situation was brought to an end by closure of Neo-Tethys 1 and 2, and the obduction of deep-

oceanic sediments and a slice of newly formed back-arc oceanic crust onto the Arabian continental margin to form an island arc. The succeeding shallow-marine limestone deposition was terminated in the east when the Oman mountains began to be uplifted into a high range some 30 Ma BP (Mega annum (million years) Before Present), but stable conditions of sedimentation continued over the bulk of the Emirates until major glaciations began to induce lower global sea levels perhaps some two to five million years ago and created the present land surface. Near-polar glaciations have controlled sea level in the Arabian Gulf for at least the last 500,000 years, thereby also controlling the supply of dune sand from the north or the cutting off of that supply, with the resulting widespread deflation and creation of sabkhas.

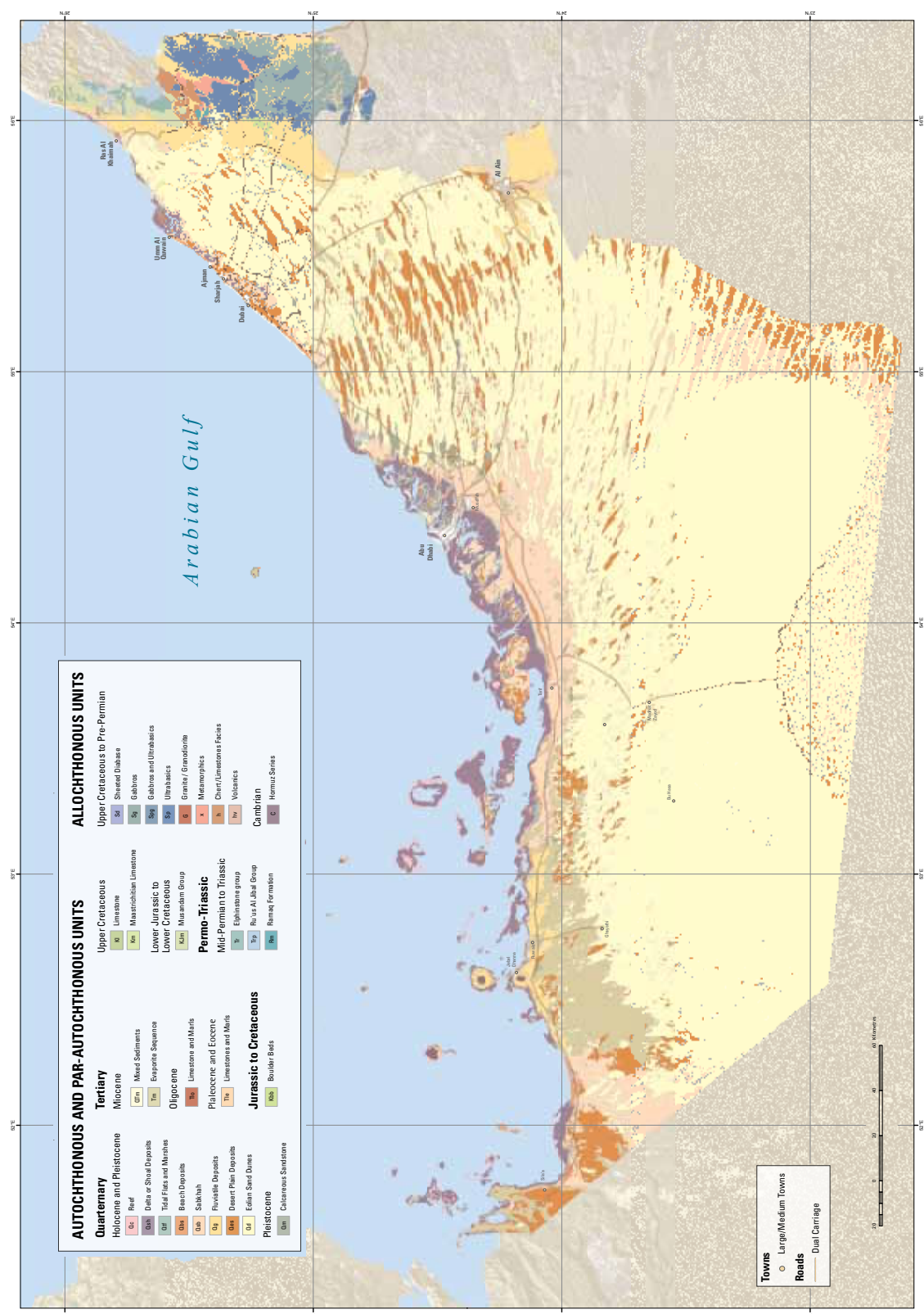


Figure 2 - Geology of the UAE.

1.2 ECOLOGICAL OVERVIEW

The majority of archaeological sites in Abu Dhabi Emirate are located in the relatively fertile plains to the west of the Hajar mountains, in the Al Ain area, in coastal areas and on offshore islands (see the web page, “ADIAS Guide to Archaeology in Abu Dhabi and the UAE”, www.adias-uae.com/archaeology.html). This is because such locations provided strategic advantages in terms of natural resources, as well as access and communication routes. It was far easier in ancient times to travel along the coast by boat than it was to traverse large sand dunes and sabkha. While the plains in the Al Ain area not only provided relatively easy going, but were also better supplied than the deserts of the interior with fresh water supplies that could be tapped with relative ease.

Palaeontological sites from the late Miocene period are confined to the Baynunah Formation, which outcrops throughout the coastal regions of Abu Dhabi, from Rumaitha in the east to Umm al-Ishtan in the west, while fossils from other, earlier periods (as yet poorly studied) are known from Jebel Hafit and smaller exposed rocky hills near Al Ain.

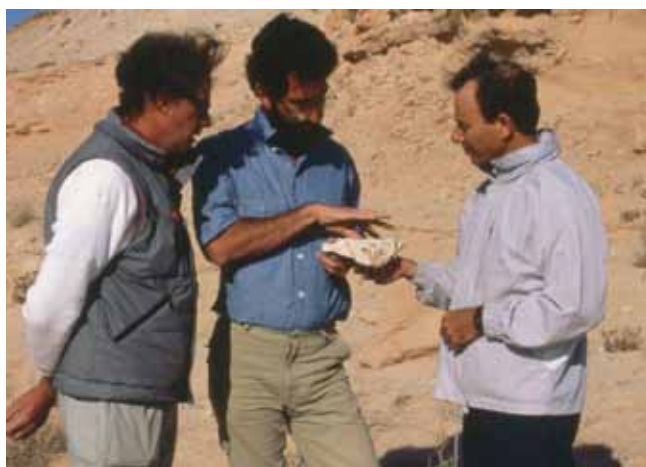


Figure 3 - Members of the first exploration team examining a crocodile skull. From left to right: Peter Whybrow, Andrew Hill and Walid Yasin (Source: Al Ain Museum).

1.3 RESEARCH IN PALAEOLOGY AND ARCHAEOLOGY IN ABU DHABI

1.3.1 Historical Development of Research in Palaeontology

The early phases of work on the palaeontology of the Emirate of Abu Dhabi, led by teams from the British Natural History Museum and Yale University laid important groundwork for the study of the late Miocene fossil vertebrate fauna of the Western Region of Abu Dhabi (Whybrow and Hill 1999). Much of the

work, carried out in association with the Department of Antiquities and Tourism in the Eastern Region of Abu Dhabi, was sponsored by the Abu Dhabi Company for Onshore Oil Operations (ADCO) and the Abu Dhabi National Oil Company (ADNOC). The Emirates University was also involved in some of the early work. The Late Miocene vertebrate fossils primarily came from fluvial sediments (river-deposited sands and gravels). Many of the animals recovered confirm this riverine origin such as freshwater mussels, crocodiles, turtles, fish and hippopotami.

Extinct fossil mammals are well-represented in the Baynunah Formation. No less than three elephant relatives (Proboscidea) are represented in the Baynunah fauna. Best documented of these extinct forms is *Stegotetrabelodon syrticus*, of which a partial skeleton was recovered from Shuwaihat. Additionally, a type of mastodon and a deinother were also present but little known. The odd-toed ungulates (Perrisodactyla) include two *Hipparion* species, three-toed horses, precursors of modern horses. Sparse remains of rhinoceros are present. The even-toed mammals (Artiodactyla) include two extinct species of pigs, a small hippopotamus, and many extinct forms of wild oxen, antelopes, and giraffe. This combination of ruminants suggests that Late Miocene Abu Dhabi was very much like the modern day savannah grasslands of East Africa.

A single canine of a male monkey from Jebel Dhanna provided the first fossil evidence of Old World monkeys found in the Arabian Peninsula. A number of small mammals, rodents and insectivores were found during the sieving of sediment samples from Shuwaihat in 1995. Among these was a species of gerbil first discovered in the Baynunah and appropriately named *Abudhabia Baynunensis*. The biogeographic affinities of the taxa represented reflect a mixture of African, Asian and European fauna. Finally, carnivore fossils include rare specimens of a sabre-toothed lion, hyaenas and an ancestral member of the weasel family.

In accordance with an agreement between ADNOC and the then Environmental Research and Wildlife Development Agency, ERWDA (now known as the Environment Agency - Abu Dhabi, EAD), the fossil collections made during work in the early 1990s returned to Abu Dhabi from the Natural History Museum (London) in 2000. These fossils were curated by the Abu Dhabi Islands Archaeological Survey (ADIAS) from 2000 until 2006, on behalf of EAD, but are now in the custody of the Abu Dhabi Authority for Culture and Heritage (ADACH). Further palaeontological fieldwork has continued, since then confirming that the late Miocene fossil vertebrate fauna of the western region of Abu Dhabi is of international importance.



Figure 4 - Late Miocene elephant trackway at Mleisa site 1 (Photograph: Dr. Mark Beech).

In 2001, extensive trackways with large footprints of Proboscideans (elephant family) were identified at Mleisa (4), a white stone plain south of the Baynunah forest (Higgs *et al.*, 2003; Higgs, 2005; Higgs *et al.*, 2005). A second Proboscidean trackway site was also later identified in the vicinity in 2003. In 2002 and 2003, work in the Ruwais area, by ADIAS, in association with TAKREER (The Abu Dhabi Oil Refining Company), identified further important fossil localities, recovering numerous fossils, the most spectacular of which was an almost complete upper tusk from the primitive elephant *Stegotetrabelodon syrticus* (5). The Ruwais tusk measured 2.54 meters in length from its base to its tip. This tusk along with other important *Stegotetrabelodon* fossils, collected in the early 1990s, were subsequently put on display in the exhibition “Abu Dhabi Eight Million Years Ago” in June 2005 (Beech and Hellyer, 2005). This

exhibition was located in the foyer of the Environment Agency building in Abu Dhabi until early 2008. To coincide with the launch of this exhibition a book and DVD were also released (Beech and Hellyer, 2005; ADIAS, 2005).

Further *Stegotetrabelodon syrticus* fossils were identified at Umm al-Ishtan, south-west of Ruwais, in late 2005 and early 2006. A third Proboscidean trackway was also identified early in 2006 close to Bida Al-Mutawa. All these finds and discoveries were made initially by members of the local community who brought these finds to the attention of the authorities in Abu Dhabi. In particular, the wildlife rangers based in the rangers’ camp at Umm al-Ishtan were most helpful. Several of the important discoveries were made by Hamed Majid Al Mansouri. These wildlife rangers, formerly under the president’s private department, are now managed by the Environment Agency – Abu Dhabi (EAD). They carry out regular patrols of the desert checking for illegal hunting practices, as well as monitoring the Houbara Bustard release area established by EAD. The eagle eyes of the desert rangers has and continues to provide a source of new fossil sites in what was previously considered to be relatively unpromising terrain.

A student from the University of California at Berkeley, Faysal Bibi, led two short field seasons in 2002-2003 under the invitation and support of H.H. Sheikh Sultan bin Zayed Al Nahyan, during which some 200 fossil specimens were collected. These included part of a skull of an elephant, most of a skeleton of a giraffe, and numerous remains of antelopes, horses and hippopotamus. Additionally, this fieldwork recovered and published on the eggshell remains of two types of large birds - ostrich relatives - which further established ties to African faunas and provided evidence of the age of the Baynunah lying between about 8–6.5 mya (Bibi *et al.*, 2006). This collection is currently in the personal care of H.H. Sheikh Sultan bin Zayed Al Nahyan. It would be of great benefit if this collection was transferred to the care of the Abu Dhabi Authority for Culture and Heritage, so that all the late Miocene fossils of Abu Dhabi are housed within a single collection at one location.



Figure 5 - Late Miocene elephant tusk from Ruwais
(Photograph: Dr. Mark Beech).

December 2006 saw the return of Professor Andrew Hill and now PhD student Faysal Bibi (both of Yale University) to Abu Dhabi to resume fieldwork in the Baynunah in collaboration with ADACH. The new Yale-ADACH team undertook a month of intensive fieldwork in December 2007 'til' January 2008 and in December 2008-January 2009, during which several new fossil sites were discovered, trackway sites were studied and documented and numerous fossils collected. A formal agreement is currently being worked out between ADACH and Yale to provide for the continuation of fieldwork for four more years to be concluded by an international conference and the publication of a second monograph on the Abu Dhabi Baynunah fossils.

1.3.2 Historical Development of Research in Archaeology

Archaeology in the Emirate of Abu Dhabi commenced in 1959, with a visit by a team of archaeologists from Denmark who were then working in Bahrain, to examine reported stone burial mounds on the island of Umm an-Nar (now known as Sa's al-Nakhl), adjacent to Abu Dhabi. These proved to be of Bronze Age date (c. 2500-2000 BC) but of a previously-undiscovered civilization that had trading connections with Mesopotamia, the Dilmun civilization in Bahrain and the Harappan civilization in the Indus Valley (Frifelt, 1975).

This was followed by further work by the Danish team, both at Umm an-Nar and in the Al Ain area, inland, including the neighboring mountain of Jebel Hafit, where hundreds of early Bronze Age burial cairns (dating to around 3000 BC) were identified, and at Hili, one of the villages in the Al Ain/Buraimi Oasis.



Figure 6 - Hamed Majid Al Mansouri, December 2006 (left) and the Yale-ADACH fossil team (right), January 2009
(Left photograph by Faysal Bibi, Right photograph by Walid Yasin).

On the instructions of the late Sheikh Zayed bin Sultan Al Nahyan (who became Ruler of Abu Dhabi in 1966 and President of the UAE in 1971), a Department of Archaeology and Tourism was established in the Diwan of the Ruler's Representative in the eastern region of Abu Dhabi in 1969. This Department carried out excavations and surveys in the Al Ain area and at Umm an-Nar and other locations in Abu Dhabi including the western province.

The Danish Archaeological Mission ceased its work in Abu Dhabi in 1971. Further work was undertaken in association with the Department of Antiquities and Tourism by teams from Iraq in the early 1970s. Then by the French Archaeological Mission in the Emirates, which commenced work in 1977 and continued in the Al Ain area beginning again in 2006 (there was a break of 12 years between 1985 and 1997).

The Abu Dhabi Islands Archaeological Survey (ADIAS) was established in 1992 on the instructions of the late President His Highness Sheikh Zayed Bin Sultan Al Nahyan, rahmat allah 'alai-hu', operating under the patronage of His Highness Sheikh Mohammed bin Zayed Al Nahyan, now Deputy Supreme Commander of the UAE Armed Forces and Crown Prince of Abu Dhabi. ADIAS was initially charged with surveying for, recording and, where appropriate, excavating archaeological sites on the coast and islands of Abu Dhabi. Its geographical scope of responsibilities was later expanded to include the bulk of the Western Region, while it was also given responsibility for palaeontology in these areas (Hellyer, 1998a,b). Major sites of importance identified by ADIAS included several of Late Stone Age (Neolithic date), including the oldest architectural remains thus far discovered in the UAE on Marawah Island, and the UAE's only known pre-Islamic Christian monastery on Sir Bani Yas. ADIAS carried out extensive surveys between 1992 and 2006 of much of the Western Region, and between 2004 and 2006 conducted a joint archaeological project with the Department of Antiquities and Tourism in Al Ain, investigating late Stone Age lithics sites at Umm az-Zamul in the south-eastern desert of Abu Dhabi.

Both the former Department of Antiquities and Tourism and the Abu Dhabi Islands Archaeological Survey became part of the new Abu Dhabi Authority for Culture and Heritage (ADACH) in early 2006. The name of the department was changed to the Historic Environment Department, which is responsible for all palaeontological and archaeological activities in the whole Emirate.

2 COMPONENTS OF HERITAGE RESOURCES



Photograph: ADACH

2.1 PALAEONTOLOGY

The earliest known fossils found in Abu Dhabi Emirate date to the Cretaceous period. No surface geological deposits bearing fossils of earlier date are known from the area.

2.1.1 Cretaceous (145.5-65.5 mya)

The term Cretaceous refers to the period c.145.5 to 65.5 million years ago. It is normally divided into a Lower (145.5 to 99.6 mya) and Upper (99.6 to 65.5 mya) Epoch. With a span of some 80 million years it is the longest single period of the last 500 million years the Earth's history.

At the beginning of the Cretaceous period the Earth's landmasses consisted of two mega-continents, known as Laurasia and Gondwana, a northern and southern landmass separated by an equatorial waterway known as the Tethys. By the end of the Cretaceous period, most of the today's continents had begun to separate from the original configuration of Laurasia and Gondwana. Sea-levels were high throughout the Cretaceous period sometimes as little as 18 per cent of the Earth's surface was free of water (*cf.* 28 per cent presently) - and temperature variation between the two poles and the equatorial regions was minimal compared to today.

The Cretaceous period was especially significant for the Emirates and its neighbours, since more than 50 per cent of the world's oil reserves were formed at this time, and of these, some 75 per cent are located in and around the Arabian Gulf. Other important metals, such as gold, silver, copper, zinc, lead, manganese, tungsten, tin and iron also became concentrated in ore bodies during the Cretaceous period.

The Cretaceous period saw the maximum radiation of the Dinosauria. Best known among these are *Tyrannosaurus*, *Iguanodon*, and *Triceratops*. Also living at this time were the Pterosauria, flying reptiles that included the largest vertebrate ever to fly, *Quetzalcoatlus*. The Cretaceous period also witnessed the appearance and evolution of many modern mammal groups, including placental mammals (*e.g.* primates, pigs, cows, cats, dogs, rodents) and marsupials (*e.g.* opossums, kangaroos, koalas). In addition to previously-existing plants such as ferns, conifers, cycads and ginkgoes, the early Cretaceous period saw the first appearance of angiosperms, the group that includes all plants that bear flowers. In conjunction with appearance of angiosperms, Cretaceous insects increased in diversity. In the marine realm, algae, particularly the Coccolithophores, were so numerous and accumulated in such vast quantities that vast quantities of chalk were formed, and it is from this chalk (Latin *creta*) that the period was named in 1822.

The Hajar mountains originated from the uplift, caused by colliding continents during the Cretaceous period, of a chain of islands formed of ophiolite (rocks deposited in deep marine conditions that are then uplifted to the surface). These ophiolites, called the Semail Ophiolite, can be seen as unfossiliferous, reddish-black rock exposed on some jebels in the eastern mountains and especially well-exposed in Wadi Ham, Fujairah Emirate. A broad, shallow and warm sea lapped against the Hajar islands and its limestones are now called the Simsim Formation. Knowledge of the palaeontology and stratigraphy of these carbonate sediments is of particular interest to the ADCO for they comprise the primary oil-bearing rocks in the Shah field, south of Liwa. The best exposures of the Simsim Formation are found at Jebel Huwayyah - known as Fossil Valley - Jebel Rawdah, Jebel Buhays and Qarn Murra, none of which are in the Emirate of Abu Dhabi.

Around the ophiolite islands, coarse beach conglomerates and beach sands were deposited. In exposed environments with high wave activity, the pounding of the waves eroded the beach rocks to form large beds of boulders which had little in the way of marine life. In more protected bays, reefs and thickets of corals and rudist bivalves lived close to the shore while sandy bays had their own fauna of burrowing bivalves and marine snails.

Much of this ancient marine fauna of crabs, sea-urchins, bivalve shells, corals and sea worms would be easily recognizable today (7). However, there are also fossils from some groups of animals that have completely disappeared, having become extinct at the end of the Cretaceous period. These include the ammonites, free-swimming relatives of bivalves and sea-snails that possessed a spirally-coiled chambered shell. Another group of marine animals that no longer exists today are the rudists, a highly specialized kind of bivalve with a large, horn-shaped lower valve that rested on or in the sediment. A rudist found by Natural History Museum palaeontologists from Jebel Rawdah has been given the scientific name of *Glabrobournonia arabica*.

Corals were common in these waters, sometimes forming dense bush-like thickets or patch reefs and sometimes occurring as button-like individuals (some rudists resemble these corals) scattered across the ocean floor. On the edges of the shoals, massive brain corals are to be found. Probably the most unusual of all the corals is the fan-shaped and solitary *Diploctenium*, which attached itself to the sea floor by a thin stalk. Rather delicate for potential preservation as a fossil, it is only found in rocks deposited in the more sheltered environments.

Of the 45 sea urchins now known from the Simsim Formation, 14 species are new to science and some

of them have been named after places where they were found or, in one instance, after a person who has helped the Natural History Museum team - *Codiopsis lehmannae*. Specimens named after places in the Emirates are *Prionocidaris emiratus*, *Heterodiadema buhaysensis*, *Goniopygus arabicus*, *Circopeltis emiratus*, and *Petalabrissus rawdahensis*.



Figure 7 - Cretaceous fossils from Jebel Hafit
(Photograph: Dr. Mark Beech).

2.1.2 Palaeocene (65.5-56 mya)

At the beginning of the Palaeocene Epoch, the world had very few larger sized terrestrial animals. This unique situation was the starting point for the great evolutionary success of the mammals. Only ten million years later, at the end of the Palaeocene, they had occupied a large part of the ecological niches left vacant by the Cretaceous-Tertiary mass extinction that saw the disappearance of the dinosaurs. By the late Palaeocene, the landscape was teeming with small insectivorous and rodent-like mammals. Medium-sized mammals were searching the forests for any kind of food they could cope with, the first large mammals were browsing on the abundant vegetation and carnivorous mammals were stalking their prey.

Despite this impressive diversification, most Palaeocene mammals still have a primitive level of anatomy in comparison to mammals of today. Often they show only the first beginning of specializations that characterise their descendants from later epochs, such as optimization of the teeth for a special kind of food or modification of the limbs for fast running.

The Palaeocene is a crucial time in the history of mammals. Unfortunately, mammal fossils from this epoch are either scarce or entirely unknown in many parts of the world.

2.1.3 Eocene (56-34 mya)

The beginning of the Eocene brought about an important modernization of mammalian faunas. Several groups of mammals with more modern appearance spread over the northern hemisphere at this time. These included the earliest artiodactyls (e.g. camels and deer), perissodactyls (e.g. horses, rhinoceroses and tapirs), rabbits and rodents. No Eocene fossils have been reported from the Emirate of Abu Dhabi.

2.1.4 Oligocene (34-23 mya)

The cooling conditions increase in intensity into the Oligocene when glaciation began in Antarctica. Oligocene rocks are present in the vicinity of Al Ain and fossil mussels were recovered from Jebel Huwayyah (Fossil Valley), just across the border with Oman. About 23 million years ago, a land bridge, possibly located between Qatar and the coastal Fars region of Iran was formed. Animals from both Africa and Asia had the opportunity for intercontinental dispersal via Arabia and it is probable that these changes to Middle East geography also changed the flow of river systems in north-western Africa and in Mesopotamia allowing animals in freshwater habitats (fish, turtles, crocodiles and aquatic mammals) to disperse into new ecosystems. The remains of these animals can be found in the Western Region of the Emirate of Abu Dhabi (see below).

2.1.5 Miocene (23-5.3 mya)

Sites with late Miocene fossil faunas are distributed from Jebel Barakah and Umm al-Ishtan in the far west to Rumaitha in the east (8). Palaeomagnetic dating, as well as biochronostratigraphic dating, suggests that these fossil sites all date to between eight and six million years ago.

The importance of these sites to the cultural and scientific heritage of the UAE lies in the fact that they are the only locations in Arabia where the remains of fossil animals and plants from the late Miocene period have been recovered that are of international significance. The Baynunah Formation crops out in an area of about 1,800 km². The fossils identified so far only come from a 560 km² area, and that has not been yet surveyed in great detail. More work is required.

The Baynunah Formation is preceded, in geological age, by the Shuwaihat Formation, which is several million years earlier, but still in the late Miocene period. No fossil material is known from the Shuwaihat Formation.

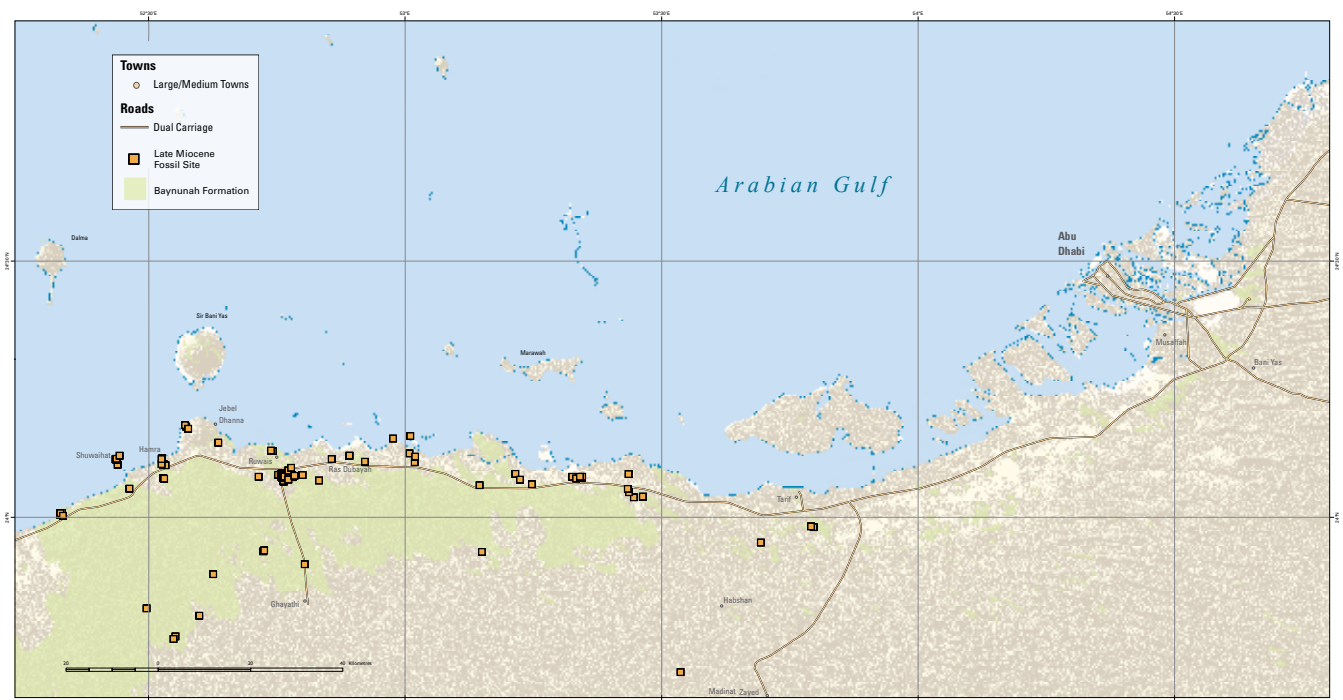


Figure 8 - Map showing the location of major late Miocene fossil sites in the Western Region of Abu Dhabi (after: Whybrow and Hill 1999).

2.1.6 Pliocene (5.3-1.8 mya)

Very little is known about this time period in Abu Dhabi Emirate and further study on the geology of the Pliocene in the Emirate of Abu Dhabi is required. Fossil mangrove pneumatophores present in some coastal areas and on offshore islands have been ascribed to this period, as have fossil corals identified on the island of Marawah (Evans, Kirkham and Carter, 2002).

2.2 ARCHAEOLOGY

2.2.1 Pleistocene (1.8 mya - 9600 BC)

Flint material attributed to the Middle Palaeolithic (Middle Old Stone Age) from the Western Region of Abu Dhabi has been definitively identified at Jebel Barakah (Wahida, Al-Tikriti and Beech, 2008). Five sites located around the jebel yielded a large collection of artefacts which has changed the date of the first human occupation of Abu Dhabi. A number of flint cores and flakes of Levallois technique were collected from the sites (Figure 9). On the basis of this technique and one stone hand axe it is believed that they belong to an early phase of the Middle Palaeolithic. This major discovery has pushed the history of Abu Dhabi to 150,000-200,000 years before present.



Figure 9 - Dr. Walid Yasin displaying the first diagnostic Levallois core from Jebel Barakah (Photograph: Dr. Mark Beech).

2.2.2 Holocene (9600 BC - present)

The Holocene refers to the period from 9600 BC to the present. The majority of archaeological finds in Abu Dhabi, within the UAE, and indeed within the Gulf region as a whole, date to this time period. Archaeologists working in the UAE have adopted the following chronological divisions which describe different time periods. These are generally accepted categories based on shifts in cultural and economic patterns. Some periods are named after particular 'type sites'. These are archaeological sites

whose local geographic name has been adopted as the name for that particular time period. The chronology adopted here is generally applicable to the UAE, Oman and the southern Arabian Gulf region.

2.2.3 Late Stone Age (5700-3800 BC)

The earliest evidence we have for human settlement in the UAE (with the exception of Palaeolithic material identified in Abu Dhabi and Sharjah) is from Marawah Island. The two sites, MR1 and MR11, have the earliest radiocarbon dates known from any site in the UAE.

2.2.3.1 Marawah

The site of MR1 is located on a rocky coastal promontory on the western coast of Marawah and was first discovered during the initial archaeological survey of the island in 1992 (King, 1998). The site consists of a limestone plateau on which are several mounds, wall lines and structural traces. A large quantity of flint projectile points, knives and scrapers were collected from the surface of this site (Hellyer, 1993). Radiocarbon dates indicate that the site was occupied during the sixth-fifth millennium BC (ADIAS Radiocarbon Archive, 2005).

Site MR11 is located in the south-western corner of the island at the north-western tip of a triangular-shaped limestone plateau about 2 km south-west of the modern village of Ghubba. It was also first discovered in 1992. The site was originally misinterpreted as being a church (Elders 2001). Excavations at this site in 2004, directed by Dr. Mark Beech for ADIAS, have revealed at least three stone-built multi-roomed structures within an area covering 200 by 150 meters (Beech *et al.*, 2005). At the end of one of these rooms was a stone platform on which the skeleton of a man had been interred. Recent analysis of the human remains collected from this structure indicates that more than one individual was present. Radiocarbon dates suggest that the site was initially occupied about 7,700 years ago. In the same room as the skeleton an almost complete beautifully decorated Ubaid pottery jar was discovered (10). This type of pottery was imported from southern Mesopotamia, modern day Iraq, providing evidence of overseas trade by the people of the UAE. Fragments of the same type of pottery however were discovered at a number of Ubaid related sites located on the coasts of Sharjah, Ajman, Umm Al Quwain and Ras Al Khaimah.



Figure 10 - Neolithic finds from Marawah Island. Top (from left to right): View of MR11 structure during excavation, & human skeletal remains found in Room 1; Middle: Ubaid pottery vessel and pearl oyster buttons from Room 1, MR11; Bottom: Flint arrowheads from site MR1, Marawah Island (Photographs: Dr. Mark Beech).

2.2.3.2 Dalma

Another important Neolithic settlement was discovered by ADIAS in 1992 on Dalma Island (Flavin and Shepherd, 1994). Excavations in 1998 at the site of DA11, located within the former compound of the Dalma branch of the Abu Dhabi Women's Association in Dalma town, have revealed two building structures along with extensive midden deposits (Beech and Elders, 1999; Beech *et al.*, 2000).

These were not sophisticated stone-built structures like those at MR11 on Marawah Island, but consisted of simple circular arrangements of post holes indicating the location of circular structures, one of which was almost seven meters in diameter. These would have provided the foundations for wooden posts and probably palm-frond walling. Around these structures were considerable midden deposits and ashy material from cooking hearths.



Figure 11- Ubaid pottery sherds from site DA11, Dalma Island (Photograph: ADIAS).

Radiocarbon dates suggest that the settlement was occupied between around 7,400 to 6,500 years ago. Dalma provides some of the earliest evidence for the exploitation of the date palm in the Middle East. Two carbonized date stones were successfully radiocarbon dated using the AMS method (Beech and Shepherd, 2001; Beech, 2003). The inhabitants of DA11, like the community on Marawah at site MR11, kept domestic sheep and goats, and consumed dugong, marine turtle, fish and shellfish (Beech, 2004). Some pottery shards from Ubaid vessels imported from southern Mesopotamia were also noted at this site (Figure 11). More frequently found at the site, as at MR11, were fragments of locally-manufactured gypsum plaster vessels, some painted with decoration emulating the designs of the imported Ubaid pottery. These demonstrate a remarkable regional tradition which has so far only been identified within the lower Gulf on Marawah and Dalma islands. These appear to be different to the plaster fragments described from Dosariyah on the coast of the Eastern Province of Saudi Arabia, which are described as being reed-impressed lime plaster fragments used to strengthen the interior faces of reed-bundle walls (Masry, 1997: 115).

2.2.3.3 Umm Az-Zamul

In the southeast region of the Emirate of Abu Dhabi near Umm az-Zamul, not far from the border between the Emirates, Oman and Saudi Arabia, a number of Neolithic sites have been recently discovered. In several locations of this region which extends within the territory of the

UAE (namely to the west of the road linking Al Qua'a with Umm az-Zamul) Neolithic people were actively practicing their daily life. At that time (around seven thousand years ago), the climate in this part of Arabia was different from that of today, with more rainfall and more vegetation.



Figure 12 - View of lithics collected from Umm az-Zamul (Photograph: Dr. Mark Beech).

During three short seasons carried out by the Abu Dhabi Islands Archaeological Survey (ADIAS), in collaboration with the Department of Antiquities and Tourism in Abu Dhabi's Eastern region, which is now part of ADACH, it became clear that the area is of importance from the archaeological point of view. Large collections of flint tools and artefacts have been discovered. Arrowheads of different types are the most recognizable tools among the collections (12), which also include flakes and limestone mortars (Kallweit *et al.*, 2004). Similar artefacts are known from other regions of the UAE but this is the first time to have been located in such inhospitable environment and in large quantities (Cuttler *et al.*, 2007).

Archaeological investigations carried out so far indicate that this region which is a desert today was different when communities were roaming the area during the Neolithic time. Preliminary evidence also indicates that some of these sites may have been originally located on the shores of lakes that may have existed in the region when the climate was wet (Cuttler *et al.*, 2007). Exposed limestone terraces that perhaps were submerged by water do exist in the plains which extend scores of kilometers to the west of the Al Hajar mountains. These plains are mainly covered with sand dunes that get higher further to the west towards the Liwa Oases. Taking in consideration the formation of the sand dunes and the exposed sites located between these dunes, one can assume that other similar sites may have been buried.



Figure 13 - View of one of the articulated camel skeletons at the Baynunah site (Photograph: Dr. Mark Beech).

2.2.3.4 The Baynunah Camel Bone Site

A remarkable new site consisting of a concentration of 60+ camel skeletons has been discovered in Abu Dhabi's Western Region in the UAE. Three camel bone samples from the site have been AMS radiocarbon dated by the Kiel Radiocarbon Dating Laboratory in Germany revealing that they date from the late fifth millennium BC. The site is located in an interdunal area located to the southeast of the Baynunah Plantation, not far from the Ruwais-Habshan pipeline. The spread of camel bones extends over an area of about 100 square meters. Preliminary analysis of the bones carried out in 2008 by Dr. Mark Beech (Historic Environment Department, ADACH) and Dr. Marjan Mashkour (CNRS/Natural History Museum, Paris) suggests that they are from wild camels. Other archaeological finds associated with the camel bones include a finely made flint arrowhead. This important newly discovered site will provide a valuable opportunity to examine a large sample of wild camel bones during the later prehistory of south-eastern Arabia. Future detailed investigations at the site in the future will throw fresh light on the early interactions between the communities inhabiting prehistoric Arabia and the camel.

2.2.3.5 Other Sites

Other smaller, but important Neolithic sites, have been discovered at a number of other coastal sites including Abu Dhabi International Airport (Beech, Cooper and Kallweit, 2003; Beech, Kallweit and Hellyer, 2004; Kallweit, 2004), and on the islands of Abu al-Abyadh (Hellyer and Hull, 2002) and Ghaghah (King and Tonghini, 1999). Sites have also been discovered in the desert interior. In 1992 a geological survey team discovered a prehistoric surface site situated five km to the south

of Bida Al-Mutawa in Abu Dhabi Emirate. Lying on a palaeodune, which is partially overlain by the first dunes of Rub Al Khali along the southeastern border of gravel desert, the site apparently covers an area of more than 10 ha (Crombé, 2000). Neolithic flint sites are also known in the Liwa area (Kallweit, 1999) and elsewhere in the deserts of the Western Region of Abu Dhabi (Kallweit, 2003; Kallweit and Hellyer, 2003). Numerous Neolithic flint sites are also reported to have been found in the vicinity of Al Ain mainly by amateurs, although these have not yet been published in any detail. Part of the Peter Rothfels collection of flints from these sites can be seen on display in the Al Ain Museum.



Figure 14 - Jemdet Nasr Pottery typical of that found at Jebel Hafit (Photograph: Al Ain Museum).

2.2.4 Hafit (3200-2700 BC)

The Hafit period is named after the well-built stone tombs present in their hundreds on the slopes of Jebel Hafit near Al Ain, and the Hajar mountains of neighboring Oman. Little evidence of fourth millennium occupation has been found on the coast and islands of Abu Dhabi. The main evidence for this period in Abu Dhabi has so far been found well inland, although a few possible Hafit-type pottery sherds were identified close to Abu Dhabi Airport (de Cardi, 1997).

It is striking that a completely different picture emerges if one considers settlements on the coastline of Oman. Here there is abundant evidence for coastal occupation during the fourth millennium BC with extensive coastal shell middens from Ras al-Hamra to Ras al-Hadd and beyond (Uerpmann and Uerpmann, 2003). This has led some authors to describe the archaeology of this period in the Gulf as the 'Dark Millennium' (Uerpmann, 2003). It is likely that a climatic deterioration caused dramatic changes of subsistence and settlement patterns in the Gulf around 4000 BC.

Sometime in the late fourth millennium BC, knowledge of mining and smelting copper ores (from the Hajar mountains), a major technological innovation, arrived in the region. This marked the beginning of the local Bronze Age.

2.2.4.1 Hafit Tombs

Jebel Hafit dominates the Al Ain and Buraimi oases. The mountain is some 1,200 m above sea level and is considered, owing to its bare rocks and exposed geology, a special geological feature in the Eastern Region of the Emirate of Abu Dhabi.



Figure 15 - Restored tombs at Jebel Hafit near Mezyad (Photograph by Walid Yasin).

Approximately 5,000 years ago, Man chose the northern escarpment and eastern slopes of this mountain as cemeteries for the dead. More than 500 graves have been found in these two areas. While some of the graves located on the northern side have been regrettably destroyed, the second group - located on the eastern side - is now protected by the Historic Environment Department of ADACH (16).

Hafit graves, also called Mezyad graves (after the name of the village located near the second group), are well-known to archaeologists, as they represent an early period in the history of the UAE. Scores of these graves were excavated more than four decades ago and proved to be similar in many ways to each other. Unlike the tombs of the Umm an-Nar period, which followed, each tomb here has a single round or oval chamber built of rough local stones. One, two or three ring-walls encircle the chamber and rise to the height of 3-4 meters above the ground. As they rise the walls gradually slope inwards until they eventually meet and forms what looks like a dome.

A narrow entrance, usually facing towards the rising sun of the East, pierces the walls. Does this have something to do with Shamash, the Sun God worshipped, with many others, by the Mesopotamians? This remains an unanswered question. A small number of these graves have been either partially or fully restored by the former Department of Antiquities and Tourism. Finds are rare, because most of the graves were, unfortunately, plundered in the past and in recent times. However, imported pottery from Mesopotamia has been discovered in the tombs (14); this pottery dates the earliest use of the tombs. These are small painted vessels of a type known as Jemdet Nasr (late fourth millennium BC; Jemdet Nasr is an archaeological site located near Babylon in Iraq and famous for its polychrome pottery).



Figure 16 - Tombs and Settlement at Umm an-Nar
(Photographs by Walid Yasin).

Although most of the pottery and also some types of beads found in the Hafit graves are of Mesopotamian origin, the architecture of the graves is local and not known in Mesopotamia. Discovery of Mesopotamian objects in these graves does indicate, however, a trade relationship between the upper and lower Gulf during the Hafit period.

Indeed, as noted above, contact between the two regions goes back to the Ubaid period of the fifth and sixth millennium BC. Some of the Hafit graves yielded bronze objects and vessels made of soapstone, as well as beads of much later date which indicate that these graves continued in use and/or were re-used in later periods, mainly during the Iron Age. The phenomenon of Iron Age people re-using old graves is well-known in the UAE and Oman; it is therefore not always possible to date the skeletal remains.

2.2.5 Umm an-Nar (2700-2000 BC)

The most important Bronze Age site located in the coastal region is on the island of Umm an-Nar (Sas al-Nakhl), situated just to the east of Abu Dhabi Island. A Danish team began excavations here in 1959 that identified 50 large stone-built collective graves and a settlement which date to around 2500 BC to 2000 BC (Frifelt, 1991, 1995). The port of Umm al-Nar acted as a terminal for copper exports to Mesopotamia. Evidence of the Umm an-Nar civilization has subsequently been discovered throughout the UAE and northern Oman. Since the mid 1970s, Umm an-Nar has been the site of the UAE's first oil refinery and a chlorine plant, while there is also a major water desalination and power generation complex on the island. The archaeological sites, however, are carefully protected and preserved.

2.2.5.1 Archaeology of Umm an-Nar Island

The island of Umm an-Nar was the first archaeological site discovered and excavated in the UAE. The island is very important from an archaeological point of view as it houses quite a large settlement and a contemporary cemetery dating to around 2600-2300 BC. Evidence from the stone-built houses (16), excavated not only by the Danes but also by teams from Iraq and the UAE, demonstrates that the island was involved with trade, fishing and copper industry. Inhabitants of the island had contact across land and sea with remote places such as Mesopotamia and the Indus valley. They traded in several commodities, among them copper, shark oil and onions, in exchange for wheat, barley, bitumen and textiles.

The Umm an-Nar cemetery, the largest from this period ever discovered in the Gulf region, consists of 50 tombs. The most impressive are those of circular shape built of dressed stones (16). They range from 6 to 12 meters in diameter and must originally have stood several meters high. In some cases the circular walls were found decorated with carvings representing animals or human figures. The tombs are divided into several chambers, each intended to contain a number of dead. Access to these chambers was through small trapezoidal-shaped entrances. Each tomb had two entrances aligned in

a north-south direction. Though most burials were distributed in antiquity, the available evidence indicates that scores of people were buried over a number of years. The graves were furnished with objects that the dead might need in their after-life. Local and imported pottery vessels were discovered, as were jewellery and various kinds of beads. A number of the tombs were restored, using the original stones, by a team from Iraq in the early 1970s.

The archaeological sites once occupied a large part of the original area of the island. In recent times this has been enlarged by dredging the seabed. The island now has an oil refinery together with military and industrial installations. Most of the latter were built on recently-reclaimed land, while the archaeological site itself is now protected by a brick wall. The ancient houses excavated many years ago have recently been restored by the former Department of Antiquities in Al Ain, and a plan to excavate and restore more of the monuments of the island is now being carried forward. Unfortunately, owing to the nature of the new installations, the island is currently closed to the public.

Today the name Umm an-Nar represents not only the site and the island but also the ancient culture, while Umm an-Nar itself remains one of the major sites representing the ancient history of the UAE during the second half of the third millennium BC. The term 'Umm an-Nar Culture' is used by archaeologists worldwide to refer to the culture that once thrived not only on this particular island but also in many other regions in the Arabian Gulf and the whole of Southeast Arabia at that time.

2.2.5.2 Hili Archaeological Park

The largest Bronze Age complex in the UAE is located at Hili. Some sites of this complex have been incorporated into Hili Archaeological Park, designed to highlight the archaeological sites and make them more accessible to the public. The remainder of the ancient complex is located largely in the preserved archaeological area outside the park, where sites from the Iron Age (around 1000 BC) are also situated.

During the second half of the third millennium BC (2500-2000 BC) the inhabitants of Southeast Arabia lived in sun-dried mud-brick houses and buried their dead in stone-built collective graves. The site designated as Hili 1, located next to the Grand Tomb, was once a high tower, standing several meters above the ground. This building, excavated by a Danish team in the 1960s, was found to have a thick circular wall embracing several rooms that were served by a well located in the centre of the structure. Only the foundations of this building remain but better-preserved minor structures abutting

the circular wall on the outside were found. The site was surrounded by a moat which may occasionally have filled with rainwater.

The remains of a similar building, designated as Hili 10, were discovered near the main entrance of the park. It was excavated in the early 1990s by the Department of Antiquities and Tourism and found also to have a central well. As at Hili 1, the building was of mud-brick construction; it has been restored recently using the same materials. Its three-meter-wide circular wall suggests that the building was once a stronghold, perhaps controlling trade routes to the region. A third building, similar to the others, located outside the south eastern corner of the park wall, was excavated by a French team (17). It seems to have had the same or an even more important role.



Figure 17 - Hili Grand Tomb (Photograph by Walid Yasin).

Collective tombs from Umm an-Nar period dating to the second half of the third millennium BC are known today at many sites in the UAE, but most importantly at both Hili and the Island of Umm an-Nar. At Hili, there are three tombs inside the park and several others outside. Hili Grand Tomb, located in the middle of the park, is over 4,000 years old (Figure 17). The largest monument in the UAE, it is around 12 meters in diameter and must originally have stood at least four meters high. It is divided into four interior chambers, each intended to house a number of dead. Though the tomb was found badly damaged when excavated, evidence from other collective graves from the same period in the region indicates that hundreds of people would have been buried here over a long period of time. The two entrances of the grave are well-decorated with carvings. The northern entrance was cut into a large stone and decorated with three different scenes: above, a man riding an animal with another man walking behind, on the right two embracing figures and, below the opening, two facing animals perhaps devouring a young gazelle or oryx. The decoration on the south-facing entrance

consists of a pair of oryx with two standing figures in between. Both entrances were originally blocked with loose stones that could easily be removed to enable reuse of the tomb. The tomb is believed to have been in use for two to three hundred years, more than four thousand years ago.



Figure 18 - Human skeletal remains and fragmented pottery vessels in Tomb N at Hili (Source: Al Ain Museum).

Not far from the grand tomb another above-ground circular tomb was found, very much disturbed. Its original layout was reconstructed and found to have six chambers formed by a cross wall dividing the tomb in half, each half further divided by two smaller, parallel walls, perpendicular to the main cross-wall. Most of the original stones were missing, and the tomb has now been restored with new stones cut into the original shapes. Because it was empty when excavated, archaeologists believe that the skeletal remains originally buried here may have been transferred to the adjacent pit-grave (Tomb N), which contained many disarticulated human bones. The recent excavations of the central section of the tomb have shown that some of the skeletal remains, including small bones, were in articulation, indicating that some of the dead were buried directly in the pit-grave (18). Tomb N is exceptional in that it also contained many objects such as pottery, stone vessels and ornaments, all dating to the very end of the third millennium BC. During at least its latest phase of use, the dead appear to have been buried directly in Tomb N, that is, only some of the earlier skeletons had been re-deposited here. Tomb N

contained perhaps as many as 800 hundred individuals, buried over a period of 100 to 200 years. Males, females and children of all ages were found. Most adults died while in their twenties or thirties, although it is not clear that some lived into old age; most had lost at least some of their teeth by the time of death (McSweeney et al. 2008).

2.2.5.3 Bida Bint Saud

Some 3,000 years ago, man inhabited the area of Bida Bint Saud, located to the north of Hili, 25 kilometers from the Al Ain National Museum. The area is dominated by an outcrop of stratified rock, rising to about 40 m above the surrounding landscape (19).

Cemeteries were discovered here in 1970 and since then a number of graves have been located and excavated along the eastern side of the outcrop and on the summit. The first excavations were by a Danish team, followed by teams from the former Department of Antiquities and Tourism in Al Ain.

The graves located along the eastern side of Bronze Age date similar to those of Hafit. According to the small number of pottery vessels, these are dated to the late fourth and early third millennia BC. Though mostly disturbed, these resemble solid heaps of stones. Excavations showed that each heap concealed a hollow chamber surrounded by a ring wall, pierced by a narrow passage leading inside. The roofs were corbelled in such a way that the ring wall inclined inwards the higher it rose. Originally these graves would have resembled domed structures.

Another group of graves belonging to the Iron Age is located on the top of the outcrop. They are of various shapes and dates, though mostly circular in shape. Like the first group, they are built above ground from local rough stones. These are collective graves divided into a number of chambers each with several burials. The discovered skeletons were in poor condition and only fragmented bones were found. Though these graves had been plundered in the past, the excavations yielded a number of discoveries including pottery and stone vessels, dagger blades, bronze arrowheads and different types of beads. Other small finds were also found. These artefacts belong to the first and second millennium BC and are on display in the Al Ain museum. Following some destruction in the mid-1980's, the excavated graves were rebuilt according to their original plans.

A few hundred meters to the west of the outcrop, a local team from the former Department of Antiquities and Tourism in Al Ain excavated a public building, the first of its kind discovered in the region. The building, which was

covered by blown sand, is built of mud bricks similar to those of many other structures of the same date already known in the region. The plan and function, however, are new. The building is mainly occupied by a large hall. The roof is missing but originally seems to have supported by twelve columns, the plinth of which are still visible. Storage rooms have been added to the outside of the building and many storage jars were found inside them.

The building may have served as a place to control the distribution of water in the region some three thousand years ago. Because of the fragile condition of the construction materials, the structure had to be back-filled with sand. It will be re-exposed only when a restoration plan is implemented. About 150 meters to the south of the building, a *falaj* (underground water tunnel) was discovered and partly excavated. Several shaft holes belonging to this *falaj*, an underground *shari'a* (access for water) with steps leading to it, and a large open cistern were excavated. A second *falaj* has also been discovered in the same region. The existence of both *aflaj* indicates that the area of Bida Bint Saud played a major role in the history of the Eastern Region of Abu Dhabi. The discoveries also provide evidence that the *falaj* system was indigenous to the region, being introduced during the Iron Age some 3,000 years ago.



Figure 19 - Views of the Bronze and Iron Age site of Bida Bint Saud (Photographs by Walid Yasin).

2.2.5.4 WADI SUQ (2000-1600BC)

True settlements from the first half of the second millennium BC have not been discovered in Abu Dhabi Emirate. However, traces represented in some architectural remains and pottery of this period have been identified at sites 1 and 8 at Hili in Al Ain. Architectural remains on the surface of the latter provided evidence of a culture which existed around 1800 BC. In general, the second millennium BC culture in the UAE remains sketchy, with few documented finds. Nevertheless, from the long collective grave at Qattarah, excavated by the former Department of Antiquities in the 1970s and 1980s, many archaeological objects have been discovered, indicating that a quite extensive community was living in the vicinity. luxury items such as pendants made of gold and silver were among the discovered objects. The grave also yielded many bronze objects such as swords, daggers, arrowheads, bangles and bracelets. Sparse evidence came from some of Abu Dhabi islands indicating that they may have been used as temporary way-stations or trading settlements by sailors from Bahrain (ancient Dilmun), on their way to Hormuz (Carter, 2003).

2.2.6 Late Bronze Age (1600-1250 BC)

Only ephemeral settlement traces from the Late Bronze Age have been identified in Abu Dhabi Emirate, and the pattern of occupation in this region during this period is, at yet, poorly understood. Sporadic objects dated to this period have been discovered in some of the reused tombs, such as those of Hafit. A falling in the water table has been identified for this period, and this may have affected patterns of settlement.

2.2.7 Iron Age (1250-300 BC)

Despite the fact that the Iron Age inhabitants in Abu Dhabi only began extensively using iron in the second half of the first millennium BC, the term 'Iron Age' is widely used to cover the period between 1300 and 300 BC. Inhabitants of the UAE continued to use copper rather than switching to the new metal, presumably because of the ready availability of copper in the mountains. The absence of inscriptions and subsequently the name of the races that lived in the Arabian Peninsula are the reasons for using the term more broadly. Man in the ancient Near East however, discovered and used iron during the 13th Century BC. Unlike the Bronze Age, large settlement sites having different layouts became common in the Iron Age. The tower-like buildings, which were known in the region in the earlier periods were replaced with other structures and separate building units. Many of the major Iron Age sites so far discovered in the UAE, including Rumeilah

and Hili, both in Al Ain, and at Muweilah and Al-Thuqaibah in Sharjah and Khatt in Ra's al-Khaimah, lie inland near the Hajar mountains and supplies of subterranean water. The period itself coincides with the first use of '*falaj*', the underground water system. The well-preserved sites in the Al Ain area, including villages, as at Rumeilah (Figure 20) and Hili 2 cemeteries, as at Bida Bint Saud, and many other sites discovered in the vicinity of Al Ain by the Department of Antiquities during the last decade are indicative of extensive settlement. The availability of ground water and the introduction of the *falaj* system by the local communities helped establishing the local culture that covered 1,000 years of the ancient history of Abu Dhabi.



Figure 20 - Aerial view of the Iron Age settlement at Rumeilah.

2.2.8 The Falaj System

Excavations carried out in and around the city of Al Ain demonstrate that the *falaj* system, *i.e.* tapping water from mother wells sent deep into the ground, has been in use in the Eastern Region of Abu Dhabi since the beginning of the first millennium BC. This early date precedes by several centuries the earliest known qanat in Persia.

The word *falaj* is locally used in the UAE and Oman but its origin goes back to the Akkadian period some 4,300 years ago. In his campaign to *Urtu* in 714 BC in the Lake Urmiya region, Sargon, the Assyrian king, mentioned the term *palgu* as open ditch. This early record of the system as well as records of Polybius, the Greek historian of the 3rd – 2nd Century BC, made scholars consider the Persian origin for this system as indisputable. Using this type of irrigation system for several millennia helped the word *falaj* to survive. Apart from Iran and Arabia the *falaj* is known in Iraq, Afghanistan, China and Central Asia. The system is also known in North Africa and, it appears to have reached the northern coast of the Mediterranean (Spain, Sicily and Greece).

The *falaj* consists of five sections: The mother well(s), the tunnel, the cut and cover section, the *shari'a* and the surface channels. The mother well is the first step building a *falaj*. Locating a suitable aquifer and sinking a well to find out if the bulk of discovered water is large enough to built a *falaj* determines to go ahead with the construction or not. Once the mother well is dug and water is discovered, other nearby wells are also excavated and connected by tunnels in order to increase the supply. The tunnel, which is pierced with vertical shaft holes, (*thuqba* Pl. *thuqab*) is dug from the mother well to the field or *vice versa*. The *thuqab* are dug to allow ventilation and removal of the spoil. They can be used as access points to the tunnel whenever maintenance is necessary. The cut and cover section starts at a point where the top of the actual tunnel becomes closer to the surface, while the *shari'a* is the first place where water becomes on the surface and can be utilized.

Around 5,000 years ago underground water level at Hili was only 4 meters below the surface. Pumping however has drastically affected the reserves in both Oman and the UAE (for changes in the ground water levels see Jorgensen and Al-Tikriti, 2006). Wells from the Bronze Age discovered at Hili indicate that water was utilized by a traditional system; drawing water by buckets. The traditional *jazra* system, known as *Saqiya* in Iraq, which is described as animal water drawn system, was still known some years ago in both Oman and the UAE. The *falaj* system was introduced by the UAE inhabitants around 1000 BC. Although the *falaj* was considered by some scholars as a possible result of mining activities in the northern Alburz and Armenia it is generally believed that the introduction of the *falaj* was a result of a direct requirement for water exploitation and it does not seem to have any connection with mining activities. The tunnels resulting from mining are not suitable for draining water without proper engineering or considering the direction and angle of slope in advance. Digging irrigation tunnels needs to be studied carefully before connecting them to the water source. Copper miners would not consider any of the conditions to obtain tunnels suitable for irrigation, such as the gradient of the ground.

Despite the extensive investigations in Iran, which have been going on since the 19th Century the *falaj* is still not known before the 5th Century BC while the relatively recent explorations in the UAE brought to light at least five *afaj* all from the Iron Age. Such a system was however extensively used in Iran during the Sasanian Empire. In our opinion the power that the Sasanians had on their neighbours including the coasts of the Arabian Peninsula including the Yemen, as well as, Egypt seems to have been the reason for attributing this system and several other cultural aspects to Iran rather than to Arabia.



Figure 21 - The Iron Age *falaj* at Hili (Site 15) and Iron Age house (Site 17) (Photographs by Walid Yasin).

At Hili the Department of Antiquities and Tourism discovered and partly excavated a *falaj* from the Iron Age (ca. 1000 BC) (Figure 21). Surface channels, *Shari'a* with sluices still *in situ*, cut and cover section and two shafts excavated. A nearby fortified site may have been as administration place to control and run the *falaj*, therefore, Dr. Walid Yasin identified it as a *beit al falaj*. Two more Iron Age *aflaj* have been also discovered by him at Bida Bint Saud. This discovery led to carry out extensive excavations to define the direction of these *aflaj*, the irrigated land and their dates. Extensive work revealed 11 shaft holes forming two lines at the first *falaj* and several others at the second one. The *Shari'a* of the first *falaj* was discovered and turned out to be different from the aboveground *shari'a* at Hili 15. It was found at a depth of 3.8 m below the surface of the ground. The access to the *shari'a* was made through steps descending to it from the northern side. While excavating the steps, fragments of Iron Age pottery were collected. Like Hili a large public building is located near this *falaj* and thought to have served as *beit al falaj*. Iron Age *aflaj* are not confined to the Al Ain oasis as the archaeological evidence shows that they were known in other areas in the UAE such as in the area north of Bida Bint Saud, Wadi Al Ayyay, Nahil, Jabeeb, and Al Madam Plain.



Figure 22 - Decorated plaster panels from the church (Photographs: Dr. Mark Beech).

In conclusion, it is clear that the *aflaj* system must have played an important role in the history of the Oman Peninsula. Also it can be considered, as a revolution that led to the establishment of many settlements in the region reminiscent in many ways to modern Arab villages. Large fields must have been cultivated and the landscape of the oases must have been not very much different from what it was before the oil boom. The system may have also attracted some tribes living outside the immediate areas, especially from the south and southwest of Arabia. On the basis of the evidence from the UAE therefore, we should re-consider the dating of the *aflaj* and other irrigation systems that were discovered in other parts of the Arabian Peninsula. The discovery of two Iron Age *aflaj* in the area of Bida Bint Saud indicates that this type of irrigation system was already well established in the region when it was constructed.

2.2.9 Late Pre-Islamic (300 BC - 300 AD)

Important evidence of occupation of many of Abu Dhabi's islands during the few centuries just prior to the coming of Islam has been identified. Among islands where sites from this period have been found are Abu al-Abyadh, Abu Dhabi, Balghelam, Dalma, Marawah, Qarnein, Sir Bani Yas, Yasat al-Ulya and Yasat Sufla, while slight traces of occupation, in the form of the occasional potsherds, have also been identified on the coast, as at Ra's Bilyaryar, northeast of Abu Dhabi.

Inland, there are again some indications from the Al Ain area, although, once again, much evidence may be buried beneath the existing city.

2.2.10 Sasanian (300-632 AD) to Early Islamic

One of the most important sites from this period is on Sir Bani Yas Island, where the Late Pre - Islamic Christian monastery found by ADIAS is the only physical evidence yet known in southeastern Arabia of the presence of Christian communities before Islam (22). Excavations between 1993 and 1996 uncovered a church constructed within a walled monastic complex (Elders, 2001, 2003; Hellyer, 2001; King, 1997, 2001). A number of associated courtyard villas were also excavated from the surrounding area of the monastery. These all appear to have been occupied during the 7th and 8th centuries AD, being abandoned shortly after the arrival of Islam, perhaps because its inhabitants became Muslims or moved away. There is textual and archaeological evidence of the presence of the Nestorian Church in the northeast Arabian Peninsula, Mesopotamia and Iran during this period, although Sir Bani Yas is the most easterly site so far identified. A number of other Nestorian churches have been identified in the Gulf, notably at Failaka in Kuwait and Jubail in Saudi Arabia, but Sir Bani Yas is the first to be clearly identified with a related monastic settlement.

2.2.11 Early, Middle and Late Islamic (750 AD - 19th Century)

Study of the Islamic period is hampered by the lack of local written records for Abu Dhabi. Arab travellers like Ibn Battuta, Al-Idrisi and Yaqut passed through or dealt with the region but they made little reference to the UAE, apart from mentioning the major trading ports of Julfar (Ra's al-Khaimah) and Dibba. The climate of the region became increasingly arid, perhaps prompting inhabitants to turn to a semi-nomadic lifestyle that subsequently lasted for much of the period until the coming of oil in the 1960s, except in the relatively well-watered areas around Al Ain. An Early Islamic *falaj* and the remains of a mosque have been discovered by the former Al Ain Department of Antiquities in the city. Some earlier settlements on offshore islands, such as Yasat al-Ulya and Ghaghah, as well as on Sir Bani Yas, appear to have been abandoned by around the beginning of the Islamic period.

For the bulk of the desert interior, with the exception of Liwa (which is discussed below), no settlement, or, indeed, occupation is attested for the whole of the period from the end of the Late Stone Age until the Late Islamic period, although it continued in the Al Ain area. There are, however, significant remains of the Islamic Period in the region of Al Ain, including the many forts for which the town is famous (Figure 23). A targeted study of the Islamic Period remains of Al Ain, together with detailed historical investigation, by the Historic Buildings division of the Historic Environment Department at the Abu Dhabi Authority for Culture and Heritage (ADACH), is starting to yield significant results.

2.2.12 Recent Islamic (19th - 20th Century)

2.2.12.1 Al Ain Area

In the Al Ain area, the continued availability of water, through *falaj* systems, made permanent occupation, associated with agriculture, feasible. A number of the built architectural monuments in Al Ain, such as the forts, date to the 19th or early 20th Centuries, while the *falaj* systems may be of a much earlier date, albeit frequently repaired. The majority of historic buildings in the Emirate of Abu Dhabi are located in and around the city of Al Ain. Historically, the oasis of Al Ain/Buraimi, now divided between the UAE and Oman respectively, represented a strategic position of great importance as the only well-watered location between Oman and the oasis of al-Hasa in present-day Saudi Arabia and the crossroads of the routes between Oman and the coastal settlements of the UAE. The underground springs from which the city takes its name provided water to a group of oases of which seven survive to this day on the UAE side of the border – Al Ain, Mutaredh, Muwaiji, Jimi, Qattara, Hili and Ma'sudi.

Each of the oases preserves evidence of the past in the form of historic buildings and archaeological sites. Traditional buildings in the mountains and along the coast of the UAE often use stone and coral as the basic building material, but inland at Al Ain there is a long and rich tradition of mud-brick building using clay collected from the *wadis* that bring down water from the nearby mountains. Archive photographs show that mud-brick houses continued to be extensively used in Al Ain until the end of the pre-oil era in the 1960s, often supplemented by *arish* structures made from palm branches and leaves.

Despite the massive expansion of Al Ain which has occurred over the last 40 years, at least 65 registered historic buildings survive within the seven oases around which the modern city has grown. These buildings are of several types including large forts, defensive towers and fortified houses (*murabbas*) built to protect the inhabitants of the oases and their produce, as well as mosques and even a traditional market or *souk*. All these buildings demonstrate the traditional building techniques of Al Ain – massively thick mud walls with limited small openings for light and air, roofed with palm log and palm mat roofs, and with floors and walls covered with mud plaster.

The ruins of the structure known as Nagfa Fort, located at the northern end of one the rocky outcrops of Jebel Hafit that commands the approach to the oasis of Al Ain perhaps represents the earliest surviving defensive structure from the late Medieval period. Some of the ruined fortified houses in the oases of Qattara and Hili may date from the 18th Century. Other early buildings in Al Ain are the 19th Century group of structures at Murayjib, the believed to have founded around 1816 by the former ruler of Abu Dhabi, Sheikh Shakhbout bin Thiyab, and the *murabba* of Al Ankah, founded in the mid -19th Century.

Probably the most significant of the historic buildings of Al Ain are those that form the group of forts – Jahili, Mezyad and Sultan, as well as the large enclosure known as Muwayji palace - that were built towards the end of the 19th Century in connection with significant political developments taking place in the region at that time, in particular the movements of the Bani Yas tribe eastward into Abu Dhabi and the rise of the currently ruling al-Nahyan family. Along with these large forts a number of watchtowers along the eastern edge of Al Ain also date to this period. Much of this defensive building appears related to the division of loyalties in Al Ain and Buraimi created by the Wahabbi presence in the Buraimi oasis from the early 19th Century until their expulsion by the Sultan of Oman in 1869. These historical divisions resurfaced during the Buraimi dispute of the mid-1950s and are now enshrined in the international border between the UAE and Oman.

A number of the historic buildings of Al Ain preserve associations with important historical events and personages of the 20th Century. These include the *murabba* of Sheikh Zayed built in 1948 in the centre of the town and several residences of the ruling family, such as the Al Ain Palace Museum and the house of Sheikh Mohammed bin Khalifa, the latter an important surviving example of local architecture and building technology in the immediate pre-oil era. A number of these 20th Century buildings are also linked with historical events during the formative years of the UAE such as the Hili Attack and the Buraimi dispute of the 1950s.

From a conservation point of view, the historic buildings fall into two broad groups, those that were restored or rebuilt during the period from the 1980s onwards, and those where no restoration or conservation work has yet been carried out. The latter category, mostly consisting of fortified houses in the oases, is currently the object of a program of conservation and stabilization being carried out by the Abu Dhabi Authority for Culture and Heritage that is intended to secure their structural integrity without compromising their authenticity or cultural value. For the buildings restored or rebuilt from the 1980s onwards ADACH is developing a policy that combines sympathetic reuse of the modern parts of the building with respect for the remaining areas of historic fabric.

A major ADACH project recently completed in Al Ain is the development of Jahili Fort (23). This project used a mixture of traditional local building materials and innovative technology to convert part of the fort into a new visitor information centre, a temporary exhibition gallery, a permanent exhibition on the traveler Mubarak Bin London - Wilfred Thesiger, and a walk-through audio-visual installation on the history and development of Al Ain.

Work on the project has also provided new archaeological information relating to an earlier possibly medieval *falaj* as well as details of the original construction of the fort in the 1890s and its use as a military base for the Trucial Oman Levies in the 1950s.



Figure 23 - View of Jahili Fort in Al Ain (Photograph: ADACH).

At Bin Hadi house in Hili Oasis another project is carrying out the careful conservation of this traditional mud-brick house. Inside the house archaeological investigations facilitating the conservation work have brought to light the remains of a number of buildings including a *madbasa* for the storage of dates. At Muwayji fort archaeological investigations inside the courtyard of the fort have revealed the remains of a number of buildings which are probably associated with the original construction of the fort by Sheikh Zayed the First.

2.2.12.2 Liwa and the Desert Interior

In the Liwa oasis, permanent settlement appears to have commenced by the 16th or 17th Century AD, and certainly by the 19th Century AD forts had been built. Most of the historic buildings of Liwa lie to the west of the junction between the main east-west road through the oasis and the road leading north to Medinat Zayed and the coast. All the buildings lie to the north of the east-west road running through the oasis.

They fall into three broad categories:

Un-restored buildings – Qasr al Hayla and Umm Hisn,

Buildings restored/rebuilt from the 1980s onwards – Marya Gharbiya, Mougab, Qutoof, Dhafeer, Mezaira, Meel and Jabana, and

Possible locations of historic buildings requiring further investigation – Id and Marya Sharqiya.

Measured by the criteria of authenticity the most significant historic buildings in Liwa are actually the two unrestored towers at Qasr al Hayla and Umm Hisn. The largely intact

state of conservation of Qasr al Hayla adds to its importance and makes it perhaps one of the most significant buildings in the entire Emirate of Abu Dhabi. Seven out of nine of the historic buildings appear to have been largely or completely rebuilt in mud-brick rather than the original coursed stone rubble from the 1980s onwards. The consequent lack of authentic historic building fabric means that the significance of these buildings is limited to the location rather than the present buildings, although they do present many aspects of the traditional mud-brick building technology used in other parts of the UAE.

Recent investigations in the desert between Al Ain and the city of Abu Dhabi, particularly at Al Mari and Bedo'a Shwaibir, have revealed several Late Islamic Period campsites dating to the last few centuries. This work was carried out by a joint team from the University of Kanazawa, Japan (Professor Tatsuo and Dr. Hanae Sasaki), together with the Historic Environment department from the Abu Dhabi Authority for Culture and Heritage (ADACH).

One further interesting site, as yet not studied in detail, is located at Mantiqa al-Sirra, to the northeast of Medinat Zayed in the Western region. This abandoned fort buried in the sand dunes is the only central desert site of its type yet identified, and further work is required to determine both its function and also, if possible, the reasons for its abandonment, although a slight harshening of the climate or reduction of the already sparse rainfall may have been responsible.

2.2.12.3 Coast and Islands

The nature of recent Islamic coastal and island sites varies from evidence of burning and pottery scatters suggesting the presence of occasional campsites to areas of more extensive fireplaces, stone structures including outline mosques, water catchment systems, shell middens and pottery scatters that probably represent at least frequent seasonal occupation. The number of sites from this period testifies to the importance of the pearling industry in the pre-oil era. Pearling may have reached a peak in the late 18th and 19th Centuries. Among key sites is a shell midden (piles of opened and abandoned pearl oyster shells) on the island of Abu al-Abyadh (Hellyer and Hull, 2002). It was once over three kilometers long, containing many millions of shells. The presence of Chinese porcelain and other imported pottery on some island sites demonstrates that, besides being involved in fishing and pearling, the people also took part in regional trade and in other economic activities.



Figure 24 - The sulphur mines at Jebel Dhanna. Left: mine shafts. Right : traces of working (Photograph: ADIAS).

One important coastal site dating to the Later Islamic period is the complex of sulphur mines at Jebel Dhanna (King, 2003). With support from ADCO, a team from the former Abu Dhabi Islands Archaeological Survey (ADIAS) identified and studied a complex of sulphur mines with around 150 individual mine shafts (24). These probably date to the 18th Century AD, and are the only sulphur mines known in Eastern Arabia. The sulphur was probably largely exported for the manufacture of gunpowder.

Buildings from the recent historical period are rare on the coastline and islands of Abu Dhabi. Key sites include the Bayt al-Muraykhi (a pearl trader's house) and the al-Dawsari, al-Muraykhi and al-Muhannadi mosques, all on Dalma Island (King, 2004a, b). The stone walled mosques on Liffiya, Marawah and Bu Sharah, as well as a number of stone outline mosques on coastal islands also form an important architectural group (King, forthcoming). Buildings in the Western Region are mostly located on the larger islands such as Dalma, Sir Bani Yas and Marawah, although there is some evidence of coastal structures and shelters on the mainland such as the jetty and harbour at Sag Barakah. On the island of Sir Bani Yas there are also remains of a much more recent group of late Islamic structures or features in the northern part of the island associated with the former village of al Zaher, including a drystone wall mosque, an enclosed palm garden and remains of stone huts. On Marawah Island the lack of available building materials resulted in unusual structures constructed out of driftwood and beach rock.

Recent settlement on the island of Abu Dhabi dates from the mid-18th Century, and a number of buildings were constructed in the 19th and early 20th Centuries, including forts, mosques and domestic dwellings, although few survive. A key impetus for the 19th Century building may have been increased prosperity resulting from the pearl

trade. The most significant historic building in the city of Abu Dhabi is undoubtedly the 18th Century fort of Qasr al Hosn. The initial settlement of Abu Dhabi Island took place in the mid 18th Century, and the first phase of the present fort was built around the 1790s, consisting of a roughly square enclosure with two round towers at the northeast and southwest corner and a square tower at the northwest corner. The changes carried out in 1940-41 under Sheikh Shakhbut bin Sultan Al-Nahyan (1928-66) constitute the second major phase of the building. These changes included the construction of the present outer walls and the two large two-storey wings along the east and south, with two round towers at the northeast and southwest corners and a square tower at the northwest corner. A major programme of conservation and presentation of Qasr al Hosn and the surrounding area around was initiated in 2008.

Other historic buildings on or immediately adjacent to Abu Dhabi Island include the Maqta tower and customs house, as well as other royal buildings such as the summer house of Sheikh Shakhbut in Khalifa Park.

2.3 INTANGIBLE HERITAGE

Intangible cultural heritage 'is the mainspring of our cultural diversity and its maintenance a guarantee for continuing creativity' (The 2003 UNESCO Convention for Safeguarding Intangible Cultural Heritage). The intangible heritage of Abu Dhabi Emirate is rich in oral literature, folklore, customs and beliefs, traditional handicrafts, games and sports, as well as performing arts. These are all vital components of everyday life.

ADACH's work in protecting this intangible heritage is closely linked to UNESCO's and involves researching, cataloguing and archiving of the oral history, local traditions and values of Abu Dhabi. These activities document and preserve traditional culture, and help to encourage the development of new local initiatives in literature, performing arts and handicrafts.

2.3.1 Emirati Handicrafts

The findings of archaeologists confirm that the early inhabitants of the UAE had mastered a number of craft skills as long ago as 7,000 years. The tombs and buildings discovered at sites like Umm al Nar and Hili in Al Ain, yielded up tools, pottery (much of it decorated to a very high standard of artistry), jewellery and alabaster objects. This evidence, correlated with examples of the crafts practised by more recent generations, indicates an ancient tradition of artisanship. There are eight main handicrafts indigenous to the UAE: pottery, *khoos* (the weaving of palm fronds), *saddoo* (weaving), spinning, *telli* (embroidery), jewellery, leatherwork and woodwork.

2.3.2 Pottery

Pottery was traditionally used for preserving and transporting food. Traditional pottery forms still in use today include the *hib* for storing and cooling drinking water; the *burmah* for keeping milk fresh and the *chirr* for storing dates and dried fish. One of the largest and technically most challenging, from the point of view of firing, was the *kharous*, capable of holding over 20 gallons of water. Incense containers, vases and braziers were also made of clay.

2.3.3 Khoos (Weaving of Palm Fronds)

The numerous date palms growing around the oases led to the development of a complete craft industry using woven palm fronds to make items such as baskets, fans and floor coverings. A few of the most common are described below:

The *mibkhara* (censer) is a four-legged conical stand on which clothes were hung so that they became infused with the perfume of incense released from beneath it.

Amakabbah, once an essential item in Emirati households, is a woven cone used to cover food.

A *suroud* is a round mat on which dishes were placed. A number of them could be stitched together to make a larger surface around which people gathered to eat.

A *jafeer* is a wide basket tapering to a flat circular base used to carry fruit and vegetables.

A type of simple house called an *arish* was built from palm trunks and fronds. It afforded a degree of privacy, provided protection from wildlife and remained relatively cool during the heat of the day.

2.3.4 Saddoo (Weaving)

Like *khoos*, this craft derives its raw materials from the local environment. The untreated wool is a by-product of keeping goats and camels. Once washed, spun and dyed using indigenous plant extracts such as henna, saffron, cactus and indigo, it can be woven into colourful, practical products such as clothing, camel trappings or tents. The distinctive tents of the Bedouin were highly appropriate and convenient for a nomadic lifestyle, being light and easy to dismantle. Floor cushions, decorations, carpets and rugs are also woven.

2.3.5 Spinning

Bedouin women used a hand wheel rather than a treadle to spin. This meant that they could spin just as easily

while travelling on the back of a camel as they could in the greater comfort of the family tent. Spinning in the UAE mostly produces yarn for *saddoo* products.

2.3.6 Telli

Al telli is a form of embroidery using twisted coloured threads, commonly used to adorn the bodice and sleeves of the Emirati traditional dress. It is found exclusively in the UAE and Oman.

2.3.7 Jewellery

Archaeological evidence shows that jewellery has been made and worn in the region for some 7,000 years. Al Ain National Museum has some fine examples of pieces wrought in gold, silver and other materials. Accessories for the hair, bracelets, rings and anklets are still popular as are various kinds of necklace, particularly those incorporating a *tabla* or small rectangular box housing Quranic verses.

2.3.8 Leather

Traditionally, leatherwork was the speciality of the Bedouin, who depended greatly on animal hides for making shoes, bags, furniture, musical instruments and camel gear. Tanned hides were also widely used to make containers for food or water. Similar containers were used to churn milk into butter. The Bedouin were skilled tanners and used a number of seeds and natural materials in the process.

2.3.9 Woodwork

The Bedouin used wood to make saddles and containers for water and animal fodder since its durability suited their nomadic lifestyle. More affluent families possessed wooden bowls and large flat wooden plates for serving food to guests. A wooden mill called a *monhaz* was used to grind grain, spices and coffee beans. Some musical instruments were also made of wood.

Until the 1960s most skilled carpentry work was restricted to the shipyards of Abu Dhabi. However, there are now many flourishing carpentry shops producing doors, windows and furniture, most of them run by members of the Asian community.

2.3.10 Emirati Dress

The clothing of Emirati women reflects the climate of the country as well as Arab and Islamic customs. Their clothes are adaptable, loose-fitting and often decorated with bright colors. The garments worn beneath the black abaya are simple and aesthetically pleasing.

They are often ornamented with gold or silver thread (*zirri* or *telli*). The traditional craft of *telli* and *zirri* is still taught to young girls and enjoyed renewed popularity during the 1960s and '70s when the general population began to experience an increase in wealth. Emirati women used to embroider their own garments with *telli*. Demand for both gold and silver thread increases on special occasions and before feasts or the wedding season.

The most popular garments for women include:

The Arab *kandoura* or *shift*, finely embroidered around the sleeves and neck.

The *thawb*, a long tunic which goes over the *kandoura*.

The *abaya*, the loose-fitting outer garment which is worn in public.

The *sheila*, a large piece of black fabric up to 2 meters long, which covers the woman's head and part of her face in public.

The *burga'*, one of the oldest traditional items of dress, is a mask once worn by girls when they came of age. Nowadays it is only really worn by the older generation. The inside surface of the mask is rubbed smooth using oyster shell or stone and painted with indigo dye, believed to have a beautifying and whitening effect on the skin. The usual colors of the *burga'* are red and gold.

The most popular garments for men are as follows:

Headgear:

The *gahfiya*, a small, knitted cap that covers the hair and keeps the *gitra* in place.

The *gutrah* is a square piece of cotton, folded into a triangle and used to cover the head. It usually matches the *dishdasha*. The type of *gutrah* changes according to personal preference, occasion and season.

The *shimagh* is the same size as the *gutrah*, but more colourful. It is often embroidered or patterned.

The *tailasan* is a headdress worn directly over the head. It hangs down over the shoulders and around the face.

Headgear is held in place by an *iqal*, or circular rope of twisted wool, usually black or white in colour.

Robes:

Everyday dress for most men in the UAE and other Gulf states is a long-sleeved, ankle-length shirt known as a *dishdasha* or *kandoura*. White is the most popular colour.

The *basht* is a long robe worn over the *dishdash*, unique to the UAE and Arabian Gulf countries. *Bashts* denote status and authority and are usually worn at religious feasts, weddings and formal public celebrations.

A light shirt called a *meqasser* is worn beneath the outer garments.

The *tarboush*, or *farokha* as it is known in the UAE, is a decorative tassel that hangs from the collar of the *kandoura*.

Footwear:

Sandals, or *ni'al*, are most commonly worn in the UAE, but thin-soled leather mules called *madras* are also popular.

2.3.11 Traditional Songs and Dance

Contemporary world culture is well represented in modern Abu Dhabi. The theatres are host to touring productions and cinemas screen the latest Hollywood releases. Television beams into homes a vast array of programmes to suit all tastes and ages. Beneath this cosmopolitan exterior, the country preserves the folk traditions which are so expressive of the character and history of its people. There are few archival sources relating to the lifestyle of the people of the Emirates; instead there is a rich oral tradition in the form of story-telling, songs, poetry and dance.

The interpretation of these folk arts varies between the coast, the oases and the desert but the structure is broadly similar and the common themes are pride, religion, praise, masculinity, strength and chivalry. Some genres are for voice only; others are accompanied by musical instruments. Some are male-dominated, whilst others can be performed by men and women. All are popular at weddings, other social events and religious feasts, particularly the Eid el-Fitr at the end of Ramadan.

One of the most well-known forms of Emirati folk art is *al razeef*, the unaccompanied recitation of verses, by two facing lines of men. The performers are dressed in traditional costume with cartridge belts and ornate curved daggers slung around their waists. They each carry a cane and a rifle and their performance is punctuated by gunfire. When all the verses have been recited, the performers rest and male dancers or *razzafeen* take over. They perform a swaying dance, weaving between the two rows and from time to time circling their rifles above their heads.

The dance of war, *al ayyala*, combines song and dance. Symbolizing triumph after a battle, it is now performed as an act of welcome to dignitaries visiting Abu Dhabi, and

is considered to embody the UAE's finest historical and cultural values. The performers' coordinated movements and vocal refrains are accompanied by much gunfire and brandishing of swords and daggers in a display that epitomizes the courage and fortitude of Bedouin living in the heart of the desert. *Al harbia* is a similar dance, in which the rhythm is supplied purely by vocal chants and the recitation of poetry.

Two other performances, *al na'ashat* and *al radha*, were traditionally given by Bedouin women at various kinds of celebration. In *al na'ashat* the dancers roll their heads from side to side to display the beauty of their long hair, especially when the songs performed relate to love, pride or the bravery of the men of the tribe. *Al radha* was traditionally performed after a wedding celebration, when the women sang as they made their way to the house where the musical instruments were kept.

Other genres reflect the isolation of the Bedouin. *Al tareq* is a recitation describing the act of leaving family and loved ones and the solitude that is felt in the empty wastes of the desert. The singer would chant it whilst riding his camel, to entertain himself. *Al taghrooda* glorifies life with all its hardships and blessings. Often, it would be recited in the desert by two or three men searching for a lost animal. The rhythmic chanting encouraged their mounts to go faster and helped pass the time.

Al maled or *al mowled* is a totally different kind of recitation that deals with religious themes. *Al maled* songs are long poems, telling the story of the Prophet Mohammed (Peace be upon Him) and his great deeds. A group of tambourine players or drummers provide a gentle, percussion background to the narration and a second, larger group repeats the refrain after the narrator.

Other distinctive genres include *al wannah* and *al sameri*. *Al wannah*, a slow romantic song for two singers, in praise of heroism, has a gentle rhythm played on tambourines, accompanied by brass instruments. *Al sameri* is an ancient form of Bedouin singing and derives from the word *samer*, meaning to stay up at night. As this suggests, the tradition was to sing through the hours of darkness, to the accompaniment of a traditional Arabic stringed instrument called a *rebec*.

Contemporary media influences and urban living have had an impact on the way these songs, dances and recitations are performed. Nonetheless, their continued performance to a wide audience and in many different settings testifies to the cultural and historical importance of the tradition and will ensure its preservation for future generations to respect and enjoy.

2.3.12 Traditional Sports

2.3.12.1 Falconry

The Arabs have engaged in falconry for over 2,000 years and the skills involved in the sport have been passed down through the generations. Falconry depends on patience and partnership between bird and handler: the bird demonstrates trust and obedience; the handler shows friendship and compassion. Peregrine and Lanner falcons are the preferred breeds for training.

In his book 'Falconry: Our Arab Heritage', H.H. the late Sheikh Zayed Bin Sultan Al Nahyan describes the main methods of capturing the birds. In the first, the hunter conceals himself beneath branches in a pit in the ground. He releases a pigeon with a string attached to its leg from the pit, to act as a lure. When the falcon seizes its prey, the hunter carefully winds in the string until the bird is within his reach. An alternative means of capture is netting. Once again, a pigeon is used as bait, being released under a net when a falcon is nearby. In its rush to attack the pigeon, the falcon becomes entangled in the net. The hunter gently removes and tethers it. The bird is then handed over to a falconer to start its training.

UAE falconers have developed their own breeding techniques which enthusiasts of the sport rate as the best in the world. One of the largest global projects relating to the breeding and preservation of falcons was launched in Al Ain in 1996.

The Intangible Heritage Department of the Abu Dhabi Authority for Culture and Heritage (ADACH) is currently working on a proposal to list falconry in the UAE as UNESCO World Heritage Intangible Heritage.

2.3.12.2 Salukis

The Bedouins have been breeding Saluki dogs for thousands of years. The name derives from the city of Saluk, in the Hadhramaut area of Yemen. These desert hounds are known for their exceptional stamina - Salukis can run for long distances and at great speed - as well as for their intelligence and loyalty. These qualities make them highly prized by all who own them.

The Arabian Saluki Centre provides excellent facilities and professional advice on breeding, Behavior, exercise regimes, diet and general health. In the UAE, racing salukis is as popular as greyhound racing in other parts of the world.

2.3.12.3 Camels, Camel Beauty Competitions and Camel Racing

Originally camel racing was only the sport of the Bedouin, but it has grown in popularity. The racing season between early October and mid-April is now eagerly anticipated by a growing number of enthusiasts, especially since entrance to racetracks is free to all.

Races were originally held in an informal setting, at weddings or festivals, but now there are 15 custom-built racetracks in the UAE. Sweihan Racetrack (130 km from Abu Dhabi) and Al Ain Racetrack (approximately 25 km from Al Ain) are two of the most popular places to enjoy this spectacular sport. Local tour operators and hotels can provide information about the racing schedule.

Camel racing is now a major industry employing some 9,000 employees, tending over 14,000 racing camels. The formation of the Camel Racing Association has resulted in the highest standards of animal welfare and scrupulous ethics that have become the benchmark for other countries. The use of child jockeys was banned some years ago; now riders have to be at least 16-years-old and weigh no less than 45 kilos. However, the use of remote-controlled robots as jockeys is very popular.

The three main breeds of racing camel are *al mahaliyat*, a brown breed, indigenous to the UAE; *al sudaniyat*, a large, white Sudanese camel and *al muhajanat*, a cross-breed of the two. Racing camels are usually the products of careful selective breeding and can attain the value and prestige of racehorses. Although betting is illegal, winning jockeys receive expensive prizes, such as luxury cars. The final race of the season is held at Al Wathba and attracts entrants from all over the world.

Thoroughbred racing camels begin training when they are about two-years-old and learn to obey basic commands given by the jockey. A two-kilometre gallop is used to identify potential champions and those selected are groomed for a future on the track. Traditionally, race camels are fed on dates, honey, alfalfa, milk and grain.

The Abu Dhabi Authority for Culture and Heritage (ADACH) organizes an annual camel festival each winter. The Second Al Dhafrah Festival took place from December 23 2008 to January 1st 2009 in Madinat Zayed, Al Gharbia (Western Region). This is part of the strategy of ADACH to preserve cultural heritage in the UAE. It is organised under the patronage of General Shaikh Mohammad Bin Zayed Al Nahyan, Abu Dhabi Crown Prince and Deputy Supreme Commander of the UAE Armed Forces. The event includes a camel beauty contest, camel auction, date-wrapping competition, handicraft market and a photography and poetry competition. More than 15,000

competitors from the UAE and GCC took part in the event. The festival aims to preserve the authentic breeding line of local camels known as *Asaile* and *Majaheem*. The festival also aims to create awareness about Bedouin culture and encourage heritage-related tourism, which will make Al Dhafra an international tourist city.

2.3.12.4 Dhow Racing

The tradition of dhow building in the UAE is still thriving and although the enormous white sails have been replaced by diesel engines, master boat builders still apply the skills developed over centuries to fashion the familiar curved wooden shape. Originally used as trading vessels, and as an essential part of the pearl-diving industry, dhows are still employed for transporting cargo but are also used to satisfy the popular interest in dhow racing.

The season starts in September, with 12-man teams of UAE nationals competing in a tournament spread over nine months for the opportunity of winning very lucrative prizes and, equally importantly, the huge honor of upholding an ancient tradition. The final and most prestigious race of the season is from Sir Bu Na'air Island to Dubai, a distance of 54 nautical miles, over a route taken by the early pearling dhows when each captain raced to be the first back to port and, perhaps, get the best price for his pearls. Whereas racing used to be undertaken only by men with a seafaring background, today more and more young people are showing interest in it as a sport to rival yachting.

Unlike yacht racing, where skippers manoeuvre their boats into the most favorable positions on the starting line, dhow crews wait in line for the signal then, using strength, technique and traditional block and tackle, they hoist the huge boom that carries the sail.

'Dhow' is not an Arabic word but was adapted by the British from the Persian word '*dawh*', meaning sailing vessel. The dhow is distinguished from other boats by its triangular sail, known as a *lateen*. Teak is still the mandatory timber, though nowadays it is sometimes supplemented by fibreglass and a steel framework. The wood may be varnished but not painted, in deference to the tradition of leaving the hull above the waterline untreated and painting the part below with lime, as a deterrent to barnacles and other growth.

An excellent place to witness the age-old craft of dhow building is at the Al-Bateen boatyard in Abu Dhabi, where hand tools and the knowledge and skill of the shipwright alone are relied upon to produce the UAE's best racing dhows without recourse to plans or drawings.

2.4 MARITIME LIFE

2.4.1 A Livelihood from the Waters of the Gulf

In the barren desert areas of southern Arabia, there was little opportunity for the people to establish any real agriculture. They managed to cultivate date palms in the oases and in the shade of the trees they grew vegetables and grain crops but variations in diet were largely restricted to meat and several kinds of bread or porridge. Potable water was scarce and life was extremely hard. During the winter, many families temporarily settled on the coast and survived by fishing. They returned to the oases in summer to gather the date harvest and escape the high humidity of the coast. There was no opportunity to establish any kind of formal industry and the only means of trading was through bartering.

2.4.2 Pearl Diving

There is archaeological evidence that as long as 7,000 years ago, the inhabitants of the region had discovered pearls. Throughout history, pearls have been considered one of the most beautiful adornments, highly prized by the early Egyptians and coveted by the rich citizens of Ancient Greece and Rome. For nearly a thousand years the harvest of the Gulf waters provided a source of food, work and wealth to many generations, through fishing, boatbuilding, pearl diving and trading. The prosperity of 18th and 19th Century India created a substantial growth in demand for pearls from the privileged classes; by the early 1900s, annual revenue from pearl sales was 5 million rupees. This lucrative market guaranteed employment to divers, crews, merchants and boat builders. At the height of the pearl trade, over 1,200 pearling boats, each with an average crew of 18 men, operated out of the coastal towns and villages of what is now the UAE. As a result, men who might otherwise achieve only a meager income from the family farm were able to earn relatively good money, but it meant they were parted from their wives and children for the four-month season of pearl harvesting. Those who profited most from pearling were the investors, who funded the boat and the operations; the captain, whose responsibility it was to find the most fruitful oyster beds and sail a good course; and the merchant who negotiated the best market deals. The divers were rewarded according to the success of their efforts, which were very considerable, and they often agreed to take a share of the profits rather than wages.

A diver's work was difficult and dangerous. During the pearling season he generally made around 50 deep dives every day. Each was of up to 2 minutes' duration and the diver was equipped only with a nose clip, leather finger protectors, a basket made of rope and a stone weighing about 5kg to help him with his descent to the seabed. He

was attached to a rope which he tugged as soon as he was ready to return to the boat and his safe return to the surface depended on the prompt response and strong arms of the puller on board! All the oyster shells collected were piled on the deck and opened in the evening under the watchful eyes of the captain. Only a small percentage of these contained a pearl.

A global economic depression in the 1930s was accompanied by the development in Japan of a cultured pearl industry and these two factors contributed to a steady, but inexorable decline in the UAE's lucrative traditional pearling industry. Thousands of people were affected and the region suffered widespread unemployment and financial hardship until the expansion of oil exploration created a new era of wealth.

2.4.3 Fishing

Fish stocks - there are more than 500 species in the Arabian Gulf - have always provided a staple diet for communities living along the Gulf coastline. Archaeological research has documented the use of net and line sinkers - rocks and pebbles of varying size and weight - and stone wall traps, into which the fish could be driven. It is also likely that hooks, gorges and lures made of shell or wood and attached to lines were used. When the fish swallowed them, the line was pulled taut and the fish were hauled in from the relatively shallow waters. There is also some evidence for the use of harpoons that might have been used to catch larger marine animals such as sharks, turtles and dugong, which are now protected species.

Numerous discoveries of fish bones indicate that there has been comparatively little change in the fish species over many millennia, though they tend to group regionally and according to habitat. Today, the preferred fishing methods are basket traps, as well as the occasional use of hook and line to catch groupers, emperors, seabream and rabbitfish. Sharks, trevallies, snappers and parrotfish are typically caught in or near coral reefs, using nets, basket traps or hooks and lines. Encircling gillnets have been used in the past to target the larger deep sea species, such as kingfish.

This wide variety still makes a major contribution to the UAE diet, as can be seen in the fish souqs of cities such as Al Ain.

2.4.4 Boatbuilding

Mankind has aspired to set forth on rivers, lakes and seas for many thousands of years. People who are not land-bound can harvest the waters, explore other territories, meet and trade with other races and exchange cultures.

Ingenuity led to the production of boats hollowed out of tree trunks or fashioned from buoyant materials. In the case of the early inhabitants of the UAE, the date palm provided everything they needed. The *shasha* was made from palm fronds and was the widespread choice of craft because it could be constructed very quickly and was extremely light to carry to and from the water.

As ambition grew to cover greater distances, the size and construction of navigable craft advanced to meet demand. Boatbuilding became one of the most important activities in the southern Gulf, supporting the burgeoning pearling industry and creating the growth of ancillary businesses such as rope manufacture and sail making.

Today, boat-builders still construct several types of traditional boats. The *shahuf* is a small, light, wooden-planked surf boat which is double-ended and from 5.5 meters to 7 meters long. Of similar construction is the larger *amla* - a surf boat about 2 meters in beam and up to 9 meters long. Dhows, generally referred to as *launches*, can be from 15 meters to 24 meters in length, and are usually decked. Construction is by hand using simple traditional tools such as the saw, adze, bow-drill, chisel, hammer and plane and often the skills are handed down through families. No plans are needed because the calculations are made by the trained eye and experience of a master craftsman, and the construction techniques have changed little for generations of boat-builders. Vessels are carvel-built, that is, the planks are laid edge to edge: hundreds of holes are drilled so that the wood does not split when long thin nails are driven through to secure the planks to the timber frames.

Boat-yards are kept very busy meeting orders for traditional boats - mainly cargo vessels and specially adapted crafts used solely for racing. Large crowds encourage their favourite crews at events such as the annual National Day holiday when two types of boats may be seen: the shallow draught single-sail dhow under the control of a small and efficient team and the much larger, heavier rowing boat, powered by anything up to 100 oarsmen.

On the surface, maritime life may seem to have changed beyond recognition. This is graphically illustrated by photographs of Abu Dhabi's coastline during the 1950s, populated only by the simple homes of fishing communities, compared with today's futuristic skyline of hotels and high-rise office blocks. But thanks to the vision of H.H. the late Sheikh Zayed Bin Sultan Al Nahyan, a modern state has evolved which, whilst constantly looking to the future, will continue to respect and preserve its past.

2.5 EMIRATI FOOD

Like most other developed countries, the modern UAE can offer a wide range of cuisines from Europe, Asia and the Americas, alongside the standard fast-food facilities. However, the national cuisine can be traced back some seven thousand years.

The earliest inhabitants of Abu Dhabi are known to have been skilled hunters. Archaeological excavations have unearthed the remains of darts, spears and other hunting accoutrements and pictures on the walls of some of the Hili Tombs depict many different kinds of game. Whilst large animals such as gazelle and oryx abounded, hunters probably also killed and ate rabbits and lizards. Interestingly, images of domesticated animals also appear on tomb walls. There is archaeological evidence that domestic cattle, sheep and goats were all kept by the earliest inhabitants of the UAE around seven thousand years ago.

Much of the Arabian Peninsula, an area of more than 3 million square kilometers, has been occupied for millennia. In some areas, settlements developed into cities, and along the coast fishing villages and busy ports grew up. However, the vast desert regions were populated by nomadic Bedouin herdsman who moved between the oases scattered throughout the interior.

Water was a precious commodity, found only at the waterholes and springs associated with oases. Sometimes the source could be 18 meters below ground level, requiring considerable effort to draw water using a bucket, rope and the power of camels, donkeys or oxen. Culinary requirements ranged from sustenance for a small group of travellers to provisions for an entire tribal encampment. It is likely that the harsh and unpredictable conditions of desert life contributed to the development of the rules of hospitality for which the Bedouin are legendary. If a stranger who was not an enemy arrived at a camp he had to be provided with food and lodging for three and one-third days. After this the guest was obliged to leave, but remained under the guardianship of his host for a further three days: the time it took for the host's food to pass through his body! The largesse of the feast was an indicator of the host's wealth and social status. The desire to impress would frequently occasion the slaughter of a beast that might otherwise have fed a number of people for several days and, if the family or tribe went hungry, such was the price of social nicety. These banquets were all-male affairs; women, girls and small children ate separately. Guests were served first and in some tribes the host abstained from eating in order to supervise the event.

Some of these customs are still observed today. At religious, ceremonial or social events the men dine separately from the women. It is also considered a matter of pride for the hosts to have prepared the meal themselves or, at the very least, to have instructed the caterers down to the smallest detail.

Although vegetables such as cucumbers, pumpkin and onions were cultivated, together with lemons, pomegranates and melons, it was the wheat and dates grown in the oases that formed the staples of the Bedouin diet. Dates keep well and can be eaten fresh or dried. They are easily transported and have excellent nutritional value. Over a hundred different varieties are known. For thousands of years wheat was used to make gruel or porridge or ground into flour for bread which was baked over coals or even in the intensely hot sands. Milk from camels, goats and sheep provided a healthy supplement to the diet. It could also be churned into butter or used to make yoghurt and cheese. Honey, various salad leaves and occasionally fish eggs, truffles or mushrooms were also eaten. However, the most important element of the diet was, and still remains, meat.

A wedding feast or major religious celebration, such as Ramadan or the Eid al Adha, is always an occasion for enjoying vast amounts of food. Typically, a whole sheep is roasted and placed atop a large tray of rice, decorated with eggs, nuts and raisins. This may be served to a table seating as few as ten people and it is not uncommon for a feast to cater for several thousand. Nowadays camel meat is often served but it was a rarer commodity to the Bedouin, who prized his camel above all else, since it was his beast of burden and mount as well as a supplier of milk, hair, hide and dung for fuel. Meat usually came from the slaughter of surplus goats and bull calves. Game was widely eaten and also satisfied a passion for hunting. Trained falcons brought down quails, pigeons and bustards and fast Saluki hunting dogs, famed for their stamina, were used to outrun rabbits and foxes.

Fish is very popular and a wide range is available, even inland. The fish market (*suq as samak*) in Al Ain sells around 30 different species ranging from barracuda to prawns and cuttlefish. Other stalls sell dried shark and anchovies.

Supermarkets now cater to the needs of Abu Dhabi's 21st Century citizens, but the traditional values of hospitality, generosity and courtesy to guests are still upheld. Family meals at home are informal, but at large gatherings time-honored etiquette is observed. The meal itself may be over quite quickly, but the social intercourse is leisurely, relaxed and invariably accompanied by coffee. In the

past, the coffee was frequently prepared by the host and served to those who had gathered to exchange news or tell stories. The beans were roasted in a pan (*mahmas*) then cooled in a wooden tray known as a *mabradah*. They were then ground in a *mihbash* made of wood, iron or brass and brewed in a clay pot (*malkama*). The coffee was then poured into the classic beaked Arabian pot (*dalla*) and served in small ceramic cups (*finjen*), exactly as it is today. Tradition dictates that the cup is only filled a quarter full and frequently refilled. When no more coffee is required, the *finjeyn* is rocked to and fro as the pourer approaches.

In the last few decades, the range of food available has increased enormously, particularly in the cities. Various Arab and expatriate communities have introduced new dishes and foodstuffs and there is a wide range of restaurants. The Asian communities exert one of the most powerful culinary influences and there are many variations on popular Indian dishes such as *biryani*.

Rice is eaten either alone or with meat or fish, using the right hand. Popular rice dishes include *makbous* and *mahshi* (see below). Bread made from wheat flour is also widely eaten.

Some of the many wheat-based dishes include:

Harees - a mixture of ground wheat and meat.

Bathitha - a sweet made of wheat flour, dates and ghee.

Mamroosa - sweetened local bread with dates.

2.5.1 Makbous

This recipe has been passed down through the generations and is a very popular dish in Abu Dhabi. Meat, chicken or fish is cooked with onions, dried lime and spices such as turmeric, cardamom and nutmeg. When tender, the meat is removed and rice cooked in the remaining stock. The meat is then mixed with the rice, the dish covered and hot coals heaped upon the lid to complete the cooking process. The meat and rice are served on a large dish or tray, garnished with nuts, raisins and fried onions.

2.5.2 Mahshi

This is a special dish served at weddings, the religious feast Eid al Adha and to honor important guests. A whole sheep or goat is cooked slowly with spices for many hours and served on a tray of rice garnished with raisins, almonds and fried onions.

2.5.3 Harees

This is one of the most famous meals in the Arab world and has been cooked for centuries. It is usually served in a deep dish at weddings, during Ramadan and at the religious feasts Eid al Fitr and Eid al Adha. It is also served to new and nursing mothers since it is believed to have restorative properties. Ground wheat and meat are cooked together over a low heat until the texture becomes creamy.

2.6 OTHER HERITAGE ACTIVITIES

The Abu Dhabi Authority for Culture and Heritage has initiated a diverse range of projects designed to promote cultural activities in Abu Dhabi. These include:

Abu Dhabi International Book Fair – With 482 exhibitors from 42 countries, a 25 per cent growth in space, new venues for events and a large range of services to exhibitors, visitors and the press, this fair continued on its path of growth. Organised by KITAB, a joint venture between the Abu Dhabi Authority for Culture and Heritage and the Frankfurt Book Fair, the Abu Dhabi International Book Fair has made one more considerable step towards becoming the hub for the Arab book markets and for worldwide business.

Abu Dhabi Poetry Academy – The success of the television programmes Prince of Poets and Millions Poet has inspired the Abu Dhabi Cultural Foundation to establish the UAE's first Nabati poetry academy to embrace the revival of the historic art. Budding poets are already enrolling in the academy, which opened for its first classes in August 2008. Students from countries such as Oman, Kuwait and Saudi Arabia have shown interest.

The courses will target adults and will be held during evenings and weekends. Founded by Sultan al Amimi, the academy already has four teachers, but is looking to hire more. The school has been recognized by the Ministry of Education and is in talks with the UK's Oxford University, which already runs courses in Nabati poetry, to work in partnership.

ArtParis Abu Dhabi – Created in 1999, ArtParis is an international fair dedicated to modern and contemporary art that takes place in March of each year, in the heart of Paris, under the elegant glass roof of the Grand Palais.

Around 110 French and foreign galleries active in the international art market present a selection of recognized artists as well as fresh new discoveries within the visual arts, including painting, sculpture, photography and video. The organizers of ArtParis, together with the authorities of Abu Dhabi - Abu Dhabi Authority for Culture and Heritage and the Tourism Development & Investment Company, have entered into an exclusive partnership for the creation of a fair for modern and contemporary art, to be mounted each year under the name of 'ArtParis Abu Dhabi'. This provides an annual meeting point for the art market and for all of the art collectors and art lovers of the Arab world.

Bait al Oud – The Oud House in Abu Dhabi is the unsung – or unstrummed, rather – hero of the Abu Dhabi Authority for Culture and Heritage. With concerts, lessons and oud-making workshops, the Oud House is keeping Arabian musical heritage vibrant.

The Circle – The Circle is the only initiative in the region devoted to film financing, production and growing talent that is designed to transform *Abu Dhabi* into a filmmaking centre within the region. The Circle is one of the most important film initiatives in the region, and hosted the Circle Conference and Interactive Media Exhibition (IMC) in 2008.

Emirates Film Competition - The Emirates Film Competition is held every year at the Cultural Foundation, the headquarters of the Abu Dhabi Authority for Culture and Heritage (ADACH) and the hub of Abu Dhabi's cultural activity. Proud to be the first film competition in the GCC (Gulf Cooperation Council) countries, which include Saudi Arabia, Kuwait, Bahrain, Qatar, Oman, Yemen and the UAE, the festival focuses on short films and documentaries with genres such as animation and experimental films on the programme.

Emirates Photographic Competition - Amateur and professional photographers may enter the annual Emirates Photography Competition to help preserve the heritage of the nation. Organised by the Abu Dhabi Authority for Culture and Heritage (ADACH) the photography competition, which is part of the Emirates Film Competition, is open to residents and nationals from the GCC.

Handicrafts Project – The Handicrafts Project is aimed at conserving traditional handicrafts and protecting them against extinction, as industrialisation poses a real threat to their preservation. This project supports the

development of 'cottage industries' where craftsmen work from their homes, providing technical and material support, and marketing goods for sale at tourist sites. Handicrafts represent an important economic activity that can create job opportunities for different segments in the community. Handicrafts also stimulate the interest of visitors and tourists, as they provide a tangible link with the past and the customs and traditions of the community they represent. In the process, the project aims to challenge stereotypical views of the community regarding the significance of traditional crafts and their economic value by raising awareness about the importance of handicrafts and encouraging children to learn and practise them to develop their skills. The Handicrafts Project represents an important way of protecting traditional crafts from extinction as well as celebrating national identity and demonstrating pride in the lives of our forefathers. The Abu Dhabi Authority for Culture and Heritage, has set up an outlet for traditional Emirati handicrafts in their headquarters building at the Cultural Foundation. The outlet, located at the Dalma corner, bears the slogan, '100 per cent Emirati, 100 per cent handmade', and is aimed at preserving and promoting traditional handicrafts in the Emirate. Visitors to the Cultural Foundation are able to watch women engage in this traditional craft at the outlet, as well as get a taste of Emirati cuisine and coffee. Female visitors can also get a henna tattoo, another traditional Emirati art. Proceeds from the sale of Emirati traditional crafts are rolled back into the project, thus allowing visitors to contribute directly to the preservation of the Emirate's folk art and handicrafts.

Kalima – A major new translation initiative by the Abu Dhabi Authority for Culture and Heritage, which funds the translation, publication and distribution of high quality foreign writing into Arabic. Kalima is endorsed by the Crown Prince of Abu Dhabi, Sheikh Mohammed bin Zayed al Nahyan. Every year Kalima selects 100 candidate titles of classic, contemporary and modern writing from around the world to be translated into Arabic.

Middle East International Film Festival – The Middle East International Film Festival - Abu Dhabi (MEIFF) is a celebration of cinema, dedicated to bringing a diverse slate of international films to the Middle East. Its excellent programming and star power has helped to create humanitarian and cultural awareness and to project Arab cinema and Arab talent globally. Audiences to the festival are exposed to a wide range and quality of programming.

New York Film Academy in Abu Dhabi – A memorandum of understanding was signed between Abu Dhabi Authority for Culture and Heritage (ADACH) and the New York Film Academy (NYFA) in July 2007 providing a platform to establish an acclaimed school that will be devoted to develop the film industry in the UAE and the region. NYFA is a unique educational facility, committed to providing the most focused filmmaking, acting and animation instruction in the world. New York Film Academy Abu Dhabi (NYFA-AD) will play a key role in the burgeoning renaissance of film and culture that the Middle East is currently witnessing. Its vision is to develop the regional film industry and make this creative art accessible to anyone with the drive and ambition for filmmaking.

Poet of the Million Project - The Millions' Poet was launched three years ago by the Abu Dhabi Authority for Culture and Heritage and is produced by Pyramedia. Its aim has been to bring the region's youth back to its roots by taking the traditions of the Bedouins from the Gulf into the 21st Century by bringing them to our screens. This year's live competition will see 48 poets battle it out through various stages to impress their audiences with their poetry and win the prestigious title of the 'Millions' Poet' as well as a cash prize of five million Dirhams. The five enigmatic and sometimes critical judges are back for the third season in their set roles for Millions' Poet. Taking their seats once again are Sultan Al Amimi, an established writer and Nabati poet from the UAE, Dr. Ghassan Al Hassan, Professor and Arabic poetry specialist from Jordan, Turki Al Mureikhi, a magazine editor from Saudi Arabia, Hamad Al Saeed, a Kuwaiti editor of a poetry magazine, and Badr Al Sefoug, a founding member of several poetry magazines from Kuwait. Viewers can tune into the recap show to watch behind the scenes footage and interviews on Monday at 19:00 on Abu Dhabi TV. Repeats of the show and also extra exclusive behind the scenes footage can also be viewed around the clock on the dedicated Million's Poet Channel on Nile Sat 11919 MHTz, Horizontal, 27500, ¾ and Arabsat Bader 4 DL, 11804 Horizontal, 27500, ¾. The live competition is aired on Abu Dhabi TV and The Million's Poet channel at 22:30 every Thursday.

Prince of Poets Competition – The Prince of Poets Festival is aimed at promoting and enhancing classical Arabic poetry, reviving the positive role of Arabic poetry as a medium of expression, and discovering young talent and giving them the chance to develop and grow. This

is being achieved by organizing a poetry competition broadcast on Abu Dhabi TV and the 'Prince of Poets' channel. The poems are judged by a committee of experts and specialists in the various aspects of the poem in terms of rhythm and rhyme as well as meaning and sense. In addition, poems recitals are judged by the audience. The Prince of Poets Festival is the first project that promotes the cultural and historical value of classical Arabic poetry to a mass audience. It connects poetry to the pulse of the community, and provides modern Arab poets with the opportunity to compete for the crown of Prince of Poets.

Qalam-Writings from UAE was created by ADACH to nurture, encourage and promote creativity and talent for all Emiratis through the medium of writing. With a vision that will enhance Abu Dhabi's role as a pioneer cultural hub in the GCC and the Arab world, Qalam has set out to develop young local writers by promoting, distributing and publishing their literary works. All kinds of writing from short-stories, novels, plays and poetry will be showcased. Qalam draws inspiration from the past and the present to illuminate the future. The development of a strong literary culture in which ideas and experiences can be explored and shared becomes the basis for greater mutual understanding and appreciation for future generations of writers and readers. Qalam's vision is to inspire young writers and showcase their work to a wider Arab audience throughout the Gulf. Qalam is committed to helping new audiences appreciate the wealth of literary talent in the UAE through the translation of selected works into international languages.

Sheikh Zayed Book Award – The Sheikh Zayed Book Award is a prestigious independent award to recognize thinkers, achievers and innovators in Arab society in the areas of knowledge, arts and the humanities. The award aims to encourage talented people to share their intellectual gifts, enriching the field of publishing, writing and translation, and creating a competitive creative atmosphere in which Arab culture can be celebrated. The Award recognises the achievements of both established writers and intellectuals as well as those of outstanding young talent. It aims to boost the Arab publishing industry so that publishers can play a role in enriching Arab culture with fresh new works, as well as promoting the translation of major works into Arabic. Children's literature is a particularly important focus of the Award, recognizing the need to encourage Arab authors to enlighten children's minds through the power of words.

Sounds of Arabia – Every May, Abu Dhabi Authority for Culture and Heritage organises one of the world's greatest tributes to Arabic music. Over the course of a week, the most acclaimed performers from the Middle East and beyond congregate in the capital to delight audiences with their musicianship. 2008 was the first year of Sounds of Arabia and won the hearts and minds of sold-out crowds, as well as those of music-lovers around the world, with a mixture of Oriental music, both traditional and modern, from Iraqi Maqqam, Andalusian guitar, oud and classical qanoun to choral, orchestral, traditional Egyptian and Mouashahat music. Plangent melodies, funky rhythms, and strong orchestral performances were performed by virtuoso musicians, composers and singers Omar Khairat, Al Fayha Choir, Furat Qaddouri, Tariq and Julia Banzi, Jahida Wehbe, Rida Popular Arts Group, Nadia Mustafa and Farida.

Turathna Project – ADACH has launched a multi-tiered plan aimed at safeguarding and reviving Emirati traditional handicrafts. The main objective of this project is to preserve traditional handicrafts and associated know-how through the development of cultural merchandising products and training programmes. The project also aims at transmitting to the people of the UAE and its visitors the values and history associated with each different type of handicraft. As part of the project, ADACH has issued a public appeal aimed at identifying and registering old Emirati handicrafts and related photographic and archival material kept in private homes. This initiative, known as “*Turathna*”, also aims at identifying potential craftsmen and women that could eventually be engaged in handicraft production and training, a key element for the project's long-term sustainability. *Turathna* was launched in May 2008 in the Western Region, Al Ain and Abu Dhabi. During this week-long event, people were invited to come forward and register any old Emirati handicraft they might have in their possession. The items, at least 30-years-old, were photographed, referenced and returned to the owner, along with a certificate of appreciation. Traditional Emirati handicrafts include *khoos* (palm fronds weaving), *saddoo* (wool weaving), *telli* (embroidery), metal works, pottery, traditional jewelry, leather work, wood work, upholstery, as well as other items related to the traditional practice of falconry, pearl diving and camel husbandry.

3 RELEVANCE OF PALAEOLOGY/ ARCHAEOLOGY



Photograph: ADACH

3.1 CULTURAL VALUE

H.H. Sheikh Zayed bin Sultan Al Nahyan, the late President of the UAE, was particularly keen in making the younger generation familiar with their cultural heritage so that it is never forgotten. He stated that a *“nation without heritage is a nation without a beginning or an end”*.

3.1.1 Understanding Behavior and Patterns of Previous Civilizations

Pursuing an understanding of the past through archaeology and other means was encouraged by Sheikh Zayed. Archaeology provides a window into understanding behavioral patterns of the past, including those of pre-Islamic civilizations. Further promotion of archaeological and cultural heritage studies, using a multi-disciplinary approach, is important, and forms a key part of the future strategy of the Abu Dhabi Authority for Culture and Heritage (ADACH).

3.1.2 Understanding Ancient Land Use Patterns

One of the aspects of the multi-disciplinary approach is a study of past patterns of land use. In the desert areas, these will be primarily related to the grazing of livestock, with the most productive areas varying according to the amount of rainfall. Recent observations suggest not only that the amount of rainfall can differ significantly on a year-to-year basis, but also that they vary significantly from area to area, within a broad pattern of there being, generally, more rainfall in the east of Abu Dhabi Emirate, in the Al Ain area, this gradually declining as one goes west and south, with the lowest rainfall being recorded in the broader areas of these districts.

This prompted, of course, traditional seasonal movements, albeit allowing for opportunistic movements to areas where there had been better rain, and where, as a result, better grazing was available.

An understanding of past patterns of land use is difficult to obtain, but some conclusions can be drawn from a combination of current patterns, an examination of rainfall patterns, and information, where available, of past climatic change, particularly insofar as this is related to rainfall.

Thus in the southeast of Abu Dhabi, today largely arid, existing land-forms in the area north of Umm az-Zamul, combined with observations following rainfall in early 2005, suggest that there may have been permanent or semi-permanent bodies of fresh water at times of the higher rainfall during the Neolithic Climatic Optimum.

In the Eastern Region, around Al Ain, a different pattern applies, both with regards to the availability of fresh water and to land-use. Besides the fact that this area, at least today, generally has more rainfall, there is also an easier access to subterranean water supplies flowing out from the adjacent Hajar mountains - these being those supplies which are tapped by the falaj water channel systems. These appear to have been introduced around 3,000 years ago, following a period of increasing aridity (proven through excavations of Bronze Age wells in the area). Land-use also changed after the Iron Age in the Al Ain area, as shown by the fact that Iron Age settlements, with *aflaj*, have been identified in areas, such as Bida Bint Saud and Jabeeb, which are now covered by mobile dunes.

Changing land-use on the coast and islands can also be detected through archaeological studies - these often suggesting that a decline in the availability of freshwater, whether through rainfall or through wells - has resulted in the abandonment of formerly-present permanent settlements, as on Ghaghah, Yasat al-Ulya and Al-Ufsa'iyyah.

3.1.3 Identifying Past and Present Belief Systems

The discovery of the pre-Islamic Christian monastery on Sir Bani Yas confirms the presence of Christianity in the Emirate of Abu Dhabi prior to the coming of Islam. This is believed to have faded away over the course of the next couple of hundreds of years or so, based upon textual evidence of the last-known Nestorian bishop from the UAE and Oman area (known to the church as Bait Mazunaye) to have attended Nestorian synods.

Since that time, the religion of the indigenous inhabitants of the Emirate of Abu Dhabi has been Islam, with the dominant sect being Sunni and with a small minority of Shi'a Muslims, primarily, since the 19th Century at least, being of immigrant origin, mainly from the southern Iranian coast.

Pre-Islamic beliefs have not been examined in detail, although a belief in the existence of an after-life can be deduced from the presence of well-built tombs during some periods (in particular the Jebel Hafit and Umm al-Nar periods) and by the presence of grave goods in burials.

3.2 SCIENTIFIC VALUE

Over the course of the decades since archaeological and palaeontological investigations first formally commenced in the Emirate of Abu Dhabi (and the UAE) in 1959, a substantial amount of fieldwork has been undertaken, particularly since the early 1990s. This and an extensive

programme of publication and of paper presentation at conferences have meant that today there is a large and widely-diversified body of knowledge about Abu Dhabi's archaeology and palaeontology. A similar pattern of extensive activity also applies to the rest of the UAE, this dating to the early 1980s when, for a variety of reasons, foreign archaeological teams that had previously focused their attention on Iran, Iraq and Saudi Arabia, began to work in the UAE.

Although this process is now being reversed, at least insofar as Iran is concerned, one result has been that the contributions of the last 25 years to knowledge of UAE archaeology outweigh those of the period from 1959 to the early 1980s. The dissemination of such knowledge outside the academic community still, however, has considerable scope for improvement.

3.3 EDUCATIONAL VALUE

History is taught in all schools in the UAE but little mention is made of the archaeology and palaeontology of the UAE. Indeed the curriculum in use in Government schools and in many private schools is focused more on the history of the wider Arab world than on that of the UAE itself. Moreover, many private schools follow a foreign curriculum.

At the level of higher education, the UAE University, based in Al Ain, currently offers a degree major in History and Archaeology. In the near future the university will introduce a 'Thematic Application' in Cultural Resource Management, which is a series of six courses aimed at training people to work in heritage, archaeology and museums. In addition, the University is planning to develop an MA in Practical Archaeology which includes a significant period of practice based education.

Studies of geology, also at the UAE University, are related primarily to the long-term needs of the UAE's oil and gas industry and, therefore, pay little attention to palaeontology.

Zayed University in Abu Dhabi presently teaches a course on 'Heritage of the Gulf' (SBS 321) and is planning to expand its teaching of archaeology, heritage and museum studies in the autumn term of 2009. It plans to upgrade its existing Diploma in Heritage Studies to a Master Degree level course.

Thus, at present, the potential educational value of the rapidly-expanding body of knowledge of the UAE's archaeology and palaeontology is not being realised.

3.3.1 Building Understanding of Common History and National Identity

‘A people that knows not its past is not equipped to tackle the challenges of the present or of the future.’ (Former UAE President Sheikh Zayed bin Sultan Al Nahyan).

If the inhabitants of the UAE are to be able to apply the dictum of Sheikh Zayed, cited above, so that they learn of their current national identity through an understanding of their shared past, then a focus on archaeology and history is required at all levels of the educational curriculum, and well as in more general public education. This can only be achieved through a well-defined and concerted, government-led approach to this challenge, although some preliminary steps can be made, at a limited level, through the activities of existing government institutions dealing with archaeology, such as the Abu Dhabi Authority for Culture and Heritage.

3.3.2 Gaps in Educational Material and Educators Relating to History, Archaeology and Palaeontology

Very little material exists in Arabic or English that addresses the archaeology and palaeontology of the Emirate of Abu Dhabi, or of the wider UAE, that is suitable for use in schools, or by educators. There is, however, a growing body of academic materials. Archaeology, palaeontology and broader aspects of the country's history are some of the topics that will be discussed during revisions of the national curriculum.

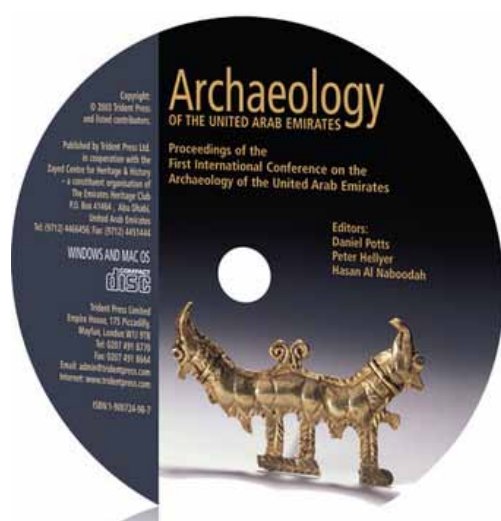


Figure 25 - Proceedings of the 1st International Conference on the Archaeology of the UAE was published in both Arabic and English, as well as in the form of a DVD (Photograph: Dr. Mark Beech)

3.3.3 Gap in Arabic Language Educational Materials

There is very little new material in Arabic on the archaeology and palaeontology of the UAE, with only a few exceptions such as ‘Hidden Riches’ (Hellyer, 1999), the ‘Proceedings of the 1st International Conference on the Archaeology of the UAE’ (Potts *et al.*, 2003) and ‘Aflaj in the UAE – Archaeological studies on ancient irrigation systems’ (Al-Tikriti, 2002b). However, in the last few years, a number of more specialized books have been produced, although they are not widely available. The Abu Dhabi Authority for Culture and Heritage (ADACH) is planning a programme of publication in Arabic, both of academic works and of material designed for the general reader.

3.3.4 Showing the Importance/Significance of UAE History to the Outside World

The annual yearbooks of the UAE's National Media Council, formerly the External Information Department of the Ministry of Information and Culture and, since February 2006, of the Ministry of Presidential Affairs, provide an annual round-up of recent archaeological and palaeontological studies that is available outside the UAE, both in printed and electronic format.

The website www.uaeinteract.com, supported by the National Media Council, also contains extensive material on archaeology and palaeontology, while both the former Abu Dhabi Islands Archaeological Survey (ADIAS) and the former Department of Antiquities and Tourism still retain their own websites, providing an archive of past work. The website of the Abu Dhabi Authority for Culture and Heritage (ADACH) is currently under development and will provide information on the latest ADACH projects. Exhibitions of archaeological artefacts from the Emirates and other displays are rarely arranged outside the country - such events have the capacity to contribute in a significant way to a greater understanding of UAE history abroad. The Historic Environment Department at ADACH has for the past two years contributed to the Annual GCC Archaeology Exhibition, sending materials to be displayed from Al Ain Museum to Fujairah, UAE (2008) and more recently to Riyadh, Saudi Arabia (January 2009).

Moreover, while, as noted above, there is a growing body of published work dealing with the archaeology, palaeontology and history of the country, much of it is academic in format, and, thus not best-suited to the general reader. Many such publications, moreover, are found only with considerable difficulty abroad, as a result of the apparent inability to identify distributors interested in handling material within the Emirates. With these constraints, a focus on developing greater use of the electronic media may prove to be a productive way to move forward on this issue.

3.4 ECONOMIC VALUE

Little study has yet been undertaken on the economic value that can be derived from archaeological, palaeontological and fossil sites and related institutions, such as museums. This is starting to be addressed now by the various projects orchestrated by the Abu Dhabi Tourism Authority (ADTA), the Tourism and Development Investment Authority (TDIC) and the Abu Dhabi Authority for Culture and Heritage (ADACH). These plans include the development of a whole series of museums within the cultural quarter of Saadiyat Island, including the Guggenheim Abu Dhabi, Louvre Abu Dhabi, National Maritime Museum and Sheikh Zayed National Museum. This latter museum will include galleries devoted to the geology, palaeontology, and archaeology of the UAE.

The existing Al Ain Museum and Hili Archaeological Park in Al Ain, attract a considerable number of visitors, while the popularity among visiting tour groups of displays of ethnographic material (such as in 'Heritage Villages') indicates that there is a potential demand to be satisfied.

The Abu Dhabi Authority for Culture and Heritage is expected to examine the potential for stimulating greater visitor interest, both among UAE residents and among visitors overseas, with a view to creating more awareness of Abu Dhabi's heritage and to generating revenues. In this process, it will be working with the Abu Dhabi Tourism Authority, with whom it shares a Chairman, Sheikh Sultan bin Tahnoon Al-Nahyan.

3.4.1 Tourism

The Abu Dhabi Tourism Authority (ADTA) is the statutory body established in 2004 with wide ranging responsibilities for the promotion and development of the Emirate's international tourism industry. Its mandate covers three primary areas: destination marketing, infrastructure and product development. ADTA is aiming *"to be a leading tourism authority that is positioning the Emirate of Abu Dhabi as an outstanding, globally recognized, sustainable tourism destination, while enriching the lives of the Abu Dhabi community and visitors alike"*. The mission of ADTA is *"...To drive and support the development and promotion of tourism in Abu Dhabi efficiently, effectively, and transparently, in partnership with all our stakeholders while ensuring the highest quality standards."* ADTA operates with the following values:

Respect: "We will behave in a manner where by each entity, partner, and individual is equally valued and heard and treated with fairness."

Pro-active: "We will anticipate our customers and business needs and act upon them pro-actively showing high levels of initiative."

Excellence with Integrity: "We will continuously strive to distinguish ourselves by delivering results of the highest quality efficiently, while applying the highest legal, ethical and moral standards to our work and behavior."

Leadership: "We will strive to be a leading public institution in the delivery of services to all constituents and stakeholders while fostering visionary leaders."

Teamwork: "We value teamwork highly and will strive to support our shared goals, openly cooperate and communicate our knowledge, and share our expertise and information both internally and externally."

Innovation: "We encourage innovation to provide solutions which will help us in achieving and delivering better and faster results."

Customer Focus: "We will offer our services with all the courtesy, respect and dedication while remaining focused on our customer needs."

Transparency: "We will ensure the highest level of transparency in our internal and external interactions by behaving, at all times, with fairness and openness."

3.4.2 Sale of Reproduction of Antiquities

At present, there is no federal legislation in the UAE relating to the sale of reproductions of antiques, or, indeed, of the sale of genuine antiques. Draft legislation on antiquities and archaeology has been prepared, but has not yet been adopted, while there may also be future legislation applicable to the Emirate of Abu Dhabi, through the Culture and Heritage Authority.

Provided that such legislation is in place, and provided that there is a suitable inspection procedure to ensure that items on sale are, indeed, reproductions, then a market may emerge for the sale of reproductions of antiques and artefacts.

3.4.3 Media Value that can be Framed around Archaeology/Palaeontology

As noted above, and in the bibliography, there is an increasing amount of media material that is being generated that addresses the archaeology, palaeontology and history of the Emirate of Abu Dhabi and the UAE as a whole. Additional materials continue to be prepared that are aimed at both an academic audience and at the general reader. As public awareness of these materials increases through better display and distribution, a great volume of sales can be anticipated.

4 MAJOR ISSUES



Photograph: ADACH

4.1 LEGISLATION AND INFRASTRUCTURE

4.1.1 Lack of Implementation of Current Laws

No federal legislation on the protection of archaeological sites currently exists, although local decrees and laws exist in some Emirates. Al Ain's six oases are formally protected by the Al Ain Oases Law of 2004 (Annex 4) and by Law No.38 of 2005 on Preservation of Palm Oases, Al Ain (Annex 5). These laws were issued by Sheikh Tahnoon Bin Mohammed Al Nayhan, Representative of the Ruler of the Eastern Region and President of the Municipality and the City Planning Office, and Agriculture and Livestock Department, and by Sheikh Mohammed Bin Zayed Al Nayhan, Crown Prince of Abu Dhabi, Chairman of the Executive Council respectively. The oases' laws also identify the Al Ain Municipality as the body responsible for the oases' maintenance and monitoring. Law No. 38 of 2005 assigns the responsibility of protecting heritage landmarks within the oases to the Abu Dhabi Authority for Culture and Heritage, along with Al Ain Municipality and the Tourism Authority. Archaeological sites are monitored by the Archaeology section of the Historic Environment Department in ADACH. ADACH and its Historic Environment Department were established by Abu Dhabi Law No. 28 of 2005; clause 6 of Law 28 charges ADACH with the responsibility of maintaining a heritage list; the monitoring powers of the Authority were granted in the same law, clause 12; and clause 7 empowers ADACH to regulate and limit the activities at archaeological sites. Finally, a new federal antiquities law has been in development for many years and appears close to being finalized.

4.1.2 Lack of Legislation Forbidding Theft and Sale of Antiquities/Fossils

No legislation currently exists in the Emirate of Abu Dhabi, and there is no UAE federal legislation, although local decrees exist in some Emirates. The UAE is, however, a signature to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). This gives the CITES office the power to confiscate e.g. ivory handled objects, stuffed animals or other such artefacts being sold without relevant permits, and to issue fines.

4.1.3 Lack of Participation in International Conventions

The UAE Federal Government is responsible for signing international conventions on behalf of the member Emirates of the federation. No such conventions or agreements relating to archaeology and palaeontology have been signed, including the UNESCO World Heritage Convention, although the issue of adhesion is currently

being discussed. ADACH has submitted the cultural sites of Al Ain (including Jebel Hafit) to the UNESCO World Heritage Committee for ratification. Detailed discussions are also underway between ADACH and UNESCO concerning the UAE initiative to register falconry as a 'Masterpiece of Intangible Cultural Heritage of Humanity'.

4.1.4 Authority for Management of Archaeological Resources

Since late 2005, the authority for the management of archaeological (and palaeontological) resources in the Emirate of Abu Dhabi is the Abu Dhabi Authority for Culture and Heritage. This body absorbed the former Department of Antiquities and Tourism in the Eastern Region of Abu Dhabi and the responsibilities formerly assigned to the Abu Dhabi Islands Archaeological Survey, ADIAS.

4.1.5 Lack of Coordination among Emirates

Although responsibility for archaeology at a federal UAE level was formerly assigned to the former Ministry of Information and Culture and is now, since February 2006, the responsibility of the new Ministry of Culture, Youth and Community Development, activities related to archaeology at a federal level have been primarily confined to the selection of individuals from within the Ministries and from local Departments of archaeology and antiquities to attend international conferences, mainly on a pan-Arab level.

There are separate departments in each Emirate, but there is no formal structure promoting collaboration between them. Recently the Ministry of Culture, Youth and Community Development organized, together with the Antiquities Department of Umm Al-Qaiwain, an all-UAE team to investigate the site of Ed-Dur. Ten days of field survey and excavation were carried out in early May 2009 under the direction of Eissa Abbas, senior archaeologist from the Sharjah Directorate of Antiquities.

Such collaboration as does currently exist is mainly at a personal, rather than an institutional level, although the degree of exchange of information has been enhanced by the introduction, since 2003, of an annual symposium on recent archaeological and palaeontological work in the country. This is organised by the Zayed Center for Heritage and History. Two volumes of proceedings, under the title of 'Emirates Heritage' have been published to date (Ziolkowski and Hellyer, 2005, 2008).

4.2 DEVELOPMENT VS. PROTECTION

4.2.1 Threats from Development / Construction Activities

Threats from development and construction activities (*i.e.*, bulldozers) on the coast, islands and inland areas are extensive and are comparable to those posed to ecology and natural habitats (see elsewhere in this report). A review of the threat to archaeological and fossil sites from coastal development can be found in Beech and Hellyer (in press).

4.2.2 Lack of Formally Protected Areas

Informal protection has been accorded to some sites in the Emirate of Abu Dhabi, such as the Hili Archaeological Park and those on the island of Umm al-Nar. A number of other sites have protective fences and signs fixed by the Historic Environment Department from the Abu Dhabi Authority for Culture and Heritage. Archaeological sites on islands within the Marawah Marine Protected Area are protected within the framework of the local Abu Dhabi legislation on protection of the environment of the area.

As noted above, the Federal Government of the UAE has not signed the World Heritage Convention or other relevant conventions; as a result no sites in Abu Dhabi or elsewhere in the UAE are afforded protection under international conventions, although the city of Al Ain, including Jebel Hafit, is now on the tentative list of the UNESCO World Heritage organization. The official nomination to the World Heritage List concerning Al Ain was recently submitted by ADACH to UNESCO in February 2009. The application is currently being considered by UNESCO and a decision should be made later in 2010.

4.3 EDUCATION AND AWARENESS

4.3.1 Lack of Awareness of Importance and Protocol related to Antiquities / Fossils

As noted above, there is a lack of public awareness about the archaeological and palaeontological heritage of the Emirate of Abu Dhabi and the UAE. One corollary of this is that there is little awareness of the necessity of ensuring that items related to this heritage are protected. Enhancing of this awareness can come about only through campaigns aimed both at the educational sector and at the general public, both in Arabic and in other languages spoken by the UAE's expatriate residents.

4.3.2 Lack of UAE Nationals Entering the Professional Field

As noted above, the national schools' curriculum devotes little or no attention to topics related to the archaeology, palaeontology and history of the UAE, while there is little tertiary education available. Archaeology and palaeontology are not a priority in the current educational system and there are no economic incentives for entering this field.

Moreover, there has, in the past, been only a relatively few number of employment opportunities related to these fields, while employment in other sectors, such as the finance industry or the oil and gas industry, is perceived as having a higher status. As a result, there are few UAE citizens with any relevant qualifications, while expatriate residents with relevant qualifications generally find that there are no employment opportunities.

With the establishment of the Abu Dhabi Authority for Culture and Heritage, which is planning to establish several museums as well as to increase the amount of archaeological and palaeontological fieldwork being undertaken, more employment opportunities can be expected to emerge in future.

4.3.3 Museums and Exhibits within Abu Dhabi

For ADACH, the creation and management of museums is of central importance in informing, educating and inspiring the people who visit them. Through the richness of their historical collections, they provide a way for the modern world to appreciate the cultural diversity and heritage of Abu Dhabi.

The oldest museum in Abu Dhabi, Al Ain National Museum, has been developing this mission for over 30 years through its ethnographic and archaeological collections which record traditional ways of life and show the long history of human occupation in the UAE. In recent years this museum has been joined by the Sheikh Zayed Palace Museum and the Dalma Island Museum, which maintain focused collections of special material.

4.3.3.1 Al Ain National Museum

Al Ain National Museum, located next to the Sultan or Eastern Fort, is the oldest museum in the UAE. It was built under the direction of HH the late Sheikh Zayed Bin Sultan Al Nahyan who believed that a country without a past has *"neither a present nor a future"*.

Al Ain National Museum is divided into two main sections - Ethnographical and Archaeological - and provides the visitor with an overview of the country's traditions and

culture alongside the much older story of the people who inhabited the area up to 8,000 years ago. Local and foreign archaeological teams, working in collaboration with the former Department of Antiquities and Tourism, now part of the Abu Dhabi Authority for Culture and Heritage, constantly supply the museum with new information that helps us understand our ancestors and their way of life.

The Ethnographical Section of the museum displays the pre-oil history of the country, many aspects of which have completely disappeared, and the exhibition includes a fascinating collection of black and white photographs from the 1960s. A series of dioramas illustrate the diversity of everyday life with examples of traditional educational methods and children's pastimes, household items and weaving looms and medical instruments and techniques. The costumes and jewellery section contains a Maria Theresa dollar bearing the date 1780. These coins were used both as currency in southeast Arabia and as ornaments. Necklaces made of Maria Theresa dollars interspersed with silver beads were popular with young girls. Farming methods and agricultural tools are well documented, and this section even contains a genuine well, some 15 meters deep, that existed on the site before the museum was built. Fishing and pearl diving, practised in the Gulf region for thousands of years, are also well represented. Traditional musical instruments and art forms are also exhibited; of particular interest are two religious books from the 17th Century and six copies of the Quran, all skilfully illuminated. There is also a display of weaponry and detailed information on the sport of falconry. One small wing of the museum contains gifts presented to H.H. the late Sheikh Zayed Bin Sultan Al Nahyan.

The Archaeological Section contains finds from the Stone Age through to the Islamic period. The oldest discoveries testify to human occupation nearly 7,500 years ago and include flint tools, stone scrapers and fine arrowheads. Funerary artefacts, such as pottery, stone vessels and copper objects, have been found in collective graves at Hili and Umm an Nar and reveal the extent of trading activity with countries such as Mesopotamia, as long ago as 5,000 years. Locally-made and imported necklaces, pendants, axes, daggers, swords and many other objects, dating to between three and four thousand years ago, have been unearthed at Qattara. Ancient settlements and graves from the Iron Age provide evidence of sophisticated industries producing fine bracelets, bangles and anklets made of bronze.

A separate exhibit explains the history and construction of the *falaj*. This ingenious system for managing water using subterranean channels was first introduced into the region during the Iron Age.

Pottery found in the Northern Emirates, widely used around the 3rd Century BC, clearly demonstrates the contrast between these early periods and the Hellenistic Era. Coins of different ages are also on display: a hoard of some 300 silver coins, minted in the mid to late 17th Century, were accidentally discovered in a small jar near Al Ain. Other exhibits include local pottery from the Islamic period, and porcelain imported from China several centuries ago.

4.3.3.2 Sheikh Zayed Palace Museum

The Palace of H.H. the late Sheikh Zayed Bin Sultan Al Nahyan was built in 1937. It was converted into a museum and opened to the public in 2001. However, visitors will not find large collections of photographs or exhibits in the museum, because Sheikh Zayed decreed that the royal palace and private residential areas should be an honest reflection of his country's culture prior to its dramatic development during the post-oil years.

The original structure comprised a private residence for the ruler and his family within a complex of courtyards. The palace was Sheikh Zayed's residence in Al Ain between 1937 and 1966. The simplicity of the buildings combined with the cool, secluded gardens and the lush green palm trees at the western edge of the Al Ain Oasis, made a deep impression upon all those who had journeyed through the surrounding desert to reach it.

The external courts each house a different majlis or meeting room where the Sheikh could receive local and foreign dignitaries. The areas set aside for local visitors were furnished traditionally with floor cushions, whilst hospitality was extended to foreigners in an area more in keeping with Western styles of furniture. Separate women's quarters were provided for the guests of the Sheikh's wife. A nearby room for the coffee-maker ensured prompt attention to the needs of guests, who were offered plentiful drinks, dates and a meal, in keeping with Arab custom. An inner courtyard contained the main kitchen and store-room, adjacent to which was the palace's vital water source: the well.

A replica of the grand court tent in the grounds of the palace represents an iconic link with Bedouin life. Sheikh Zayed was proud to meet guests and VIPs there to demonstrate Arabian hospitality and generosity. Another symbol of Sheikh Zayed's commitment to his people is the Land Rover in which he drove into the desert to visit the tribes so that he could understand and respect the conditions under which they lived. A similar Land Rover is currently displayed in the museum.

The museum houses many fine portraits of the royal family and a family tree depicting the Sheikh's lineage.

There is a schoolroom, with a collection of small desks and a blackboard, where the royal children received their education from private tutors. The spiritual needs of the family were met in the Quran room.

Architecturally, Sheikh Zayed Palace Museum replicates many of the characteristic features of important buildings in the UAE. The towers on either side of the main entrance were added during the restoration of the palace in imitation of the multi-storeyed tower of Jahili Fort. Visitors entering through the outer gate immediately leave behind the bustle and traffic of the modern city. Built at a time when air-conditioning was unknown, the buildings were kept reasonably cool through the inclusion of broad square verandas that shaded the main rooms and decorative perforated stone or wooden screens through which the breeze could pass. The practicality and simplicity of the buildings, coupled with their colors and textures produce a pleasant and soothing effect.

Opening times:

Saturdays to Thursdays: 8.30 am – 7.30 pm

Fridays: 3.00 pm – 7.30 pm

Mondays: closed

Entry is free of charge.

4.3.3.3 Dalma Museum

For centuries, Dalma Island was an important pearl-trading centre and its shoreline was lined with markets. The island lies approximately 30 kilometers off the coast of Abu Dhabi, some 220 kilometers west of the capital. Dalma Island, which has a population of around 10,000, is approximately nine kilometers from north to south (not including the modern, artificial peninsula to the south), and five kilometers east to west. Many of the inhabitants are fishermen or farmers who work on the island's numerous farms. Dalma is surprisingly green, with extensive vegetable fields and fruit orchards.

Plentiful supplies of fresh water have encouraged human occupation of the island since the Stone Age, approximately 7,000 years ago, and a profile of the lifestyle of its early inhabitants has been pieced together from the results of archaeological excavations. Significant finds include pieces of Ubaid pottery, imported from Mesopotamia (modern Iraq), painted and plain plaster vessels, a limestone mortar, finely flaked stone tools and a variety of shell and stone beads. Charred date stones dating from the late sixth to early fifth millennium BC, fish and animal bones tell archaeologists much about the people's diet and their ability to harvest the resources of both land and sea. The date stones discovered represent

some of the earliest evidence of the consumption of dates in Arabia. However, it is not known whether they were from a wild or domesticated date palm.

Dalma Island became an important centre at the height of the pearl trade. It was also reputed to have over 200 wells and actually supplied water to Abu Dhabi Island until the 1950s. An architectural survey of the buildings on Dalma was carried out in 1992, while a restoration programme on the Al-Muraykhi House and three mosques was conducted between 1993 and 1994.

The museum was formerly the house of a pearl merchant, Muhammad Bin Jasim al-Muraykhi. It dates from 1931 and is made of beach stone and coral covered in gypsum plaster. The building was designed as a secure commercial property, with strong windowless rooms on the ground floor and an upper storey, reached only by a wooden ladder, in which the merchant entertained guests and conducted business. Recent excavations near the house revealed a date press (*madbasah*), which has now been completely restored.

The museum contains an exhibit of local finds, including an interesting collection of British and Indian currency in use during the 19th and early 20th Centuries when the pearl industry was at its height.

Opening times: Dalma Museum is open from 8.00 am to 4.00 pm every day except Friday.

Entrance is free of charge.

4.3.3.4 Future Planned Museums

Besides the various museums announced for the new cultural quarter on Saadiyat Island, which are being developed by the Abu Dhabi Tourism Authority (ADTA), namely the Guggenheim Centre, Louvre Abu Dhabi, National Maritime Museum and Sheikh Zayed National Museum, ADACH has plans to open a range of new museums in the next five years, including a Bedouin museum, an ethnographic museum, and the large-scale development of the Qasr al Hosn historic area of central Abu Dhabi. By making such unique collections open and available to the world, ADACH aims to foster respect and understanding for Abu Dhabi's own history and aims to encourage an appreciation of cultural richness and diversity.

4.4 ANTIQUITIES TRADE

4.4.1 Sale of Antiquities

As noted above, there is no legislation in Abu Dhabi, or at a federal UAE level relating to the sale of antiquities, although federal legislation has been drafted.

4.4.2 Smuggling via the UAE

The existence of a trade in antiquities smuggled into the UAE from other countries is well-attested, although, with the exception of the Emirate of Sharjah, there is no relevant legislation to permit action to be taken against it.

In the past, both ADIAS and the Department of Antiquities and Tourism, and nowadays ADACH, are occasionally asked to assist the Abu Dhabi Police with the identification of artefacts, although police interest was related to whether or not a salesman was misrepresenting the age of the items, rather than to whether or not they had been illegally exported from their country of origin to the UAE.

5 MANAGEMENT AND CONSERVATION



Photograph: ADACH

5.1 INSTITUTIONAL ARRANGEMENTS

5.1.1 MOUs with the Environment Agency - Abu Dhabi (EAD)

In 2000 a Memorandum of Understanding (MOU) was signed between the Abu Dhabi Islands Archaeological Survey (ADIAS) and the Environment Agency Abu Dhabi (EAD), at that time known as the Environmental Research and Wildlife Development Agency (ERWDA). This MOU was to develop the ADIAS Sites Database, a geo-referenced database of archaeological and palaeontological sites for the Western Region of Abu Dhabi (Beech and Hellyer 2000). The application was developed in Microsoft SQL and was hosted on the EAD server, forming part of the Abu Dhabi Environmental Database (EDB).

The ADIAS Sites Database recorded the following information: site code, previous or old site codes, latitude and longitude co-ordinates (recorded in decimal degrees, with the datum as WGS84), size and extent of the site in meters, details of surveys carried out, brief description of archaeological finds, classification of site type, classification of age of site, grade of importance of the site (local, regional, national or international).

Ownership of the ADIAS Sites Database was transferred to ADACH after 1 June 2006. The Historic Environment Department team has since developed and expanded the ADACH Sites Database to include palaeontological sites, archaeological sites and historic buildings throughout the whole of Abu Dhabi Emirate. This includes many sites in the Eastern Region.

ADACH currently uses the same platform as EAD, with ESRI ArcInfo/ArcMap 9.3.1 being used to produce maps and undertake analyses of the data.

ADACH signed an MOU with EAD on 22 September 2008 for a period of two years to facilitate mutual data sharing.

5.1.2 ADIAS partnership with the Department of Antiquities and Tourism in the Eastern Region

Three seasons of joint fieldwork between 2004-2006 were carried out by ADIAS and the Department at sites in the southeast of Abu Dhabi, although without any formal agreements.

With ADIAS ceasing to be involved in excavations and with the Department now being absorbed into the Culture and Heritage Authority, the need for such a partnership came to an end.

5.1.3 Informal relationships

Together with the Abu Dhabi Islands Archaeological Survey (ADIAS), and the Ministry of Information and Culture, the Zayed Centre for Heritage and History organised the First International Conference on Emirates Archaeology, which was held in Abu Dhabi from 17-19 May 2001. The Centre and ADIAS have subsequently organised four annual symposia on recent archaeological and palaeontological work in the Emirates between 2003 and 2006. These symposia were held in late March to early April and were attended by participants from local departments throughout the country as well as by foreign-based archaeologists working in the country.

5.1.4 Abu Dhabi Authority for Culture and Heritage (ADACH)

For details of this newly-established body, see below. It is now the primary governmental authority in the Emirate of Abu Dhabi responsible for archaeology.

5.2 GOVERNMENTAL BODIES

5.2.1 The Former 'Department of Antiquities and Tourism', Al Ain

This former Department of Antiquities and Tourism, Al Ain, established in 1969, was incorporated into ADACH in April 2007 and its name was changed to the Department of Historic Environment. Soon after the foundation of the UAE in 1971 the department became part of the Ministry of Information, in charge of archaeological activities in the whole country. Being based in the city of Al Ain it was attached to the Diwan of the Representative of the Eastern Region in 1977, and confined its activities to the Emirate of Abu Dhabi. Nevertheless, staff from the same department carried out excavation programmes in the northern Emirates, especially at Fujairah and Ajman. Among the major archaeological areas which the department is in charge of are Hili, Hafit, Bida bint Saud and Umm an-Nar. Protection and site preservation were among other duties of the department. Restoration of historic buildings and running the Al Ain National Museum are only some of several other duties. Among the fruitful research programs the department carried out is the palaeontological investigations which were taken place in co-operation with the Natural History Museum in London and the Peabody Museum of Natural History at Yale University in the United States of America.

5.2.2 The Former "Cultural Heritage Unit", Abu Dhabi Tourism Authority, Abu Dhabi

The Cultural Heritage Unit (CHU), formerly part of the Al Ain Tourism and Economic Development Authority, was transferred to the Abu Dhabi Tourism Authority. This then in turn was subsequently transferred to the Abu Dhabi Authority for Culture and Heritage (ADACH). It no longer exists.

5.2.3 The Former "Abu Dhabi Islands Archaeological Survey (ADIAS)"

The Abu Dhabi Islands Archaeological Survey, ADIAS, was established in 1992 on the instructions of the Late President His Highness Sheikh Zayed Bin Sultan Al Nahyan, rahmat allah 'alai-hu, operating under the patronage of His Highness Sheikh Mohammed bin Zayed Al Nahyan, now Deputy Supreme Commander of the UAE Armed Forces and Crown Prince of Abu Dhabi. ADIAS was initially charged with responsibility for surveying for, recording and, where appropriate, excavating archaeological sites on the coast and islands of Abu Dhabi. Its geographical scope of responsibilities was later expanded to include the bulk of the Western Region, while it was also given responsibility for palaeontology in these areas (King 1998; Hellyer, 1998a, b). Major sites of importance identified by ADIAS included several of Late Stone Age (Neolithic date), including the oldest architectural remains thus far discovered in the UAE, on Marawah Island, and the UAE's only known pre-Islamic Christian monastery, on Sir Bani Yas. ADIAS carried out extensive surveys of much of the Western Region between 1992 and 2006, and between 2004-2006 carried out a joint archaeological project, together with the Department of Antiquities and Tourism in Al Ain, investigating Late Stone Age lithics sites at Umm az-Zamul, in the southeastern desert of Abu Dhabi.

ADIAS ceased to exist on 1 June 2006 when its archives and responsibility for its duties were transferred to the Historic Environment Department at the Abu Dhabi Authority for Culture and Heritage (ADACH). Dr. Mark Beech, formerly the ADIAS Senior Resident Archaeologist, was transferred to ADACH becoming the Cultural Landscapes Manager within the Historic Environment Department.

5.2.4 The Former "Cultural Foundation", Abu Dhabi

The Cultural Foundation in Abu Dhabi is made up of two major institutions, the Arts and Culture Establishment and the National Library. The National Library contains a large collection of books known as the Gulf and Arabian Peninsula Library, a significant collection of manuscripts and an online database. The Cultural Foundation has now become part of the new Abu Dhabi Authority for Culture and Heritage (ADACH) and forms the current headquarters building for the authority.

5.2.5 The National Centre for Documentation and Research

The National Centre for Documentation and Research (CDR) was established in 1968 to document the history of the UAE and Gulf region. Originally part of the Cultural Foundation in Abu Dhabi, it is now part of the Ministry of Presidential Affairs. Among its collections of documents is archival material obtained from a number of foreign sources including: American, British, Dutch, French, German, Japanese, Ottoman, Persian, and Portuguese. The Portuguese, Dutch, British and French holdings constitute a particularly strong resource.

5.2.6 Zayed Centre for Heritage and History

Established in March 1999 by the late President H.H. Sheikh Zayed bin Sultan al Nahyan, the Zayed Centre for Heritage and History in Al Ain is an official, cultural and research institution founded to foster study and research related to tradition and history.

Together with the Abu Dhabi Islands Archaeological Survey (ADIAS), and the Ministry of Information and Culture, the Centre organised the First International Conference on Emirates Archaeology, 17-19 May 2001. The Centre and ADIAS have subsequently organised four annual symposia, in 2003, 2004, 2005 and 2006, on recent archaeological and palaeontological work in the UAE, these being attended by participants from local departments throughout the country and by foreign-based archaeologists working in the country. The Zayed Centre holds weekly lectures relating to the history, heritage and culture of the UAE and the Gulf region. It also publishes books on the history and heritage of the Gulf and has an extensive collection of books, tapes, DVDs and manuscripts.

5.2.7 Abu Dhabi Authority for Culture and Heritage (ADACH)

On the 14th October 2005 President H.H. Sheikh Khalifa bin Zayed Al Nahyan, acting in his capacity as Ruler of Abu Dhabi, issued a law to establish the Abu Dhabi Authority for Culture and Heritage.

According to the terms of the Law, the Authority: 'will oversee intellectual and artistic activities in the Emirate of Abu Dhabi and will also be responsible for maintaining, protecting, managing and promoting the cultural heritage of the Emirate' through the following means:

- *The evolving of cultural policies, plans and programmes and ensuring that such policies are implemented.*

- *Undertaking projects designed to develop, promote and protect the cultural heritage of the Emirate and to make appropriate recommendations to the relevant authorities.*
- *Organizing and developing activities dealing with the heritage of the country as well as organizing conferences, cultural shows, plastic arts exhibitions and other activities related to the activities of the National Library.*
- *Organizing study programmes and seminars and other intellectual, scientific and professional meetings in addition to the publication of research and studies in the field of culture and heritage.*
- *Conserving historical, archaeological, heritages sites and buildings, as well as preparing an inventory of cultural property and artefacts.*
- *Carrying out of archaeological excavations, conserving archaeological artefacts and relics and issuing licences for excavations.*
- *Supervising the work and activities of archaeological excavation teams and establishing a department to manage, develop and supervise museums and other buildings where cultural artefacts are housed.*
- *Recommending laws and regulations to protect, promote and preserve cultural heritage.*
- *-Providing support for training and educational activities in the Authority's field of specialization.*
- *Developing human and cultural resources in the fields of documentation, management, archiving and preservation of cultural heritage.*
- *Outlining general plans for the activities of museums, in addition to planning for exhibitions on heritage, ensuring that such plans are carried out in association with the authorities and institutions concerned.*
- *- checking for violations of and damage to the cultural heritage and antiquities of the Emirate and taking the necessary legal action in association with the relevant authorities.*
- *Providing support and assistance to bodies working in the field of the preservation, management and promotion of cultural heritage.*
- *Exercising control over heritage and cultural property, whether public or private.*
- *Managing the National Library in such a way as to enrich and promote intellectual, artistic and scientific activities in Abu Dhabi through the provision of*

references, journals and periodicals in Arabic and other languages in various fields of knowledge.

- *Recording national history through the collection of documents, the registering of the heritage of the Emirate and through the publication of works in this field.'*

The Authority has absorbed the following organizations: the Cultural Foundation, the Abu Dhabi Islands Archaeological Survey (ADIAS), the Department of Antiquities and Tourism in Abu Dhabi's Eastern Region and the Cultural Heritage section of the Abu Dhabi Tourism Authority.



Figure 26 - Logo of the Emirates Natural History Group – Abu Dhabi.

5.3 NON-GOVERNMENTAL ORGANISATIONS (NGOS)

5.3.1 Emirates Natural History Group

The Emirates Natural History Group (ENHG) was founded in 1977 as a non-profit organisation for individuals with an interest in the natural history of the UAE (Figure 26). There are three chapters of the ENHG in the UAE and these are located in Abu Dhabi, Al Ain and Dubai. Bi-weekly lectures are held, as well as regular fieldtrips during weekends. The subject matter of these lectures and fieldtrips is not merely confined to natural history and there is a great interest in archaeology and paleontology amongst the members of this group. The ENHG has a bi-annual journal called *Tribulus*, which publishes a wide range of articles on natural history, palaeontology and archaeology.

Members of the Abu Dhabi ENHG chapter have participated as volunteers on surveys and excavations carried out by the Abu Dhabi Islands Archaeological Survey (ADIAS) at Abu Dhabi International Airport (winter 2002-3), as well as more recently at Umm az-Zamul, while the chapter has also provided financial support to several ADIAS projects, as well as to other archaeological work elsewhere in the Emirates.

In 2004 the ENHG published a book, 'Jebel Hafit: A Natural History' (Aspinall and Hellyer, 2004), which includes a chapter on archaeology by Drs. Rob Carter and Walid Yasin Al-Tikriti.

The Al Ain Chapter of the ENHG was established in 1980 and has a programme of lectures and fieldtrips similar to those of the Abu Dhabi Chapter. Its location has made it easy for interested members to undertake detailed recording of a number of archaeological sites in the Al Ain region. These have included surveys of wadis around the Al Ain region and across the border into Oman. They have made important discoveries such as an important Iron Age site at Jabeeb near Al Ain and the copper mining slag sites at Wadi Khutwa. Information collected has been shared with the Historic Environment Department at ADACH in Abu Dhabi and Al Ain, which also receives some of the archaeological material collected for review and assessment.

Of special interest to the group is the history of copper smelting in the region over the past 5,000 or more years. The group has made an effort to record smelting sites and revisit sites recorded in the past (*i.e.* Wadi Safafir). The search for copper mine sites continues. Likewise, the group has a special interest in the archaeology at Jabeeb where ancient *falaj*, smelting hearths and occupation sites have been recorded. The *falaj* here were first reported by the USGS and were partly excavated by the former Department of Antiquities in Al Ain. Other sites of special interest include the graves and settlements of Jebel Qatara and the Jebel Hafit period tombs of Jebel Aqbar (both in the neighboring Sultanate of Oman).

The group has also provided financial support for archaeological projects in Abu Dhabi and in other Emirates. This has included awarding grants to support DNA research on human remains found at archaeological sites in the UAE and for a number of topics related to natural history.

5.4 CONSERVATION

The Department of Conservation at ADACH undertakes research, policy development and programming of conservation activities within the Emirate of Abu Dhabi, outlining priorities, schedules and financial resources and coordinating the implementation of the conservation work programme. The department collaborates with other relevant departments of ADACH for research and conservation work, organizes professional and academic training in the field of heritage conservation, and manages the documentation of sites, museum collections and information on conservation techniques. The Department of Conservation is lead by Ege Yildirim, Conservation Coordinator.

It strives to follow the guidelines and principles laid out in the international charters and conventions on the care, conservation and management of cultural property, in order to ensure the proper identification, protection and conservation of the cultural sites of Abu Dhabi Emirate.

The Department of Conservation will soon include the Center for Earthen Building Conservation and Construction, which aims to provide academic and vocational training in the conservation and new construction of earthen structures.

5.4.1 Conservation of Abu Dhabi's Historic Sites

As part of its mandate to conserve the tangible heritage of Abu Dhabi Emirate, the Abu Dhabi Authority for Culture and Heritage has been developing policies and programming numerous initiatives for the conservation of Abu Dhabi's historic buildings, sites and collections. This is based on the Abu Dhabi Cultural Heritage Management Strategy, prepared by a UNESCO-led team of experts in 2005, and the ADACH Strategic Plan 2009-2013, which defines Priority Area 1 as '*to conserve the threatened tangible cultural heritage of Abu Dhabi.*' These initiatives are undertaken jointly by the Strategic Planning Office, the Department of Conservation, and the Department of the Historic Environment, as well as other departments of ADACH.

5.4.2 Emergency Conservation Programme

As part of the mandate of ADACH to conserve the threatened tangible heritage of Abu Dhabi, and the Strategic Plan target to have '30 per cent of Abu Dhabi's historical buildings and sites conserved' by 2013, ADACH has initiated the Emergency Conservation Programme aimed to identify, prioritize and address urgent issues of conservation of the historic buildings in the Emirate of Abu Dhabi. The programme, encompassing numerous historic structures, was launched in Summer 2008, and includes

in its scope of interventions, emergency consolidation to ensure the safety of the buildings, preventing imminent dangers of physical collapse and arresting further decay. It deals with major structural problems and seeks to eliminate nearby sources of threat to the integrity of the structures.

Within the scope of this programme, scheduled to last two years, various activities are planned and underway. These include the development of methodologies; site condition surveys carried out in consultation with a specialist structural engineer Christof Ziegert; scheduling of interventions; fencing, cleaning, shoring work, and preliminary consolidation; photographic and photogrammetric documentation; and mobilization of consolidation work, accompanied by archaeological investigations.

5.4.3 Conservation of Jahili Fort

Al Jahili Fort, located next to Jahili Public Gardens, near Al Ain Oasis in the city center, is one of Al Ain's most spectacular sites and one of the largest forts in the UAE (Figure 27). The Fort was built by Sheikh Zayed the First between 1891-1898.

The significance of Jahili fort lies in its central location in modern Al Ain and the survival within it of a large and imposing traditional building. The different elements of this building provide a strong physical and visual link to important local and regional historical events of both the 19th and 20th Centuries. The fort preserves important associations with the rise of the Nahyan family and the person of Sheikh Zayed the First, as well as the formative historical events of the region during the 1950s in which the TOL played a significant part, namely the Buraimi dispute of 1952-55 and the Jebel Akhdar war in Oman 1954-59. Indeed, the location and landmark status of the site is such that Jahili Fort has come to symbolize the traditional architecture and cultural heritage of the UAE.

In 2007, the Abu Dhabi Authority for Culture and Heritage began a flagship project at Al Jahili Fort, aiming at rehabilitating the historic fort and transforming into a major focal point in Al Ain, providing cultural services to the community and visitors. It includes a visitor information center, a temporary exhibition hall and a permanent exhibition hall on the travels of the renowned Mubarak Bin London (Wilfred Thesiger).

The Jahili Fort Rehabilitation Project was executed with sensitivity to the building's history and respective periods, using innovative and sustainable building technologies based on natural, authentic clay materials.



Figure 27 - Inauguration of Jahili Fort (Photograph: Ege Yildirim).

In December 2009 Jahili Fort re-opened to the public to great acclaim.

5.4.4 Conservation of Bin Hadi House

One of the major building conservation projects currently under implementation by ADACH is at the Hamad bin Hadi Al Darmaki House (Bin Hadi House), in Hili Oasis, Al Ain. The Bin Hadi House is a good example of fortified houses guarding the approaches to Al Ain's oases and serving as a refuge for its inhabitants and safe storage for their produce. The house displays the usual rectangular enclosure with a large square tower at one corner. Today, the site is a largely abandoned ruin, which displays many phases of occupation.

One of the major building conservation projects currently under implementation by ADACH is at the Hamad bin Hadi Al Darmaki House (Bin Hadi House), in Hili Oasis, Al Ain (Figure 28). The Bin Hadi House is a good example of fortified houses guarding the approaches to Al Ain's oases and serving as a refuge for its inhabitants and safe storage for their produce. The house displays the usual rectangular enclosure with a large square tower at one corner. Today, the site is a largely abandoned ruin, which displays many phases of occupation.

ADACH has been carrying out an integrated project combining archaeology and conservation here since 2007. Oral tradition appears to place the foundation of the building in the generation before the arrival of the family of Sheikh Zayed the First in Al An, *i.e.* around 1820 AD. The archaeological work has sought to address more general questions concerning both the history of construction and the history of use of the Bin Hadi House and others like it. The conservation work aims to consolidate the building and preserve the historic surfaces without radically changing the archaeological appearance of the structure. The works are carried out by earthen conservation expert Mr. Ali Malekabbasi, working closely under the supervision of the Department of Conservation and the Department of Historic Environment.

Similar projects combining archaeology and conservation are planned for other similar sites, like that of Abdullah bin Salem al Darmaki in Qattara Oasis and Bin Jabr al Swaidi House in Jimi Oasis.



Figure 28 - Restoration of the Bin Hadi house in Al Ain (Photographs: Ege Yildirim)

5.4.5 Conservation of Historic Materials and Object Collections

As part of its mandate to conserve the tangible heritage of Abu Dhabi, ADACH is undertaking various activities toward material conservation for the historic sites and object collections under its care. An important part of material conservation is the treatment of wooden elements in historic sites against termite infestation. As one of the projects within this scope, ADACH has conducted thermal treatment, using microwave technology for the wooden doorframe belonging to the House of the late Sheikh Mohammed Bin Khalifa al Nahyan, in spring 2008 (Figure 29). The treatment, conducted by Mr. Steffen Steinbach, an expert from Germany, is a remedial measure against infestation; to prevent re-infestation, further treatment is planned by ADACH, followed by appropriate display of though door in its original setting or in a museum in Al Ain.

The material conservation laboratory based in Al Ain Museum, which supports these anti-termite treatment activities, also provides material testing facilities for ongoing earthen building projects, as well as for treatment of various objects stored in the Al Ain Museum. These laboratory facilities will be expanded with the establishment of the ADACH Central Laboratories in the near future.

Another major component of object conservation is the ongoing paper conservation work. Works have begun in late 2008 to establish a conservation laboratory and initiate a programme for the long-term preservation and conservation, display and exhibition of the collection of books and manuscripts in the Emirate of Abu Dhabi, a large part of which are housed in the National Library in Abu Dhabi.



Figure 29 - Treating a historic door against termite infestation. The beautiful door comes from the house of the late Sheikh Mohammed Bin Khalifa al Nahyan in Al Ain (Photograph: Ege Yildirim).

5.4.6 Policy, Legislation and Regulation

There is no comprehensive archaeology/antiquities law for the UAE. A draft federal law has been prepared, but is not yet adopted. In October 2005 the President H.H. Sheikh Khalifa bin Zayed Al Nahyan, acting in his capacity as Ruler of Abu Dhabi, issued a law to establish the Abu Dhabi Authority for Culture and Heritage (see above). This body is now responsible for drafting appropriate legislation for the Emirate of Abu Dhabi.

5.4.7 Research and Monitoring

Regular patrolling and monitoring of archaeological sites throughout Abu Dhabi Emirate is now carried out by employees of the Historic Environment Department at the Abu Dhabi Authority for Culture and Heritage, ADACH. In collaboration with the former ADIAS, the Abu Dhabi Company for Onshore Oil Operations, ADCO, has erected warning notices at several sites in its oil field concession area and the responsibility for ensuring that these are safeguarded has been assigned to ADCO Environmental Engineers.

5.4.8 Protected Areas

Property ownership is generally of three types: Emirate (government), private¹, and royal. This is the case with historic buildings. ADACH, on behalf of the Emirate, formally owns previously restored buildings and those that are used for heritage purposes, such as Jahili and Mezyad forts. Similarly, both Al Ain National Museum and the Sheikh Zayed Palace Museum are owned and maintained by ADACH.

Currently historic buildings that have not been restored or conserved are largely privately owned, although they are directly managed and maintained by the Abu Dhabi Authority for Culture and Heritage. In some cases ownership has been passed over to the Authority in return for financial compensation, and efforts are being made to extend this to the remaining buildings.

Royal ownership applies to some historic buildings, for example, case of Muwayji Palace, which is owned by H.H. the President Sheikh Khalifa Bin Zayed Al Nahyan. Their management is however totally delegated to ADACH.

All archaeological sites are owned by ADACH. However, some archaeological and palaeontological sites in the operational area of the oil company, ADCO, are protected under the company's own internal policy.

¹ "Prior to the enactment of the Abu Dhabi property laws [of 2005?], title to all land in Abu Dhabi resided in the Ruler..." – Property World Middle East, "Abu Dhabi Property Law: The Building Blocks," 2006. Accessed November 13, 2008. <http://www.propertyworldme.com/content/html/1450.asp>

Sites in the Marawah Marine Protected Area are covered by the legislation relating to that area, which is administered by the Environment Agency - Abu Dhabi, EAD.

In the Eastern Region (and at Umm al-Nar), the former Department of Antiquities and Tourism has built protective walls around some key sites, such as those in the Hili Archaeological Park and the Iron Age village at Rumeilah. Signs and protective features have also been installed at other sites like Bida Bint Saud.

Two late Miocene fossil trackways at Mleisa, first identified by ADIAS, have both been fenced by the local office of the Municipality, to prevent vehicular access. A number of other Late Miocene fossil sites in Al Gharbia, Abu Dhabi's western region have been recently fenced by the Historic Environment Department at ADACH. These include Jaw Al-Dibsa, Umm al-Ishtan, and Bida Al-Mutawa. The same team has also put a large protective fence around the desert fort of Hosn as-Surra, located just to the northeast of Medinat Zayed.

5.4.9 Enforcement

Little enforcement activity has been carried out, in the absence of legislation and, as far as is known, there have been no court cases involving damage to archaeological sites in the Emirate of Abu Dhabi. This issue will be addressed by the new archaeology law prepared by ADACH which will soon be ratified.

5.4.10 Awareness and Capacity Building

Issues related to the need for an increase in awareness and capacity building have been dealt with above, but include the preparation of more media material, in relevant languages, that is aimed at the general public, revisions to the national curriculum, including the preparation of textbooks and other teaching material, and a building of relationships between those bodies concerned with palaeontology, archaeology, and cultural heritage and other governmental and non-governmental organisations and the corporate sector.



Figure 30 - Sign for the Marawah Marine Protected Area
(Photograph: Dr. Mark Beech)



Figure 31 - ADCO warning sign for the protected area around RM-7 a late Miocene vertebrate fossil locality at Rumaitha. (Photograph: Dr. Mark Beech).

6 OUTLOOK



Photograph: ADACH

6.1 SUMMARY OF THE STATE OF KNOWLEDGE

6.1.1 Palaeontology

A wide variety of palaeontological sites exist within Abu Dhabi Emirate.

Cretaceous fossils (dating to between 145.5 to 65.5 million years ago) consist of marine fossils such as sea urchins, shells and corals. These are principally found in the area of Jebel Hafit in the Eastern Region.

Late Miocene fossils (dating to between 8 and 6 million years ago) are located within the Baynunah formation along the coast and interior of Abu Dhabi Emirate between Rumaitha in the east to Jebel Barakah in the west. Recent work at Umm al-Ishtan and close to Bida al-Mutawa demonstrates that the Baynunah formation in actual fact extends further west and south than originally determined by earlier palaeontological research. Fossils have been discovered from a large number of sites. Animals represented include freshwater molluscs, freshwater catfish, freshwater turtles and terrestrial tortoises, crocodiles and birds (including ostrich, egret and darter). Largest amongst the fossil mammalian remains are bones from proboscideans/elephants (mainly from the four-tusked *Stegotetralodon syrticus*, together with a type of Mastodon and Deinothera). The odd-toed ungulates include two species of primitive three-toed horse (Hipparion) and a rhinoceros. Even-toed ungulates include pigs, hippopotami, cattle, antelopes, gazelle and giraffe. Carnivore fossils included sabre-toothed cat, hyaena and wolverine. Other animals represented include an Old World monkey, a new gerbil species named *Abudhabia baynunensis*, a cane rat, a jerboa, an Old World rat and an undetermined shrew.

Together these fossils demonstrate that Abu Dhabi Emirate, though still a relatively arid land, bore broad rivers which supported savannah grasslands and a diverse wildlife, somewhat akin to modern day East Africa.

In addition to the fossil bearing sites, a series of trackway sites have also been recently identified at Mleisa, Niqa and Bida al-Mutawa. These trackways have hundreds of footprints made by some type of proboscidean, as well as other animals, in the case of the Niqa site. Further study of these sites is required but initial investigations suggest that they too may date to the late Miocene period. The Yale-Adach team's work during December 2007 focused on the documentation, sediment sampling, and palaeomagnetic study of the Mleisa sites in large part to determine the age and relative association of the footprint sites to those of the Baynunah Formation on the coast.

Pleistocene marine fossils have been identified in the form of fossil mangrove pneumatophora, present in some coastal areas and on offshore islands. Fossil corals have also been identified on the island of Marawah. Some of these relate to periods of higher sea-levels in the past.

6.1.2 Archaeology

Archaeological stone artefacts, of Middle Palaeolithic date, have been identified at Jebel Barakah in Abu Dhabi's Western Region. Five sites located around the jebel yielded a large collection of artefacts which has changed the date of the first human occupation of the land of Abu Dhabi. A number of flint cores and flakes of Levallois technique were collected from the sites. On the basis of this technique and one stone handaxe it is believed that they belong to an early phase of the Middle Palaeolithic. This major discovery has pushed the history of Abu Dhabi to 150000-200000 years.

The earliest archaeological settlement sites so far known within Abu Dhabi date to the early Holocene period, about 7,500 years ago. This period is known as the Late Stone Age, Neolithic or Ubaid period, and dates from around 7,500 years ago up until just over 5,000 years ago (5500-3200 BC). Traces of these early inhabitants of Abu Dhabi can be found on the coast and islands, as well as the desert interior. Key sites include sites MR1 and MR11 on Marawah Island and site DA11 on Dalma Island. Ubaid pottery is known from these sites, a clear sign of contacts with southern Mesopotamia at that time, or at least with traders in the central Gulf, who were themselves in contact with Ubaid cultural groups.

Key Neolithic sites located in the desert interior can be found in the Umm az-Zamul region. These are aceramic but have substantial lithic assemblages focused in particular locations. As known elsewhere in the Rub al-Khali, these may relate to settlement activities adjacent to ancient lakes which the Neolithic pastoral nomads exploited on a regular basis.

The Hafit period (3200-2600 BC) is named after the well-built stone tombs present in their hundreds on the slopes of Jebel Hafit near Al Ain, and the Hajar mountains of neighboring Oman. Pottery found within these tombs includes small painted vessels of a type known as Jemdet Nasr. This is an archaeological site located near Babylon in southern Iraq, famous for its polychrome pottery, produced in the late fourth millennium BC. The main evidence for this period in Abu Dhabi has so far been found well inland, although a few possible Hafit-type pottery sherds have been identified close to Abu Dhabi Airport. It is striking that a completely different picture emerges if one considers coastal settlements on the coastline of Oman. Here there is abundant evidence

for coastal occupation during the fourth millennium BC with extensive coastal shell middens from Ra's al-Hamra to Ra's al-Hadd and beyond. The archaeology of this period in the Gulf has been referred to by some authors as the 'Dark Millennium'. It seems that a marked climatic deterioration caused dramatic changes of subsistence and settlement patterns in the Gulf around 4000 BC.

Sometime in the late fourth millennium BC, however, a major technological innovation arrived in the region, which included how to mine and smelt the copper ores found in the Hajar mountains. This marked the beginning of the local Bronze Age.

The most important Bronze Age site located in the coastal region of Abu Dhabi is on the island of Umm al-Nar (also known as Sas al-Nakhl), situated just to the east of Abu Dhabi Island. This type site gives its name to the chronological period known as Umm al-Nar (2600-2000 BC). The port of Umm al-Nar acted as a terminal for copper exports to Mesopotamia. Evidence of the Umm al-Nar civilization has subsequently been discovered throughout the UAE and northern Oman.

Within the interior, the most important group of archaeological sites dating to the Bronze Age is found in Hili, just to the north of the centre of Al Ain. During the second half of the third millennium BC (2500 - 2000 BC) the inhabitants of this area lived in sun-dried mud-brick houses and buried their dead in stone-built collective graves (although stone-built houses from the period are known from Umm al-Nar). The site designated as Hili 1, located next to the Grand Tomb, was once a high tower, standing several meters above the ground. This building had a thick circular wall embracing several rooms which were served by a well located in the centre of the structure. It was surrounded by a moat. A similar building, known as Hili 10, with a central well was also discovered near the main entrance of the park. A third building, known as Hili 8, located outside the south eastern corner of the park wall, was excavated by a French team. It seems to have had the same or an even more important role.

Collective tombs from the Umm al-Nar period dating to the second half of the third millennium BC are known today at many sites in the UAE, but most importantly at both Hili and the island of Umm al-Nar. At Hili, there are three tombs inside the park and several others outside. Hili Grand Tomb, located in the middle of the park, is over 4,000-years-old and was probably in use for two or three hundred years. Evidence from collective graves from the same period in the region indicates that hundreds of people would have been buried here over a long period of time. A particularly interesting discovery at the Hili site was the existence of a pit-grave, known as Tomb N, adjacent to one of the smaller above ground circular

tombs. This was found to contain many objects such as pottery, stone vessels and ornaments, all dating to the very end of the third millennium BC. Tomb N contained perhaps as many as six hundred individuals, buried over a period of 100 to 200 years.

Another important site located in the eastern region of Abu Dhabi Emirate is Bida Bint Saud. This is situated to the north of Hili, some 25km from the city of Al Ain. The high rocky plateau rises some 40 meters above the surrounding area. A number of Hafit and Iron Age graves have been also excavated here. A large public mud-brick building has been excavated here dating to around 3,000 years ago. It is thought that this may have served as a place to control the distribution of water since about 150 meters south of this building a *falaj* (underground water tunnel) was discovered and partly excavated. A second *falaj* has also been discovered in the same region. The existence of both *afalaj* indicates that the area of Bida Bint Saud played a major role in the history of the Eastern Region of Abu Dhabi. The discoveries also provide important evidence that the *falaj* system was indigenous to the region, being introduced during the Iron Age some 3,000 years ago.

Evidence of occupation during the middle Bronze Age, known as the Wadi Suq period (2000-1600 BC), around 4,000 years ago, has been found on several of Abu Dhabi's islands, including Ghaghah, Sir Bani Yas, Marawah, Rufayq and Balghelam. There is little evidence of occupation of the deserts during this period, perhaps due to climatic change, and less rainfall, and some of the islands in the Western Region may have been used as temporary way-stations or trading settlements by sailors from Bahrain (ancient Dilmun), on their way to Hormuz. Occupation in the Wadi Suq period is also attested from Al Ain, in particular from a long collective grave excavated in the 1970s in the Qattara oasis. There is, however, relatively little evidence of occupation during this period.

Only ephemeral settlement traces from the Late Bronze Age (1600-1250 BC) have been identified on the coast and islands of Abu Dhabi, and the pattern of occupation in this region during this period is, at yet, poorly understood. Given the relative abundance in the Al Ain area of sites from the Jebel Hafit and Umm al-Nar periods, which preceded the Wadi Suq and Late Bronze Age periods, and from the Iron Age, which followed, it is considered likely that the area continued to be occupied, even if few sites have yet been identified. A falling in the water table has, however, been identified during this period, and this may have affected patterns of settlement.

Many of the major Iron Age sites so far discovered in the UAE, including Rumeilah and Hili, both in Al Ain, and at Muweilah and Al-Thuqaibah in Sharjah and Khatt in Ra's

al-Khaimah, lie inland near the Hajar mountains and supplies of subterranean water. This period coincides with the first use of '*falaj*' underground water systems. The well-preserved sites in the Al Ain area, including villages, as at Rumeilah, and cemeteries, as mentioned earlier at Bida Bint Saud, are indicative of extensive settlement, while other Iron Age sites recently discovered by the ADACH Historic Environment Department such as those at Sweihan, Wadi al Ayay, Nahil and others suggest that the area suitable for settlement was then larger than it was during later periods. The term 'Iron Age' was technically a misnomer, as the inhabitants of the UAE continued to use copper rather than switching to the new metal, presumably because of the ready availability of copper in the mountains. Recent discoveries from Mowailih in Sharjah and Sarooq al Hadid in Dubai however have demonstrated that the Iron industry was known since at least Iron Age II. Only sparse evidence from the Iron Age (1250-300 BC) has been found on the coastline and islands of Abu Dhabi, many appearing to be temporary campsites or way-stations relating to maritime trade, and perhaps occupied on only a seasonal basis.

Important traces of evidence of occupation during the Late Pre-Islamic period (300 BC - 300 AD) of many of Abu Dhabi's islands during the few centuries just prior to the coming of Islam has been identified. These largely consist of surface pottery scatters where there has been no or limited opportunity to carry out follow-up excavations. Among islands where sites from this period have been found are Abu al-Abyadh, Abu Dhabi, Balghelam, Dalma, Marawah, Qarnein, Sir Bani Yas, Yasat al-Ulya and Yasat Sufla. Inland, there are again some indications from the Al Ain area, although, once again, much evidence may be buried beneath the existing city.

One of the most important sites from the Late Pre-Islamic to Early Islamic period is located on Sir Bani Yas Island, where the pre-Islamic Christian monastery discovered during excavations in the early to mid 1990s is the only physical evidence yet known in south-eastern Arabia of the presence of Christian communities before Islam. Excavations which took place between 1993-96 uncovered a church constructed within a walled monastic complex. A number of associated courtyard villas were also excavated from the surrounding area of the monastery. These all appear to have been occupied during the 7th - 8th Centuries AD, being abandoned shortly after the arrival of Islam, perhaps because its inhabitants became Muslims or moved away. There is textual and archaeological evidence of the presence of the Nestorian Church in the northeast Arabian Peninsula, Mesopotamia and Iran during this period, although Sir Bani Yas is the furthest east site so far identified.

A number of other Nestorian churches have been identified in the Gulf, notably at Failaka (Al Qussur) and Akaz in Kuwait and Jubail in Saudi Arabia, but Sir Bani Yas is the first to be clearly identified with a related monastic settlement.

Study of the Islamic period (750 AD to 19th Century) is hampered by the lack of local written records for Abu Dhabi. Arab travelers like Ibn Battuta, Al-Idrisi and Yaqut passed through or dealt with the region but they made little reference to the UAE, apart from mentioning the major trading ports of Julfar (Ra's al-Khaimah) and Dibba. Some earlier settlements on offshore islands, such as Yasat al-Ulya and Ghaghah, as well as on Sir Bani Yas, appear to have been abandoned by around the beginning of the Islamic period. For the bulk of the interior, no settlement, or, indeed, occupation is attested for the whole of the period from the end of the Late Stone Age until the Late Islamic period, although it continued in the Al Ain area. There are significant remains of the Islamic period in the region of Al Ain including an Early Islamic *falaj* and remains of a mosque which may have been contemporary to the *falaj* and many forts for which the town is famous.

One interesting site, not yet studied in detail, is located at Mantiqa al-Sirra, in the Western Region, to the east of Medinat Zayed. This site, also referred to as Hosn as-Surra, is a large fortified settlement with apparent abandoned wells nearby, and with pottery suggesting an occupation date in the Late Islamic period. Further work is required to determine both its function and the reasons for its abandonment, although a slight harshening of the climate or reduction of the already sparse rainfall may have been responsible.

Sites have been found throughout the Emirate of Abu Dhabi dating to the Recent Islamic period (19th-20th Century), although they are, not surprisingly, less common in the desert areas. The nature of the sites varies from evidence of burning and pottery scatters suggesting the presence of occasional campsites to areas of more extensive fireplaces, stone structures including outline mosques, water catchment systems, shell middens and pottery scatters which probably represent at least frequent seasonal occupation. The number of sites from this period testifies to the importance of the pearling industry in the pre-oil era. Pearling may have reached a peak in the late 18th and 19th Centuries. Among key sites is a shell midden (piles of opened and abandoned pearl oyster shells) on the island of Abu al-Abyadh which was once over three kilometers long, containing many millions of shells. The presence of Chinese porcelain and other imported pottery on some island sites demonstrates that, besides being involved in fishing and pearling, the people also took part in regional trade and in other economic activities.

An important coastal site dating to the Later Islamic period are the sulphur mines discovered at Jebel Dhanna. This complex of sulphur mines with around 150 individual mine shafts probably date to the 18th Century AD, and are the only sulphur mines known in Eastern Arabia. The sulphur was probably largely exported, for the manufacture of gunpowder.

Buildings from the recent historical period are rare on the coastline and islands of Abu Dhabi. Key sites include the Bayt al-Muraykhi (pearl trader's house) and al-Dawsari, al-Muraykhi and al-Muhannadi mosques in Dalma town on Dalma Island. The stone walled mosques on Liffiya, Marawah and Bu Sharah, as well as number of stone outline mosques on coastal islands also form an important architectural group. In the Liwa Oases, permanent settlement appears to have commenced by the 16th or 17th Century AD, and certainly by the 19th Century AD forts had been built. In the Al Ain area, the continued availability of water, through *falaj* systems, made permanent occupation, associated with agriculture, feasible. A number of the built architectural monuments in Al Ain, such as the forts, (now restored by the Department of Antiquities and Tourism) date to the 19th or early 20th Centuries, while the *falaj* systems may be of a much earlier date, albeit frequently repaired.

Recent settlement on the island of Abu Dhabi dates from the mid-18th Century, and a number of buildings were constructed in the 19th and early 20th Centuries, including forts, mosques and domestic dwellings, although few survive. A key impetus for the 19th Century building may have been increased prosperity resulting from the pearling trade. It is a pity that so few traces of recent historical architecture genuinely survive. Those buildings which do remain, such as the important group of buildings on Dalma, provide an important link to life in Abu Dhabi during the pre-oil era.

6.2 WHAT ARE THE ISSUES?

A number of issues are currently important to discuss in relation to palaeontology, archaeology and cultural heritage in Abu Dhabi.

6.2.1 Legislation

The major issue relating to the palaeontological and archaeological resources of Abu Dhabi Emirate is the lack of legislation to enforce protection of sites. This is especially critical with the modern pace of development and landscape transformations currently under way.

6.2.2 Monitoring and Management

Regular patrolling and monitoring of the existing known sites is carried out by the staff of the Historic Environment Department of ADACH, although this is not intensive or systematic due to a lack of staff. Environmental Impact Assessments (EIAs) should be carried out for all development projects according to the Federal Environment Laws No. 23 and 24 (1999), however there is no current enforcement of the provision that the palaeontological/archaeological/cultural heritage component is fulfilled, beyond the Environment Agency – Abu Dhabi (EAD) referring on developers to ADACH for the cultural heritage component of EIAs.

6.2.3 Preliminary Cultural Reviews (PCRs)

The Preliminary Cultural Review (PCR) process is a service provided by the Historic Environment Department of the Abu Dhabi Authority for Culture and Heritage to organizations, firms or individuals requiring archaeological/cultural impact clearance prior to development, whether it is in the context of a Preliminary Environmental Review (PER), Strategic Environmental Assessment (SEA), Environmental Impact Assessment (EIA) study, or Construction/Development Permit. The PCR procedure forms the Cultural Heritage component of Environmental Impact Assessment procedures carried out according to the UAE Federal Environment Laws no. 23 and 24 (1999). Please note that according to Abu Dhabi Law no 28 of 2005 concerning their establishment, Abu Dhabi Authority for Culture and Heritage (ADACH) are the sole authority in Abu Dhabi Emirate responsible for:

Law 28/2005, clause 6 - Preserving the archaeological and historical sites and buildings and preparing an inventory list of the movable and real properties of cultural heritage nature.

Law 28/2005, clause 7 - Carrying out excavations in the field of archeology and reformation of archeological possessions and issuing the required licensing for exploring such items and supervising the works and activities of the scientific missions operating in the archaeological domain.

Law 28/2005, clause 8 - Erecting, managing and developing museums as well as supervising and preserving the cultural possessions that are kept in museums and warehouses.

Law 28/2005, clause 12 - Tracking violations and infringements to the Emirate's cultural heritage, by cooperating with the competent authorities.

Law 28/2005, clause 17 - Carrying out any business or activity that is related to the cultural heritage inside or outside the Emirate for the aim of achieving the Authority's goals, as entrusted to it by the Executive Council's Chairman.

6.2.3.1 PCR Procedures

Please complete the attached form and then submit it along with payment of the administration fee of 500 Dirhams to either:

Abu Dhabi: Cashier's Office, 1st Floor - Office no. 189, Cultural Foundation, Sheikh Rashid bin Saeed Al Maktoum Street (Airport Road), Abu Dhabi Authority for Culture and Heritage (ADACH), P.O.Box 2380, Abu Dhabi, UAE.

Al Ain: Finance Department, Historic Environment Department, Abu Dhabi Authority for Culture and Heritage (ADACH), Al Ain National Museum, P.O. Box 15715, Al Ain, UAE.

Please ensure that you have provided all necessary accompanying items:

- (1) An official letter from your company soliciting the PCR application,
- (2) The fully completed PCR application form,
- (3) An accompanying map of the area occupied by project, along with corner co-ordinates for its boundary (in decimal degrees with WGS84 as the mapping datum), and
- (4) 500 Dirhams application fee.

Applications are reviewed within a 14-day period where applicants are then informed whether a PCR is required. When required, an email will be sent informing the applicant of the necessary costs of the survey. A fixed daily charge rate for staff needed is calculated based on the appropriate costs according to the size of the survey and amount of time involved to complete both survey as well as administration and report writing. A typical survey may involve anything between 2-4 personnel and is currently charged at 2,500 Dirhams per person per day. Surveys generally are of 1-5 days in duration. Subsequent administration and report writing normally involves 1-2 personnel for 1-2 days.

If it is judged that a PCR survey is not required then you will be contacted by email informing you that a no objection letter will be issued from our side in due course. Should a PCR survey be required then we will invoice you for the necessary amount once the survey and report have been

completed. Payment of this invoice should then be made by cheque made payable to the 'Abu Dhabi Authority for Culture and Heritage'. This should be delivered to either:

Abu Dhabi: Cashier's Office, 1st Floor - Office no. 189, Cultural Foundation, Sheikh Rashid bin Saeed Al Maktoum Street (Airport Road), Abu Dhabi Authority for Culture and Heritage (ADACH), P.O.Box 2380, Abu Dhabi, UAE.

Al Ain: Finance Department, Historic Environment Department, Abu Dhabi Authority for Culture and Heritage (ADACH), Al Ain National Museum, P.O. Box 15715, Al Ain, UAE.

If the person paying the cheque then brings a copy of the payment receipt to either:

Reem Ibrahim (Executive Secretary, Strategic Planning Office, 2nd floor, opposite Office no. 285, Cultural Foundation, Abu Dhabi) or Mustapha Sayed (Executive Secretary to Mohammed Amer Al-Neyadi, Director of the Historic Environment Department in Al Ain), then they can directly receive hard and soft copies of the report. Please note that you cannot receive hard and soft copies of this report until we receive full payment of the invoiced amount.

The PCR report itself may either function as a no objection document, or may provide a list of mitigation procedures which have to be undertaken before your project may proceed.

6.2.3.2 PCR Enquiries

Queries concerning PCR procedures can be addressed to one of the following personnel from the Historic Environment Department in Abu Dhabi or Al Ain:

Dr. Mark J. Beech
Cultural Landscapes Manager
Historic Environment Department
Abu Dhabi Authority for Culture and Heritage (ADACH)
Office no. 226 - 2nd floor
Cultural Foundation
Sheikh Rashid bin Saeed Al Maktoum Street (no.2 Street - 'Airport Road')
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6.2.4 Training

There are a lack of UAE nationals trained in archaeology and palaeontology. This is discussed in further detail below. Future mentoring or in-house training of UAE nationals, perhaps formalized as partnerships with existing university archaeology departments, should be urgently considered.

6.2.5 Education and Awareness

The Abu Dhabi Authority for Culture and Heritage (ADACH) is now providing a more unified approach to management of palaeontological, archaeological and cultural heritage resources in Abu Dhabi Emirate. A coordinated strategy is being developed with the preparation of brochures, posters, radio and television campaigns.

6.3 GAP ANALYSIS

The Gap Analysis presented here is based on a general consensus of opinions gathered at the original AGEDI archaeology and palaeontology workshop to which all stakeholders were invited.

6.3.1 Data and Knowledge

It was generally agreed that an important point was to co-ordinate data gathering and sharing so that knowledge concerning the palaeontology and archaeology of Abu Dhabi Emirate was widely available to all interested parties.

6.3.2 Policy and Regulation

There was consensus that the lack of policy and regulation at all levels (institutions, local and federal government) was hindering progress in the management of archaeology and palaeontology in Abu Dhabi Emirate. It should be noted however that the original AGEDI workshop was held prior to the establishment of the new Abu Dhabi Authority for Culture and Heritage (ADACH).

6.3.3 Awareness and Best Practices

The problem of lack of awareness of best practices in heritage management, and the need for training in appropriate practices carried out following internationally recognized standards was iterated.

6.3.4 Lack of Professional Association

Unlike a number of other professions, there is no formal professional association of archaeologists within Abu Dhabi Emirate, or indeed within the Emirates as a whole. The establishment of such a body in the future may introduce a more professional approach and help to develop best practices.

6.3.5 Monitoring and Management

A need for monitoring and organised management of archaeological and palaeontological resources was expressed. It was suggested by a number of attendees that this would be best achieved by having archaeologists posted in, and/or responsible for, different regions throughout Abu Dhabi Emirate to patrol and monitor existing known sites, as well as to check new areas being developed.

6.3.6 Education and Awareness

The topic of education and awareness came up frequently during discussions at the workshop. Increased awareness of heritage issues was stressed as vital to educate the general public about the importance of archaeological and palaeontological sites in Abu Dhabi Emirate.

6.4 WAY FORWARD

6.4.1 Development of Appropriate Legislation

In October 2005 the President H.H. Sheikh Khalifa bin Zayed Al Nahyan, acting in his capacity as Ruler of Abu Dhabi, issued a law to establish the Abu Dhabi Authority for Culture and Heritage (see above). This body is now responsible for drafting appropriate legislation for the Emirate of Abu Dhabi. Hopefully, this will act as a spur to encourage the draft federal archaeology/antiquities law to be adopted.

6.4.2 Increase National and International Awareness of UAE Heritage

Increased awareness of heritage issues at both a national and international level is important. As discussed above, there is cultural, scientific, educational and economic value to both archaeological and palaeontological resources. At present these resources are undervalued. Efforts should be made to promote awareness of these resources by holding exhibitions, publication, including the preparation of suitable educational material, as well as through the use of multimedia formats, e.g. CD, DVD, internet and television, as well as the holding of conferences and workshops.

It is important that archaeologists working in the UAE participate in all regional and international conferences and meetings relating to archaeology in the Middle East. Palaeontology, archaeology and cultural heritage finds do not respect national boundaries. Many types of sites and cultural periods are common across the region, and there are a number of transboundary issues, such as Hafit and Umm al-Nar tombs/periods which both occur in the UAE and Oman. Participation in regional meetings such as those organised by the GCC Union of Archaeologists, and international meetings such as the Seminar for Arabian Studies, held annually at the British Museum in London, and the International Congress on Archaeology of the Ancient Near East, ICAANE, help to maintain contacts between colleagues in neighboring countries, as well as to keep colleagues up to date with the latest research developments within the region.

6.4.3 Designate Key Sites as Potential World Heritage Sites

The designation of key sites as potential World Heritage Sites is an important step towards wider recognition of the importance of the heritage of the UAE. There have already been discussions held with representatives from UNESCO concerning the possible listing of the city of Al Ain, including Jebel Hafit. This proposal has been entered on the Tentative List of the UNESCO World Heritage Centre. In late January 2009 a formal submission was made by ADACH to UNESCO listing Al Ain, including Jebel Hafit, as a World Heritage site.

6.4.4 Increase Transparency and Access to Data

The establishment of an Abu Dhabi wide geo-referenced database of all palaeontological, archaeological and cultural heritage sites is critical for the future management and development of the cultural heritage resources of Abu Dhabi Emirate. This database is currently being developed by the Historic Environment Department at ADACH within a GIS-based system as a valuable tool for development and planning.

Increased transparency and access to data are of the utmost importance. Access to cultural heritage data via an online Geospatial portal would increase awareness and knowledge of such sites to a wider audience. A current attempt to remedy this is being provided by the Abu Dhabi Global Environmental Data Initiative (AGEDI).

A Memorandum of Understanding was signed in 2008 between the Abu Dhabi Authority for Culture and Heritage and the Environment Agency – Abu Dhabi. The MoU is for data sharing and the exchange of expertise between specialists employed within the two organizations. This will facilitate the updating of cultural heritage data within the AGEDI Geospatial portal.

6.4.5 Resolve Issues Surrounding Data Ownership and Access

Some issues relating to data ownership and access exist and need to be resolved. Many of the previous archaeological surveys carried out in Abu Dhabi were undertaken at the request of various high-ranking individuals or were located inside oil concession areas, being commissioned by the Abu Dhabi Company for Onshore Oil Operations, ADCO, or were commissioned by other companies. It is important that all data emanating from this work be included in the Abu Dhabi database of palaeontological, archaeological and historical sites, while maintaining the appropriate degree of confidentiality.

6.4.6 Develop Archaeological Association at the Federal Level

The development of a Federal Archaeological Association would encourage coordination and collaboration between the different departments in different Emirates. Such an association should be open both to UAE nationals and to citizens of other countries. It might play a leading role in the adoption of Codes of Practice for archaeological and palaeontological work across the whole of the Emirates. Good practice should aim to follow international standards in terms of field methodologies adopted, electronic archiving of archaeological and palaeontological data and publication of results.

This organisation might also be an appropriate body to organise an annual conference to promote the exchange and sharing of information between the different Emirates. Such a conference has been organized for the past five years by the Zayed Centre for Heritage and History, together with the former Abu Dhabi Islands Archaeological Survey (ADIAS). This has been traditionally held for the past few years during late March/early April in Al Ain, towards the end of the main archaeology field season. By holding such a meeting at this time of year it permits visiting archaeologists from some of the international teams working in the Emirates to participate at the end of their field seasons.

6.4.7 Identify Executive Authority for Increasing Efficiency of Existing Co-ordination/ Collaboration Efforts

The Abu Dhabi Authority for Culture and Heritage (ADACH) is now playing a leading role in increasing efficiency in the management of palaeontological, archaeological and historical resources in Abu Dhabi Emirate. This is helping to avoid duplication of effort and resources.

6.4.8 Improve Training and Qualifications

The subject of archaeology is only currently taught on a full-time basis at one university in the UAE, the Emirates University in Al Ain. The scope of the existing archaeology degree course taught there should be widened to provide practical archaeological training for UAE nationals. This should involve such elements as instruction in surveying, excavation, mapping, use of GIS, documentation, as well as laboratory-based analytical studies. Ideally the students would have to undertake a placement during their degree course to gain practical work experience.

The College of Arts and Science at Zayed University in Abu Dhabi now provides a Professional Certificate in Heritage Management. This is a certificate course suitable for recent graduates who would like to develop professional skills necessary to work in the growing

heritage and tourism sector, or for working professionals who wish to increase their skills and build knowledge of museum and library management. The UAE's expanding cultural institutions mean that there will be future growth and demand for trained personnel within this sector. The Cultural Heritage short course modules cover the vocabulary and concepts of heritage management and provides a survey of the rich heritage of the UAE. Key themes include tangible and intangible heritage, the preservation and organization of heritage objects, cultural heritage and the built environment, Emirati heritage and global tourism. The Museum management modules covers the basics of managing exhibitions and museums. Key themes include the mission and history of museums, collection care and exhibitions, managing exhibitions, shows and museums, and conservation, understanding objects and displays. The Library and Archive Management modules covers the organization and management of written documents and archival collections. Key themes include information organization, information literacy, the conservation of print material and include work experience. The Professional Certificate in Heritage Management may in the future be upgraded to become a Masters Degree.

The Paris-Sorbonne University established a branch in Abu Dhabi in time for the 2006-2007 academic year. Undergraduate taught there include archaeology, but this only forms part of their degree course. In addition, there is no particular focus on Arabian Gulf archaeology.

Few UAE nationals have post-graduate training in archaeology or palaeontology. There is a need for scholarships to provide opportunities for UAE nationals to go abroad for postgraduate training, appropriate Masters Degree courses and PhD studies. Hopefully in the future there will also be opportunities within the UAE to undertake post-graduate studies in palaeontology, archaeology, historical studies, museum studies, and other cultural heritage-related subjects.

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9 References

- Abu Dhabi Global Environmental Data Initiative (AGEDI)* websites: <http://portal.agedi.ae/> and <http://www.agedi.info/en/index.jsp>
- Abu Dhabi Islands Archaeological Survey (ADIAS) 2005.* DVD file: Abu Dhabi 8 Million Years Ago - Fossils from the Western Region. ADIAS. Available in both Arabic and English, featuring: (1) Fossils from Western Abu Dhabi - The Animals of 8 Million Years Ago (4 mins, 12 secs). Presentation produced and directed by Will Higgs and Dr. Mark Beech (ADIAS) – 2005; (2) Hot Fossils from Abu Dhabi (5 mins, 27 secs) - Presenter: David Attenborough. Film produced and directed by Dave Holmes RKD Productions Ltd., London - 1991. Arabic version produced by Dr. Mark Beech (ADIAS) - 2005.; (3) Abu Dhabi - the Missing Link (28 mins, 47 secs). Film produced and directed by Brooke Film Productions for the Abu Dhabi Company for Onshore Oil Operations (ADCO) - 1991.
- Abu Dhabi Islands Archaeological Survey (ADIAS) website: www.adias-uae.com ADIAS Guide to Archaeology in Abu Dhabi and the UAE website: www.adias-uae.com/archaeology.html
- ADIAS Radiocarbon Archive (part of the ADIAS website): www.adias-uae.com/radiocarbon.html
- Al Tikriti, W.Y. 2001. Reconsideration of the Late Fourth and Third Millennium in the Arabian Gulf with Special Reference to the UAE. Unpublished PhD thesis, University of Cambridge, UK.
- Al Tikriti, W.Y. 2002a. The Southeast Arabian Origin of the Falaj System. *Proceedings of the Seminar for Arabian Studies* 32: 117-138.
- Al Tikriti, W.Y. 2002b. Al-aflaj fi dawlat al-imarat al-'arabiyat al-mutahida. Dirasat athariya fi anzamat al-rayy al-qadima - Aflaj in the United Arab Emirates: Archaeological Studies on Ancient Irrigation Systems (in Arabic). Ministry of Information and Culture, Abu Dhabi. 161 pages.
- Al Tikriti, W.Y. 2005a. *Al Ain National Museum* (leaflet). Department of Antiquities and Tourism, Al Ain, UAE 12pp. (Arabic and English).
- Al Tikriti, W.Y. 2005b. *Hafit Tombs* (leaflet). Department of Antiquities and Tourism, Al Ain, UAE 12pp. (Arabic and English).
- Al Tikriti, W.Y. 2005c. *Hili Archaeological Park* (leaflet). Department of Antiquities and Tourism, Al Ain, UAE 12pp. (Arabic and English).
- Al Tikriti, W.Y. 2005d. *Bida Bint Saud* (leaflet). Department of Antiquities and Tourism, Al Ain, UAE 12pp. (Arabic and English).
- Al Tikriti, W.Y. 2005e. *Umm An Nar* (leaflet). Department of Antiquities and Tourism, Al Ain, UAE 12pp. (Arabic and English).
- Aspinall, S.J. and P. Hellyer (Eds.). 2004. *Jebel Hafit: A Natural History*. Emirates Natural History Group (ENHG). Sponsored by the Abu Dhabi Company for Onshore Oil Operations (ADCO).
- Beech, M. 2003. Archaeobotanical Evidence for Early Date Consumption in the Arabian Gulf. Pages 11-31. In: ECSSR (ed), *The Date Palm - From Traditional Resource to Green Wealth*. Emirates Center for Strategic Studies and Research, Abu Dhabi.
- Beech, M.J. 2004. In the Land of the Ichthyophagi: Modelling fish exploitation in the Arabian Gulf and Gulf of Oman from the 5th millennium BC to the Late Islamic period. Abu Dhabi Islands Archaeological Survey Monograph 1 - British Archaeological Reports International Series S1217. ArchaeoPress, Oxford. ISBN 1841715778. xxi + 293 pages; 126 figures, maps, plans, drawings, photographs; 232 tables; 8 Appendices of data, remains and sites.
- Beech, M., K. Cooper and H. Kallweit. 2003. *Archaeology at the Al Ghazal Golf Club*. ADIAS, Abu Dhabi. Leaflet, 6pp.
- Beech M., R. Cuttler, D. Moscrop, H. Kallweit & J. Martin. 2005. New evidence for the Neolithic settlement of Marawah Island, Abu Dhabi, UAE. *Proceedings of the Seminar for Arabian Studies* 35: 37-56.
- Beech, M. and J. Elders. 1999. An Ubaid-related settlement on Dalma Island, UAE. *Bulletin of the Society for Arabian Studies* 4: 17-21.
- Beech, M. J. Elders and E. Shepherd. 2000. Reconsidering the 'Ubaid of the Southern Gulf: new results from excavations on Dalma Island, UAE *Proceedings of the Seminar for Arabian Studies* 30: 41-47.
- Beech, M. and P. Hellyer. 2004. *ADIAS Site Summary Database (SSD). Draft version 3, dated 14 June 2004*. Abu Dhabi Islands Archaeological Survey (ADIAS), unpublished report.

Beech, M. and P. Hellyer (eds.). 2005. *Abu Dhabi 8 Million Years Ago - Late Miocene Fossils from the Western Region*. Abu Dhabi Islands Archaeological Survey.

(ADIAS): Dar Al Fajr Printing Press, Abu Dhabi, UAE. 68 pages; 73 figures, maps, plans, drawings, photographs. ISBN 9948-03-188-1.

Beech M. and Hellyer P. in press. The coastal palaeontology and archaeology of Abu Dhabi Emirate - the value of an ICZM approach towards management of the heritage of the UAE. In: T.Z. Al Abdessalaam (ed.), *Integrated Coastal Zone Management in the UAE*. Environment Agency, Abu Dhabi.

Beech, M. and W. Higgs. 2005. A New Late Miocene Fossil Site in Ruwais, Western Region of Abu Dhabi, UAE. In: P. Hellyer and M. Ziolkowski (eds.), *Emirates Heritage Vol. 1 - Proceedings of the 1st Annual Symposium on Recent Palaeontological and Archaeological Discoveries in the Emirates, Al Ain*. Zayed Centre for Heritage and History, Al Ain. pp.6-21. ISBN 9948-06-130-6.

Beech, M. and Hogarth, P. 2002. An archaeological perspective on the development and exploitation of mangroves in the UAE. In: Salim Javid and Amrita G. de Soyza (eds.), *Research and Management Options for Mangrove and Salt Marsh Ecosystems - Proceedings of the 2nd International Symposium and Workshop on Arid Zone Environments (22-24 December 2001, Abu Dhabi, UAE)* Environmental Research and Wildlife Development Agency (ERWDA), Abu Dhabi, UAE. pp.196-198.

Beech, M., H. Kallweit, R. Cuttler and W.Y. Al-Tikriti. 2006. Neolithic sites in Umm az-Zamul, SE desert of Abu Dhabi, UAE. *Bulletin of the Society for Arabian Studies* 11: 17-26.

Beech, M., H. Kallweit and P. Hellyer. 2004. New archaeological investigations at Abu Dhabi Airport, UAE. *Proceedings of the Seminar for Arabian Studies* 34: 1-15.

Beech, M., H. Kallweit, A. Zander and W.Y. Al-Tikriti. In prep. New insights into the desert neolithic of southeast Arabia: recent work at Kharimat Khor Al Manahil and Khor Al Manahil, Abu Dhabi, UAE. Paper to be presented at the Prof. Hans-Peter Uerpmann 65th birthday Festschrift symposium, Tuebingen, Germany. 31 October-1 November 2006.

Beech, M. and E. Shepherd. 2001. Archaeobotanical evidence for early date consumption on Dalma Island, UAE. *Antiquity* 75: 83-9.

Bibi, Faysal, Shabel, Alan B., Kraatz, Brian P. and Stidham, Thomas A. 2006. New Fossil Ratite (Aves: Palaeognathae) Eggshell Discoveries from the Late Miocene Baynunah Formation of the UAE, Arabian Peninsula. *Palaeontologia Electronica* Vol. 9, Issue 1; 2A:13p, 554KB; http://palaeo-electronica.org/paleo/2006_1/eggshell/issue1_06.htm

A. Brown, D. Brown, G. Coles, D. Dawson, A. Dodd, J. Gardiner, G. Lock, C. Longworth, N. Merriman, P. Miller, D. Murray, J. Reeve and A. Wise. 1999. *Digital Archives from Excavation and Fieldwork: Guide to Good Practice. Version 1*, Archaeology Data Service. Online: <http://ads.ahds.ac.uk/project/goodguides/excavation/>

R. Carter, 2003. Tracing Bronze Age trade in the Arabian Gulf: Evidence for Way-stations of the Merchants of Dilmun between Bahrain and the Northern Emirates. In: D.T. Potts, H. Naboodah and P. Hellyer (eds.), *Archaeology of the UAE: Proceedings of the First International Conference on the Archaeology of the UAE*. Trident Press Ltd., London. pp.123-131.

De Cardi, B. 1997. Third Millennium and Later Pottery from Abu Dhabi Airport. *Arabian Archaeology and Epigraphy* 8: 161-173.

Cleuziou, S. 1989. Excavations at Hili 8: a preliminary report on the 4th to 7th campaigns. *Archaeology in the UAE* 5: 61-86.

Crombé, P. 2000. A neolithic site at Bida al Mitawaa in Western Abu Dhabi (UAE). *Arabian Archaeology and Epigraphy* 11: 9-14.

Cuttler, R., M. Beech, H. Kallweit, A. Zander and W.Y. Al-Tikriti. 2007. Pastoral nomadic communities of the Holocene climatic optimum: excavation and research at Kharimat Khor al Manahil and Khor Al Manahil in the Rub al-Khali, Abu Dhabi. *Proceedings of the Seminar for Arabian Studies* 37: 61-78.

Elders, J. 2001. The lost churches of the Arabian Gulf: recent discoveries on the islands of Sir Bani Yas and Marawah, Abu Dhabi Emirate, UAE. *Proceedings of the Seminar for Arabian Studies* 31: 47-58.

Elders, J. 2003. The Nestorians in the Gulf: Just Passing Through? In: D.T. Potts, H. Naboodah and P. Hellyer (eds.), *Proceedings of the First International Conference on the Archaeology of the UAE (Abu Dhabi, 15-18 April 2001)*. Trident Press, London. pp. 229-236.

Evans, G., A. Kirkham and R.A. Carter. 2002. Quaternary Development of the UAE Coast: New Evidence from Marawah Island, Abu Dhabi. *GeoArabia* 7(3): 441-458.

- Flavin, K. and Shepherd, E. 1994. Fishing in the Gulf: Preliminary investigations at an Ubaid site, Dalma (UAE). *Proceedings of the Seminar for Arabian Studies* 24: 115-134.
- Frifelt, K. 1975. A Possible Link between the Jemdet Nasr and the Umm an-Nar Graves in Oman, *Journal of Oman Studies* 1: 57-80.
- Frifelt, K. 1991. *The Island of Umm-An-Nar. 1, Third Millennium Graves* (with contributions by Manfred Kunter, Ella Hoch and David S. Reese). Jutland Archaeological Society Publications. Aarhus University Press. ISBN: 8772885610.
- Frifelt, K. 1995. *The Island of Umm An-Nar. 2, The Third Millennium Settlement* (with contributions by Andreas Hauptmann, Ella Hoch and George Willcox). Jutland Archaeological Society Publications, 26:2. Aarhus University Press, Moesgaard, Aarhus. ISBN: 8772885777.
- Gillings, M. and A. Wise (eds.). 2000. *GIS Good Guide to Practice*. Archaeology Data Service. ISSN 1463-5194.
- Glennie, K. 2002. *The Desert of Southeast Arabia*. GeoArabia.
- Hellyer, P. 1993. Neolithic flints from Merawah. *Tribulus (Journal of the Emirates Natural History Group)* 3.1: 20.
- Hellyer, P. 1998a. *Filling in the Blanks - Recent Archaeological Discoveries in Abu Dhabi*. Motivate: Dubai, for the Abu Dhabi National Oil Company, ADNOC.
- Hellyer, P. 1998b. The relevance of Archaeology to Coastal Zone Management. *Tribulus (Journal of the Emirates Natural History Group)* 8.1: 26-28. This article can be downloaded from the ADIAS website at: www.adias-uae.com/publications/hellyer98b.pdf
- Hellyer, P. (ed.). 1998c. *Waves of Time: The Maritime History of the UAE*. Trident Press: London.
- Hellyer, P. 1999. *Hidden Riches - An Archaeological Introduction to the UAE*. Union National Bank: Abu Dhabi.
- Hellyer, P. 2001. Nestorian Christianity in Pre-Islamic UAE and Southeastern Arabia. *Journal of Social Affairs* 18 (No.72): 79-99.
- Hellyer, P. 2002. The Archaeology of the Sabkhas of Abu Dhabi. In: H-J. Barth and B. B?er (eds.), *Sabkha Ecosystems - Volume I: The Arabian Peninsula and Adjacent Countries*. Tasks for Vegetation Sciences Vol 36. Kluwer Academic Publishers, Dordrecht. pp.325-333.
- Hellyer, P. and Beech, M. 2001a. Protected Areas and Cultural Heritage: An Abu Dhabi Case Study. In: Research and Management Options for Protected Areas. Proceedings of the First International Symposium and Workshop on Arid Zone Environments (January 2000). Environmental Research and Wildlife Development Agency, Abu Dhabi. pp.195-213. An online version of this article can be accessed via the ADIAS website at: www.adias-uae.com/protect.html
- Hellyer, P. and Beech, M. 2001b. C14 dating of Iron Age hearths on the island of Rufayq, Abu Dhabi. *Tribulus (Journal of the Emirates Natural History Group)* 11.1: 21-23.
- Hellyer, P. and D.J. Hull. 2002. The Archaeology of Abu Al Abyad. In: R.J. Perry (ed.), *The Island of Abu Al Abyad*. ERWDA, Abu Dhabi. pp.17-38.
- Hellyer, P. and G.R.D. King. 1999. A site from the early first millennium AD at Ra's Bilyaryar, Abu Dhabi, UAE *Arabian Archaeology and Epigraphy* 10: 119-123.
- Higgs, W. 2005. The Fossil Trackway at Mleisa. In: M. Beech and P. Hellyer (eds.), *Abu Dhabi 8 Million Years Ago - Late Miocene Fossils from the Western Region*. Abu Dhabi Islands Archaeological Survey (ADIAS): Dar Al Fajr Printing Press, Abu Dhabi, UAE. pp.37-41.
- Higgs, W., A. Gardner and M. Beech. 2005. A Fossil Proboscidean Trackway at Mleisa, Western Region of Abu Dhabi, UAE. In: P. Hellyer and M. Ziolkowski (eds.), *Emirates Heritage Vol. 1 - Proceedings of the 1st Annual Symposium on Recent Palaeontological and Archaeological Discoveries in the Emirates, Al Ain*. Zayed Centre for Heritage and History, Al Ain. pp.21-27. ISBN 994806-130-6.
- Higgs, W., A. Kirkham, G. Evans and D. Hull. 2003. A Late Miocene Proboscidean Trackway from Mleisa, UAE. *Tribulus (Journal of the Emirates Natural History Group)* 13.2: 3-8.
- Jorgensen, D.G. and W.Y. Al-Tikriti. 2006. *Water, Man and Climate Changes since the Bronze Age in Al Ain, UAE*. National Drilling Company (NDC), Abu Dhabi.
- Kallweit, H. 1999. Second Preliminary Report of the German Archaeological Mission in Abu Dhabi, December 1998 - March 1999. Universität Freiburg, Germany. Abu Dhabi, UAE.
- Kallweit, H. 2003. Remarks on the Late Stone Age in the UAE In: D.T. Potts, H. Naboodah and P. Hellyer (eds.), *Archaeology of the UAE: Proceedings of the First International Conference on the Archaeology of the UAE*. Trident Press Ltd., London. pp.55-64.

- Kallweit, H. 2004. Lithics from the Emirates: the Abu Dhabi Airport sites. *Proceedings of the Seminar for Arabian Studies* 34: 139-145.
- Kallweit H., M. Beech and W.Y. Al-Tikriti. 2005. Kharimat Khor al-Manahil and Khor Al Manahil - New Neolithic sites in the southeastern desert of the UAE. *Proceedings of the Seminar for Arabian Studies* 35: 97-113.
- Kallweit, H. and P. Hellyer. 2003. A flint 'dagger' from Rumaitha, Emirate of Abu Dhabi, UAE. *Arabian Archaeology and Epigraphy* 14 (1): 1-7.
- King, G.R.D. 1997. A Nestorian monastic settlement on the island of Sir Bani Yas, Abu Dhabi: a preliminary report. *Bulletin of the School of Oriental and African Studies* 60(2): 221-235.
- King, G.R.D. 1998. Abu Dhabi Islands Archaeological Survey: Season I - An Archaeological Survey of Sir Bani Yas, Dalma and Marawah: Season One. Trident Press: London.
- King, G.R.D. 2001. The coming of Islam and the Islamic period in the UAE. In: I. Al-Abed and P. Hellyer (eds.), *The UAE: A New Perspective*. Trident Press, UK. pp.70-97. An online version of this article can be accessed via the following website at: http://uaeinteract.com/uaeint_misc/pdf/perspectives/03.pdf
- King, G.R.D. (ed.) 2003. Sulphur, Camels and Gunpowder - The Sulphur Mines at Jebel Dhanna, Abu Dhabi, UAE - An archaeological site of the late Islamic period. With contributions by D.Hull, S. Rowland, P. Hellyer, S.J. Aspinall, M.J. Beech, R.A. Carter and G.R.D. King. Abu Dhabi Islands Archaeological Survey (ADIAS) and the Abu Dhabi Company for Onshore Oil Operations (ADCO), Abu Dhabi. ISBN 1-904566-43-X. LCCN 2003 113985.
- King, G.R.D. (with architectural drawings by D. Connolly). 2004a. Bayt al-Muraykhî: a later Islamic pearl merchant's house at Dalmâ, Abu Dhabi Emirate. *Tribulus (Journal of the Emirates Natural History Group)* 14.1: 3-8.
- King, G.R.D. (with ground-plans and elevational drawings by David Connolly). 2004b. The Traditional Mosques of Dalma, Abu Dhabi Emirate. *Tribulus (Journal of the Emirates Natural History Group)* 14.2: 23-31.
- King, G.R.D. forthcoming. *The Mosques of Abu Dhabi*. Abu Dhabi Islands Archaeological Survey (ADIAS).
- King, G.R.D., D. Dunlop, J. Elders, S. Garfi, A. Stephenson, and C. Tonghini. 1995. A report on the Abu Dhabi Islands Archaeological Survey (1993-1994). *Proceedings of the Seminar for Arabian Studies* 25: 63-74.
- King, G.R.D. and C. Tonghini. 1999. The Western Islands of Abu Dhabi Emirate - Notes on Ghagha. In: C.S. Phillips, D.T. Potts and S. Searight (eds.), *Arabia and its Neighbours - Essays on Prehistorical and Historical Developments presented in honor of Beatrice de Cardi*. Abiel II. Brepols. pp.117-142.
- Masry, A.H. 1997. Prehistory in Northeastern Arabia - The Problem of Interregional Interaction. Kegan Paul International, London and New York.
- McBrearty, S. 1997. Earliest Stone Tools from the Emirate of Abu Dhabi, UAE. Chapter 26 in P.J. Whybrow and A. Hill (eds.), *Fossil Vertebrates of Arabia*. Yale University Press: New Haven, CT. pp.373-388.
- McSweeney, K., S. Méry and R. Macchiarelli. 2008. Rewriting the end of the Early Bronze Age in the UAE through the anthropological and artefactual evaluation of two collective Umm an-Nar graves at Hili (eastern region of Abu Dhabi). *Arabian Archaeology and Epigraphy* 19 (1): 1-14.
- Potts, D.T. 1990. *The Arabian Gulf in Antiquity* (2 vols). Clarendon Press, Oxford.
- Potts, D.T. 1991. Before the Emirates: an Archaeological and Historical Account of Developments in the Region ca 5000 BC to 676 AD. Pages 28-69. In: I. Al-Abed and P. Hellyer (eds.), *The UAE: A New Perspective*. Trident Press, London. An online version of this article can be accessed via the following website at: http://uaeinteract.com/uaeint_misc/pdf/perspectives/02.pdf
- Potts, D.T. 2000. *Ancient Magan*. Trident Press, London.
- Potts, D.T., H. Naboodah and P. Hellyer (eds.). 2003. Archaeology of the UAE: Proceedings of the First International Conference on the Archaeology of the UAE. Trident Press Ltd., London.
- Richards, J. and D. Robinson (eds.). 2001. *Digital Archives from Excavation and Fieldwork: Guide to Good Practice*. Second Edition. Archaeology Data Service. ISSN 1463-5194.
- Uerpmann, M. 2003. The Dark Millennium - Remarks on the Final Stone Age in the Emirates and Oman. In: D.T. Potts, H. Naboodah and P. Hellyer (eds.), *Proceedings of the First International Conference on the Archaeology of the UAE (Abu Dhabi, 15-18 April 2001)*. Trident Press, London. pp.74-81.
- Uerpmann, M. and H-P. Uerpmann. 2003. *Stone Age Sites and their Natural Environment - The Capital Area of Northern Oman Part III*. Beihefte zum Tubinger Atlas

des Vorderen Orients - Reihe A (Naturwissenschaften) Nr. 31/3. Dr Ludwig Reichert: Wiesbaden, Germany.

Wahida G., W.Y. Al Tikriti and M. Beech 2008. Barakah: A Middle Palaeolithic Site in Abu Dhabi Emirate. *Proceedings of the Seminar for Arabian Studies* 38: 55-64.

Whybrow, P.J. 1989. New stratotype; the Baynunah Formation (Late Miocene). *Newsletters on Stratigraphy* 21(1): 1-9.

Whybrow, P.J. and A. Hill (Eds.). 1999. *Fossil Vertebrates of Arabia*. New Haven, CT, Yale University Press.

Ziolkowski, M. and P. Hellyer (eds.). 2005. *Emirates Heritage - Volume 1*. Zayed Centre for Heritage and History, Emirates Heritage Club. Al Ain.

Ziolkowski, M. and P. Hellyer (eds.). 2008. *Emirates Heritage - Volume 2*. Zayed Centre for Heritage and History, Emirates Heritage Club. Al Ain.

10 APPENDICES

10.1 APPENDIX 1 - GLOSSARY OF TERMS AND ABBREVIATIONS

Abbasid - period dating between 750 to 1100 AD.

Butchery site - collection of bones dispersed on the surface (often dugong, turtle, *etc.*). Some may show signs of cut marks.

Cairn - agglomeration of stones possibly concealing a burial chamber.

Camp Site - traces of an old camp/encampment. May have stones organised on ground surface where 'arish or tents previously stood. This category may comprise two or more of the following attributes: 'Hearth', 'Lithic Scatter' 'Midden', 'Pottery Scatter', 'Shell Scatter'.

Cistern - stone or plaster construction for collection of water.

Cleared Area - area where the surface stones and sediment have been deliberately cleared. This may in some cases be connected with 'Water catchment' system.

Cretaceous - period dating between 145.5 to 65.5 mya.

Early, Middle, and Late Islamic period dating between 750 AD to the 19th Century.

Eocene - period dating between 56 to 34 mya.

Falaj - underground water canal system.

Field Terrace - field built on a man-made terrace, usually found in the mountains.

Fish trap - stone-built fish trap located in intertidal zone.

Fossil - any remnant, impression or trace of an organism that has been preserved in ancient sediment.

Hafit - period dating between 3200 to 2600 BC.

Hearth - cooking/processing area denoted by the presence of one or more of the following attributes: square, rectangular or sub-rectangular, or circular stone alignments, ash, charcoal, burnt shell/bone, *etc.*

Hellenistic/Parthian - period dating between 300 BC to AD 230.

Holocene - period dating between 9600 BC to present.

Human Burial - human skeletal burial, sometimes located within a 'Cairn' or perhaps indicated by the presence of a gravestone.

Iron Age - period dating between 1250 to 300 BC.

Jemdat Nasr - period dating between the late fourth to early third millennium BC.

Jetty - stone-built jetty located in intertidal zone/shallow waters.

Julfar - period dating between AD 14th to 17th Centuries.

Late Bronze Age - period dating between 1600 to 1250 BC.

Late Islamic - period dating between 1600 to 1900 AD.

Late Pre-Islamic - period dating between 300 BC to 300 AD.

Late Stone Age/Ubaid - period dating between 5700 to 3800 BC.

Lithic Scatter - scatter of stone tools or waste stone flakes resulting from human modification.

Midden - usually consisting largely of interwoven layers of ashy sand containing shell and bone.

Mid Islamic - period dating between 1100 to 1600 AD.

Mine - mineshafts, *i.e.* holes cut as shafts to allow access for mineral exploitation.

Miocene - period dating between 23 to 5.3 mya.

Modern - period dating between AD 1900 to the pre-oil era.

Mosque - mosques are usually identified by the presence of a mihrab and/or walls in an appropriate alignment/orientation.

Mound - a man-made mound which may obscure a 'Burial' or 'Cairn', or may represent concealed 'Settlement' traces.

Natura - this category is assigned to sites which were previously believed to be palaeontological or archaeological sites but are now known, after further investigation, to be simply a natural phenomenon.

Oligocene - period dating between 56 to 34 mya.

Ophiolite - rocks of the oceanic crust (formed in deep sea conditions) that have been uplifted onto continental crust (exposed to the surface).

Ostrich eggshell scatter - scatter of Miocene or Holocene ostrich eggshell.

Palaeontology - study of ancient life by way of fossils (= paleontology).

Palaeocene - period dating between 65.5 to 56 mya.

Pleistocene - period dating between 1.8 mya to 9600 BC.

Pleistocene/Holocene - period dating between 1.8 million years to present.

Pliocene - period dating between 5.3 to 1.8 mya.

Pottery scatter - scatter of pottery sherds on the ground surface.

Pre-Islamic - period dating between 300 BC to 600 AD.

Recent Islamic - period dating between 19th to 20th Century.

Rock depression - shallow depressions cut into rock surfaces.

Sasanian - period dating between 300 to 632 AD.

Settlement - a larger site usually comprising two or more of the following attributes: 'Hearth', 'Midden', 'Mounds', 'Pottery Scatter', 'Structure', and 'Wall'.

Shell scatter - scatter of shells on the ground surface. If the scatter is of a considerable size and density then it may be referred to as a Midden.

Structure - traces of stone walls forming part of a building.

Umm an Nar or Umm al-Nar - period dating between 2600 to 2000 BC.

Umayyad - period dating between 600 to 750 AD.

Wadi Suq - period dating between 2000 to 1600 BC.

Wall - remains of a wall, usually stone (but can also be from mudbrick or simply traces of a ditch cut for an 'arish type of structure).

Water catchment - small walls of either stone or sediment forming part of a damming system designed to retain water.

Well - wells vary from simple holes in the ground to more complex shafts lined with stones.

10.2 APPENDIX 2 - RELEVANT WEBSITES AND METADATA

Palaeontology

"Miocene Vertebrates from the Emirate of Abu Dhabi, UAE: The Natural History Museum - Yale University Abu Dhabi Miocene Project" by Peter J. Whybrow and Andrew Hill, a project carried out in collaboration with the Abu Dhabi Company for Onshore Oil Operations (ADCO), the UAE Ministry for Higher Education and Scientific Research and the Natural History Museum, London, U.K. between 1999-2002 can be found online at:

www.adias-uae.com/fossils/index.html

The palaeontological work carried out by the Abu Dhabi Islands Archaeological Survey (ADIAS) between 1996-2006 can be found online at the following sites:

Ruwais - a new late Miocene fossil site
www.adias-uae.com/ruwais.html

Mleisa - fossil Proboscidean trackways dating to the late Miocene
www.adias-uae.com/mleisa.html

Details of the exhibition 'Abu Dhabi 8 million years ago - Fossils from the Western Region'
<http://www.adias-uae.com/fossils.html>

Information about geology and fossils in Abu Dhabi Emirate and the UAE can be found online on the UAE interact website at:

<http://uaeinteract.com/nature/geology/index.asp>

Archaeology

Abu Dhabi Authority for Culture and Heritage (ADACH)
www.adach.ae/

Abu Dhabi Islands Archaeological Survey (former website of ADIAS)
www.adias-uae.com

Al Ain National Museum (former website of the Department of Antiquities and Tourism)
www.aam.gov.ae/

Dalma Island Museum
www.dalmaisland.com/Aboutus.asp

Cultural Landscapes

Cultural Landscapes Division, Historic Environment
Department, Abu Dhabi Authority for Culture and
Heritage (ADACH)
www.adach.ae/en/portal/heritage/qases.lanscapes.aspx

Cultural Landscape – UNESCO
<http://whc.unesco.org/en/culturallandscape/>

Historic Buildings

Historic Buildings Division, Historic Environment
Department, Abu Dhabi Authority for Culture and
Heritage (ADACH)
www.adach.ae/en/portal/heritage/qasar.alhosnfort.aspx

International Council on Monuments and Sites
(ICOMOS)
www.international.icomos.org/

The International Centre for the Study of the
Preservation and Restoration of Cultural Property
(ICCROM)
www.iccrom.org/

Conservation

Conservation Department, Abu Dhabi Authority for
Culture and Heritage (ADACH)
www.adach.ae/en/portal/heritage/department.conversation.aspx

Intangible Heritage

Intangible Heritage Department, Abu Dhabi Authority for
Culture and Heritage (ADACH)
www.adach.ae/en/portal/heritage/intangible.heritage.aspx

Other ADACH Projects

There are also a number of organizations and initiatives
instigated by the Abu Dhabi Authority for Culture and
Heritage (ADACH). These include:

Abu Dhabi International Book Fair
www.adbookfair.com/cms/

Abu Dhabi Poetry Academy
www.adach.ae/featured-projects/poetry-academy/en/

Art Paris Abu Dhabi
www.ArtParis-abudhabi.com/

Bait al Oud
www.adach.ae/featured-projects/bait-al-oud/en/

The Circle
www.thecircle.ae/

Emirates Film Competition
www.efilmc.ae/

Emirates Photographic Competition
www.ephoto.net/index.aspx

Handicrafts Project
www.adach.ae/featured-projects/handicrafts-projects/en/

Kalima – a major new translation initiative by the Abu
Dhabi Authority for Culture & Heritage, which funds the
translation, publication and distribution of high quality
foreign writing into Arabic
www.kalima.ae/

Middle East International Film Festival
www.meiff.com/

New York Film Academy in Abu Dhabi
www.nyfa.com/film_school/study_abroad/abudhabi.php

Poet of the Million project
www.almillion.net/

Prince of Poets competition
www.princeofpoets.com/

Qalam – created by ADACH to nurture, encourage and
promote creativity and talent for all Emiratis through the
medium of writing.
www.adach.ae/featured-projects/qalam/en/

Sheikh Zayed Book Award
www.zayedaward.com/

Sounds of Arabia
<http://www.adach.ae/featured-projects/sounds-of-arabia/en/>

Turathna project
www.adach.ae/featured-projects/turathuna/en/

Other Organisations

Centre for Documentation and Research (CDR), Abu
Dhabi
www.cdr.gov.ae/

Zayed Center for Heritage and History (ZCHH), Al Ain
www.zayedcenter.org.ae/

Emirates Natural History Group (ENHG) - Abu Dhabi
chapter

<http://groups.yahoo.com/group/ADNHS/>

Emirates Natural History Group (ENHG) - Al Ain chapter
www.enhg.org

