



**HAL**  
open science

## Towards new paradigms: multiple pathways for the Arabian Neolithic

Rémy Crassard, Philipp Drechsler

► **To cite this version:**

Rémy Crassard, Philipp Drechsler. Towards new paradigms: multiple pathways for the Arabian Neolithic. *Arabian Archaeology and Epigraphy*, 2013, *The Neolithic of Arabia – New Paradigms and Future Perspectives*, 24 (1), pp.3 - 8. 10.1111/aae.12021 . hal-01828787

**HAL Id: hal-01828787**

**<https://hal.science/hal-01828787>**

Submitted on 4 Jul 2018

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

# Towards new paradigms: multiple pathways for the Arabian Neolithic

The origin and course of the Neolithic on the Arabian Peninsula is the subject of an ongoing academic debate. Faunal data suggest an origin for domestication of animals in the Levant and these can be found in Arabia from the sixth millennium onwards. In contrast, lithic evidence does not support the hypothesis that Neolithic herders, accompanying their herds, spread over the entire Peninsula, as they did not leave significant traces of their material culture. Although Pre-Pottery Neolithic A (PPNA)/PPNB influences can be traced across the northern part of Arabia, it is barely possible to observe them further south. By contrast, lithic technology in this region is characterised by major indigenous developments that might originate from a Pleistocene cultural heritage. By discussing the process of Neolithisation in Arabia from different points of view we can avoid the pitfalls of simplistic or monocausal models as well as preconceptions. Furthermore, we will be able to demonstrate that the Neolithic developed differently in different regions of the Arabian Peninsula.

**Keywords:** Neolithic, Arabia, Levant, research history, archaeozoology, lithic technology

**Rémy Crassard<sup>1</sup>, Philipp Drechsler<sup>2</sup>**

<sup>1</sup>Centre National de la Recherche Scientifique CNRS–UMR 5133, Maison de l’Orient et de la Méditerranée, 5/7 rue Raulin, 69365, Lyon, Cedex 07, France

<sup>2</sup>Universität Tübingen, Institut für Ur- und Frühgeschichte, Burgsteige 11, 72070, Tübingen, Germany

e-mails: remy.crassard@mom.fr,  
philipp.drechsler@uni-uebingen.de

## 1. Difficulties in the creation of a Neolithic archaeology for Arabia

Neolithic research on the Arabian Peninsula has suffered from three major difficulties: the vastness of the area, the short history of research and persistent preconceptions. All archaeologists working in this field today should be aware of the challenge and strive to overcome these difficulties in the future.

The landmass of the Arabian Peninsula covers an area of almost 3.3 million km<sup>2</sup>. As part of the Old World dry belt, many regions of the Peninsula are arid or hyper-arid and at present most are only sparsely populated. This extreme environment and the immensity of Arabia have made access difficult for archaeologists. Palaeolithic and Neolithic evidence along its northern and southern margins was discovered ninety years ago (Rhotert 1938; Caton-Thompson 1953; Field 1960). In 1925, Field collected several stone artefacts at the northern edge of the Arabian Peninsula and concluded that this area was more fertile during prehistoric times and hence readily accessible to humans. At about the same time, Caton-Thompson

carried out excavations and surveys in Wadi Hadramawt in Yemen, where knapped stone artefacts proved the presence of a Pleistocene population. The earliest information about the occurrence of lithics from central Arabia comes from Philby who collected stone tools during his journey in 1932 across the Rub’ al-Khali sand sea (Philby 1933).

With the discovery of oil in the Kingdom of Saudi Arabia in the late 1930s, the pace of scientific exploration on the Arabian Peninsula increased. As a consequence, newly established antiquities departments initiated archaeological expeditions to document the wealth of archaeological remains, but due to the restricted accessibility of potential fields of work, research remained fragmented. This encouraged the establishment of local research foci that were not necessarily comparable with each other. As a result, many aspects of the origin and development of the Neolithic in Arabia remained vague.

During the last decade, an intensification of the scientific debate has made it increasingly clear that the Neolithisation of Arabia has been a complex interplay between external influences and indigenous developments. This

perception was at first almost impossible because of preconceptions that dominated the discourse for many years. Some scholars rather saw the Arabian Peninsula as an elephants' graveyard for 'civilized' populations from the north (Garbini 1994), or even as a cul-de-sac denying any cultural development of southern Arabian populations (Coon 1943).

Nevertheless, present archaeological evidence is showing a completely different picture. It indicates numerous autonomous developments, which took place and influenced the course of the Neolithic (Cleuziou & Tosi 1998). As a corrective to the notion that the Arabian Peninsula played only a marginal role during human prehistory, Tosi argued that hunter-gatherer groups living in Arabia gradually shifted their economy from predation to production. After developing into more complex societies these groups ultimately established independent civilisations (Tosi 1986).

But this was only one part of the history. From the 1990s onwards it became evident that domesticated sheep, goats and cattle were an important part of the economy of human groups settling on the Arabian Peninsula during the sixth, fifth and fourth millennia BC (Uerpmann & Uerpmann 2000, 2008; Uerpmann, Uerpmann & Jasim 2000; Martin, McCorriston & Crassard 2009). The development of diverse palaeoenvironmental studies was also a crucial step in the definition of the Holocene moist phase in Arabia (*c.* 8000–4500 BC), influenced by the monsoon that provided a more hospitable environment than today for most of the arid regions of South Arabia (e.g. Cleuziou & Tosi 1998; Parker 2009; Lézine *et al.* 2010).

## **2. Neolithic, or not? A long-lasting definition problem in Arabia**

For a very long time, scholars working in Arabia tried to avoid the term Neolithic, using substitutes such as 'Late Stone Age' or 'Late Prehistoric' instead (Potts 1993; Uerpmann M. 1992; Cleuziou & Tosi 1998; Zarins 2001). Other researchers used the term but always set it in quotation marks (Edens 1982). This reluctance is understandable as the Neolithic was originally defined in Europe in 1865 by Lubbock as the ground-stone period. Subsequently, numerous additional attributes have been assigned to the Neolithic, ending up with the concept of a 'Neolithic package' that should include ground-stone tools, agriculture and herding, sedentarism and pottery. Applying this standard, it is questionable whether any groups living on the Arabian Peninsula during the early or

mid-Holocene could be defined as Neolithic. Evidence for sedentarism is poor, a broad spectrum of wild animals and plants were exploited and pottery only appears in very few contexts; but following the argument that the prevailing economy has a major impact on society, we are confident that increasing evidence for the presence of domesticated animals in archaeozoological assemblages dating from the sixth to the fourth millennium BC permits the labelling of these groups in Arabia as Neolithic.

## **3. A Levantine incursion? Faunal evidence from the Early Neolithic**

In both the eastern and western parts of the Peninsula, archaeozoological assemblages have been investigated, which included — besides wild animals — bones of domesticated sheep, goats and cattle. According to radiocarbon dates, this association of animals already existed during the sixth millennium BC (Martin, McCorriston & Crassard 2009). Later, regional differences existed within the Peninsula, indicating increasing local adaptations (Drechsler 2007; Crassard 2008, 2009).

Considering the natural distribution of the wild ancestors of these animals, wild sheep did not occur on the Arabian Peninsula during the early and mid-Holocene. Domesticated sheep therefore represent a foreign element, most plausibly deriving from stock initially domesticated in the Fertile Crescent to the north. The situation is less clear for domesticated goats and cattle, as the territory of their wild progenitors has reached parts of the Arabian Peninsula. Facilitated by ameliorating climatic conditions during the mid-Holocene (e.g. Parker 2009; Lézine *et al.* 2010), mixed herds of domesticated sheep, goats and cattle might have roamed the landmass of Arabia as early as the sixth millennium BC (Uerpmann, Potts & Uerpmann 2009). During this time, the natural environment in Arabia was well suited to the dispersal of Neolithic herders (Drechsler 2009). Recent palaeogenetic studies further suggest that there was only one founding population for all domesticated cattle deriving from *Bos taurus* stock, weakening the argument for local domestication (Bollongino *et al.* 2012).

## **4. A Levantine incursion? Lithic evidence from the Early Neolithic**

While archaeozoological data support the hypothesis of a Levantine origin for the Neolithic in Arabia, material culture is another means to explain the emergence and

development of Arabian Neolithic communities. The oldest Holocene sites in Arabia are associated, in some cases, with the Levantine PPNB (Inizan 1988; Charpentier & Crassard, this volume), dating to about 8700–7000 BC. This period is poorly known in Arabia, as very few secure dates have been obtained on stratified sites in Arabia from the ninth/eighth millennium BC (Crassard 2008). Regarding the lithic industries, only a few examples may indicate a link with the Fertile Crescent ‘core region’.

Good evidence for an early Neolithic intrusion is offered at Jebel Qatar 101 site (JQ-101) in the Jubbah basin, northern Saudi Arabia. Here, el-Khiam and Helwan points have been recovered which are typical and widespread in the Levant during the PPNA and early PPNB periods (9500–8700 BC/8700–8200 BC). As their type is so specific, it is most likely that the Saudi Arabian examples have a northern origin (Crassard *et al.*, forthcoming). Whether Neolithic populations came to the Nefud desert directly from the Levant or local human groups adapted the PPNA/PPNB technology is still an open question. The first technical observations suggest that the JQ-101 points are more a local adaptation with the intention of imitating the shape of the classical points, while the knowledge involved in the blank production itself seems to be missing. This influence was, nevertheless, short-term and must have been limited to the northern parts of the Arabian Peninsula.

Another example of presupposed Neolithic incursions from the Fertile Crescent has been described from the site of Acila, Qatar. At that site, projectile points made from blades resembling Levantine Amuq points have been found. Furthermore, the ‘naviform’ method of debitage production was used to provide small blades as blanks (Inizan 1980, 1988). This material, which conforms most closely to the hypothesis of a Levantine Neolithic dispersal, has been wrongly compared to Qatar-B industries and Fasad points (Charpentier & Crassard, this volume). Noticeable differences in technology and types of arrowheads point to a more complex picture of the origins of the Neolithic migration, coming potentially from the north.

Throughout the course of the Neolithic period, typically Arabian local innovations and developments of local lithic traditions can now be highlighted. One of the best-documented traditions in southern Arabia refers to the use of ‘trihedral points’, shaped bifacially or sometimes trifacially, with a triangular section. They are well represented throughout the southern fringe of Arabia and developed from the seventh to the fifth millennium BC (Charpentier 2004; Crassard 2008). Likewise, the fluting method is

another South Arabian specificity that dates to the same period (Charpentier & Inizan 2002). The corresponding reduction sequences, partly known from the material found at Manayzah (Crassard *et al.* 2006), further show the intentionality of fluting a long time after the fluted points from the Americas. Most plausibly, these local developments were the result of a refugium effect (Crassard 2009). Adopting the Pleistocene refugia hypothesis (Petraglia & Rose 2009) for the Holocene, the contraction and expansion of populations are explained by different factors including technology, climate, topography, resource access, acceptance of innovations and dispersals.

## 5. The problem in defining the Middle and Late Neolithic

During the fifth millennium BC, we can suppose that Neolithic traditions were present in many parts of the Arabian Peninsula. Although this period is rather well known in south-east Arabia, in Yemen it is only poorly understood while in Saudi Arabia, except for the Gulf coast, there are almost no data available.

After the finding of many artefacts from surface sites in various parts of Arabia, mainly in the Rub’ al-Khali, the term ‘Arabian Bifacial Tradition’ (ABT) was proposed to describe a whole range of projectile points and various bifacial pieces (Edens 1982). On the basis of pioneering palaeoclimatic investigations (McClure 1976), until today this lithic facies has been generally associated with the fifth millennium BC. It now needs to be made very clear that we have only poor radiometric dating for most of these industries and even then it is highly debatable to presuppose a universal fifth-millennium BC dating. Moreover, the term ABT is typologically insecure as it encompasses many types and materials, making it controversial (Inizan *et al.* 1998; Charpentier 2004).

During the fifth millennium BC, the occurrence of ‘Ubaid pottery in coastal Neolithic sites between Kuwait and Ras al-Khaimah in the UAE clearly demonstrates substantial maritime interaction with the north (Vogt 1994). The spatial distribution of sites and quantities of pottery suggest diverse mechanisms for the distribution of goods in the Upper, Central and Lower Gulf. What characterises all ‘Ubaid sites in Arabia is the predominance of a subsistence pattern and lithic production that relates to the Arabian Neolithic, while the ‘Ubaid pottery remains an intrusive element. The function of the ‘Ubaid pottery within a basically aceramic Neolithic society is a field of recent debate (Carter & Crawford 2010; Drechsler 2011).

At the end of the fifth millennium BC, the monsoon influence decreased, at first in the northern lowlands, then in the highlands of the whole Peninsula. It is most probable that fewer people were present in the central part of Arabia, and many people retreated to the coasts or to more suitable areas such as highlands and water-fed localities. The fourth millennium BC shows a development towards strong local traditions, with a more intensive exploitation of different environments (Cleuziou & Tosi 1998). Once again, this period is best known along the Omani and UAE coasts, as elsewhere archaeological data are still scarce. The transition to the Bronze Age is then marked by the adoption of monumental burials and specific funerary and cultic traditions (Cleuziou 2004). In Yemen, the Bronze Age seems to appear in the mid-fourth millennium BC, and in the late fourth and beginning of the third millennium BC in the Oman peninsula. In northern parts of the Arabian Peninsula, the situation is mostly unknown, apart from the Central Gulf where the Bronze Age probably appeared at a yet undefined time within the fourth millennium BC.

## 6. Future perspectives

When addressing some of the main problematic fields of research, it becomes clear that there exist major geographical gaps in Arabian Neolithic research, which severely restrict the proper interpretation of detailed aspects of Neolithic origins and developments. These difficulties can only be overcome with an intensification of archaeological fieldwork. We should not, however, discount the importance of traditions from the Pleistocene in modelling human behaviours and environmental adaptation. Recent studies on the Middle Palaeolithic of Arabia show interesting similarities with the early to mid-Holocene in terms of potential contraction and diffusion of populations, as a refugium effect could have had a major impact during both periods (e.g. Rose 2010; Petraglia 2011). Recent and future studies in genetics will also provide new evidence for the origins of Neolithic populations (Al-Abri *et al.* 2012; Fernandes *et al.* 2012).

## References

- Al-Abri, A., Podgorná, E., Rose, J.I. & Pereira, L. *et al.* 2012. Pleistocene-Holocene boundary in southern Arabia from the perspective of human mtDNA variation. *American Journal of Physical Anthropology* doi: 10.1002/ajpa.22131 (e-publication ahead of print.)
- Bollongino, R., Burger, J., Powell, A. & Mashkour, M. *et al.* 2012. Modern Taurine Cattle Descended from Small Number of Near-Eastern founders. *Oxford Journal of Molecular Biology and Evolution* doi: 10.1093/molbev/mss092

Faunal studies necessitate the excavation of stratified sites with well-preserved bones. As such sites are a rare exception in Arabia, research on the origin of domesticated animals still needs more data and further analyses. The origin of plant domestication and the origin of the oasis economy are also aspects that should be studied more intensively.

As for lithic terminology, we need to refrain from using terminologies that are too broad such as the ‘Arabian Bifacial Tradition’ or very typologically oriented terms. As south Arabia’s lithic traditions are now much better known thanks to the last ten or twenty years of advances in this field, we should rather use concepts of ‘cultures’ such as the ‘Trihedral Points Tradition’, as well as other well-defined entities based on lithic traditions.

In terms of settlement patterns, the relation between inland and coastal sites at different periods is a research question that needs to be further explored. Can we really see differences between populations from coastal and inland sites? The question of seasonal occupation at coastal versus inland sites is then central to the wider frame of the Arabian Neolithic.

Finally, an intensification of systematic archaeological research on the Neolithic of Arabia offers the unique opportunity to reconsider present hypotheses about the emergence of the Neolithic, human dispersals, social interaction and environmental adaptations that have been developed in other parts of the world. Located in close spatial proximity to other regions that showed rapid cultural and economic developments during the early and mid-Holocene, it has a valuable cultural heritage that still awaits investigation.

## Acknowledgements

We wish to thank all the participants in the 2012 ESF Exploratory Workshop in Lyon who made great efforts to share new and older data on very different fields of research. Regarding the large topic of this paper, we would like to thank in particular Vincent Charpentier, Marie-Louise Inizan, Hans-Peter and Margaret Uerpmann, Frédéric Abbès, Steve Rosen for fruitful discussions, and especially Joy McCorriston who had the original idea for a Neolithic Workshop.



## MULTIPLE PATHWAYS FOR THE ARABIAN NEOLITHIC

- Carter, R. & Crawford, H. 2010. *Maritime Interactions in the Arabian Neolithic*. Leiden: Brill.
- Caton-Thompson, G. 1953. Some Paleoliths from South Arabia. *Proceedings of the Prehistoric Society* 19: 189–218.
- Charpentier, V. 2004. Trihedral points: a new facet to the ‘Arabian Bifacial Tradition’. *PSAS* 34: 53–66.
- Charpentier, V. 2008. Hunter-gatherers of the ‘empty quarter of the early Holocene’ to the last Neolithic societies: chronology of the late prehistory of south-eastern Arabia (8000–3100 BC). *PSAS* 38: 59–82.
- Charpentier, V. & Inizan, M.-L. 2002. Fluting in the Old World: the Neolithic projectile points of Arabia. *Lithic Technology* 27/1: 39–46.
- Cleuziou, S. 2004. Pourquoi si tard? Nous avons pris un autre chemin. L’Arabie des chasseurs-cueilleurs de l’Holocène au début de l’Âge du Bronze. Pages 123–148 in Guilaïne, J. (ed.), *Aux marges des grands foyers du Néolithique, périphéries débitrices ou créatrices?* (Paris, Éditions Errance).
- Cleuziou, S. & Tosi, M. 1998. Hommes, climats et environnements dans la péninsule arabique à l’Holocène. *Paléorient* 23/2: 121–135.
- Coon, C.S. 1943. Southern Arabia: a Problem for the Future. *Papers of the Peabody Museum of American Archaeology and Ethnology* 20: 187–220.
- Crassard, R. 2008. *La Préhistoire du Yémen. Diffusions et diversités locales, à travers l’étude d’industries lithiques du Hadramawt*. (British Archaeological Reports S1842). Oxford: Archaeopress.
- Crassard, R. 2009. Modalities and characteristics of human occupations in Yemen during the Early/Mid-Holocene. *Comptes Rendus de l’Académie des Sciences — Geoscience* 341: 713–725.
- Crassard, R., McCorriston, J., Oches, E., bin ‘Aqil, A. *et al.* 2006. Manayzah, early to mid-Holocene occupations in Wadi Sana (Hadramawt, Yemen). *PSAS* 36: 151–173.
- Crassard, R., Petraglia, M.D., Parker, A.G. & Parton, A. *et al.* forthcoming. Beyond the Levant: first evidence of a Pre-Pottery Neolithic incursion into the Nefud Desert, Saudi Arabia. *PLoS ONE*.
- Drechsler, P. 2007. Spreading the Neolithic over the Arabian Peninsula. *PSAS* 37: 93–109.
- Drechsler, P. 2009. *The Dispersal of the Neolithic over the Arabian Peninsula*. (British Archaeological Reports S1969). Oxford: Archaeopress.
- Drechsler, P. 2011. Places of contact, spheres of interaction. The ‘Ubaid phenomenon in the Central Gulf area as seen from a first season of re-investigations at Dosariyah, Eastern Province, Saudi Arabia. *PSAS* 41: 69–82.
- Edens, C. 1982. Towards a definition of the western Rub’ al-Khali ‘Neolithic’. *Atlat* 6: 109–124.
- Fernandes, V., Alshamali, F., Alves, M., Costa, M.D. *et al.* 2012. The Arabian Cradle: Mitochondrial Relicts of the First Steps along the Southern Route out of Africa. *The American Journal of Human Genetics* 90: 1–9.
- Field, H. 1960. *North Arabian Desert Archaeological Survey, 1925–50*. (Papers of the Peabody Museum of Archaeology and Ethnology, Harvard University, vol. 45, no. 2). Cambridge, MA: The Peabody Museum.
- Garbini, G. 1994. Preistoria e Protostoria. Pages 11–18 in Noja, S. (ed.), *I primi arabi* (Milan, Jaca Book).
- Inizan, M.-L. 1980. Sur les industries à lames de Qatar. *Paléorient* 6: 233–236.
- Inizan, M.-L. 1988. *Préhistoire à Qatar*. vol. 2. Paris: Éditions Recherche sur les Civilisations.
- Inizan, M.-L., Lézine, A.-M., Marcolongo, B. & Saliège, J.-F. *et al.* 1998. Paléolacs et peuplements holocènes du Yémen: le Ramlat as-Sabat’ayn. *Paléorient* 23/2: 137–149.
- Lézine, A.-M., Robert, C., Cleuziou, S., Inizan, M.-L. *et al.* 2010. Climate change and human occupation in the Southern Arabian lowlands during the last deglaciation and the Holocene. *Global and Planetary Change* 72: 412–428.
- McClure, H.A. 1976. Radiocarbon chronology of late Quaternary lakes in the Arabian desert. *Nature* 263: 755–756.
- Martin, L., McCorriston, J. & Crassard, R. 2009. Early Arabian pastoralism at Manayzah in Wadi Sana, Hadramawt. *PSAS* 39: 271–282.
- Parker, A.G. 2009. Developing a framework for hominin dispersal over the last 350 ka. Pages 39–49 in Petraglia, M.D. & Rose, J.I. (eds.), *The Evolution of Human Populations in Arabia: Paleoenvironments, Prehistory and Genetics* (Dordrecht, Springer Press).
- Petraglia, M.D. 2011. Trailblazers across Arabia. *Nature* 470: 50–51.
- Petraglia, M.D. & Rose, J.I. 2009. *The Evolution of Human Populations in Arabia: Paleoenvironments, Prehistory and Genetics*. Dordrecht: Springer Press.
- Philby, H.St.J.B. 1933. *The Empty Quarter. Being a description of the Great South Desert of Arabia known as Rub’ al Khali*. London: Constable and Company Ltd.
- Potts, D.T. 1993. The Late Prehistoric, Protohistoric and Early Historic Periods in Eastern Arabia (ca. 5000–1200 B.C.). *Journal of World Prehistory* 7/2: 163–212.
- Rhotert, H. 1938. Transjordanien. *Vorgeschichtliche Forschungen*. Pages 1–251 in Jensen, A.E. & Rhotert, H. (eds.), *Verlauf und Ergebnisse der XII. Deutschen Inner-Afrikanischen Forschungs-Expedition (DIAFE) 1934/35*, vol. 2. (Stuttgart, Strecker und Schröder).
- Rose, J.I. 2010. New light on human prehistory in the Arabo-Persian Gulf Oasis. *Current Anthropology* 51: 849–883.
- Tosi, M. 1986. The emerging picture of prehistoric Arabia. *Annual Review of Anthropology* 15: 461–490.
- Uerpmann, M. 1992. Structuring the Late Stone Age of Southeastern Arabia. *AAE* 3: 65–109.
- Uerpmann, M. & Uerpmann, H.-P. 2000. Faunal Remains of Al-Buhais 18. An aceramic neolithic site in the Emirate of Sharjah (SE-Arabia) — Excavations 1995–1998. Pages 40–49 in Mashkour, M., Choyke, A.M., Buitenhuis, H. & Poplin, F. (eds.), *Archaeozoology of the Near East IVB. Proceedings of the fourth international symposium on the archaeozoology of southwestern Asia and adjacent areas* (Groningen, ARC Publications).
- Uerpmann, M. & Uerpmann, H.-P. 2008. Neolithic Faunal Remains from al-Buhais 18 (Sharjah, UAE). Pages 97–132 in Uerpmann H.-P., Uerpmann M. & Jasim S.A. (eds.), *The Natural Environment of Jebel al-Buhais: Past and Present, The Archaeology of Jebel al-Buhais, Sharjah, United Arab Emirates*, vol. 2. (Tübingen, Kerns Verlag).
- Uerpmann, H.-P., Potts, D. & Uerpmann, M. 2009. Holocene (re-)occupation of eastern Arabia. Pages 205–214 in Petraglia M.D.

R. CRASSARD AND P. DRECHSLER

- & Rose J. I. (eds.), *Evolution of Human Populations in Arabia: Paleoenvironments, Prehistory and Genetics* (Dordrecht, Springer).
- Uerpmann, M., Uerpmann, H.-P. & Jasim, S.A. 2000. Stone Age nomadism in SE Arabia — palaeo-economic considerations on the Neolithic site of Al-Buhais 18 in the Emirate of Sharjah, UAE. *PSAS* 30: 229–234.
- Vogt, B. 1994. In Search for Coastal Sites in Prehistoric Makkan: mid-Holocene ‘shell eaters’ in the coastal desert of Ras al-Khaimah, U.A.E. Pages 113–128 in Kenoyer, J. M. (ed.), *From Sumer to Meluhha: Contributions to the Archaeology of South and West Asia in Memory of George F. Dales, Jr.* (Wisconsin Archaeological Reports 3) (Madison, WI, Department of Anthropology, University of Wisconsin).
- Zarins, J. 2001. *The Land of Incense: Archaeological work in the Governorate of Dhofar, Sultanate of Oman, 1990–1995*. Muscat: Sultan Qaboos University Publications.