The Archaeological Heritage of Oman

THE EARLY IRON AGE METAL HOARD FROM THE AL KHAWD AREA (SULTAN QABOOS UNIVERSITY) SULTANATE OF OMAN

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Transcription of the Arabic alphabet

Letter Name	Transcription	Arabic Letter
hamzah	ʾ	ء
alif	-	ا
baʾ	b	ب
tāʾ	t	ت
ṯāʾ	ṯ	ث
ǧīm	ǧ	ج
ḥā	ḥ	ح
ḫā	ḫ	خ
dāl	d	د
ḏāl	ḏ	ذ
rāʾ	r	ر
zāy	z	ز
sīn	s	س
šīn	š	ش
ṣād	ṣ	ص
ḍād	ḍ	ض
ṭāʾ	ṭ	ط
ẓāʾ	ẓ	ظ
ʿayn	ʿ	ع
ġayn	ġ	غ
fāʾ	f	ف
qāf	q	ق
kāf	k	ك
lām	l	ل
mīm	m	م
nūn	n	ن
hāʾ	h	ه
wāw	w	و
yāʾ	y	ي

Site mapping is an important tool in the following study. The transcription system for Arabic used here is the same as for the Seminar for Arabian Studies and *Deutsche Morgenländische Gesellschaft* (DIN 31635). In the 1970s and 1980s archaeologists mapped and compiled site coordinates based on first generation K668 1:100.000 British topographic maps of Oman published in 1959, with only few place-names (especially Hauptmann 1985, 116–7). Several named below are difficult to localise in the field because they are known from faultily published transcription attempts and publications which may give coordinates incorrectly and or resolve them only to the minute. In our region, one degree latitude (parallel) equals 111 km and one minute latitude equals 1.85 km. If one is searching for a site, the position with a ± of two minutes leeway in both x and y axes may well cause the field or Google Earth search to be unsuccessful or time-consuming. Today main sources for the localisation and place-names of larger places in Oman cited below include NSA K6611 series map sheets in 1:100.000 scale and more rarely newer 'Oman Topo 50K' ones in 1:50.000 scale as well GPS readings taken during visits. Since 2001 this DigitalGlobe QuickBird-based imagery resolution is at best 60 cm, pan-sharpened. Between Google Earth and the GPS at optimal reception, differences up to 15 m in the z axis may occur.

The master of Oman's geography, J. C. Wilkinson, grapples with his task explaining that it would have been less hazardous had it been possible to relate his research to a set of authoritative specialist studies in certain fields (Wilkinson 1977, 2). For the term "Oman" he cites it in one case as being understood to designate a place inside the al-Buraymī oasis (1977, 4). Depending on one's relative standpoint, there is also a bewildering variability in the terms used to describe relative locations within the country. For example, one reads that the Capital (like Musandam) lies in 'northern Oman'. While not completely false, a system is necessary to disambiguate the relative positions of Oman's provinces. A simple orientation in general is as follows:

Oman	Latin	transcription
northern	Buraymi	al-Buraymī
north-eastern	Batina, north & south, Muscat	Šamāl al-Bāṭinah, Ǧanūb al-Bāṭinah, Masqāṭ
north-western	Zahira	al-Ẓāhirah
central	Dahiliyya	al-Dāḫilīyah
eastern	Sharqiyya north & south	Šamāl al-Šarqīyah, Ǧanūb al-Šarqīyah
south-eastern	Wusta	al-Wusṭā
southern	Zufar	Ẓufār

Table 0.1. Province location in the Sultanate of Oman.

Place-names derive from the *Gazetteer of Oman,* the internet Geo-names server (https://download.geonames.org/export/dump/) as well as NSA-sanctioned publications such as the *Journal of Oman studies* and El-Baz 2004. The orthography used in the *Gazetteer* differs from that of the NSA maps which has developed over the years to include more diacritics. Al-Jahwari 2013, 284–9 lists and transcribes 306 towns and important archaeological sites in south-eastern Arabia. Small sites derive often from archaeological site reports, and lists of copper mining/smelting sites of Prospection (Oman) Ltd Muscat. As a last resort we may refer to road signs which often deviate from official NSA spellings. These nine sources combined with Google Earth, suffice to localise most sites.

The rendering of place-names below must have a standard. During field searches the locals questioned may not understand place-names faultily pronounced by foreign archaeologists or ones which are simply wrong: *cf.* Table 7; *e.g.* correctly Wādī Ṣaʿ, not "Wadi Salh" (which G. Weisgerber pronounced "Wadi Salch"), Qurūn al-ḫabab, not "Loch Bab", ʿUqdat al-Bakra, not "As-Saffa", Qirn Abū Lihīya, Wādī Sirī, not "al-Dhurra, Wadi Aghdāʾ", "al-Maʿdin" not "al-Maydan". Moreover, the important "Al Miaydin" appears in the specialist literature on Oman and maps in five different spellings, all from the same Arabic word root.[1] In remote desert areas locals knowledgeble about traditional place-names often are thinly sewn. Today, one is most likely to encounter a foreign guest labourer or a young Omani without knowledge of local traditional place-names. Rarely, if ever, are archaeologists interested or capable of transcribing the Arabic letters *ʿayn*, *alif*, *ṣād* or *sīn*, *ḍād* or *ḏāl*, *zāy* or *ẓāʾ*, which often appear inconsistently even in the same map. Thus, the sign ʿ means both *ʿayn* and/or *alif*. The Arabic rendering of a few names cannot be verified, such as "Ṭawī Leshe", "Wādī al-Qaṭf" and Šīyar (instead of "Šira", trees), the latter as a simplified form of 'Šiğar' (Yule and Weisgerber 1998). While many place-names are transcribed in the sources directly from the local language, often the sources adjust them in accordance with Modern Standard Arabic (accordingly instead of the spoken language, *e.g.* the less correct "Dabā" instead of "Dibā", or "Al Athaibah" instead of al-Aḍayba). In the Arabic place-names rendered below, pausal forms generally are not realised.

In accordance with NSA practice, the place-names in these maps show no diacritics, only Latin letters. This also holds for the first mention of a given place-name in the text which appears together with the transcription in brackets. Thereafter the transcription appears alone. Table 7 lists most of the relevant place-names and their identifying basic data.

[1] Modern standard Arabic and Classical Arabic are identical: Maʿdin/maʿādin (respectively, sing./plur., Wehr 1985, 821; Lane 1874, book 1 pt. 5, 1977): "mine, ore, mineral, metal". In Oman the place-name al-Muʿaydin is a local, perhaps archaic realisation of this root. "al-Maydan" instead of "al-Maʿdin": Coleman and Bailey 1981, II deposit nos. (12) & (13). Al-maydʾan (the centre) is not intended. The place-name 'Al Khawd' (al-Ḫawḍ) which repeatedly occurs below, deserves mention: 'Ḫauḍ': plunge, rush (into); entering, entry (into something e.g., into war, into negotiations); penetration; search, examination, discussion, treatment (Wehr 1985, 368). According to the Lisan al-Arab, 'run in the water or wade' (pers. comm. B. Mershen).

Abbreviations

Archaeological context abbreviations

The vast majority of archaeological contexts cited below are funerary. Alpha-numeric grave designations combine one to three letter prefixes to designate the site, followed by a number for the cemetery and finally by a grave number suffix: *e.g.* S10815: S (the site Samad ash Shan (Samad al-Šaʾn)), 10 (cemetery S10), 815 (grave no. 815). Most of the different contexts are documented in Yule 2001a I, 473–6. In the case of multiple burials in a given grave finds may or may not be attributed to a particular burial, for example respectively gr. S2172/1 or S2172/-. The following list includes most of the place-name abbreviations and EIA archaeological sites named in our study.

A	Al Akhdhar/al-Aḫḍar
Am	Al Amqat/al-ʿAmqāt
As	Asima/ʿAsīma
B	Bawshar/Bawšar
Bar1	Samail/Samāʾil grave Bar1
Bid	Bidya
Bis	Bisya/Bisya
Bhs	Al Buhais/al-Buḥayṣ
Bu	Al Bustan/al-Bustān
Du	Ed Dur/al-Dūr
Fsh	Fashgha/Fašġa
Fu	Amlah/ʿAmlāʾ, al-Fuwayda
G	Al Ghalilah/al-Ġalīla
Gh	Al Ghuriyain/al-Ġuriyayn
H	Hili/Hili
Ha	Hafit/Ḥafīt
M	Al Moyassar/al-Muyassar (previously al-Maysar)
Mai	Amla, Al Mais/ʿAmlāʾ, al-Maiṣ
Ml	Mleiha/al-Milayḥa
Mo	Mowayhat
Mu	Muqatta/Muqatta
N	Nizwa/Nizwā
Q	Qattarah/Qaṭṭāra
S	Samad al Shan/Samad al-Šaʾn
Sa	Masirah, Sachrut al Hadri/Maṣīra, Saḫrut al-Ḥadrī
Se	Ibri, Selme/ʿIbrī, Selme

Shi	Shimal/Šimal
UB	Uqdat al-Bakrah/ʿUqdat al-Bakra
W	Al Wasit tomb W1/al-Wāsiṭ tomb W1
Wa	Wadi Suq/Wādī Sūq

Artefact-class abbreviations

Artefact-class abbreviations, conceived for computer storage and sorting for south-eastern Arabia, first appeared in Yule and Weisgerber 2001 and Yule 2001a. They are updated and gradually anglicized in Yule and Weisgerber 2015a and in Yule 2018a. At present, 583 classes including 67 for beads total at 650 (Table 2). In contrast, the term 'artefact groups' refers to the major artefact forms (such as arrowheads, bangles, swords *etc*.), not the actual artefact-classes (*e.g.* Swords S1).

A	axe or adze
Ar	arrowhead
Awl	awl
B	bangle
C	ceramic
D	dagger
Kn	knife or spatula
L	lancehead
Me	metal vessel
MeGB	metal vessel globular
MeOb	metal vessel open
Pin	garment pin
P	pottery
R	razor
Ri	ring
S	sword
Sl	stone lid
Sv	stone vessel
Tw	tweezers

Other abbreviations

A	aceramic
AAS	atomic absorption spectroscopy
Ach	Achaemenid
Akk	Akkadian
b	breadth
BCE	Before Common Era
Br	bronze

CAD	Chicago Assyrian Dictionary
CE	Common Era
cf.	Compare. In the catalogue the reader is referred to a given comparison, but which is not close enough to be useful for dating purposes.
cm	centimetre
Cu	copper
DA	Department of Antiquities artefact registration number
DBM	Deutsches Bergbau-Museum, Bochum
ED	Early Dynastic
ed XRF	x-ray energy dispersive fluorescence
EIA	Early Iron Age
g	gram
h	height
H	Ḥafit period
Har	Harappan
Him	Ḥimyarite
I	Islamic
ICP-AES	inductively coupled plasma atomic emission spectroscopy
ICP-OES	inductively coupled plasma optical emission spectroscopy
km	kilometre
IA	Iron Age
LBA	Late Bronze Age
LCG	long collective grave
LIA	Late Iron Age, Samad LIA if not otherwise specified
LOD	limit of detection
LOI	loss on ignition
m	metre
NSA	National Survey Authority
p	preserved dimension or weight
PBF	*Prähistorische Bronzefunde*
PIR	*pré-Islamique récente*
PPL	plane polarised light (parallel polarisers)
Sas	Sasanian period
SQU	Sultan Qaboos University
Sum	Sumerian
TL	thermoluminescence dating
U	Umm an-Nār period
VMS	volcanogenic massive sulphide
W	Wādī Sūq period
XPL	crossed polarised light (crossed polarisers)
XRF	Roentgen fluorescence

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Chapter 1

Foreword

In 2004 numerous anciently deposited metallic artefacts by chance came to light on the campus of the Sultan Qaboos University in Al Khawd (al-Ḫawḍ). Mostly fashioned from copper, less so tin-bronze, these Early Iron Age (EIA) finds complement archaeological major metal finds in south-eastern Arabia published in 2001, 2015 and 2018. Other important contemporary contexted ones have been excavated more recently, but are known only from preliminary reports, public lectures or word of mouth. The al-Ḫawḍ hoard finds were systematically photographed, drawn, materially analysed and catalogued for the first time in the Department of Archaeology of the Sultan Qaboos University (SQU), where they are stored. The authors briefly introduced this important find, which is to be turned over to the Ministry of Heritage and Tourism, Sultanate of Oman in Muscat (Masqaṭ), at a virtual conference about EIA metallurgy in south-eastern Arabia (Yule *et al.* 2020).

Inevitably, a research project undertaking such as the present one could hardly have come to fruition without the concerted help of institutions and individuals who we are pleased to acknowledge. First, I thank Nasser Al-Jahwari and Khaled Douglas of SQU for inviting me to participate in studying the al-Ḫawḍ hoard. Their support helped me to remain viable in our field after official retirement. The authors are indebted for the in-kind and financial support of the SQU. Sultan al-Bakri, Director General of Archaeology of the Ministry of Heritage and Tourism, and Jamal al-Musawi, Director General of the National Museum, both generously allowed us to record comparable finds in their institutions. Over the years the ministry provided quarters during the sojourns in Oman for me and my study group.

In 2004 Nasser Al-Jahwari and Ali ElMahi conducted the rescue excavation at the site and wrote the first preliminary report. In 2019–2020 Al-Jahwari and Khaled Douglas secured a research grant from SQU to conduct this study. Both coordinated the team, organised the support of SQU, oversaw the documentation on a daily basis and participated in actual recording and documentation of the finds. Bernhard Pracejus, contributed the chapter on geology, evaluated the roentgen fluorescence (XRF) assays and compared them with all of the published ones for metallic artefacts from prehistoric Oman. He saw to a necessary grounding of the project in the discipline of geology, sourced and described the find material in terms of their chemistry. Hajir Ambu Ali conducted actual XRF measurements of the artefacts under his supervision. Yaqub al- Rahbi (SQU) photographed the finds and edited the photos in consultation with the other members of the study group. Yule catalogued, drew, digitised the drawings as well as studied and documented the finds. Irene Blome inked Figure 4.11, the arrowhead classification. Fausto Mauro (Rome) pencil-drew finds from 17–20.09.2019 and corrected some of the text for which he is heartily thanked. He also checked a late version of the text, always of value for such studies. Similarly, Michela Gaudiello (Warsaw) contributed her time and talent and in a further visit (27.01.–1.02.2020). Ali Tijani ElMahi, Nasser Al-Jahwari and Mohammed Al-Belushi (SQU) were among the first to view the find. Nasser Hamed Al-Hinai (SQU) made first drawings of the hoard finds.

This publication ultimately builds on studies of ancient metal work which I began 1982–98 at the *Deutsches Bergbau-Museum* in Bochum under the tutelage of Gerd Weisgerber, who we will hear from often in the following. Grants at that time from the German Research Council, Fritz Thyssen Foundation

and Gerda Henkel Foundation cast the seed for this latter-day research. Lloyd Weeks took time from his busy professional and family life to patiently answer numerous questions, some of which painfully exposed the limits of the authors' knowledge. He served as a reliable source of expert information in the fast-growing field of archaeometallurgy, especially as it relates to his complex excavation site of Sārūq al-Ḥadīd, which is tantalisingly known from preliminary reports and lectures. Andreas Hauptmann (DBM) corrected especially the chapter regarding archaeometallurgy, added key sources and focussed the discussion as few possibly could. The authors also sought advice from the experts from the research project *Prähistorische Bronzefunde* (English: Prehistoric Bronze Finds) at the Department of Prehistory of Frankfurt University, especially Ute Dietz in various matters. The chairholder, Werner Arnold, of the Heidelberg University Seminar for the Languages and Cultures of the Near East, Semitic Studies provided me with a desk at which to work and expert advice in regard to Arabic, thus the reference below to a "Heidelberg Initiative". Maciej Klimiuk of this same seminar patiently sharpened my awareness about the Romanising of place-names in Oman. Ulrich Hofmann added sources for Oman's place-names. Joseph Lehner corrected the name of EIA mine Loch Bab to Qurun Al Habab (Qurūn al-ḥabab) and was an excellent discussion partner for our common topic.

Julie Goy (Paris) made suggestions for the section regarding the Masāfī site. Michele Degli Esposti helpfully guided me through his research of Salut (Salūt). Marzia Sasso (also Pisa) provided essential stratigraphic dating information for the finds there above and beyond the published data. Mathilde Jean (Paris) took the trouble to correct a draught regarding the Madmar (Muḍmār) East complex. Others also kindly responded to verification requests. Valentina Azzarà (Leiden) updated on the important Bronze Age settlement and production site Ras Al Jinz (Raʾs al-Ǧinz) from its vast data. In advance of publication, Francesco Genchi (Rome) provided numerous images of finds from the Diba (Dibā) corridor tombs being excavated under his supervision. Betina Faist and Ariel Bagg (Heidelberg) suggested bibliography to keep the authors on the right Assyriological path. My thanks also go to Dennys Frenez for expertly readying the text for printing.

The recording of the hoard finds took place in three campaigns: 17–29.09.2019, 2–8.12.2019 and 27.01–8.02.2020. To weigh the objects we used in most cases a highly sensitive electronic scale in the Department of Mineralogy of the SQU and an electronic Soehnle kitchen scale with a range of 0–2000 g. From February to July of 2020 the Covid-19 pandemic crimped our contact to Oman but prolonged the available editing giving valuable time to re-think and correct. It also resulted in the postponement of final checks in Oman planned for March 2020.

In the al-Ḫawḍ area on 29.03.2019 B. Mershen led me to a LIA settlement and burials (report: Mershen 2002). Kh. Douglas showed the team sites on the campus on 20.09.2019 which we documented on 31.01.2020. Gaudiello and I mapped the Ḥur al-Ḏabʿ cemetery in October 2018, January, February, April and October 2019 as well as Yule and Mauro 20-29.09.2019 (reports: Gaudiello and Yule 2018a; 2018b; 2019; Yule and Mauro 2019).

Throughout, the term 'copper' appears instead of 'copper alloy' with single quotation marks or 'bronze' in a general way, usually for artefacts not analysed, for the sake of editorial consistency. Bronze is an intentional alloying of tin and copper to improve hardness, colour and facilitate the smelting.

A discussion ends each chapter, all synthesized in the final chapter.

- The introductory Chapter 2 explains the background, goals, documentational standards, dating parameters and the role of Oman's geographic isolation. It also muses about a possible Bronze Age bias in Gulf archaeology which impinges historiographically on the present study. It states questions to be posed to the material.
- Chapter 3 tersely summarises archaeological literature relevant to the EIA for field use or where library resources are limited.
- Chapter 4 describes the find circumstances of the artefact-groups represented in the al-Ḫawḍ hoard: Arrowheads, axes/adzes, bangles, daggers, knives, socketed lanceheads/spearheads, metal vessels, razors, rings, swords and tweezers are assigned to existing discrete classes for all from prehistoric south-eastern Arabia. This updates the related study of the EIA workshops from Uqdat al-Bakrah (ʿUqdat al-Bakra) in which 11 of these groups which occurred at that site are analysed (Yule and Gernez 2018). Our Table 1 catalogues the finds and Table 2 updates the find-classification.
- Chapter 5 reviews and parses diachronically relevant find contexts in south-eastern Arabia which contain metal from the Umm an-Nār to the Islamic age to structure the relative chronology and the spatial distribution of the different find-classes for the discussion of hoard function. The second part of this chapter includes analogous metal finds in Mesopotamian and South Asian contexts to widen the pool of comparisons regarding hoard function for our focus region.
- Chapter 6, authored by Bernhard Pracejus, presents the geological background to the potential origin of the metals, the analysis largely by means of reflected light microscopy, geochemical analysis.
- Chapter 7 discusses the archaeometallurgy, mining, smelting and post-smelting production for the al-Ḫawḍ hoard and other local EIA metal objects. The development, changes of thought and opinion regarding metal production in Arabia today reach a crescendo since field research began to mount in the 1970s.
- Chapter 8 discusses the 1st millennium BCE metals industry and exports from EIA south-eastern Arabia (Qadē) to Mesopotamia. Qadesian copper exports continued, but the evidence for eastern Mediterranean imports to Mesopotamia is mounting.
- Chapter 9 synthesises the main points surrounding the archaeological and technological context of the al-Ḫawḍ hoard: Paradoxically the productivity of the EIA south-eastern Arabian metals technology and industry *de facto* usually are vastly under-rated and nebulously are skewed in the public eye which favours the Bronze Age as a general thematic focus – an implicit bias.

Paul A. Yule

Image 2. Metal finds from the EIA al-Ḫawḍ hoard (Al-Rahbi, SQU).

Chapter 2

Introduction

Qadē contextualised

3rd to 1st millennium BCE cuneiform texts mention a prehistoric copper exporting land known first in the Sumerian language as Magan and later in Akkadian as Makan[1], located in the 'Lower Sea' (Arabian Gulf and Sea of Oman) littorals. Bronze Age Magan/Makan captivated scholars decades before its lesser known EIA Semitic successor, Qadē. This Aramaic word means 'morning' or 'east', known in the Talmud as *qiddūmā* (lucidly on this, Eilers 1983, 103). King Padē, of the land of Qadē, of the town of Izkī *(pa-de-e* LUGAL ^{kur}*qa-de-e šá ina* ^{uru}*iz-ke-e)* in a cuneiform text written in the 7th century BCE during the reign of the Neo-Assyrian king, Assurbanipal, drew the attention of several experts (Thompson and Mallowan 1933, 87, 96, 105; Zadok 1977, 203, 209; 1981, 54, 56; Potts 1985, 81–3; 1992 II, 311; Borger 1996, 283 no. 132, 294 *etc*.; Yule 2014a, 17–8, 29; 2015c, 183; Bagg 2017, lxxv & 484). Documented 200 years later in the Achaemenid Bısutun trilingual cuneiform inscription, another name, 'Maciya', is an ethnic nominative, a palatalised Aryan *nisbe* of Maka (Eilers 1983, 101). The name for both the folk and province during the 6th century BCE descends from the Akkadian Makan. Qadē and Makā designate the inhabitants of what has become Oman and western Iran (size and position: Eilers 1983, 104–9; Potts 1985 and 1986), although admittedly the archaeological term EIA, as used below, refers exclusively to sites and finds from south-eastern Arabia, which we hope to illuminate.

The first textual, cuneiform mention of prehistoric Oman was not direct, but rather ultimately resulted from the British E. L. Durand's explorations on the mid-Gulf island Baḥrayn in the late 1800s. Among other archaeological finds there an engraved black diorite bow of a ship or an animal tongue, or more likely a door pivot-stone, came to light some 70–80 cm in length, the so-called Durand stone (Durand 1880, figs. 1–4 opposite p. 193; Heimpel 1987b, 24). The grandfather of Assyriology, H. C. Rawlinson, translated and commented on this Old Babylonian inscription (*e.g.* 1880, 204). He was convinced that here he had come across an aspect important to the Mesopotamian world and translated the inscription as follows: "The palace of Rimugas, servant of Mercury, of the tribe of Ogyr", p. 209 (^{d}EN - $^{za\text{-}AK}$zàg: ^{d}AK (=Nabû) Tilmun^{ki} (Heimpel 1987b, 24 note 11)). Rawlinson equated the planet Mercury with the deity Inzak who he knew from a list of ancient Near Eastern gods which seemed to be the local equivalent for the better-known Babylonian scribal deity, Nabū. This peculiar chain of associations, which interests me personally, connects Mesopotamia geographically to the region to the south-east, ancient the so-called Lower Sea.

Searching other cuneiform texts in which the place-name Makan occurred revealed it to coincide with two others consistently mentioned in the order Dilmun, Makan and Meluḫḫa (Rawlinson 1880, 204, 212; Heimpel 1987b, 22–4). Rawlinson hypothesized that the latter two were the names of "contiguous ports" lying further down the Gulf. Throughout the 19th century several explorers already had reported copper deposits at various points in Oman (Potts 1992 I, 113–9). For the equation of Makan with what has become Oman the geologist-historian H. Peake cited two Akkadian texts from Assur (1928, 456 note 1; Schroeder

[1] During the 1st millennium in Neo-Assyrian texts this place-name is realised with a single k phoneme (Heimpel 1987a, 195; Bagg 2017, 383: 'Makan'). The place-name Makā should not be confused with Islamic Mecca (Makka).

1920, text nos. 92 & 183). Forty-four years after Rawlinson's "Notes", B. Landsberger (then Leipzig) connected the inscribed Makan origin on the 'diorite' statues of the Mesopotamian king Gudea with a report about deposits of this and related rocks from which the royal statues of the day are fashioned "on all islands west of the entrance to the Gulf and on numerous small rocky islands in the southernmost bulge (*i.e.* of Oman)" of the Sea of Oman (Landsberger 1924, 217 note 2; Heimpel 1987a, 195; Yule and Guba 2001). For the source of the imported royal stone, diorite, and valuable *mes* wood (but not copper) mentioned in the texts, Landsberger, later confirmed by others, postulated south-eastern Arabia at a time when cuneiform texts and scholarly thought regarding the Lower Sea still were quite rare.

In the 1920s the geologist G. M. Lees (London) visited "…Jebel Mảadan in Wadi Ahin…in the mountains behind Sohar in Oman" (for this site see Goettler *et al.* 1976, 49. More precisely, El-Baz 2004, 12 shows "Al Muaydin" (المعيدن, al-Maʿdin) to lie at 23°49'22"N, 56°28'24"E, 17 km NNW of al-Rākī, 64 air km SW from Sohar (Ṣuhār)). There Lees observed undated "old workings" and collected samples of copper ore as well as slag. Although the slag contained only a small amount of copper and no nickel, the ore contained 1.5% of copper and 0.19% nickel (Peake 1928, 456). Later analyses also report no nickel in the slag from al-Muyassar site M1 and other sites (Hastings *et al.* 1975, 15; Dayton 1978, 74) the result of a "remarkably poor database" (Begemann *et al.* 2010, 144). But in the end both the copper slag and ore from Oman and artefacts from Sumer proved to share natural tell-tale high nickel content (see below). Otherwise nickel is significantly rare as an impurity in copper ore.

Decades after Peake's article, A. L. Oppenheim (Chicago) noted the obvious, that the island Baḥrayn (ancient Dilmun) lacks both copper and fuel of its own and was simply a staging point for trade between the south and Mesopotamia (1954, 7; Schöler *und* Kleindienst 1990 for a picture of Near Eastern copper resources). During the early 2nd millennium Isin/Larsa period a group of seafaring merchants from Ur traded grain, sesame oil (Heimpel 1987a, 198) and textiles against this copper, as their Ur texts reveal. G. Bibby (Moesgaard) popularised the idea of extensive Bronze Age metals trade up and down the Gulf in his widely read *Looking for Dilmun* (1970, 199, 235–6, 298). As time advanced, more cuneiform texts came to light which mentioned the import of copper (never bronze) from the Lower Sea to Mesopotamia (83 texts related to imports: Heimpel 1987a, 198). The number of textual mentions of Makan and thus of imports from there climax in the early 2nd millennium (Heimpel 1987b, 60 tab. 1). At first glance, Heimpel's table regarding trade suggests copper to be the most frequently mentioned import. Less often than copper also the rocks gabbro and diorite, beads of precious stone, ivory *etc*. occur, but neither then nor now do the texts enable one to accurately rank them in their true quantitative order of commercial importance.

Makan was also a fanciful name for Egypt in Neo-Assyrian inscriptions, beginning with the king Tukulti-Ninurta I (discussion: Heimpel 1987a, 196). Later, Esarhaddon mounts a campaign against 'Makan' (Egypt), so to speak at the end of the known earth (pers. comm. 30.05.2020 Gary Beckman, Ann Arbor). Makan and Meluḫḫa appear subsequently in Esarhaddon's inscriptions as alternative names for Upper Egypt and Nubia (Bagg 2017, 383, 422–4).

If in the 1970s Oman was a strong candidate for the localisation of ancient Magan/Makan, by the mid-1990s effectively there was no longer any real scepticism on archaeological, archaeometallurgical or Assyriological grounds (*e.g.* Berthoud *et al.* 1982, 40, 41 versus Weisgerber 1991b, 76–9). In 2001 the statement that the scientific basis for Makan as the source of copper for Mesopotamia was lacking in reality means that one can always update and improve on this kind of scientific standard of evidence, which is what the author of a key relevant study succeeded in doing (Prange 2001, 98). One cannot deny that the large scale production of copper in south-eastern Arabia has been the main justification for the association

of ancient Makan with this region in the first place (Weisgerber 1980, 72; 1988, 285; 1991b; 1992; Potts I 1992, 145; Weeks 1997, 16; Weisgerber 2007a, 194). In the field of Gulf archaeology south-eastern Arabia's copper production during the Bronze Age dominates discussion despite occasional incongruent comments such as: "…production levels are perhaps many times higher than in the Umm an-Nar period…" (Weeks 2004, 52) which builds on, "…the significance of tin in the third millennium B.C. in the economy of the Near East is very easily overrated" (Moorey 1982, 87).

150 known copper ore and smelting deposits of all periods in the 500 km long strike length of the Samail Ophiolite zone of the Hajar (Ḥağar) Mountains (">100 large copper deposits": Weisgerber 1980, 103; over "400 deposits": Guba 2002, 145; "150 deposits": Partington 2010, 836) with smelting workshops and slag fields enable an important prehistoric and historic copper production and export in Oman (Coleman and Bailey 1981; Hauptmann 1985, 25; Weeks 1997, 17; Prange 2001, 13). The textual metals narrative regarding Makan's thriving copper trade via Dilmun breaks off during the Ur III period in the third quarter of the 3rd millennium (Heimpel 1987a, 197). International trade cannot be doubted, despite the lack of cuneiform sources (Reiter 1997, 187), which otherwise suggest the decline in the international metals trade between Mesopotamia, the Gulf and South Asia after 1750 BCE.

Questions to be addressed

Our first priority in this study is to establish the production date of the constituent finds of the al-Ḫawḍ hoard and then reconstruct how, when and why they arrived in their final resting place, since they were not produced in order to form the hoard itself. If there was an (over) abundance of EIA copper and its products in south-eastern Arabia and Mesopotamia, why is so little understood about them? Did bronze first come into widespread production there in the EIA or earlier? The world over in all periods the accumulation of metal wealth in the form of hoards inevitably raises the question of their purpose and south-eastern Arabia is no exception. If in fact grave robbing is a far more efficient way to obtain metal than prospection, mining, beneficiation, roasting, smelting, alloying and refining, does EIA mining consist largely of tomb plundering and slag recycling? If so, does this exploitation of metal account for the rarity of extant Bronze Age copper artefacts or, paradoxically, were fewer produced during that cultural apex? In a given period and area the proportion of copper slag to extant copper artefacts must link to each other quantitatively, since the former mirror the latter. In the EIA did copper production and export also grind to a halt? Finally, in south-eastern Arabia is it fair to characterise the EIA as a 'dark age' as in some neighbouring regions?

Documentational standards

The systematic inventorying of ancient metal finds has a high informational value. The main difficulty with the study of prehistoric hoards and metal finds amounts to impressionistic descriptions of the find circumstances and of the finds themselves. Numerous finds published in tiny photos with neither cross-section nor conservation intervention cannot be classified stringently. Where cited below, the shapes and individual find-classes of such amount to non-quantifiable educated estimates. The following presentation uses as a model the serial publication *Prähistorische Bronzefunde*, a prestigious European archaeological research project, which strives to correct this deficit. With 187 published volumes, PBF sets methodological standards for world prehistory (Jockenhövel *et al.* 2016, 19–32). The founder, Hermann Müller-Karpe, saw as a prime goal of prehistory the comparison of the different sites and their finds. For this reason

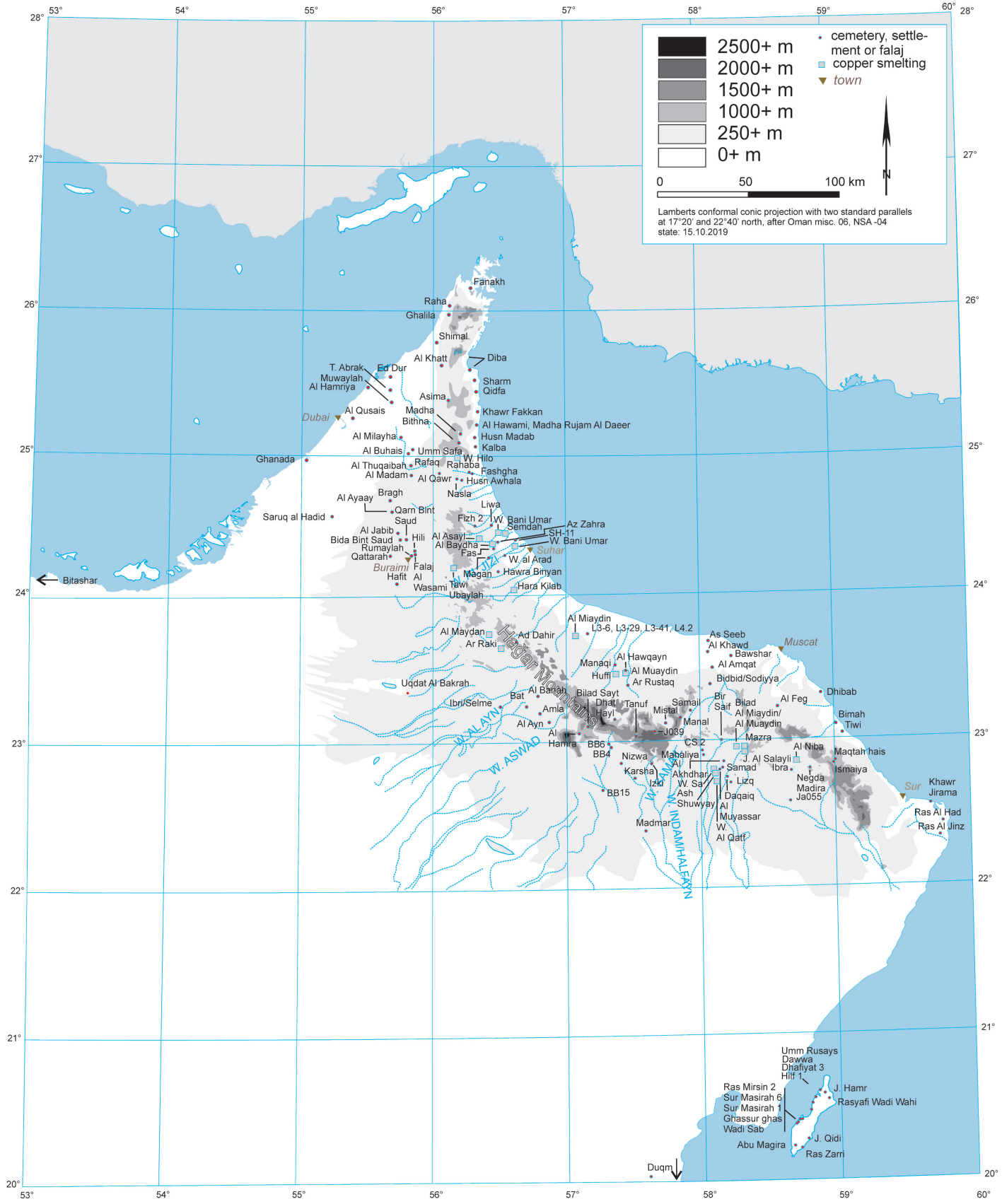

Figure 2.1. Archaeological sites in south-eastern Arabia which date to the Early Iron Age. This map is not an authority on international borders (Yule, state 24.11.2020).

Europe's leading prehistorians optimised and unified the drawing standards in focussed annual meetings. To this end standardised reduction scales came into use, often 2:5, 1:2 or 1:8, depending on the size of the artefacts, *e.g.* arrowheads, metal vessels, swords *etc*. In the present study arrowheads appear 1:2, one sword is 1:3 and the rest are 2:5 in scale. Although the very earliest PBF volumes are little more than typo-chronological studies with an appended illustrated catalogue, as an awareness of the possibilities dawned, the range of topics rapidly expanded into all branches of prehistory. These include analyses of the different alloys, different alloys in relation to particular kinds of artefacts, the interpretation of the find-circumstances (retrievable, non-retrievable), the identification of artefact function (usable, non-usable), the illumination of the production and actual use of a given implement (*e.g.* Říhovský 1996 for weapon manufacture and use) as well as discussions of foreign influences. PBF became the main platform for our understanding mostly of European prehistoric metal finds and a source for thinking models about them. Not only the large number of finds and context observations, but also its high documentational and editorial standards distinguish it. Over recent decades a development of information and analytical methodology has become manifest.

Different archaeological publications may position the artefacts (especially metallic ones) with a semi-systematic layout, sometimes without any kind of scale. In the PBF volumes consequently the depictive convention is that artefacts appear to represent the manner with which they were carried or used. Arrowheads and spearheads point upward, whereas the tips and cutting edges of daggers, swords, flat axes, razors, pins and tweezers point downward. Shaft-hole axes (shaft-hole is vertical), knives and spatulas are posed horizontally. Archaeological publications on Arabia show varying degrees of appreciation of today's publication standards and an awareness of a further possible ergological (a term especially in German ethnology, the study of work, tools and their ramifications) interpretation of a given image. If the artist does not signal secondary damage, the shape of the original artefact often may be misleading. This includes *e.g.* the broken tangs of arrowheads or artefacts corroded to the extent that their original form is not recognisable. Thus the al-Ḫawḍ images which appear below are only slightly 'restored' by means of extension lines, since it is not our intention to accent and document damage and corrosion. Graphic reconstruction rests on directly existing artefact parts.

Different factors influence the degree of verisimilitude of artefact drawings. These include the available budget for an artist, available time, preservation or restoration of the artefact, not to omit the will to present a visual rendering which corresponds qualitatively with the historical importance of the artefact being depicted. Restored south-eastern Arabian metallic artefacts derive mostly from Ibri/Selme (ʿIbrī/Selme), Uqdat al Bakra (ʿUqdat al-Bakra), Saruq al Hadid, U.A.E. (Sārūq al-Ḥadīd) and Shimal, U.A.E. (Šimal) tomb Sh102. In the following we prioritise a depiction of the finds which easily can be compared with those from other sites and periods.

Drawings complement what photos cannot show. Ink-shaded ones on a par with those of PBF publications were never a realistic option for the present publication for financial and organisational reasons. For one, this would have extended the publication time unrealistically. To depict the hoard artefacts we opted to combine photos with drawn cross-sections because the illusionistic drawn rendering of a frontal (*en face*) view of an arrowhead in several publications seems to contradict its cross-section. Optically the midrib of an arrowhead may appear more rounded than in the drawn section. Combining a photo and its drawn cross-section minimises this dissonance. The arrowhead sections are astonishingly difficult to draw accurately. For this reason we first pencil-draw them twice life size. During the digitising (with CorelDraw) a hairline cross-section, as wide as the 60 cm wide monitor screen, is then reduced to the scale of the photo. For small

objects the difference between a usable and non-usable cross-section which errs in the false direction may amount to a thick pencil-line in width. Several published section drawings reveal more about the artist's technique (or hand steadyness) than the actual artefact form. *A propos* the cross-sections, the upper surface of the section drawing is the front of the object. Since profile drawings may be of little or no use, above and beyond the cross-section, they are useful only to show bending damage[2]. For arrowheads we omit them. However, axes, daggers and swords require a more thorough visualisation.

Yaqub Al-Rahbi of SQU photographed both faces of each object and the best preserved of the two was that layouted. To optimise the graphic depiction, cross-sections are rendered as hollow thin line drawings, which are easier to understand than blacked out ones. Also, when juxtaposed or overlapped, optically they are easier to compare with each other. While to some extent this is a question of personal taste, most PBF authors prefer hollow cross-sections, if for no other reason than the ink does not bleed through the page if printed on thin paper. Prehistorians such as Otto Kleemann (Bonn) refer jokingly to blackened cross-sections as, "worms on the page". Since each draftsman has his or her/own drawing style, we tried to minimise this variability, and a single draftsman digitised the cross-sections. Where the sections are drawn with a dashed line, the corrosion is such that the original form is not discernable.

Working strategy and representativeness of the extant finds

Essential for the study of any hoard is to classify the finds, but not as an end in itself, as some authors may believe. Instead, it enables one to reduce a large number of heterogeneous individual finds into as few manageable find-classes (Eggert 2001, 122–8) as possible which can be overviewed temporally and spatially. Typical of a young field of research, the present report focusses on the relative chronology of the EIA al-Ḫawḍ find-classes. The typological method is based on the analysis of formal, functional and material similarities of objects (Korbel 1981, 608). Form classification is not new. The mid-18th century *Systema naturae* of the Swedish Carl von Linné is a taxonomic ordering of plants (Kraus 1991) which since has served as a model for ethnographic and archaeological classification according to taxa. Find-classes classify, but unlike a typology do not strive to typify. The attributes of a given class therefore may be more heterogeneous than those of a type, but by increasing the number of classes these may each become internally more homogeneous in form but at the cost of cluttering the overview. In south-eastern Arabia a classification of the finds is more appropriate than a typology, the latter in which ideally the material sample is better known and has been subjected to systematic study over decades in numerous ways, as in the case of some archaeological finds from Greco-Roman Europe (*e.g.* figural vase painting and terra sigillata pottery). These are less subject to unforeseeable fluctuation as a result of new finds. For this same reason to classify Mesopotamian metal vessels M. Müller-Karpe (Mainz) prefers the term *'Formengruppen'* (English: 'form groups') avoiding *'Typen'* (English: 'types'; Müller-Karpe 1994, vi). With notable exceptions (*e.g.* Mouton 1990; Al-Jahwari 2013; Saunders 2016, 8–14) artefact classifications are not widespread in south-eastern Arabian archaeology.

In Gulf archaeology, today we have to accept the preponderance of preliminary site reports in the literature as natural foundation building at this early stage of development. Once the foundation (documented contexts and finds) is established, interpretative work can follow.

[2] Additional cross-sections often combined with photos are available in heidICON pool SKVO "Oman".

Over the years, continued additions to south-eastern Arabia metal finds and to the find-classification indicate that the known extant ones only approximate what was current during prehistory. While at first glance we possess large numbers of published find-classes, for a chronology the spatial and temporal lacunae between them are almost as important as the finds themselves. Also, rarely do precious metal (rare exceptions: Sārūq al-Ḥadīd and Dibā corridor tombs) or organic material (*e.g.* Palaeolithic wooden weapons: Gill 2010; Hassmann 2013) survive millennia of the scourges of metal scavenging and weathering. While in some places a given category of finds first appears as bone, wood or antler, hardly any of this progression have survived in south-eastern Arabia (*cf.* bone arrowheads in Poland: Gedl 2014, 1; in Hasanlu: Thornton and Pigott 2011, 146 fig. 6.7 above; 2 bone arrowheads: Sārūq al-Ḥadīd (pers. comm. L. Weeks 15.04.2020)). Entire regions, such as south-western Arabia, have yielded hardly any metal weapons, although their previous importance is undisputed from abundant textual, visual (*i.e.* sculptural depictions) and historic evidence or extrapolation. Some of the sites discussed below were investigated by only small teams for a short period of time, especially ʿUqdat al-Bakra, and are anything but intensively researched. Finally, metal finds occur very rarely in ancient south-eastern Arabian workshops and smithys (exceptions: EIA ʿUqdat al-Bakra and early Islamic Mulāq, Weisgerber 1981, 187 *Abb.* 8; Hauptmann 1985, 35 *Abb.* 14) which underlines the shallowness of our knowledge.

The al-Ḫawḍ hoard is important first because till now no other sizeable EIA metal hoards have come to light in the eastern part of the Sultanate – historiographically our focus. In closest spatial proximity to it is the contemporary one from ʿIbrī/Selme, 168 km to the west-south-west. Second, it offers a large but manageable new sample of arrowheads and other kinds of implements for which one can study the different forms and use-wear variations. In our focal region of Arabia the spatial distribution of the different EIA classes of metallic artefacts (and those of other periods as well) otherwise rests mostly on the study of funerary contexts.

New metallic find-classes from al-Ḫawḍ combine with known ones (see below), which requires us to adjust the chronology of different find-classes by means of a database and some 6000 illustrated note cards in DIN A5 format (*cf.* Plate 18 and Yule 2018a, pl. E). Books are likely to first mention moral issues germane to their origin. In the present study these issues pertain to qualified archaeological observation: We focus on archaeologically recovered artefacts, not those from the antiquities trade without a provenance. The database pertains to finds which adequately can be documented, not tiny photos of corroded, broken artefacts without cross-sections.

Dating parameters

We can neither reliably finely date the ultimate origin of artefact-classes nor the deposit of the metal finds in absolute years, including the al-Ḫawḍ hoard. Instead we rely on dating models (based on chronological estimates of their accompanying finds) in context with other attributes of this age which offer complementary dating evidence. Invariably EIA burials, the probable source of much of the hoarded metals in south-eastern Arabia, have a mixed stratigraphy or are robbed to varying degrees. What we know best are the architectural grave/tomb forms, chronologically mixed contexts or those without finds.

Often the question occurs how homogeneous are artefact categories defined as they are by material, technique and shape? For example, recently at Sārūq al-Ḥadīd backed microliths occurred in number possibly as a component of hunting weaponry from the Middle Bronze Age even down into the EIA (Moore *et al.* 2020, 149, 157). Backed microliths may run parallel to the newly emergent metallic

arrowhead technology. Usually associated with 'Mesolithic' hunting-gathering economies, such argued datings "…all fail under closer scrutiny" (Moore *et al*. 2020, 155). Winged, lithic bifacial arrowheads seem to disappear in the region after the Late Neolithic, although examples have occasion turned up *in situ* during later periods as at Sārūq al-Ḥadīd and other sites during the Middle and Late Bronze Age (Moore *et al.* 2020, 157–8 fig. 8). The mixed nature of the materials, stone and metal are probably more common than we know.

The al-Ḫawḍ hoard artefact-classes fit best within south-eastern Arabia's EIA assemblage to judge from shape comparisons. However, metallic implements dated to the EIA have rarely been observed in a hut tomb context (exception: *e.g.* tomb M803, Yule and Gaudiello 2017, 51 tab. 1). The chronologist is confronted repeatedly with a 'chicken or the egg' dilemma of methodological primacy, whether the known extant finds date a given find context with its metallic finds or if the opposite takes place. Here we will never be completely free of circular logic. Repeatedly, the cataloguer must decide with a few contexted finds which to varying degrees may or may not be chronologically representative. In arriving at a chronological estimate, the present cataloguer has decided to err in the direction of dating too broadly rather than too narrowly: If a few finds are known *e.g.* from EIA II context, the dating may be estimated simply as "EIA". We use the datings often as published and do not forcibly redate them to a particular chronology, but some of these have been re-interpreted below. The spotty quality of our source data must be underscored. As Donald Rumsfeld once aptly stated (the so-called Johari window of probability), "Reports that say that something hasn't happened are always interesting to me, because …there are things we know we know… there are known unknowns; that is to say we know there are some things we do not know. But there are also unknown unknowns – the ones we don't know we don't know." (news briefing 12.02.2012). An important fourth category in the archaeology of Arabia may be added, that which we know, but which is intentionally not acknowledged (for this principle: Zizek 2004). The frequent occurrence of new find-classes requires re-classification of older find-classes to new ones (Rumsfeld's 3rd category).

Oman's geographic isolation

D. T. Potts (then Sydney) once aptly concluded that, "It is time we began to look at the Gulf as uniting, rather than dividing the landmasses which flank it" (Potts 1986b, 285). After all, a number of historic known Persian invasions to the western littoral show the accessibility of this region. Potts further articulates numerous ancient ways and roads in different parts of Arabia over the centuries (1988). However, south-eastern Arabia remains the odd dark corner in the equation. While early explorers such as J. R. Wellsted and H. H. Whitelock expecting desert were surprised on the Jabal Al Akhdar (al-Ǧebel al-Aḫḍar) at the paradoxic verdancy there (Phillips 1971, 2–3), in fact, oceans, deserts and mountains undoubtedly all have isolated Oman from its neighbours, albeit with exceptions (Lombard 1985, 274). The winter and summer monsoon winds present another difficulty to nautical visitors, the impact of which on the local weather varies greatly in and around Oman. They alternate seasonally in the Indian Ocean in the summer toward the north-east and in the winter toward the south-west. This pattern holds neither for the Sea of Oman nor Arabian Gulf themselves which have their own more complex local patterns. However, climatic research cautions us to be wary of projecting today's regularity and intensity of the monsoon throughout the entire Holocene (*cf.* Sinha *et al.* 2006, 1367–8). In addition, coastal currents inside the Gulf require for sailing ships knowledgeable skippers.

Before actually reaching the western shoreline of today's U.A.E. Gulf, ships first may have to hazard coastal sand bars (Wagner and van der Togt 1973; Riegel *et al.* 2010). On arrival to the south-eastern Arabian coast a treacherous *sabkha*, desert or dense mangrove swamp may greet the visitor. On making landfall, one must reckon with the intensely hot local climate itself which always has gotten a bad press (Phillips 1971, 6). While Oman invites with a gaping north-eastern coast of some 280 km of savannah, the Batina (Bāṭina), the north contrasts with, "…cliffs rising sheer from sea which defeat all but an experienced climber" (de Cardi *et al.* 1975, 11). To the south, mountains separate it just above Muscat (Masqaṭ). Moving further inland, waterless tracks lead into the interior otherwise impeded with its stone, sand and mountain deserts (Edgell 2006, 327, 401–3, 447 *etc.*). The isolated Ḥağar mountain range which forms the physical core of the region dominates the Arabian shore of the Sea of Oman sweeping northwards in an arc in all of some 650 km in length. Both ends of this range plunge straight into the sea (Wilkinson 1977, 6–8). The vast desert to the west imperviously seals off central and eastern Oman ('Oman Proper', *i.e.* respectively the governorates Dāḫiliyya as well as Eastern and Southern Šarqīya). The western outliers of the central part of the Sultanate to Ẓufār can be crossed by small camel caravans, as proven by W. Thesiger. Also the Persian coastal topography opposite Oman is inhospitable.

Over the centuries the plethora of Semitic languages in Arabia itself bespeaks a complex history of settlement, migration, contact and isolation. If oceans and seas unite, why then is Arabic only a minor language in Iran and vice versa (Arabic in Iran: Bozkurt in press)? Isolation, both temporal and spatial, hinders transfer and propagates cultural divergence which resulted in Oman's own present-day spoken Arabic and non-Arabic dialects in the first place (Holes 2017). It explains the conservativeness of Oman's languages, in contrast to its geographically and historically more accessible neighbours to the north and west. Opposite this isolation is globalisation. Since 1970 this mechanism has resulted in a drastic decrease in Oman's non-Arabic languages. Such observations as analogies for archaeology confound archaeologists who are captivated by south-eastern Arabian Bronze Age open seagoing trade and western Arabia's historical enormous camel caravans. Understandably they may prefer to focus on Oman's several mountain passes which penetrate the central Ḥağar chain to enable communication with the partly rugged interior, instead of drawing attention to its intractable combined mountains and deserts.

Consider that only since the oil wealth came to bear in Oman in the early 1970s have roads actually been built there (Yule 2018b, 458 citing C. Holes (Oxford)). Not only do steep and rugged mountains, deserts and oceans seal south-eastern Arabia off from the outside, they also divide it internally (*e.g.* Masqaṭ *vis à vis* adjacent Al Amirat (al-ʿAmirāt)). The effects of anomalous physical structure on isolation within heartland Oman, which always has been limited, requires further study (Wilkinson 1977, 10, 66). C. Holes describes in the 1970s that a man (let alone a woman) living *c.*60 km from Muscat may never have visited the capital during his lifetime (2017, 293). The topography also fostered other divisive factors. Carter (1977, 11) pointed out that the isolation of Oman's interior served to preserve its tribal structure.

Inside the country long-range camel caravaning, as in *e.g.* northern Africa and western Arabia, was understandably more the exception than the rule, as relived by W. Thesiger's trans-Arabian camel experiments of 1946–47 and 1948–50 (Thesiger 1959). To the logistical dangers belongs transgressing the territories of opposed warring tribes unaware of anything outside their own backward territory. Even in main sources on caravan trade little or no evidence for south-eastern Arabian caravans has survived (*e.g.* Janzen 1980, 70–83; Groom 1981; Potts 1988; Maraqten 1996; Hoyland 2001). As for the traditional Gulf – Africa sailing circuit, while admittedly most wooden seacraft reached a given goal, many (*c.*10%) did not

(Prins 1966, 3). In the present work it is paradoxical that the disparate EIA communities with little direct contact with each other still share a broad formal homogeneity in their archaeological assemblage (Yule 2018b, 458 on this isolation applied to the LIA). Finally, pre-oil Oman listed among the sparest populations of the world, and one with a short life-expectency. Both contribute to a reduction of collective memory potential and increased and a loss of information over its large surface area.

A Bronze Age bias?

Is the Bronze Age archaeology of south-eastern Arabia inherently more interesting than that of the EIA? For this region and the Near East in general the brilliance of the Bronze Age culture is irresistible to most archaeologists. This remote age with its superbly hewn stone Umm an-Nār tholoi, physically large inhabitants (men 175.8 cm, women 154.5 cm stature, Yule 2018b, 448 tab. 3 citing M. Kunter) and astonishingly developed far-flung early international trade is indeed enticing. Today it seems self-evident to write a book about Bronze Age south-eastern Arabia without even explaining why this particular pre-Islamic period is selected for study at the expense of others. While 235 known EIA sites far outnumber Wadi Suq (Wādī Sūq) and Umm an Nar (Umm an-Nār) ones, as in other 'late' fields of ancient Near Eastern archaeology, paradoxically they receive only a fraction of the scholarly attention (obsolete but still valid attempted statistic: Yule 2001a I, 16 tab. 2.2). However, the past two decades show a partial mitagation. For example, P. Magee's archaeological survey book of 2014 shows 109 pages dedicated to the BA and 177 to the EIA. The Samad LIA receives far less scholarly attention than the EIA which preceded it. But the least published period in our region is not its least interesting one.

Divergent archaeological schools of thought

The present study focusses on material culture and ergology, the latter term for the research of technology. This term, which has no close translation in this sense in English, refers to the study of the object culture of non-European traditional societies. The term 'material culture' stands in opposition to the widespread practice to designate the products simply as 'material' (as elucidated in Feest *und* Janata 1999, 1). Despite its common use 'material culture' is frequently criticised. The main argument of idealistic critics lies in the ostensible contradiction between the word 'material' and the notion of culture as a cognitive and cultural process. However, such are not tangible if not handed down as events, communications and simply as material objects, which for the culture materialists represent the true object of ethnology (Feest *und* Janata 1999, 1).

While the cultural anthropologist may find the following discussions of relative chronology, artefact ergology and classification to be insipid, for lack of socio-anthropological concentration, the European prehistorian on occasion may find the exegeses of some anthropological archaeological studies to be over-interpreted or perhaps too speculative. Since the function of metal hoards is still an undeveloped topic in Arabian archaeology, arguably the members of both disciplines might recognise in it a common interest.