THE ARCHAEOLOGICAL HERITAGE OF OMAN - VOL. 12

LANDSCAPES OF DEATH

EARLY BRONZE AGE TOMBS AND MORTUARY RITUALS ON THE OMAN PENINSULA

Kimberly D. Williams

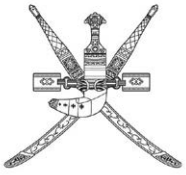
MINISTRY OF HERITAGE AND TOURISM - SULTANATE OF OMAN
2023

The Archaeological Heritage of Oman

LANDSCAPES OF DEATH

Early Bronze Age Tombs and Mortuary Rituals on the Oman Peninsula

KIMBERLY D. WILLIAMS



Sultanate of Oman سلطنة عُمان
وزارة التراث والسياحة
Ministry of Heritage and Tourism

Archaeopress Publishing Ltd
Summertown Pavilion
18-24 Middle Way
Summertown
Oxford OX2 7LG
www.archaeopress.com

Landscapes of Death: Tombs and Mortuary Rituals in Early Bronze Age Oman
(Includes bibliographical references and index).

1. Arabia. 2. Oman 3. Mortuary Rituals. 4. Antiquities 5. Bronze Age.

This edition is published by Archaeopress Publishing Ltd in association with the Ministry of Heritage and Tourism, Sultanate of Oman.

ISBN 978-1-80327-529-1
ISBN 978-1-80327-530-7 (e-Pdf)

Ministry of Heritage and Tourism
Sultanate of Oman, Muscat
P.O. Box 200, Postal Code 115
Thaqafah Street
Muscat, Sultanate of Oman

Cover: Umm an-Nar type tomb at Shir, Sultanate of Oman (photograph by Oriol Alamany)

Contents

List of figures, tables and spotlights vii

Acknowledgments xiii

Introduction xv

1 **Mortuary Ritual as a Reflection of Life** 1

2 **Mortuary Monuments: Cairns (3200–2700 BC)** 10

3 **Mortuary Monuments: Umm an-Nar Period Communal Tombs (2700–2000 BC)** 55

4 **Evidence of Transitions** 85

5 **Early Bronze Age Death Practices and Bioarchaeological Analyses (3200-2000 BC)** 104

6 **Future Research and Recommendations** 142

Bibliography 155

Appendices 175

Index 251

List of figures, tables and spotlights

* All photographs by Kimberly D. Williams unless otherwise noted.

FIGURES

0.1.	Early Bronze Age cairns at the UNESCO World Heritage site of Al-Ayn	xvi
2.1.	Early Bronze Age cairns at Al-Khubayb necropolis, Dhank	10
2.2.	Early Bronze Age cairns (a) Mudhai, Dhofar (photo courtesy of Joy McCorriston, RASA team); (b) Al-Khubayb necropolis; (c) Zukayt necropolis	11
2.3.	Map of key Early Bronze Age Cairn sites of the Oman Peninsula	12
2.4.	Examples of Jemdet Nasr vessels (after Cleuziou and Tosi 2020: fig. 93)	13
2.5.	(a) Beads and (b) shell pendant recovered from excavation of Hafit-type cairns at the Al-Khubayb necropolis	13
2.6.	Examples of (a) dagger commonly recovered during excavation of Hafit-type cairns and (b) bronze awl/needle	13
2.7.	Early Bronze Age cairns at the site Abu Silah, Dhank	15
2.8.	Tomb D001-001 before excavation (after Williams *et al*. 2014)	16
2.9.	Neolithic interment under floor in tomb D001-001 (after Williams *et al*. 2014)	17
2.10.	Closeup of exterior of wall of D001-001 (after Williams *et al*. 2014)	17
2.11.	Plan of the necropolis of KJ1 (C. Sévin-Allouet)	18
2.12.	Tomb 1 of the KJ1 necropolis (C. Sévin-Allouet)	19
2.13.	Tomb 2 of the KJ1 necropolis and the associated dwelling (C. Sévin-Allouet)	19
2.14.	Architectural evolution of tomb 2 of KJ1 (C. Sévin-Allouet)	19
2.15.	Examples of variation in building materials used to construct Early Bronze Age cairns (a) Zukayt; (b) Halban; (c) Halban; (d) Al-Khubayb; (e) Dhofar (photographs a-d: K.D. Williams; photographs and courtesy of RASA project, Joy McCorriston)	22
2.16.	Sample of large-scale surveys that reported on Early Bronze Age cairn distribution (survey areas are estimated for illustration purposes)	23
2.17.	View of portion of the Abu Silah necropolis, Dhank	24
2.18.	Schematic drawings of cairn plans from Jebel Hafit showing each of the five directions that entrances faced	25
2.19.	Satellite view of the Ras Al-Jinz bay, with the location of sites RJ-6 and RJ-1 (O. Munoz, Google Earth Image)	26
2.20.	The Ras Al-Jinz bay view from the Jebel as-Saffran, with the location of sites RJ-6 and RJ-1 (O. Munoz)	27
2.21.	Plan of the southern group of tombs at RJ-6 (O. Munoz, after G. Santini's excavation notebook, tombs layouts from Santini 1992, and 3D model of Tomb 2 from San Basilio 2017)	27
2.22.	View of the Tomb 5 at RJ-6 at the end of the excavation showing the wall structure and the preparation of the floor of the chamber with small stones (Joint Hadd Project)	28

2.23.	View of the Tomb 4 at RJ-6 during its excavation showing the wall structure with an external plinth and some articulated portions of skeletons in the chamber (G. Santini Joint Hadd Project)	28
2.24.	Axial deformation observed on a right tibia (right) and fibula (left) from Tomb 5 at RJ-6, which led to disability of the individual (O. Munoz)	29
2.25.	Map of the area with excavated (yellow dots) and surveyed tombs (red dots) (O. Munoz)	30
2.26.	Tombs of the Shiyā necropolis, on the cliff and in the wadi bed, near the modern houses (O. Munoz)	31
2.27.	Oblique and zenithal views of excavated tombs in Shiyā (O. Munoz)	32
2.28.	Grave goods from the tombs of Shiyā (O. Munoz)	33
2.29.	Localization of the site HD-7.3 and the other necropolises and main archaeological settlements in the area of Ras Al-Hadd (O. Munoz)	34
2.30.	The tombs at HD-7.3 view from west (O. Munoz, G. Seguin)	35
2.31.	Layout of the tombs in the necropolis HD-7.3 (O. Munoz)	35
2.32.	Zenithal views of the tombs from HD-7.3. Note the bedrock arrangement outside of the Tomb 4 (O. Munoz, G. Seguin)	36
2.33.	Objects associated to the individual A of tomb 5 of Ras Al-Hadd HD-7.3: "razor" or "spatula" in copper alloy, decorated compartmentalized box in soft stone, and stick in copper alloy; and restitution of the position of the deposited individual (O. Munoz)	39
2.34.	Early Bronze Age cairns at the UNESCO World Heritage site Al-Ayn (P. Yule)	40
2.35.	Early Bronze Age cairns at the UNESCO World Heritage site Al-Ayn (P. Yule)	41
2.36.	Example of Early Bronze Age cairn in Dhofar (courtesy RASA project, Joy McCorriston)	44
2.37.	Example of cairn in Hadramawt, Yemen	44
2.38.	Early Bronze Age cairns at the UNESCO World Heritage site Al-Ayn (P. Yule)	46
2.39.	Early Bronze Age cairn at the UNESCO World Heritage site Al-Ayn (P. Yule)	46
2.40.	Schematic overheads of the cairns excavated at Tawi Silaim (after de Cardi *et al.* 1977)	47
2.41.	Early Bronze Age cairn from the site of Shenah (photo: Y. Al-Rahbi; courtesy Mohamed Al-Belushi, Sultan Qaboos University)	49
2.42.	Map of necropoles in the Dhank region	50
2.43.	Distribution of cairns at the Al-Khubayb necropolis	51
2.44.	(a) Example of Hafit-type cairn at Al-Khubayb necropolis; (b) Example of Hafit/Umm an-Nar transitional cairn at Al-Khubayb necropolis (S007-001; Williams and Gregoricka 2013, 2019); (c) Example of tumulus at Al-Khubayb necropolis (S007-169; Williams and Gregoricka 2020)	52
2.45.	Hafit-type cairns at the Al-Khubayb necropolis	52
2.46.	Example of Hafit/Umm an-Nar transitional cairn surrounded by Hafit-type cairns at Al-Khubayb necropolis	53
3.1.	Umm an-Nar tomb A at UNESCO World Heritage site of Bat (C. Schmidt)	55
3.2.	Location of published Umm an-Nar sites	56
3.3.	Examples of white ashlar stones that formed the façade of most Umm an-Nar circular tombs from the site of Shokur, Dhank	57

3.4. Rounded wadi cobbles from Iron Age cairns built on top of Umm an-Nar Tomb 1 at DH7 (Dahwa). These stones covered the earlier Umm an-Nar tomb and helped to protect the Early Bronze Age context. Roof stones and ringwall from the Umm an-Nar tomb were visible as the remains of the cairn stones were removed 58

3.5. Umm an-Nar Island tombs excavated by Danish Archaeological Expedition (after Thorvildsen 1962) 59

3.6. Example of Umm an-Nar tomb roof slabs from Dahwa site: (a) Tomb 1, DH7 roof stones circled, (b) close up of roof stone from Tomb 1, DH7 60

3.7. Umm an-Nar Island tombs excavated by Iraqi Archaeological Expedition (after Al-Tikriti 1981) 61

3.8. Tomb 1001 at Adam (G. Gernez) 62

3.9. Tomb 2000 at Adam (after Gernez and Giraud 2019) 62

3.10. Sample of tombs at Bat (Tombs 53, 54, 55B, 84, and 87 after Frifelt 1975; rest after Schmidt and Döpper 2014) 64

3.11. Sample of tombs at the Hili site (after Al-Tikriti 1981; Cleuziou and Vogt 1985) 65

3.12. Schematic plan of Hili, Tomb A (after Cleuziou and Vogt 1985) 66

3.13. Hili, Tomb E and N (after Al-Tikriti and Méry 2000) 67

3.14. Umm an-Nar tomb at Mleiha (after Jasim 2003) 70

3.15. Mowaihat, Tomb A and B (after Al-Tikriti 1989) 72

3.16. Tomb QA 1-1 at site of Qumairah (after Rutkowski 2018) 74

3.17. Ras Al-Jinz, Tomb 1 and bone pits (after Al-Tikriti 1989) 75

3.18. Al-Sufouh Tombs I-IV (after Benton 1996) 79

3.19. Schematic overhead plan of Tomb Unar 2 (after Blau 2001b) 79

3.20. Tell Abraq (after Martin *et al.* 2019) 81

3.21. Overhead view of DH7-T1 and bone pit (photograph M. Al-Mamari) 83

3.22. Row of white ashlar façade stones found face down 83

3.23. DH7-001 facing west. From this view one can see the position of DH7-001 on a low hill 83

3.24. One example of Indus ivory hair comb found in DH7-001 under a poorly preserved skull 83

3.25. Detail of chambers and corridor of DH7-001 83

4.1. Tomb at site of Zukayt 85

4.2. Hypothesized general differences between Hafit-type cairns and transitional cairns 87

4.3. Cairn use during Umm an-Nar period 88

4.4. Example of reconstructed transitional cairn from the UNESCO World Heritage site of Bat/Al-Ayn (Sulieman Al-Jabri) 90

4.5. Schematic plans of transitional period cairns with internal architecture (Bat Tomb 1138 after Frifelt 1975b; Jebel Emalah Tomb I after Benton and Potts 1994; Al-Khubayb S007-001 and S007-012 after Williams and Gregoricka 2019; Jebel Buhais BHS 57, BHS 88, and BHS 89 after Jasim 2012) 91

4.6. Shi1 at the Shir site (Paul Yule) 93

4.7. Tomb SG 82 at the Shenah site (Yaqoub Al-Rahbi, courtesy of Mohamed Al-Belushi, Sultan Qaboos University) 94

4.8. Tomb SG 269 at the Shenah site (Yaqoub Al-Rahbi, courtesy of Mohamed Al-Belushi, Sultan Qaboos University) 94

4.9. View from inside cairn of corbelled walls and capstone roof (Yaqoub Al-Rahbi, courtesy of Mohamed Al-Belushi, Sultan Qaboos University) 94

4.10. Example of square entrance, Tomb SG 277, Shenah (Yaqoub Al-Rahbi, courtesy of Mohamed Al-Belushi, Sultan Qaboos University) 95

4.11. Example of triangular entrance, Tomb SG 271, Shenah (Yaqoub Al-Rahbi, courtesy of Mohamed Al-Belushi, Sultan Qaboos University) 95

4.12. Map of the study region with name and location of the sites that have been sampled for obtaining evidence of structural change in monumental tombs and design variability in ceramic materials 97

4.13. Map of the study region showing pairwise inter-site similarity as a measure of interaction. Opacity of the edges connecting sites is scaled according to the Horn overlap obtained for each pair of sites (Horn 1966). Since the index is standardised, high similarity (1) corresponds to total opacity (full colour) and 0 (absolute diversity) corresponds to a completely transparent line 97

4.14. Diachronic density estimation of (from top left): 1) Hafit and Umm an-Nar types; 2) Dressing types; 3) Inner structural articulation; 4) Entrance types 99

4.15. Average values of intra-site diversity (*tF*), inter-site Jaccard distance and inter-site squared Euclidean distance measured for tomb dressing in each 100-year time-step 100

4.16. Average values of intra-site diversity (*tF*), inter-site Jaccard distance and inter-site squared Euclidean distance measured for tomb entrance in each 100-year time-step 100

4.17. Average values of intra-site diversity (*tF*), inter-site Jaccard distance and inter-site squared Euclidean distance measured for tomb inner articulation in each 100-year time-step 100

4.18. Schematic of Al-Khubayb tomb (after Döpper 2017) 102

5.1. Early Bronze Age death practices on the Oman Peninsula (3200-2000 BC) 104

5.2. (a) Early Bronze Age cairns on high ridge of Abu Silah necropolis, Dhank, Oman; (b) Early Bronze Age cairns on Abu Silah necropolis with view of Aflaj necropolis in the distance. On clear days some cairns are visible to viewers standing on either necropolis; (c) Early Bronze Age cairns facing south toward the open desert; (d) Example of Early Bronze Age cairn necropolis where cairns are not organized in lines on a ridge, Al-Khubayb necropolis, Dhank; (e) Example of Early Bronze Age cairns organized in lines at Al-Khubayb necropolis, Dhank 105

5.3. Early Bronze Age "Haluf tomb" (facing south) in Dhofar (after McCorriston *et al*. 2014) 113

5.4. (a) View of cairn entrances at the UNESCO World Heritage site of Bat/Al-Ayn; (b) Close-up of cairn entrance at the UNESCO World Heritage site of Bat/Al-Ayn 114

5.5. (a) Erosion of exterior wall of this Early Bronze Age cairn reveals the inner wall, UNESCO World Heritage site of Bat/Al-Ayn; (b) View of corbelled walls and roof of an Early Bronze Age cairn from inside the chamber, UNESCO World Heritage site of Bat/Al-Ayn, (c) Example of erosion and deflation of cairn at the Al-Khubayb necropolis; (d) Detail of the stone used to construct the cairns at the Al-Khubayb necropolis. These stones have suffered significant erosion which lead to a more "ruined" appearance. This cairn, however, was not disturbed and contained an intact burial chamber; (e) Detail of stone used to construct the cairns at the UNESCO World Heritage site of Bat/Al-Ayn. This stone suffered less erosion as a result the cairn more closely resembles its original appearance; (f) Example of erosion at the site of Zukayt 115

5.6. Example of cairn at site of Halban. Rubble fill between the outer and inner walls of the cairn can be seen 116

5.7. Summary of Umm an-Nar mortuary ritual involving the communal tomb and burial pit 126

5.8. (a) Early Bronze Age cairns high on the landscape at the Abu Silah site in Dhank, and (b) an Umm an-Nar communal tomb at the Qumairah site 135

6.1. Use and reuse of tumulus S021-001, Aflaj necropolis, Dhank (adapted from Williams and Gregoricka 2020) 145

6.2. Use of transitional cairn S007-003, Al-Khubayb necropolis, Dhank (after Williams and Gregoricka 2019) 146

6.3. An Early Bronze Age mortuary landscape at the site of Abu Silah, Dhank. 147

6.4. Some Umm an-Nar period sites with evidence of burning as part of the mortuary ritual 148

6.5. Detail of burned and unburned, commingled, and fragmented deposit in bone pit at Dahwa (DH7-001, bone pit) 150

6.6. Burned and unburned hamate bone of the hand. These bones are not from the same individual, but they were from the same archaeological context and demonstrate different levels of exposure to fire (Dahwa site, DH7-001, bone pit) 151

6.7. Long bone fragment with differential burning (Dahwa site, DH7-001, bone pit) 151

6.8. Proximal ulna fragment showing cracking due to heat and color change (Dahwa site, DH7-001, bone pit) 151

6.9. Long bone fragment showing cracking, warping, and color changes (Dahwa site, DH7-001, bone pit) 151

6.10. Cranial fragments showing differential exposure to heat (a) exterior surface, (b) interior surface (Dahwa site, DH7-001, bone pit) 151

6.11 Heated/burned fragment of ivory comb (Dahwa site, DH7-001, bone pit) 151

TABLES

2.1. Terminology used for Early Bronze Age cairn tombs 20

2.2. Radiocarbon dates from Shiyā 32

2.3. Published dates for Dhank area cairns 35

2.4. Characteristics of necropoles from Ja'alan survey (after Giraud 2010) 42

2.5. Radiocarbon dates from Ras Al-Hadd HD-7.3 53

3.1. Published radiocarbon dates from Umm an-Nar tombs 69

4.1. Pairwise inter-site similarity for tomb entrance type. Values are measured as Morisita-Horn indices of overlap (Horn 1966). Mean regional value = 0.63 98

5.1. Published radiocarbon dates for Early Bronze Age cairns. Calibrations calculated with OxCal 4.3 (Bronk Ramsey 2009) with IntCal13 Atmospheric Curve (Reimer *et al.* 2013) 112

5.2. Summary of features of "Haluf tombs" 113

5.3. Published data on health and demography of individuals interred in Early Bronze Age cairns 118

6.1. Summary of evidence of fire in Umm an-Nar tombs and bone pits 150

SPOTLIGHTS

1.	Mudhai, Dhofar	16
2.	Necropolis KJ1, Ash-Sharqiyah, by C. Sévin-Allouet, A. Thomas and N. Gautier	18
3.	Jebel Hafit, U.A.E.	25
4.	Ras Al-Jinz RJ-6 necropolis, Ash-Sharqiyah Governorate, Oman, by O. Munoz, G. Santini and K. Rointru	26
5.	Shiyā necropolis, Ash-Sharqiyah Governorate, Oman, by O. Munoz	30
6.	Ras Al-Hadd HD-7.3 necropolis, Ash Sharqiyah Governorate, Oman, by O. Munoz and G. Seguin	34
7.	Al-Khubayb, Dhank	50
8.	Hili Tomb A, U.A.E.	66
9.	Hili Tomb N, U.A.E.	67
10.	Mowaihat (Ajman) Tomb A and B, U.A.E.	72
11.	Ras Al-Jinz RJ-1, Ash-Sharqiyah	75
12.	Al-Sufouh Tombs I–IV, U.A.E	78
13.	Tell Abraq, U.A.E	81
14.	Dahwa, Al-Batinah	82
15.	Shenah, Al-Qabil	94
16.	Trait-Based Analysis of Early Bronze Age Tombs, by E. Bortolini	96
17.	Dating Early Bronze Age Mortuary Monuments	110
18.	Haluf, Dhofar	113
19.	Tomb Reuse: An Example From Al-Khubayb Necropolis, Al-Dhahirah	146
20.	Umm an-Nar Mortuary Ritual and Use of Fire	148

APPENDICES

A.1.	Published surveys that document cairns (the term "cairn" may have been used for structures that are not Early Bronze Age cairns)	176
A.2 .	Published excavated Early Bronze Age Cairns: Architecture Summary (does not include Jebel Hafit cairns)	195
A.3 .	Published excavated Early Bronze Age Cairns: Interments	202
A.4 .	Published excavated Early Bronze Age Cairns: Material Culture (does not include Jebel Hafit cairns)	208
A.5 .	Summary of architectural features and interments at Jebel Hafit	217
A.6 .	Summary of interred material culture at Jebel Hafit	220
A.7 .	Excavated Umm an-Nar tombs: Architecture Summary	228
A.8 .	Excavated Umm an-Nar burial pits	233
A.9 .	Excavated Umm an-Nar communal tombs and bone pits: Interments	234
A.10.	Excavated Umm an-Nar communal tombs and bone pits: Material Culture	237

Acknowledgments

This work would not have been possible without the support of the Ministry of Heritage and Tourism. I am very grateful to His Majesty Sultan Haitham bin Tariq Al-Said, the Sultan of Oman (former Minister of Heritage and Culture when I began my research career in the Sultanate of Oman). Deepest gratitude to His Excellency Salim Mohammed Almahruqi, Minister of Heritage and Tourism of the Sultanate of Oman. Additionally, I thank His Excellency Eng. Ibrahim Said Al-Kharusi, Undersecretary of the Ministry of Heritage and Tourism for the Heritage Sector, Mr. Sultan Saif Al-Bakri, Advisor to the Minister of Heritage and Tourism for Heritage, Mr. Khamis Al-Asmi and Mr. Ali Hamood Al-Mahrooqi, respectively former and present Director of the Department of Excavations and Archaeological Studies.

I am also very indebted all staff at the Ministry of Heritage and Tourism that I have worked with, most recently, Ms. Sumaya Al-Busaidi, Mr. Sulieman Al-Jabri, Ms. Ibtisam Al-Mamari, Mr. Khalil Al-Nadabi, Ms. Shaikha Al-Rasbi, Ms. Maryam Al-Shabibi, Ms. Samiya Al-Shaqsi, Mr. Khalid Al-Swafi, and Mr. Mohammed Al-Waili. Special thanks to Mr. Khalid Habib Al-Lawati, Director of the Journal of Omani Studies Department, and Ms. Azza Abdul Aziz Al-Hinai, Translator in the Journal of Omani Studies Department, for their valuable support and advice throughout the whole editorial process.

This book is the direct result of support from the Fulbright US Scholar Program (Grant #48150626), which allowed me to live in Oman 2015-2017. During this time, I was in residence at Sultan Qaboos University. I am indebted to faculty (Dr. Mohammed Al-Belushi, Dr. Khalid Douglas, Dr. Mohammed Hesein, and Dr. Nasser Al-Jahwari) and staff (Mr. Yaqoub Al-Bahri, Mr. Nasser Al- Hinai, and Mr. Yaqoub Al-Rahbi) in the Department of Archaeology at Sultan Qaboos University who have been good colleagues and friends over the years. I am also indebted to Dr. Walid Al-Tikriti for permission to reproduce tomb plans from his unpublished dissertation.

This work has been improved with photographs provided by Dr. Mohammed Al-Belushi, Hélène David-Cuny, Dr. Stephanie Döpper, Dr. Guillaume Gernez, Dr. Conrad Schmidt, and Dr. Paul Yule. Three additional colleagues contributed "spotlights" on their work: Dr. Christophe Sévin-Allouet (Chapter 2: Spotlight 2), Dr. Olivia Munoz (Chapter 2: Spotlights 4, 5 and 6), and Dr. Eugenio Bortolini (Chapter 4: Spotlight 15).

I thank my many friends and colleagues who work and live in the Sultanate of Oman. I would not have started work in Oman if not for the mentorship of Dr. Joy McCorriston. By inviting me to be a part of her field project (first in Yemen and then in Oman), she provided a space for me to develop skills that made me a more skilled archaeologist and scholar in general. I can never repay this opportunity or express the extent of my gratitude, but I can pay this kindness and generosity forward by providing opportunities for future students and supporting my fellow colleagues so that we can all learn more about the spectacular history of this region. Oman is a special place for me and helping to share information about the history of the region is a great honor.

Finally, I thank Dr. Dennys Frenez for his indefatigable patience in the process of completing this work. I know I would not have been able to complete this work without his encouragement and expert support.

Kimberly D. Williams
kimberwilliams@temple.edu

Introduction

Death is a universal experience for all people, in all periods of human existence. Perhaps because witnessing the death of friends and family is one of a few life experiences that all people can relate to, or perhaps because the question of what becomes of a person when they die has been asked by every generation, people have long been fascinated with death practices. Travelers and antiquarians who observed the cultures of far-away places and ancient ruins of tombs, settlements, and other residues of the ancient past both close to home and abroad, provided the earliest accounts about variation in death practices. Throughout the world, these observations intrigued those who read or heard about how other cultures, contemporaneous and ancient, lived and died. Surely, over the course of history, many accounts have been lost, but some of the earliest recorded demonstrate the power of death practice narratives. These accounts range from the works of history's earliest recorded historians such as Herodotus and Thucydides to medieval travelers (e.g. Ibn Battuta, Abu Zayd Al-Sirafi) to Western travelers/explorer to Arabia (e.g., Philby, Thesiger, etc.) and elsewhere.

As an archaeologist observing just these physical remains, the material culture that may be associated with the remains, and the vessel (e.g., urn, grave, tomb, etc.) where these remains are interred, it is not possible to gain a full picture of the rituals surrounding the death and interment of these people. Thus, we must remember that there are aspects of death practices that can never be fully preserved in the archaeological record. Nonetheless, these are vital aspects of the ritual(s) performed by the living. This awareness should temper our interpretations past practices by heightening awareness of the events the archaeological record bears witness to and openly acknowledging the aspects of these practices that are lost. It should also inspire us to responsibly consider ethnographic analogy to generate insight into aspects of the human past that we often cannot know: intention, emotions, and memory.

Early Bronze Age Landscapes of Death on the Oman Peninsula

This volume considers death practices of the ancient inhabitants of the Oman Peninsula during the Early Bronze Age (3200-2000 BC). It was this time that the earliest widespread construction of monuments to inter the dead occurred. The death practices of the preceding Neolithic period are known from comparatively fewer sites (see Munoz 2019 for a review), most of which were coastal sites such as Ras Al-Hamra (RH-5; e.g., Biagi *et al.* 1984; Maggi 1984; Coppa *et al.* 1985; Maggi *et al.* 1985; Macchiarelli 1989; Coppa *et al.* 1990; Biagi 1994; Santini 2002; Biagi and Nisbet 2006; Salvatori 2007; Charpentier and Mery 2010; Marcucci *et al.* 2011; Zazzo *et al.* 2014). The dead were interred in oval graves or occasionally in middens (Durante and Tosi 1977; Maggi *et al.* 1985).

There were exceptions during the Neolithic period, such as the inland site of Al-Buhais 18 (BHS18; Kiesewetter *et al.* 2000; Uerpmann *et al.* 2000, 2013; de Beauclair *et al.* 2006; de Beauclair 2008; Kutterer and De Beauclair 2008; Kutterer *et al.* 2012). Here, there is strong evidence for a seasonally used cemetery, and the mortuary practices of primary versus secondary interments varied significantly. The repatriation of those who died away from Jebel Buhais strongly suggests the importance of place for these Neolithic people.

Figure 0.1. Early Bronze Age cairns at the UNESCO World Heritage site of Al-Ayn.

Other evidence from both inland (Dhank, Williams and Gregoricka 2021) and the Ja'alan (Jarama, Sevin-Allouet, this volume) provides important evidence of more isolated Neolithic era mortuary monuments rather than pit graves. Still, despite these data suggesting ties to places and seemingly occasional mortuary monument construction, the Early Bronze Age was the first time that the use of monuments to the dead became a widespread practice across the expanse of Arabia.

This volume presents the evidence for how the dead were treated during the Early Bronze Age and explores hypotheses for why these ritual practices emerged, became universally practiced, and how they changed over time. Central to this inquiry is a consideration of the previously mentioned unknowable aspects of the past, which permeate all human experience of death and death practices: intention, emotion, and memory. This volume considers individual treatments of the dead (e.g., construction of individual tombs, placement of individual bodies), as well as the communal act of engaging in common funerary rituals. It seeks to present what we know about events in the past, and how we can understand what they meant for those who witnessed and practiced them, as well as for those who lived afterwards with the monuments that remained.

Chapter 1

Mortuary Ritual as a Reflection of Life

Mortuary Archaeology and *Bioarchaeology* are two interconnected fields of study that seek to learn about the lives of past peoples and how their descendants treated the dead. Depending on the research agenda of any given archaeologist, there may be an emphasis on the mortuary monument, the material culture, the mortuary ritual, or the interred skeletal remains. In some cases, all of these areas of inquiry are considered in unison, and as one may expect, this provides the most robust evidence of past life from a mortuary perspective.

On the surface, the primary goal of the study of mortuary monuments and their contents is to learn about the dead, specifically their sex, age, and cause of death, and the funerary goods that were left with them. Of course, these data do inform archaeologists about how people lived in the past. From the grave or tomb architecture, we can learn about the construction techniques, the skill, and the labor needed to build a receptacle for the dead. The material culture can help us determine a date of interment without destructive radiocarbon analyses, and often these objects inform us about the local economy, trade relationships, or even elements of spiritual beliefs. Grave goods can also provide insight into the role the individual held in society when they lived, although these items may just as easily create confusion about social status. The skeletal remains can help us learn about aspects of diet, workload, lifestyle, infectious disease experience, accidental and violent trauma, and aspects of growth and development.

While the study of the skeletal remains of those interred in ancient monuments can help us understand many characteristics of past peoples, this understanding also requires that we consider the manner in which they were treated after death in concert with the architecture of the tomb or grave and the material culture interred. In turn, this is informative about the society in which they lived. As is often asserted, the dead (and thus, mortuary archaeological inquiry) tell us more about life and the motivations of the living than death and the dead in the ancient past. The reason this is true is that while we may be left with the mortal remains, the material culture, and the tomb or grave in which they were deposited, the decisions surrounding the treatment of the body rest solely with the living who perform the act of disposal of the dead. This is not to say that the dead may not express their wishes before their death, but the final decision(s) about the disposition of the deceased rests with those they left behind. This creates opportunities to honor the dead and their legacy, but it also creates opportunities to alter power structures and tell a family or community story in a form that benefits the living. By parsing the objective evidence and looking closely at differential mortuary rituals, the study of death practices can be a powerful tool to understand the past.

Despite this great potential, the study of mortuary monuments and the interred dead is often limited by preservation, disturbance, reuse, and other unknowable processes that may not be recorded in the archaeological record, but that affect preservation nonetheless. For example, if only the skeleton is preserved, the window into past health and well-being is entirely dependent on the impact any life experiences had on the bony skeleton during life. Therefore, information about all the other life processes that affect soft-tissue only is largely lost to time. The skeleton may be differentially preserved or disarticulated due to environmental conditions, extended mortuary rituals, reuse of the mortuary setting, or even looting. It is also vital to keep in mind that any mortuary context examined can only provide a picture of mortuary ritual(s) that involves

the tomb or grave and anything interred in that receptacle and preserved. Many aspects of death rituals (e.g., cleaning the body, prayer, mortuary processions, and the mourning of those left behind) are unseen in the archaeological record. Additionally, in situations where extended mortuary rituals are practiced (e.g., multiple stages of interment of an individual, movement of the body or part of the body, and other processing of the deceased), we also cannot see many of the rituals practiced by the living and the archaeological record may only show a portion of an uncompleted ritual.

On balance, these potential benefits and limitations need to be considered in all analyses of past mortuary practices. These also need to be kept in mind when mortuary data are used to assert positions on social organization and social status in the past. To illustrate this point, it is useful to consider the development of the field and the ways that analyses of death practices have been explored and criticized by scholars.

Precursors to Modern Mortuary Archaeology Theory

Most retrospectives (for example, see Bartel 1982 and Carr 1995 for overviews) on the recent history of the study of death practices trace some of the earliest considerations of these rituals, variation within and across cultures, and the motivations of people who developed and practiced them, to work by scholars in the 19th century. Questions swirled around the basis of religious thought and the development of "civilization." Religious practices and evidence of "complexity" were interrogated for evidence of the root of civilized religious beliefs. Past and contemporaneous non-Western peoples were viewed a primitive others, not yet ascending to the ideal form and not yet achieving cultural progress. In particular, ancestor worship was a favorite interpretation, fueled in no small part by the increasing awareness of ancient monuments that housed the dead. These early analyses were clouded with bias, but they generated an important starting point for a period in anthropological and sociological research that is the basis for many of the ideas that modern archaeologists employ as they consider the treatment of the dead.

During the early to mid-20th century, work on this topic saw two main schools of thought: French Sociology and British Social Anthropology. The work of Emile Durkheim began to parse the differences between becoming an ancestor or simply one of the deceased. Central to this is the separation of the sacred and the profane and the separation between the collective consciousness and the individual (e.g., Durkheim 1915). Two of the most influential scholars, sociologists Robert Hertz and Arthur Van Gennep, developed important insights into how the living understood and dealt with death in their community. Hertz (1960 [1907]) considered the treatment of the body after death from the perspective that mortuary rituals act to redefine the deceased individual's role in society. He focused on secondary burial treatments of the dead. Strictly speaking, secondary burials and secondary burial rituals are not subsequent burials/interment in a space already holding the remains of another deceased individual – secondary burials/burial rituals are acts that are performed on remains and/or associated material culture subsequent to the initial interment and ritual. This could mean moving, manipulating, or altering the state of the remains after a period of time. Some examples include visiting the deceased once skeletonization has occurred and reorganizing the placement of the bones, moving a bone or the full skeleton to a different location, various degrees of burning and cremation, the deposit of additional material culture, and countless other acts that are meant to further or complete the mortuary ritual.

Hertz considered death as a process or a transition from one socially defined status to another. The decomposition/removal of the flesh of the corpse was seen as the process of disembodiment of the individual from its role in living society, closely linked to the process of mourning by those left behind.

Once separated from its identity as a member of the living, the bones then received secondary rites where they were processed (e.g., moved, broken) in order to facilitate the transition of the individual into their next (new) identity. Hertz used ethnographic data to develop the idea that mortuary rituals serve to define the relationship between the deceased and the living society left behind – they provide a process whereby an individual becomes an "ancestor." Hertz observed that these rituals were needed for the living to define the temporary exclusion (Davies 2000) of the deceased from living society as they changed in physical state after death. Mortuary rituals give the living society a way to mitigate the emotional difficulties when a death occurs.

Soon after, Van Gennep produced the seminal *Rites de Passage* (1960 [1907]) wherein he described transitions in life such as birth, initiation, marriage, and death as well as three rites of passage of the mortuary ritual: separation, transition, and incorporation. Similar to Hertz, Van Gennep linked mourning with periods of transition for the living society. Through mortuary ritual the living help the deceased through these states, and perhaps more importantly, help the living accept the change that death brings to society. He acknowledged that characteristics (such as age, sex, and status) of the deceased might influence the mortuary ritual and the impact of the death on society so that some deaths were more or less difficult to accept.

Unfortunately, the work of Hertz and Van Gennep was not well known for English-reading/writing scholarship until many decades later when these works were translated. The importance of the translation of these works (Hertz 1960; Van Gennep 1960) and the recognition of these and other contributions by these scholars cannot be overstated. Hertz's influence in particular is seen in many discussions of rituals and the role of symbols in ritual (Parkin 1996). Instead, scholars had been developing work in anthropology and sociology that focused on kinship and the reaction of the living to the dead. This included debates assertions that the living were (e.g., Bendann 1930; Malinowski 1944) and were not (e.g., Radcliffe-Brown 1922) motivated by fear and taboos associated with the corpse, and the rituals that were part of the proper treatment of the dead (e.g. Bendann 1930). Central to these inquiries was the concern of how mortuary behaviors helped the living process the death of individuals and helped them to reconcile the new identity of the dead with regard to the society to which they had belonged. Radcliffe-Browne (1922) is a good example of this view, with his interpretation of ritualized weeping of the Andaman Islanders during funeral ceremonies not as an expression of grief, but rather as a performance that symbolically communicated the social bonds between the living and the dead.

Once Hertz and Van Gennep were translated, their important work on the transitional phases a deceased member of society goes through with the aid of mortuary ritual became known to the English reading community of anthropologists (Rakita and Buikstra 2005: 2). At this point, the role of the identity of the individual (as opposed to the society as a whole) was more often considered important in mortuary behavior. Gluckman (1962) criticized Van Gennep (1908/1960) for producing only superficial consideration of society, and among other insights, highlighted his observations regarding gender differences in mortuary rituals (suggesting that mortuary rituals served to emphasize the differential social roles of males and females) and linking the complexity of death practices to the anxiety surrounding the economic and health factors that result with each death in a community.

While it is and has been tempting to use ethnographic analogy to understand archaeological populations, it is a mistake to draw direct comparisons. Ucko (1969) cautioned about using ethnographic data to interpret the archaeological record. He pointed out that sometimes mortuary rituals may characterize a given culture, but that there are dangers of over-interpreting limited archaeological data. For example, he elaborated on

variation in grave goods, grave or tomb dimensions, treatment by age, sex or social status, body position, and effort expended to dispose of the dead (including very simple practices that need not be interpreted as lack of care or respect). Since we know these variations (and many more) exist in contemporary mortuary rituals, the most important analogy we should make with prehistoric people is to assume that prehistoric people also participated in a wide range of practices. Further, while changes in practices are often interpreted as signals as changes in belief systems, both Ucko (1969) and Fabian (1973) made clear that even if one is observing a living population, mortuary rituals do necessarily reflect the spiritual or religious belief systems and modern observations certainly cannot easily be used to infer the belief systems of archaeological populations.

New Archaeology and the Processual Movement

The "New Archaeology" or processual movement (e.g., Binford 1962) saw explicit attempts to understand archaeological populations through the lens of their mortuary ritual and with a goal to understand how social structure is represented in these practices. "Middle Range Theory" in archaeological inquiry has sought to find human universals would lead to "middle range laws" applicable to any society. One important component of this thinking was the analysis of mortuary rituals. A plethora of archaeologists set to work documenting and comparing mortuary practices in living populations and ethnographic records and then applying these insights to archaeological problems.

Out of the work toward characterizing the middle range, came the work of Binford (1971) who developed a number of proposals about the relationship between society and mortuary rituals. Kroeber (1927) had been one of the earliest to comment on variation in mortuary ritual and methods of "disposal of the dead,' and his ideas were the dominant view until this time. He attributed the practice of two mortuary rituals (burial and cremation) in the same community to mortuary practices being unstable and fluctuating according to what was 'fashionable" or according to exposure to other ideas. Thus, he characterized mortuary rituals as separate from other aspects of culture and not necessarily reflective of the culture as a whole. Binford tested this idea by developing hypotheses that considered the interrelationship of mortuary rituals, social organization, and subsistence strategy rather than accepting that death practices were entirely independent of these things. He advocated for considering mortuary ritual as two parts: ritual and technical practice. This approach was important because it allowed archaeologists to consider evidence of ritual (including non-mortuary behaviors) and evidence of the mortuary practice independently. With this approach, archaeologists could test why and where variation in practices might be seen. Binford's work elaborated on the idea of social complexity by proposing that mortuary rituals should reflect the complexity of the community that the deceased was from (e.g., foragers, hunter-gatherers, pastoralists, farmers, etc.) and that the way they were celebrated through funerary rituals should vary depending on their status within that community. Binford rejected Kroeber's thesis that mortuary rituals were unstable and changed easily through exposure to other practices. His work also added more texture to Childe's (1945) assertion that changes in subsistence base lead to changes in mortuary rituals

Binford's work, in addition to that of Saxe (1970, 1971) led to the commonly invoked hypothesis surrounding the creation and maintenance of bounded cemeteries. Saxe developed eight hypotheses on funerary treatment, status, complexity of society, and social persona. The most famous of these and the one that is most commonly used to interpret prehistoric mortuary rituals is hypothesis 8, which states that formal locations for the disposal of the dead (e.g., cemeteries) are symbols that help communities deal with resource scarcity, and that these emerge when communities become more complex and need to assert

ownership or control access of those scarce resources. This formal bounded area for the dead acts as a marker that communicates these relationships with the resource(s) in question.

Refining and Testing the Saxe/Binford Paradigm

The Saxe/Binford framework was widely applied to archaeological sites around the world, and focused mortuary archaeological inquiries onto the establishing social rank and groupings. Criticism and alternate approaches emerged and covered several key themes: expansion of the framework, revision of the framework, and tempering of the application of the framework.

For example, Tainter (1975, 1978) elaborated by suggesting that "energy expenditure" associated with the mortuary ritual (which includes everything from planning, building a structure, treatment of the body, and the closing of the tomb or grave) will be commensurate with the social rank of the deceased. Further, he found in his analyses that this ritual was more often related to the status of the deceased than the quality and quantity of mortuary goods. The question of what type of social position (e.g., vertical versus horizontal) is reflected in this practice and was later tackled by Carr (1995) who argued that expressions of personal identity decrease with social complexity and indications of horizontal social position increase with social complexity.

So, if archaeologists were to use mortuary goods to understand social rank and from this interpret social organization at a site, how reliable is the archaeological record with regard to preservation of these data? Moreover, if Tainter's assertion that ritual reflected social rank better than interred material culture, how well can we assess status in mortuary contexts? Several approaches to this and related questions helped to refine the application of the Saxe/Binford framework. First, Goldstein (1981) emphasized that mortuary systems are multidimensional and that inherent bias in archaeological inquiry (e.g., difficulties in understanding context and time-depth; sampling bias) limits appropriate interpretation of mortuary contexts. She asked what utility there was in quantifying the number of social classes within a mortuary system when the archaeologist could not be sure to have captured all the possible social categories that had been present due to these issues of bias. She proposed incorporating a consideration of spatiality to Saxe's famous hypothesis 8, most specifically to highlight the organization of mortuary spaces as a tool to organize and understand mortuary ritual. She suggested (Goldstein 1981) corporate groups that used ancestral ties to assert control of resources would engage in ritualized reaffirmation of these ties regularly. The frequency of these rituals would be linked to the importance of leveraging these ties to manage desired resources and maintenance of cemeteries is one method of these reaffirmations. Further, she suggested that if a devoted space for the disposal of the dead is present then it is likely that this was due to the presence of corporate groups that constructed this space in order assert control over resources at that location. This revision explicitly considers these data from a spatial perspective and links the behavioral strategies articulated by Saxe and Binford to use of discrete space. In her analyses of Mississippian mortuary practices, she demonstrated that analyses considering only artifacts could identify differences in status from the mortuary record, but that an analysis using both artifacts and positioning was able to more finely differentiate group membership.

O'Shea (1981) also tested the Saxe/Binford framework. He used data from five Native American sites that had ethnographic descriptions of mortuary rituals and observable archaeological data. He explored the consistency between the range of social distinctions known from ethnographical data and what was visible in the archaeological record, as well as known temporal changes in mortuary ritual versus what was represented in the archaeological record. Like Goldstein (1981) he found that vertical relationships (social rank) were observable – artifacts present in a mortuary context can be used to determine relative rank within

that community, but that horizontal (kin-based) distinctions were not observable. Specifically, he highlighted elements symbolic of horizontal distinctions such as clothing, hairstyle, body placement, and other artifacts that may not be preserved, but which are vital to identify these distinctions. His other key result here was that the ethnographic record had recorded temporal instability in mortuary practices that were not visible and that demonstrated that temporal changes in mortuary practices are obscured by the archaeological record, thus emphasizing the importance of considering temporal change in mortuary practices.

Charles and Buikstra (1983) further elaborated on the spatial component of the Saxe/Binford/Goldstein framework by exploring how this framework worked in sedentary Archaic Native American groups that were experiencing various degrees of competition. In addition to linking formal, bounded spaces for the dead with a sedentary lifestyle and the need to engage in territorial behavior, they framed the corporate group as the village and noted that adult individuals were differentiated by their ability to participate in subsistence activities (sick adults were excluded).

Modeling Mortuary Monuments

The Saxe-Binford framework became the dominant model used to infer social complexity from the mortuary record (e.g., Saxe and Gall 1977; Chapman *et al*. 1981; Bloch and Parry 1982; Chapman 1987; Metcalf and Huntington 1991; Morris 1991; Brown 1995; Charles 1995; Goldstein 1981, 1995), and simultaneously a new framework to understand monument building was developing. Renfrew (1976) argued that the megalithic tombs of northwestern Europe developed not as a result of diffusion of an idea to build these monuments, but rather developed independently in a number of locations by segmentary societies as territory markers. While not an explicit reference to Saxe-Binford, this interpretation implicated the construction of mortuary features with reference to claims of territory that were driven by stress - demographic pressure (population growth) experienced with agricultural intensification and competition for fertile land. Importantly, he acknowledged the distinction between the primary utilitarian function of the monuments (receptacle to inter the dead) and the likelihood that the symbolic function served other purposes. Specifically he noted that these tombs were public monuments that were built by the living and that the placement and inception of these monuments may be linked to a desire to mark territory. Chapman (1981) explicitly applied the Saxe-Binford model to this same topic and argued that megalithic tombs were analogous to bounded cemeteries, thereby extending the application of hypothesis 8 to monuments.

Chapman (1995) revisited this idea for the volume *Regional Approaches to Mortuary Analyses* (Beck 1995) and acknowledged some important updates. First, between these two publications, a more nuanced understanding of the timing of subsistence strategy changes developed, which altered the argument for stress caused by agricultural intensification and competition for land. Next, Chapman integrated Ingold's (1986) work on the difference between "territory" and "tenure," convincing Chapman that the more appropriate way to frame resources of interest in the Saxe-Binford model was to refer to land or resource tenure which extends to appropriation of places, paths, and locations and helps to mitigate some of the problematic notions of who and why people exert claims of territory. Finally, he encouraged an understanding of monuments beyond using them as a proxy for settlement location (especially since Universalist rules do not define one by the other in all locations). He further encouraged these megalithic tombs to be considered formal disposal areas for the dead, as well as a means of communication that can be manipulated and appropriated for other purposes.

No More Appendices: Bioarchaeology

In the midst of the changes that New Archaeology brought to mortuary archaeology, a related field of study began to assert the important role it held for interpreting the lives of past people: Bioarchaeology (Blakely 1977). The importance of the emergence of this field cannot be overstated. Prior to this time, much of the work that was conducted on the skeletal remains found in the graves and tombs that were the center of so much study was relegated to appendices found at the end of a site report or summarized in some other brief manner. Too often, only portions of the skeleton or grave goods were recovered from excavations or excavation proceeded in a manner that nearly all context (e.g., body position) for the skeleton was lost. Until this point, the role of the osteology specialist was often to study the skeletal remains in a laboratory far from the context from which they had been excavated. It was with this new era of archaeology that Bioarchaeology (in the American sense - in Europe bioarchaeology is often still used to described the study of faunal remains; Osteoarchaeology is a good parallel term in Europe) that married archaeology and skeletal biology, emerged as a valid form of archaeological inquiry. This is not to say that the cooperation of these two field had never been practiced or recognized as a worthy goal. Still, much of the analyses of human skeletal remains sought to classify people. Unfortunately, this meant a focus on craniometry and establishing the differences between the "races" (e.g., Morton 1839, 1844). The truth of human variation is that there is more variation within groups than between them, and there are no biologically defined races. Early osteology work was an attempt to understand human variation and to understand the origin of different groups of people (e.g., Hooten 1930: Neumann 1952), but more sophisticated views of human variation banished many of these early practices.

At the time that New Archaeology was taking root, researchers were beginning to examine not just the material culture and the receptacle that held the dead, but all aspects of the skeletal remains including the treatment of the body and the evidence of health and disease apparent on the skeleton. The practice of bioarchaeology differs from simply treating the skeletal remains as an artifact and having a specialist examine the bones specifically. Bioarchaeologists are archaeologists who integrate a knowledge of skeletal anatomy with excavation of the receptacle (tomb, grave, etc.) and knowledge of the material culture. Perhaps most important in this work was the adoption of a population perspective (see Armelagos 2003). This approach allowed the bioarchaeologist to develop an excavation plan that can generate considerable insight into mortuary ritual and how it may vary by age, sex, and health status. It can facilitate the development of detailed demographic data that can help to more fully understand not only the mortuary ritual, but also the quality of life and lifestyle of people in the ancient past. Finally, rather than appearing in an appendix as an afterthought, these data became central to the arguments surrounding mortuary practices.

Understanding the "Why" of Mortuary Practices: the Post-Processual Approach

If one summarizes the processual approach to mortuary rituals as seeking to use the scientific method to establish middle range behaviors that explain the interrelationships of socioeconomics, spatiality, and human behavior in the death practices, the post-processual approach (e.g., Hodder 1982a, 1982b, 1985) can be summarized as seeking answers for why people engaged in those behaviors and what these decisions meant for individuals and individual cultures. This movement was provoked by the view that processual inquiries sought to establish universals and generalizations about human behavior. For example, Hodder (1985) emphasized that the processual framework seemed to lose sight of the role of the individual to make decisions and interpret symbolic material culture. Importantly, individuals and individual cultures (as

opposed to all cultures) have the potential to interpret behavior and material culture differently from one another. Objects of material culture may have both functional and symbolic function (e.g., Miller 1982; Tilley 1982; Miller and Tilley 1983), as do structures, cemeteries, graves, and other spaces (e.g., Parker Pearson 2002). Individual and group agency allow for and perhaps encourages the use of any of these objects and spaces for negotiation of identity, boundaries, power, and a host of other possible active social processes. Viewing death practices through this lens, promoted a reconsideration of processual explanations because it introduced the possibility that cross-cultural and even intra-cemetery analyses could be misunderstood if it is assumed that all mortuary treatments and funerary offerings mean the same thing to all individuals and all cultures.

Take, for example, the concept of energy expenditure related to rank or status or social role (e.g., Tainter 1975, 1978). These principles are useful for situations where death practices for wealthy or more important people are clearly more elaborate, but it is sometimes misapplied when researchers assume that a larger or more complex monument, grave, or ritual implies higher rank or wealth or some other measure of social status. Parker Pearson (1982) artfully demonstrated this in his study of mortuary practices of Victorian England where it seemed that wealthier segments of society periodically adopted more modest practices in an effort to distinguish themselves. In these circumstances, simple observation of the "wealth" of the grave did not match social rank, but instead had an inverse relationship. He was able to evaluate this based on historical records, which also included information on the motivation of the people at this time. This is, of course, a luxury that archaeologists often do not have, so this example should serve as point of caution about over-interpreting the correlation between funerary wealth and wealth/importance during life. Parker Pearson (2002) extended this perspective to the study of monuments as well using a relational analogy to compare the use of wood and stone in funerary structures in Madagascar to understand the iterative building of European megaliths. Here, the "universal" that may be applied to studies of other cultures is that symbolism in one culture is not necessarily applicable in other.

Building on the work of Bloch (1971), Parker Pearson also challenged the interpretation that identity of the deceased would be reflected in their mortuary treatment, by asserting that the identity of the deceased was actually the result of interplay between the status of the individual in life as well as the actions of the living descendants who performed the mortuary ritual(s). Thus, there was considerable opportunity to manipulate the situation, to use the ritual to communicate identity of the deceased to benefit the living, to manage politics, and/or (re)negotiate relationships.

This post-processual approach was sharply criticized, but without doubt, these scholars influenced the next stage of research in mortuary practices especially with regard to questions surrounding identity, memory, interpretation of landscapes and sacred spaces, the body as material culture, kinship, and monumentality (e.g., Van Dyke and Alcock 2003; Sofaer 2006; Devlin and Graham 2015; among many others). Landscape perspectives, including examination of the space and place that the dead are interred, where death practices are performed, and where and how the dead are memorialized, are useful for understanding past practices and communities. Landscape approaches range from empirically oriented quantification of the use of space for mortuary practices and monument construction (e.g., de Reu *et al.* 2011; Bongers *et al.* 2012; Deadman 2012; Deadman and Al-Jahwari 2016) to phenomenological approaches (e.g., Bradley 1987, 1998 Barrett 1990; Birch and Williamson 2015) that seek to learn about how these same practices embodied identity, remembering/forgetting, and political embodiment. We can contrast these two approaches by declaring that an empirical approach examines spatiality and measurable relationships between different places on the landscape whereas a phenomenological approach considers the interpretation of spatiality not only

considering measurable relationships but also with an eye for how the landscape was viewed by different people and over time.

Methodology in this Volume

"*Mortuary monuments are both the context for funerary rites and their consequence." (Barrett 1990)*

This brief review of the milestones in the evolution of thinking in mortuary archaeology and bioarchaeology is not meant to be comprehensive. This review provides a framework to explore the theoretical influences on mortuary archaeology and bioarchaeology in general in order to introduce the methodology employed in this volume. It is this writer's intent to examine the work that has thus far been published on the Early Bronze Age mortuary landscapes on the Oman Peninsula, to synthesize what we know and do not know about death practices during this period of history, and propose new questions and future directions for research.

From a methodological perspective, this volume seeks to utilize pieces of each approach where appropriate. For the study of the dead and past death practices, it seems that it may be impossible to divorce the consideration of individual (and group) perspective and agency from patterns of products that might be generalizable to larger social systems. As Barrett (1990) succinctly concludes, mortuary monuments represent both context (process, experience) and consequence (the fact of the mortuary monuments itself) of past death practices. This volume takes this assertion seriously and on balance, it tries to apply the methods employed by Charles and Buikstra (2002) who considered what "events" can be discerned from the archaeological record. In other words, in this volume the author attempts to answer the question "What do we know happened?" and then using those data tries to model what these events may have meant for how ancient people of the Oman Peninsula treated the dead.

Chapter 2

Mortuary Monuments: Cairns (3200–2700 BC)

Early Bronze Age burial cairns are ubiquitous throughout most of the Oman Peninsula as well as across all of Arabia. Knowledge of these cairns is not new; certainly, many generations of local inhabitants and travelers to the region have seen these structures. When the true nature of their construction and use was forgotten is not known – that too has been forgotten. Since that time, many narratives have developed to explain why they are there, when they were built, and what purpose they held. These cairns have become part of the landscape of the Oman Peninsula in a way that other archaeological ruins have not. Towers and other buildings made of stone or mudbrick are also visible throughout the region, but these degrade differently than the cairns. Many foundations of structures are buried by sand, built over by later development, or even hidden by palm oases. Cairns, however, due their placement high on the landscape and usually in areas that are largely unsuitable for use as settlements, remain mysterious and serve to remind visitors of ancient practices, long forgotten.

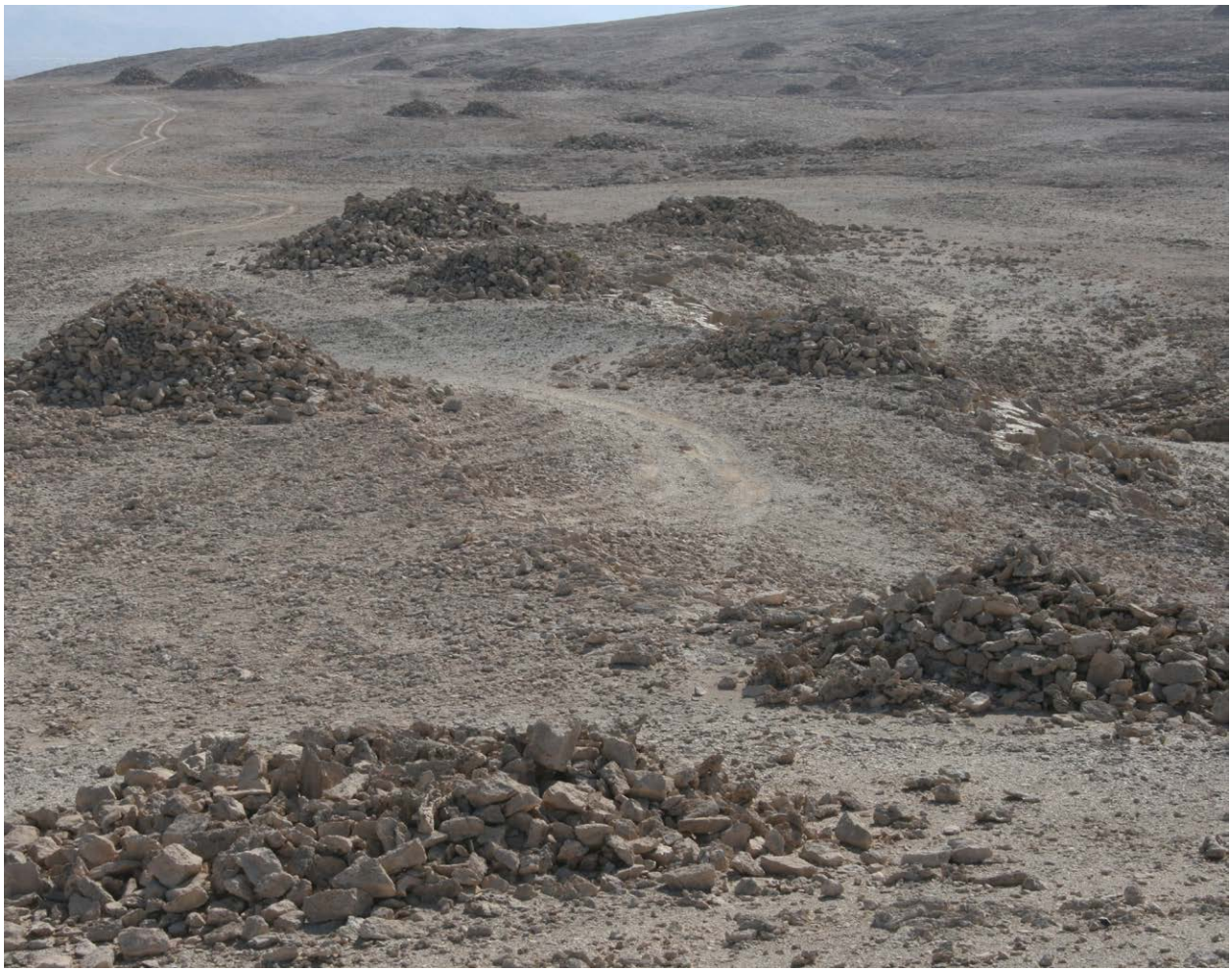


Figure 2.1. Early Bronze Age cairns at Al-Khubayb necropolis, Dhank.

Figure 2.2. Early Bronze Age cairns (a) Al-Khubayb necropolis; (b) Al-Khubayb necropolis; (c) Zukayt necropolis.

First Archaeology of Early Bronze Age Cairns

On the Oman Peninsula, Early Bronze Age archaeological inquiry began in earnest following initial work on the burial mounds on Bahrain and the later discovery of the 3rd millennium settlement and monumental tombs on Umm an-Nar Island. Researchers saw this discovery as the first significant evidence of settlements at the edge of more prominent Near Eastern civilizations, and sites that would help elucidate the reach of those empires during the Early Bronze Age. The Danish expeditions to Umm an-Nar Island were quickly followed by visits to the Buraimi oasis and the recognition of the tombs at Jebel Hafit as a different form of mortuary structure, although it was not until excavations at this site that it became apparent that these tombs were the predecessors of the finely built monuments seen on Umm an-Nar Island.

In the cairns at Jebel Hafit, the presence of Jemdet Nasr/Early Dynastic ceramic jars (Figure 2.4) helped to date these tombs to the end of the fourth millennium /start of the 3rd millennium BC. Researchers characterized these tombs simply as single chambered conical tombs made from local unworked stones. In addition to Jemdet Nasr/Early Dynastic vessels, beads of faience, softstone, shell, carnelian, quartz, and agate were found (Figures 2.5a and 2.5b). Small instruments such as pins, awls, spatulas, and other personal tools, as well as rivets and daggers were among the copper/bronze objects found in these tombs as well (Figure 2.6a-b). The inclusion of foreign goods and the objects made from copper/bronze received special attention because it has long been conjecture that the Oman Peninsula was the location of the Magan referred to in Mesopotamian texts as the source of copper mines that were in heavy demand in the 3rd millennium BC. In the early years of inquiry, the limited data available did not support extensive trade with the northern power agents such as the Mesopotamian and Indus civilizations, and while 3rd millennium BC copper smelting sites were known in Oman (e.g., Weisgerber 1981a, 1983), there was not good evidence that this copper production was large enough to support significant export out of the Oman Peninsula (see Hastings *et al*. 1975).

Figure 2.3. Map of key Early Bronze Age cairn sites of the Oman Peninsula.

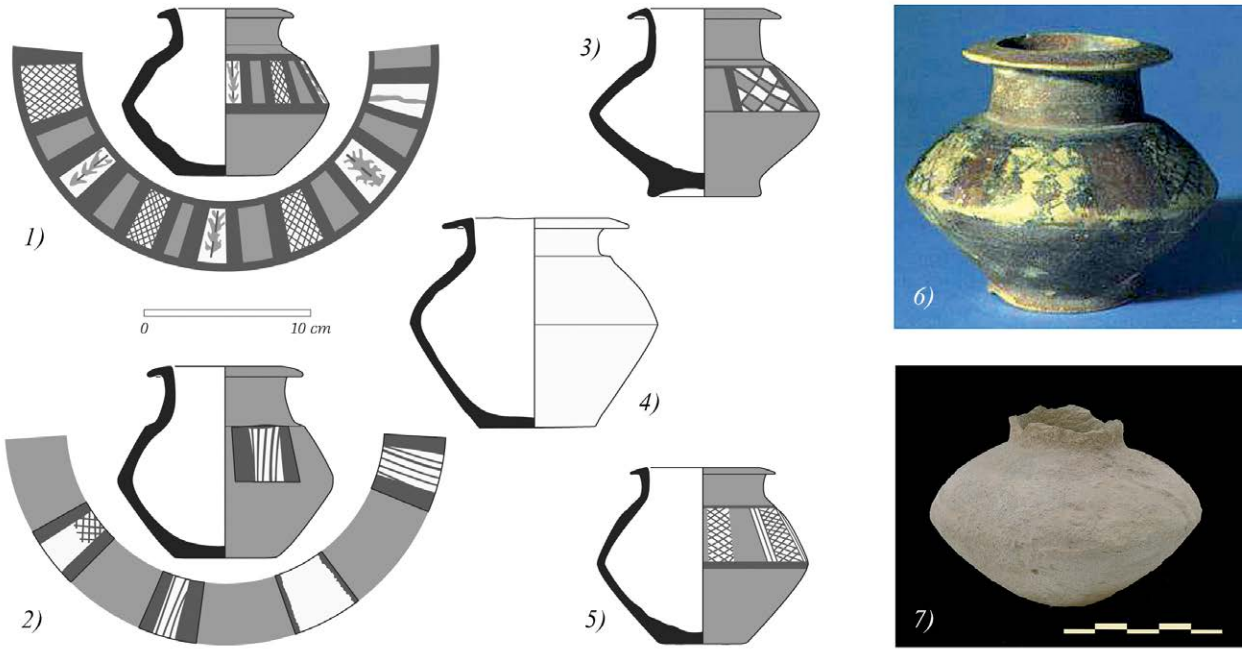


Figure 2.4. Examples of Jemdet Nasr vessels (after Cleuziou and Tosi 2021: fig. 93).

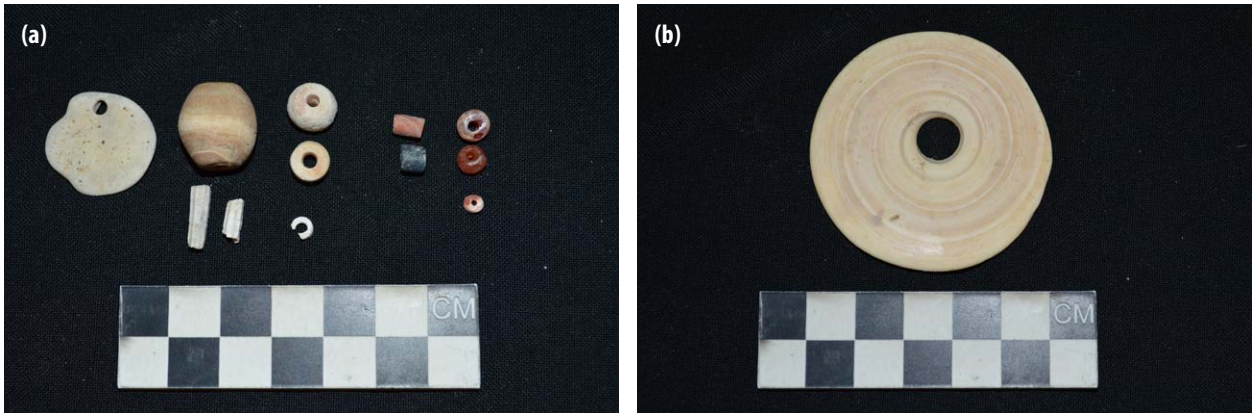


Figure 2.5. (a) Beads and (b) shell pendant recovered from excavation of Hafit-type cairns at the Al-Khubayb necropolis.

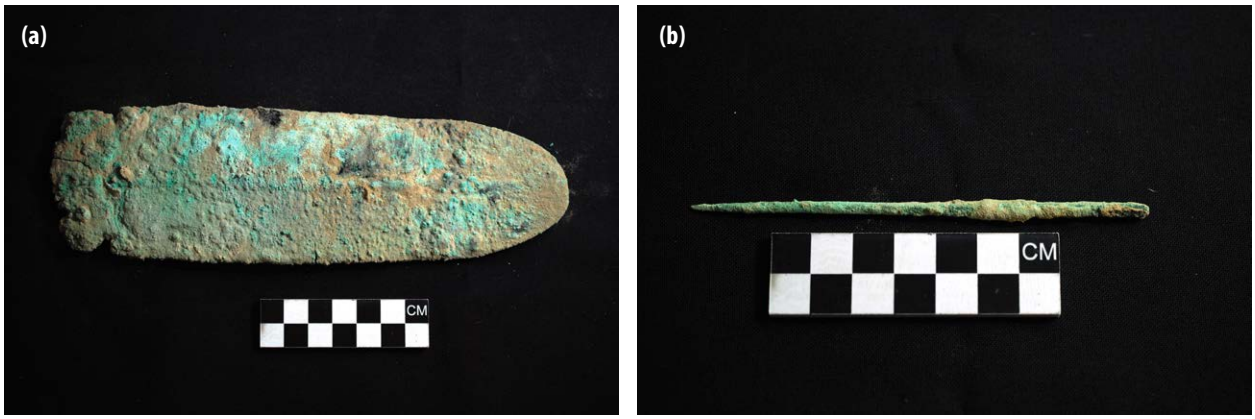


Figure 2.6. Examples of (a) dagger commonly recovered during excavation of Hafit-type cairns and (b) bronze awl/needle.

As excavations continued, more evidence accrued and a picture of interaction with powerful foreigners favored the power and agency of the empires to the north of the Oman Peninsula. More often than not, the lack of clear centralized hierarchy on the Oman Peninsula at this time made researchers assume that the influence from these larger power agents shaped the behavior and practices of the people of the Oman Peninsula. In the simplest terms, the presence of the copper/bronze demonstrated that these items were considered valuable, and the inclusion of the Jemdet Nasr/Early Dynastic ceramics demonstrated contact between Mesopotamia and the Oman Peninsula as well as the suggestion that these foreign objects were important enough to furnish the graves of the dead.

The chronology of the Hafit and Umm an-Nar periods and the way these lined up with better understood archaeological horizons was debated (Potts 1986), and arguably, for many years, the strongest line of evidence were the Jemdet Nasr/Early Dynastic ceramics. Bead forms and materials used in their manufacture did not help to narrow the chronology, and other material culture such as bronze/copper rivets and blades were not diagnostic of a period more specific than "Bronze Age."

Soon, this picture became even more complicated as investigations at Jebel Hafit and then at the site of Bat demonstrated that these tombs were reused during the Iron Age (Frifelt 1975a), thus often mixing the interred materials and conflating evidence of the interment events contained in them. Both recent and ancient looters robbed and/or damaged many tombs, and more recent construction efforts from at least the 1960's onward saw the tombs fall victim to stone quarrying.

Starting in the 1970's large surveys and targeted excavations primarily in the northern Oman Peninsula, provided important information about the distribution of Early Bronze Age cairns and variation in construction. Researchers tried to understand the relationship between these early cairns and the subsequent complex mortuary rituals and structures that followed them chronologically in northern Oman. It was not long before the infrequent examples of internal architecture and larger size of some of these tombs (so-called beehive-tombs) were seen as the intermediate or transitional form between the simple burial cairn and the complex Umm an-Nar tomb (Frifelt 1971). This progression from single or small order multiple interments in Hafit period cairns to communal interment in Umm an-Nar period (often) multi-compartment monumental tombs, fit the interpretation of these observations.

In southern Oman, contemporaneous Early Bronze Age cairns were far more simply built and in fact, they share architectural features that are similar to contemporaneous cairns of Early Bronze Age Hadramawt, as well as more generally across much of Arabia. These cairns are also difficult to place with chronological precision, and like those on the northern Oman Peninsula, were frequently reused in later times. Survey and excavation of these tombs are much more recent and limited. Moreover, in southern Oman, the progression from simple interment in single chambered cairns to more complex funerary rituals that was observed in the north did not occur and thus, what succeeded the Early Bronze Age cairn in this region is not well understood. Thus, the Early Bronze Age cairn across the Oman Peninsula is a deceptively complicated archaeological problem.

What is a Cairn?

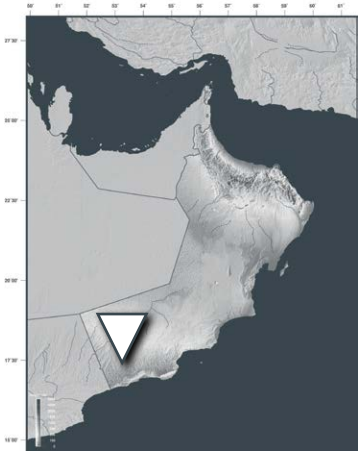
Monumentality

The establishment of monuments for the dead is an aspect of human behavior that is seen around the world, imagined and constructed independently in a number of locations. The development of monumentality is a long considered question, attributed to signaling of territory, land tenure, and the complex relationships

between people who depended on various natural resources (e.g., Saxe and Gall 1977; Chapman *et al*. 1981). The Early Bronze Age (3200-2000 BC) on the Oman Peninsula is characterized by the first appearance of monumental tombs. This style of monument for the dead is seen across all of Arabia at this time although regional variations in cairn architecture and use are clear. During the preceding Neolithic period, the dead were interred in shallow pits, often ringed or marked with stone circles (Durante and Tosi 1977; Maggi *et al*. 1985; Gaultier *et al*. 2005; Usai 2006; Munoz *et al*. 2010). There is some evidence of monument construction early in the Neolithic period (Williams and Gregoricka 2020; and see Spotlight: Necropolis at KJ1), and there is evidence of Neolithic remains that may have been moved into more recent Early Bronze Age tombs (Williams *et al*. 2014). In this case, Neolithic skeletal material was placed under the floor of a monument presumed to have been built during the Early Bronze Age (see Spotlight: Mudhai). Despite this blurring of the lines between the practices of the Neolithic and the earliest part of the Early Bronze Age, the first *widespread* construction and use of monumental tombs can be confidently attributed to the earliest part of the Bronze Age – the late 4th and early 3rd millennium BC. Increasing information about inland Neolithic settlements (e.g., Bretzke *et al*. 2018) and monumental architecture before the Early Bronze Age (e.g., Williams and Gregoricka 2020; and see Spotlight: Necropolis at KJ1) is creating a more nuanced picture of life at this time and will likely lead to more information that may push the date of the monumental construction on the Oman Peninsula earlier.

Figure 2.7. Early Bronze Age cairns at the site Abu Silah, Dhank.

Spotlight 1 | Mudhai, Dhofar, Oman



The Mudhai oasis (Figure 2.3) was investigated by the Arabian Human Social Dynamics team 2009-2010 (Harrower *et al.* 2014; McCorriston *et al*. 2014; Williams *et al*. 2014). Early Bronze Age tombs and other small scale monuments were documented, and in some cases, excavated. One tomb was particularly remarkable for the details it provided regarding Early Bronze Age mortuary ritual.

Tomb D001-001, located on a bedrock plateau overlooking the village of Mudhai, was the sole tomb located on this low cliff (Figure 2.8). The round burial chamber (1.20 m diameter) was intact and five individuals were interred in this monument.

Individual A: This individual, an adult male 40+years of age, was interred in a tightly flexed position against the eastern wall and directly on bedrock (Figure 2.10). Based on the tight flexion of the body, it is likely that the remains were bound with material no longer preserved. This individual was encompassed by a stone semi-circle which delineated the interment space from the rest of the burial chamber. An irregular stone floor was built on top of this interment and the rest of the chamber.

In life, this individual experienced fractures of the toes (middle and distal phalanges) and fractures of the 3rd, 4th, 5th, 6th and 7th cervical vertebrae as well as the 1st thoracic vertebrae. The toes and the 3rd thru 5th cervical vertebrae healed, but the fractures of the 6th and 7th cervical vertebrae as well as the 1st thoracic vertebrae did not heal properly (incomplete fusion), likely leading to significant functional impairment. A calibrated bone bioapatite date for this individual placed his death at 4221-3379 cal. BC (Table 5.1).

Figure 2.8. Tomb D001-001 before excavation (after Williams *et al*. 2014)

Individual B: This individual, a young adult male 20-30 years of age at death, was also tightly bound and placed along the southern chamber wall. This individual was placed on the stone floor that covered Individual A. The calibrated bone bioapatite date for this individual placed his death at 3082-2879 cal. BC (Table 5.1). No further information could be gleaned from the skeletal remains.

Individuals C, D, and E: These three individuals were found commingled in the center of the tomb chamber. They represent at least one, and likely two reuse events of this tomb. Individual C (adult female 20-25 years) and Individual D (pre-term/term infant) were found in close association and likely comprise one reuse event where as Individual E (older male, 40+ years) may represent a second reuse event. A single bone bioapatite sample was submitted for chronometric dating, revealing a date of 3329-2935 cal. BC (Table 5.1). It is important to note that these remains were both commingled and disturbed by roof fall and taphonomic activity.

Figure 2.9. Closeup of exterior of wall of D001-001 (after Williams *et al*. 2014)

Figure 2.10. Neolithic interment under floor in tomb D001-001 (after Williams *et al*. 2014)

Key Citations

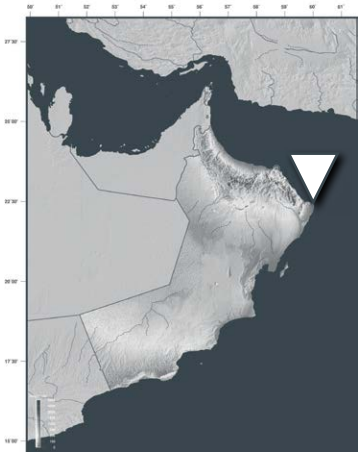
Harrower M.J., M.J. Senn and J. McCorriston (2014) Tombs, triliths, and oases: spatial analysis of the Arabian Human Social Dynamics (AHSD) Project, Archaeological Survey 2009-2010. *Journal of Oman Studies* 18: 145-151.

McCorriston J., M.J. Harrower, T. Steimer-Herbet, K.D. Williams, M. Senn, M. Al-Hadhari, M. Al-Kathiri, J.-F. Saliege and J. Everhart (2014) Monuments and landscape of mobile pastoralists: the Dhofar Monument Survey 2009-2011. *Journal of Oman Studies* 18: 117-144.

Williams K.D., T. Steimer-Herbet, L. Gregoricka, J.-F. Saliege, J. McCorriston (2014) Bioarchaeological analyses of 3rd millennium BC high circular tower tombs in Dhofar, Oman. *Journal of Oman Studies* 18: 153-173.

Spotlight 2 | Necropolis KJ1, Ash-Sharqiyah, Oman

C. Sévin-Allouet, A. Thomas and N. Gautier



The necropolis of KJ1 is located in the Wilayat f Sur, about 3 km south-west of the Khor Jarama. This necropolis lays at the top of a promontory with eleven Hafit-type cairns (based on their shape) and on the terrace are another seven such cairns (Figure 2.11).

The excavation of Tomb 1 on the aforementioned terrace in 2018 unearthed a monument with complex architecture (Figure 2.12). It took the form of a large circular structure built with dry stone and measuring 6.70 meters in diameter and 1.70 m tall. It was likelt sealed with a corbelled roof, but this was not evident in the remaining structure. One interment (st.1004) was placed in the center of the monument. This individual was a probable adult male who was placed in a flexed position on the right side. Excavation revealed little evidence of looting or other disturbance of this interment. Bioapatite dating of bone of this individual dated the interment to 3494-3125 cal. BC, the end of the Neolithic period.

A second interment (St.1001) was discovered in a small stone attachment on the northeast side of the cairn. Also an adult, this individual was also placed in a flexed position on its left, oriented NW-SE, looking toward the NE side. There is no evidence of looting of this added compartment. Mortuary offerings included beads, a piece of coral, a copper pin, and two large shells.

Bioapatite dating of this individual date this interment to the Iron Age II period (794-548 cal. BC).

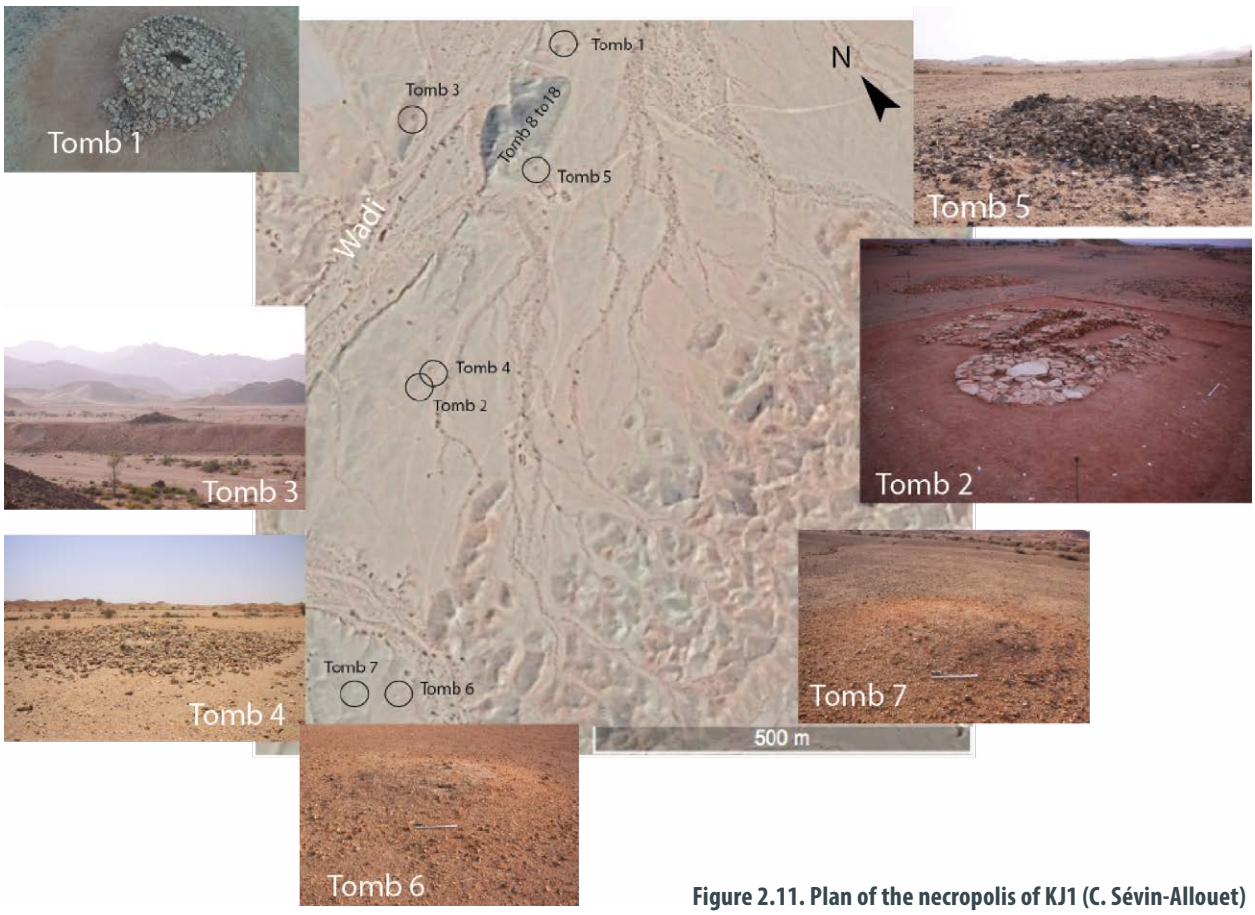


Figure 2.11. Plan of the necropolis of KJ1 (C. Sévin-Allouet)

A second excavation campaign, conducted during the winter of 2019, uncovered a complex monument combining a circular tomb measuring 4.20 m in diameter with a rectangular building (Figure 2.13). Three individuals were found in cells located in the center of the tomb, two adults and a 16-month-old baby, associated with ovi-caprid deposits, beads, and shell ring. Two bioapatite dates were obtained. A sample bone from an adult individual produced a calibrated date of 3081-2906 cal. BC (Hafit Period) and a sample from the ovi-caprid remains produced a date of 3016-2904 cal. BC (Hafit Period).

At the end of its use, this tomb was most certainly condemned by fire. Indeed, traces of a very important fire are visible throughout the southern part of the tomb. The limestone presents here a blue / red color and has been completely destroyed by the intense heat. According to a radiocarbon dating on charcoal, the large rectangular monument was built later than the tomb, belonging to the Umm an-Nar period (2575-2347 cal. BC). Considering the architectural elements it is possible to propose at least two or three distinct architectural phases corresponding to different occupations and remodeling (Figure 2.14).

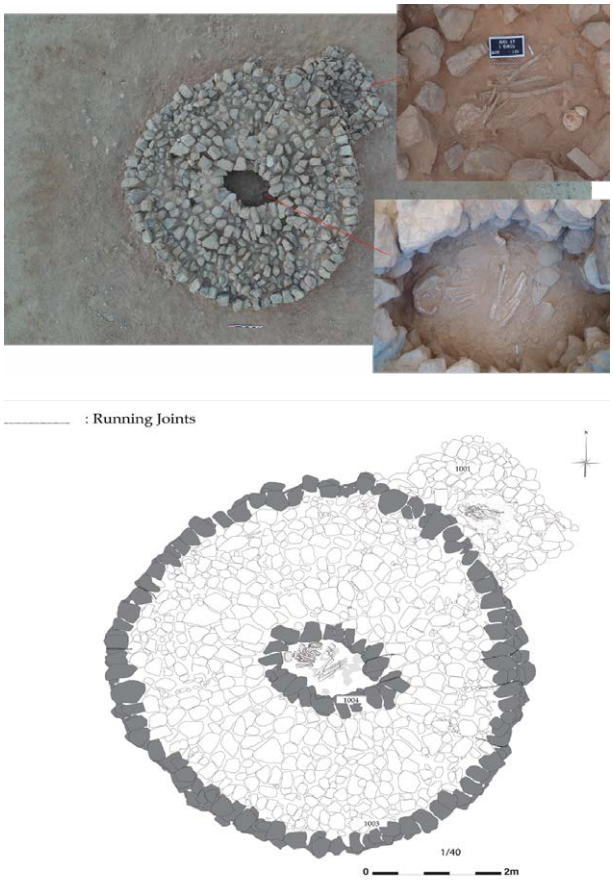


Figure 2.12.
Tomb 1 of the KJ1 necropolis
(C. Sévin-Allouet)

Figure 2.13.
Tomb 2 of the KJ1 necropolis and the associated dwelling (C. Sévin-Allouet)

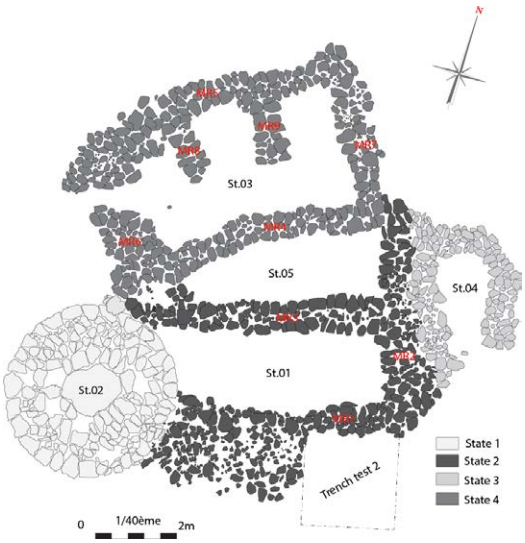


Figure 2.14.
Architectural evolution of tomb 2 of KJ1 (C. Sévin-Allouet)

Table 2.1. Terminology used for Early Bronze Age cairn tombs.

Term	Citations
Beehive Cairn	de Cardi 1975; de Cardi *at al.* 1975
Beehive Cairn Tombs	de Cardi *at al.* 1976
Beehive Tomb	de Cardi *at al.* 1976, 1977; Gentelle and Frifelt 1989; Al-Jahwari 2013a,b
Cairn	Frifelt 1971; Cleuziou 1996; de Cardi *et al.* 1979; de Cardi *at al.* 1976, 1977; Ibrahim and ElMahi 2000; Stocks 1996; Yule and Weisgerber 1998
Cairn tombs	Humphries 1974; de Cardi *at al.* 1976, 1977
Cairn Graves	Cleuziou and Tosi 2007
Circular Tombs	Costa 2006; de Cardi *at al.* 1976
Conical burial cairns	de Cardi *at al.* 1975
Conical cairns	de Cardi *at al.* 1976
Graves	Schrieber and Haser 2004
Hafit cairn/tomb	Al-Jahwari 2013a,b; Schmidt and Dopper 2017
Hafit-type cairn	ElMahi and Ibrahim 2003; Haser 2003; Schrieber and Haser 2004; Cleuziou and Tosi 2007; Giraud 2010; Williams and Gregoricka 2013, 2019; Yule and Weisgerber 1988
Hafit Period Tombs	Giraud *at al.* 2010; Cable and Al-Jabri 2019
Hafit/Beehive Tombs	Schrieber 2007
Pill Box Cairn/Tomb	de Cardi *at al.* 1975, 1976; Yule and Weisgerber 1998
Third Millennium graves	Gentille and Frifelt 1989
Bronze Age Cairns	Yule and Weisgerber 1998
Transitional Tower Tomb	Williams and Gregoricka 2019

Architecture and Building Material

Understanding the architecture of these monuments is an important part of their study. By determining the process of building, placement, and use of these monuments archaeologists can begin to piece together the role they played in ancient society. Some of the more difficult and unanswered research questions surrounding Early Bronze Age cairns of the Oman Peninsula, as well as cairns found across all of Arabia, are the questions of the number of different cairn forms, the characteristics that differentiate these forms, and what, if any, meaning we can glean from these differences. This volume addresses the observed variation and considers where this variation represents meaningful differences in sociocultural, socioeconomic, temporal, or ritual practices. Indeed, there are differences that point to variable local economies and style, but this writer takes the stance that it is less useful to develop precise categories than it is to recognize that the concept of and the act of building a mortuary cairn is the most important reflection of this period of prehistoric life in this region. As a result, in this volume, Early Bronze Age cairns are treated as a single class of monuments built in the first stage of widespread mortuary monument building (approximately 3200-2700 BC) on the Oman Peninsula. Within this class of monuments, variation is considered with particular emphasis on region and temporal variants. These variants may reflect investment in mortuary monuments based on local subsistence strategy, local resources, or temporal context.

Owing to regional variation in cairn construction, as well as a number of methodologies used to characterize these monuments, a large number of terms have been used to name Early Bronze Age cairns in the Oman Peninsula as well as the rest of Arabia. This issue has been addressed by a number of researchers (e.g., Böhme 2011, Potts 2012, Bortolini and Munoz 2015, Bortolini 2019; Williams and Gregoricka 2019) and while current understanding is that there is a wide range of variation in these cairns, it is still difficult to understand older literature when there was less agreement about terminology. For example, terms used for Early Bronze Age cairns include "cairn," "cairn tomb," "tower tomb," "high circular tower tomb," "Hafit-type cairn," "Hafit tomb," "Beehive tomb," and "Hafit grave" among others (see Table 2.1).

There are a number of reasons for this large number of terms. First, these monuments were built using immediately local materials that include stone that breaks into sheet-like blocks, smoothed river boulders, or very irregular limestone boulders. Very often in the northern Oman Peninsula, but not in Dhofar, researchers comment on the fact that the stones were well selected to create a smoothed exterior wall. Over time, these monuments have seen a variety of climatic conditions such as fluctuating temperatures, rain, and wind. The building blocks have deteriorated, and this has compromised the structural integrity of the monuments. These monuments have fallen victim to looting activities both ancient and modern, and they have been used as stone quarries. Finally, these monuments were often reused at later times, sometimes up to 3,000 years following the initial construction and use (e.g. Williams and Gregoricka 2013). All of these factors have compromised the architecture, and now very often these cairns appear as deflated mounds. During pedestrian surveys, simple observation cannot elucidate the internal architecture, use of the space in the burial chamber(s), or the contents of the tomb. The appearance of these cairns across the Oman Peninsula can appear quite different depending on the local building material and specific experience of the monument (Figure 2.15a-e).

In addition to the human and natural factors that have altered these cairns, there was local variation in construction techniques, which may maintain or further compromise the integrity of these structures over time – also leading to differences in appearance and differences in patterns of erosion. The variety of terms used over the years and by different research teams was often descriptive and the intention was to characterize the tomb and mortuary traditions broadly in order to understand the distribution of the monuments and develop excavation plans. Thus, researchers have used vague (e.g., "cairn") or more specific terms (e.g., "Beehive tomb") depending on the information that was available upon the inspection of each monument. It can be challenging to discern if the monument(s) described are comparable, and this can be especially challenging when researchers try to apply increasingly specific terminology. Very often, apparent differences in tomb forms can be attributed to the available local materials. This difficulty regarding cairn classification has been well known since the earliest archaeological surveys. Doe (1977: 36) commented that "[f]requently the term cairn merely signifies the shape and not the construction for no examples have been properly excavated to record the internal architecture."

Distribution

> *"Round us were the graves of the ancient dead: tumuli, grouped together on high places. Immensely old, they had grown into the desert floor; only their shapes indicated that there were once the work of man."* (Thesiger 1959: 89)

Following the initial discovery of monumental circular tombs on Umm an-Nar Island (Glob 1959), surveys expanded eastward across the Oman Peninsula. These surveys led the to the discovery of thousands of Early

Figure 2.15. Examples of variation in building materials used to construct Early Bronze Age cairns (a) Zukayt; (b) Halban; (c) Dhofar (courtesy of RASA project, Joy McCorriston); (d) Al-Khubayb; (e) Halban (all other photos: K.D. Williams).

Bronze Age cairns (and other archaeological features) and serve as the basis for much of our understanding about the distribution of archaeological features in this region north and west of the Rub al Khali and along the eastern coast of Oman. The Dhofar region experienced a different awakening of archaeological inquiry, and was originated by scholars who had been conducting research in Yemen. Here, the surveys that have been conducted across all of the Oman Peninsula are considered by region.

Northern Oman Peninsula

Some of the earliest descriptions of Early Bronze Age tombs tried to sort out the chronology of regional mortuary monument construction. The most important development on this topic was Karen Frifelt's (1971)

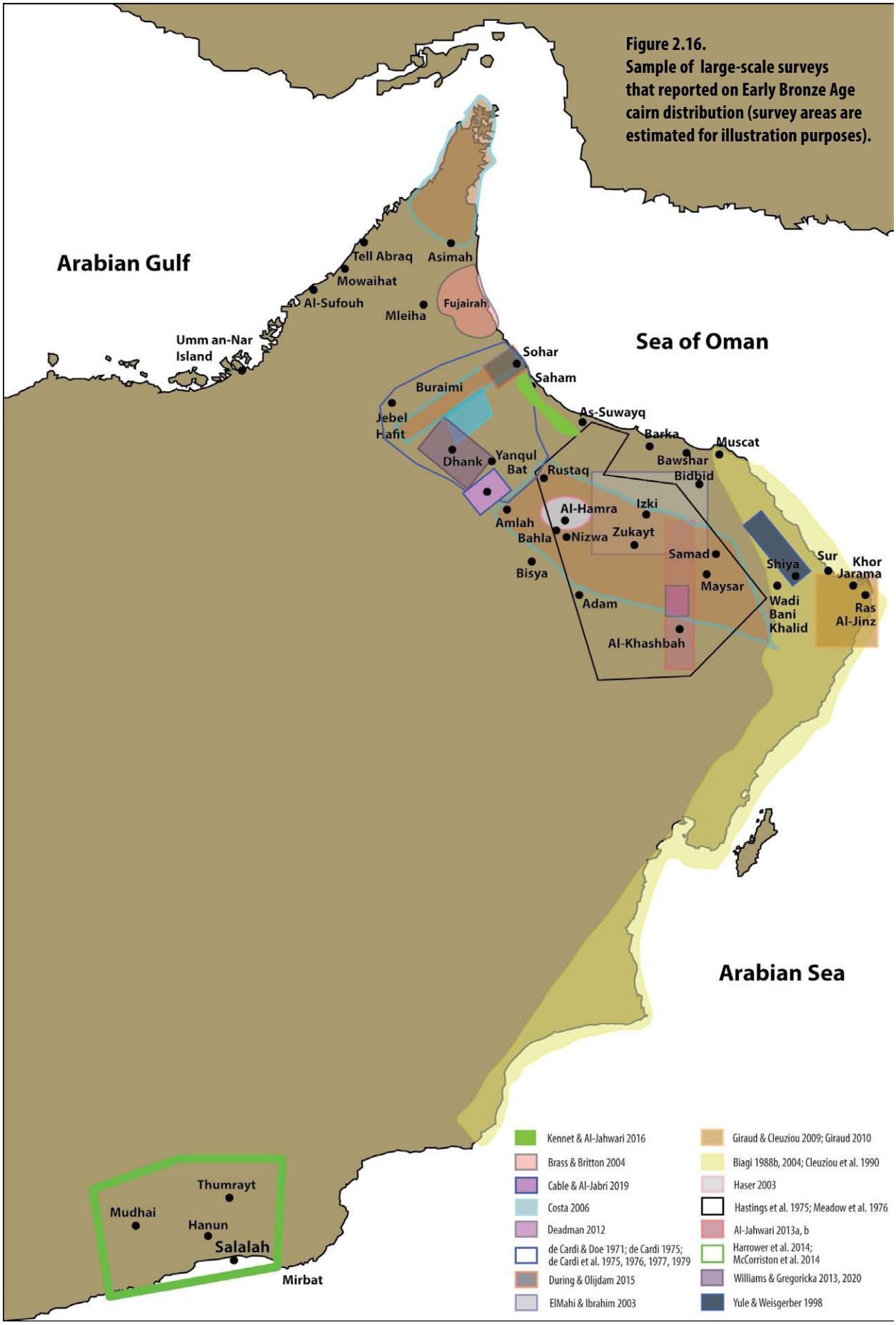


Figure 2.16.
Sample of large-scale surveys that reported on Early Bronze Age cairn distribution (survey areas are estimated for illustration purposes).

Figure 2.17. View of portion of the Abu Silah necropolis, Dhank.

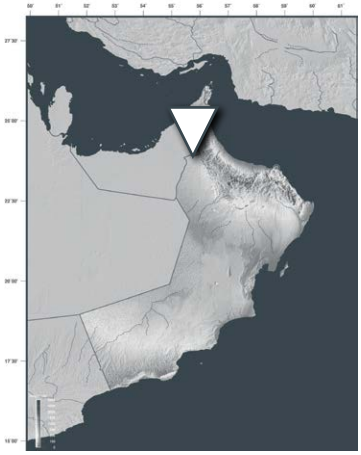
documentation of the cairns built at Jebel Hafit, which she initially called "Hafit cairns" and contrasted them with the monumental communal tombs known on Umm an-Nar Island as well as Jemdet Nasr graves.

During-Caspers (1970) also presented the issue of tomb variation between what we now know are Hafit-type cairns and Umm an-Nar communal tombs, using the terms "beehive shaped tombs" and "cairns" for the monuments excavated on Umm an-Nar Island. This early report inferred a relationship between the size of a tomb and the number of chambers it contained (During-Caspers 1970: 208-209). Amateur excavations of two cairns in the Buraimi area yielded very limited details, but complete Jemdet Nasr/Early Dynastic polychrome vessels were recovered and published for the first time (During-Caspers 1971). These cairns still dominate the ridgelines across the Oman Peninsula, although many structures now appear only as ruined piles of stones.

Beatrice de Cardi documented a large number of these cairns as part of her surveys across the northernmost parts of the Oman Peninsula including Ras Al-Khaimah, the Musandam, and along the Batinah Coast (de Cardi and Doe 1971; de Cardi *et al.* 1975). Later surveys in central Oman and the Ash-Sharqiyah regions expanded these surveys eastward to document these cairns and other archaeological features (de Cardi 1975; de Cardi *et al.* 1976; de Cardi *et al.* 1977).

Frifelt (1975a, 1975b) expanded her work from Jebel Hafit with surveys from the Buraimi oasis and along the Wadi Jizzi/Suq, across Al-Hajar mountain range to Sohar; and the Ibri area (caravan route along Western foot of Al-Hajar range). She speculated that some of the cairns seen on the route from Dhank to Ibri were likely from the Iron Age, especially those built higher on the ridgeline (Frifelt 1975a: 381-383), but later work around Dhank does not supported this hypothesis (e.g., Williams and Gregoricka 2020).

Spotlight 3 | Jebel Hafit, U.A.E.



Excavated between 1961 and 1971, the tombs at Jebel Hafit provided some of the first evidence regarding construction and use of small mortuary cairns on the Oman Peninsula. Despite stone quarrying, looting, and reuse events, the tombs at this site have provided important architectural evidence of Early Bronze Age cairns. This necropolis is on the ridges at the western end of the Al-Hajar mountains and near to the well documented Buraimi oasis. This site occupies an important location between the sites closer to the Arabian Gulf and inland sites south of the Al-Hajar mountains.

The 46 cairns excavated revealed monuments that ranged from 4.0-8.0m in exterior diameter and 0.5-2.7m in standing height. All of these tombs are characterized by a single burial chamber that was shaped round, pear, oval, rectangular, or rhomboidal. When identified, entrances opened in variable directions (Figure 2.18).

Like all Early Bronze Age mortuary monuments, preservation of the skeletal material was impacted by preservation issues and reuse events. In total, there is evidence of 52 individuals (44-47 individuals from the Early Bronze Age and an additional 4-6 individuals from later reuse events) in these 46 tombs, with most of the tombs (43%) having containing evidence of a single interment. Reuse events were identified from the Umm an-Nar period, the Wadi Suq period, and the Iron Age.

Early Bronze Age material culture recovered from these cairns included Early Dynastic Jemdet Nasr ceramic vessels, beads, and small copper/bronze objects.

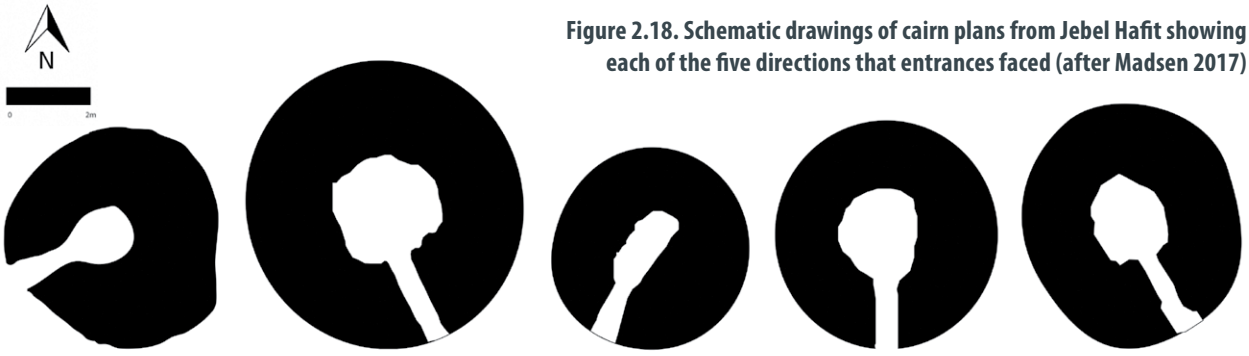


Figure 2.18. Schematic drawings of cairn plans from Jebel Hafit showing each of the five directions that entrances faced (after Madsen 2017)

Number of Tombs Examined: 46

Dimensions of Tombs

- Exterior Diameter: 4.0-8.0m
- Maximum Standing Height: 0.5-2.7m

Chamber Shapes

- Circular
- Pear Oval
- Rectangular
- Rhomboid

Number of Ringwalls: 1-5

Entrance Orientation

- WSW (n=1)
- SW (n= 2)
- S (n= 21)
- SSE (n=8)
- SE (n=3)
- unclear/not located (n=11)

Minimum Number of Individuals Interred: 52

Early Bronze Age

- Empty 35%
- 1 interment 43%
- 2 interments 2%
- 3 interments 13%
- > 3 interments 2%

Reuse Events

- Umm an-Nar 3
- Wadi Suq 3
- Iron Age 2
- Unknown 4

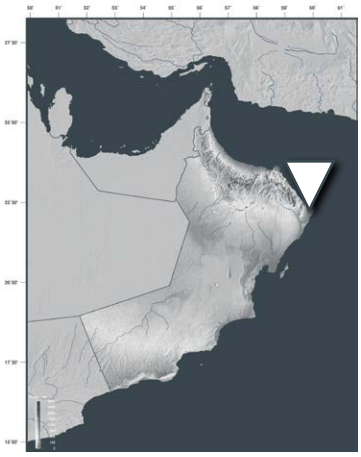
Key Citations

Frifelt K. 1971.Jemdet Nasr graves in the Oman. *Kuml* 1970: 355-383.

Madsen B. 2017. *The Early Bronze Age tombs of Jebel Hafit*. Jutland Archaeological Society Publications 93.

Spotlight 4 | Ras Al-Jinz RJ-6 necropolis, Ash-Sharqiyah, Oman

Olivia Munoz, Geraldina Santini and Kaïna Rointru



The necropolis labelled RJ-6 is located at the foot of the Jebel as-Saffran, in the Ras Al-Jinz Bay (Governorate of Sharqiyah) (Figures 2.19 and 2.20). Two distinct groups of Hafit-type tombs (North and South) constitute the necropolis, totaling 22 funerary monuments. Nine tombs, the majority of which are located in the southern group (Figures 2.20 and 2.21), were excavated by G. Santini in the late 1980s as part as the *Joint Hadd Project* (Santini 1992; 2019). The osteological study was carried out between 2012 and 2017 by O. Munoz (Tombs 2, 3, 5, 6, 7 and 8), funded by the University of Paris 1 - Panthéon-Sorbonne and the French National Center for Scientific Research and National Research Agency (CNRS UMR 7041, Labex "Les passés dans le present" #ANR-11-LABX-0026) (Munoz 2014). The remaining material was studied by K. Rointru for her Master thesis at the University of Bordeaux (Tombs 1 and 4, Rointru 2022). In the meantime, several excavated tombs were recorded in 3D by F. San Basilio as part of his master's thesis at the University of Paris 1 - Panthéon-Sorbonne (San Basilio 2017).

The tombs are ellipsoid, with a diameter from 3.5m to 6.5 m, and a preserved height between 0.7m and 0.8 m. They consist of a chamber surrounded by two concentric stone walls filled with irregular boulders. The tomb entrances are generally oriented to the east-southeast, sometimes with a lintel and a threshold. In some tombs, a floor made of flat slabs or small stones was observed (Figure 2.22). Several tombs excavated at RJ-6 are characterized by the presence of an outer stone ring consisting of a few stone courses, forming a plinth around the tomb (Figure 2.23), as is also the case in some tombs at Ras Al-Hadd HD-7, HD-10, and Shiyā (Munoz 2014; Salvatori 2001; Munoz *et al.* 2017).

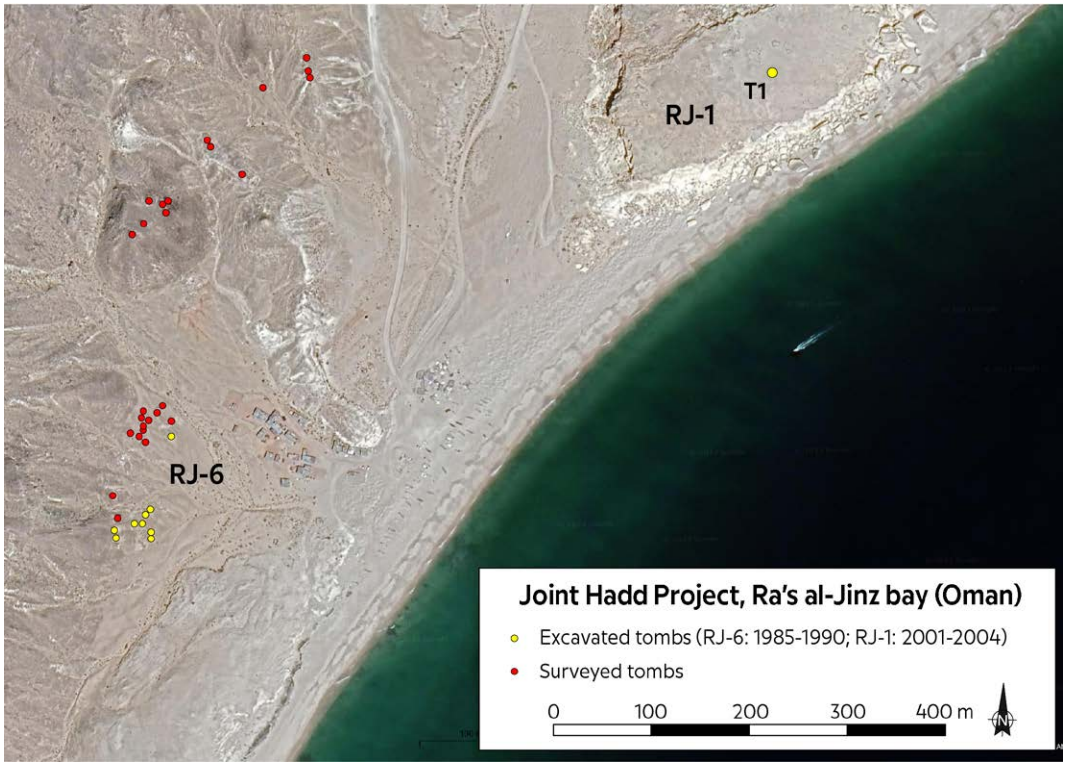


Figure 2.19. Satellite view of the Ras Al-Jinz bay with the location of sites RJ-6 and RJ-1 (O. Munoz / Google Earth Image).

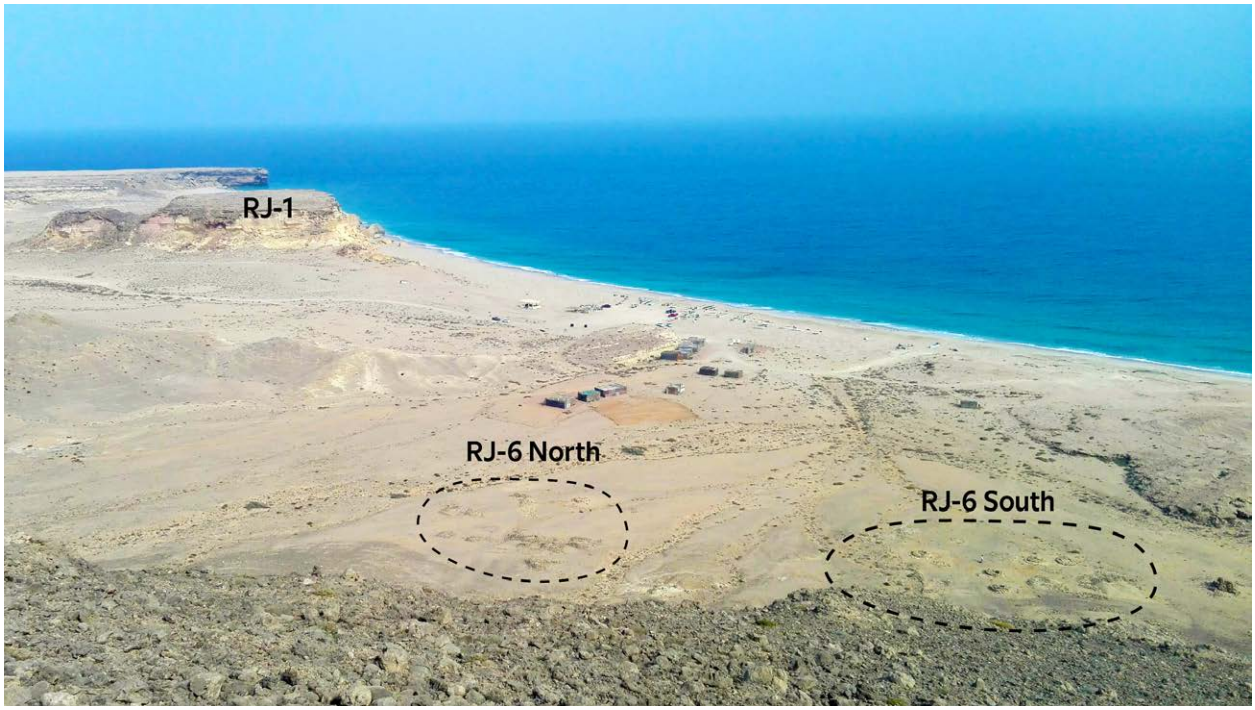


Figure 2.20. The Ras Al-Jinz bay view from the Jebel as-Saffran with the location of sites RJ-6 and RJ-1 (O. Munoz).

Figure 2.21. Plan of the southern group of tombs at RJ-6 (O. Munoz, after G. Santini's excavation notebook, tombs layouts from Santini 1992, and 3D model of Tomb 2 from San Basilio 2017).

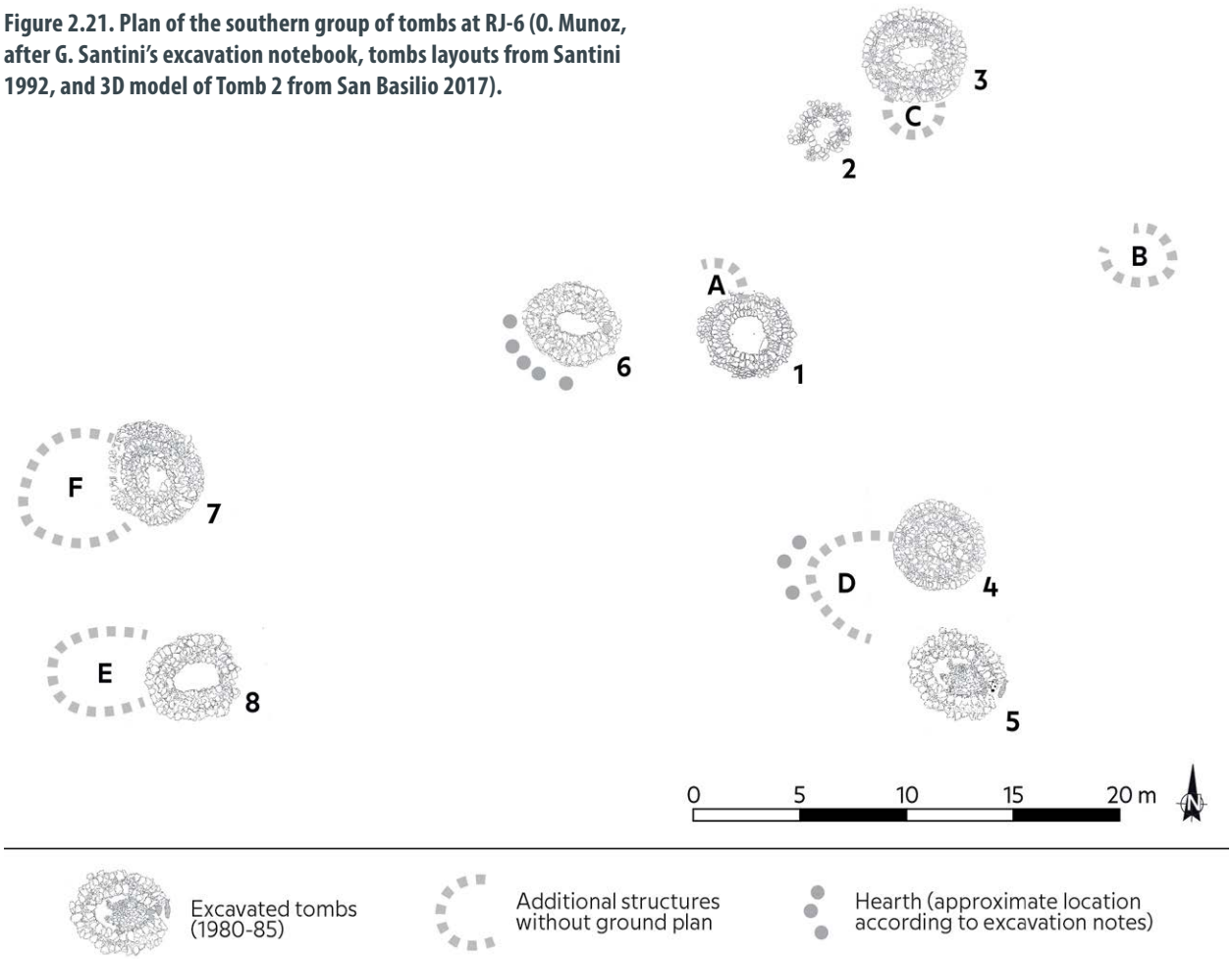


Figure 2.22. Tomb 5 at RJ-6 at the end of the excavation showing the wall structure and the preparation of the chamber floor with small stones (Joint Hadd Project).

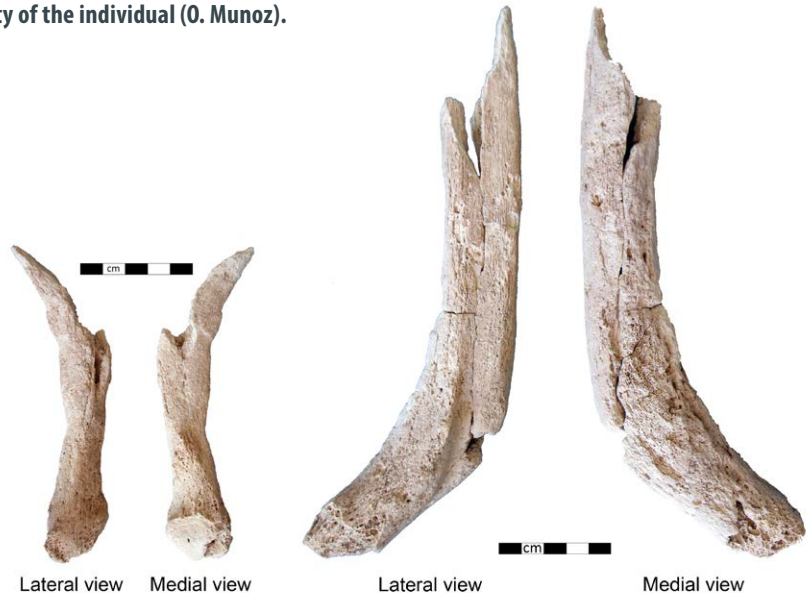
Figure 2.23. View of the Tomb 4 at RJ-6 during its excavation showing the wall structure with an external plinth and some articulated portions of skeletons in the chamber (G. Santini / Joint Hadd Project).

The radiocarbon dates certain tombs to the beginning of the 3rd millennium BC, as the furniture deposited with the deceased also suggests. This includes numerous beads made from shell, soft stone, and other materials, as well as copper objects (hooks, pins), and shell ornaments (rings, perforated plaques) (Santini 1992). A perforated shark tooth more commonly found in neolithic contexts, was also found. New dating will allow us to better understand the duration of the use of the tombs and whether they were used simultaneously or consecutively. It seems that the necropolis was abandoned during the 3rd millennium BC and its space reused for other functions, as suggested by some stone alignments and hearths recovered around the tombs (Figure 2.21; Santini 1992).

One of the particularities of this necropolis is the large number of individuals buried in some tombs (up to thirty individuals, Munoz 2014; Rointru 2022). For the Hafit period in Oman, the only other example currently known with so many individuals deposited in the tombs comes from the tombs of Ras Al-Hadd HD-10, about 10 km from Ras Al-Jinz (Salvatori 2001). At RJ-6, the anthropological study showed that up to 30 individuals could have been deposited some of the burial chambers, whose surface area is about 1m². Men, women and children of all age groups are present in the tombs. The osteological profile suggests that the deposits were mainly primary, which means that entire corpses were disposed in the chamber, since small bones, such as those of the feet and hands, are very well represented. The still articulated skeletal parts found in grave 4, for example, also testify to primary deposits (Figure 2.23). In the tombs with a high number of individuals, it is impossible for the deposits to have been simultaneous, given the volume available in the chamber, and one can deduce that they were spaced out in time (San Basilio 2017). This indicates that the monuments were used as collective tombs, over a period of time that remains difficult to estimate. These successive deposits required recurrent arrangements of the human remains during use (removal storage on the sides of the chamber, deposition of a layer of stone). At Ras Al-Hadd HD-10, Salvatori found that the deposits could be sealed with flat stones before the monument was condemned (tomb HD-10.2.1, Salvatori 2001: 71). At RJ-6, no bones were found outside the tombs, as at Ras Al-Hadd HD -7, where bones were found in a secondary position near the outer wall of one of the tombs, or later at Umm an-Nar in emptying pits around the monumental tombs.

The osteological study carried out on dental remains from RJ-6 suggest that Hafit coastal populations display some changes in oral pathologies compared to their Neolithic counterparts, which indicate modifications in their lifestyle and a diversification of the diet (Munoz 2014; 2017). The people from RJ-6 present high dental wear, low rate of calculus, frequent periodontal disease, combined with low abscess and ante-mortem tooth loss frequencies and absence of caries. These markers suggest that marine resources were a main component of the diet, with no or very limited impact of agriculture on oral health.

Figure 2.24. Axial deformation observed on a right tibia (right) and fibula (left) from Tomb 5 at RJ -6, which led to disability of the individual (O. Munoz).



Furthermore, damage (e.g., chipping, fractures) was observed on a fairly large proportion of the teeth (10%), mainly molars, suggesting minimally processed foods with hard particles or the use of teeth for non-food functions (grinding, pincers, etc.). Finally, the moderate rate of linear enamel hypoplasia, a stress marker, suggests a population that was not subjected to recurrent physiological stress. The demographic profile of those buried in the tombs, moreover, suggests that the population was experiencing some population growth (Munoz 2014).

Finally, in Tomb 5, the bones of the right leg (tibia and fibula) of an adult individual showed significant axial deformation and bone remodelling, a very disabling pathology (Figure 2.24). Although the cause of this pathology is not yet clear, this shows the solidarity of the group, as the community knew how to care for this individual during an important part of his life and until his death, when this person certainly had difficulty moving.

Key Citations

Munoz, O. 2014. *Pratiques funéraires et paramètres biologiques dans la Péninsule d'Oman du Néolithique à la fin de l'âge du Bronze ancien (Ve-IIIe millénaires av. N.E.)*. PhD Thesis, Université Paris 1 - Panthéon-Sorbonne / Università di Roma - La Sapienza, Paris.

Rointru, K. 2022. *Etude archéoanthropologique des sépultures collectives de la période Hafit (3100-2700 BC). L'exemple de la tombe 1 du site de Ra's al-Jinz 6 (Sultanat d'Oman)*. Master Thesis, Université de Bordeaux, Bordeaux.

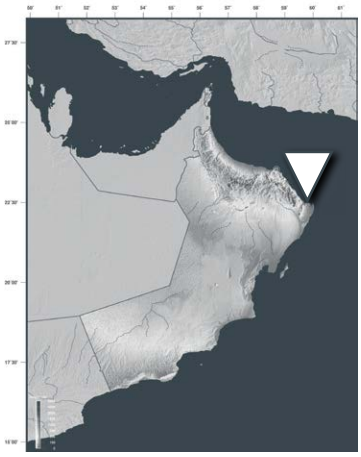
San Basilio, F. 2017. *Apports de la modélisation tridimensionnelle pour l'étude de deux nécropoles côtières de l'âge du bronze en Arabie orientale : Les cas de Shiyā et de Ras Al-Jinz RJ-6*. Master thesis, Université de Paris 1 - Panthéon-Sorbonne, Paris.

Santini, G. 1992. *Analisi dei caracteri dominanti per la definizione dei rituale nelle necropoli preistoriche e protostoriche della Penisola di Oman*. PhD Thesis, Istituto Universitario Orientale, Universita di Napoli, Napoli.

Santini, G. 2019. The Early Bronze Age Necropolis of Ras Al-Jinz RJ-6. In D. Frenez and M. Cattani (eds.), *Dreamers: 40 Years of Italian Archaeological Research in Oman*, Rome, 79-81.

Spotlight 5 | Shiyā necropolis, Ash Sharqiyah, Oman

Olivia Munoz



With nearly 350 tombs, the necropolis of Shiyā, located near the present-day city of Sur (Ash Sharqiyah Governorate), represents one of the most important Early Bronze Age necropolises recorded on the Omani coast (Figure 2.25). Due to recent urban expansion, many of them are now endangered. The site was first identified by P. Biagi, then mapped by J. Giraud, during surveys conducted within the framework of the Joint Hadd Project, directed by S. Cleuziou and M. Tosi (Biagi 1988b; Giraud 2007). Since 2016, the necropolis has been the subject of an excavation program, with the support of the Institute of Deserts and Steppes and the French National Center for Scientific Research (CNRS) (Munoz *et al*. 2017). The area was surveyed with a drone, which made it possible to map 348 tombs and to integrate them into a digital terrain model (Figure 2.25). Although the monuments are mostly distributed on tertiary limestone terraces overlooking the mouth of a wadi, the seashore, and the lagoon, some are settled in lower terraces, in the bed of the wadi, and below the cliff on the coastal strip, showing significant variability of tomb visibility (Figure 2.26).

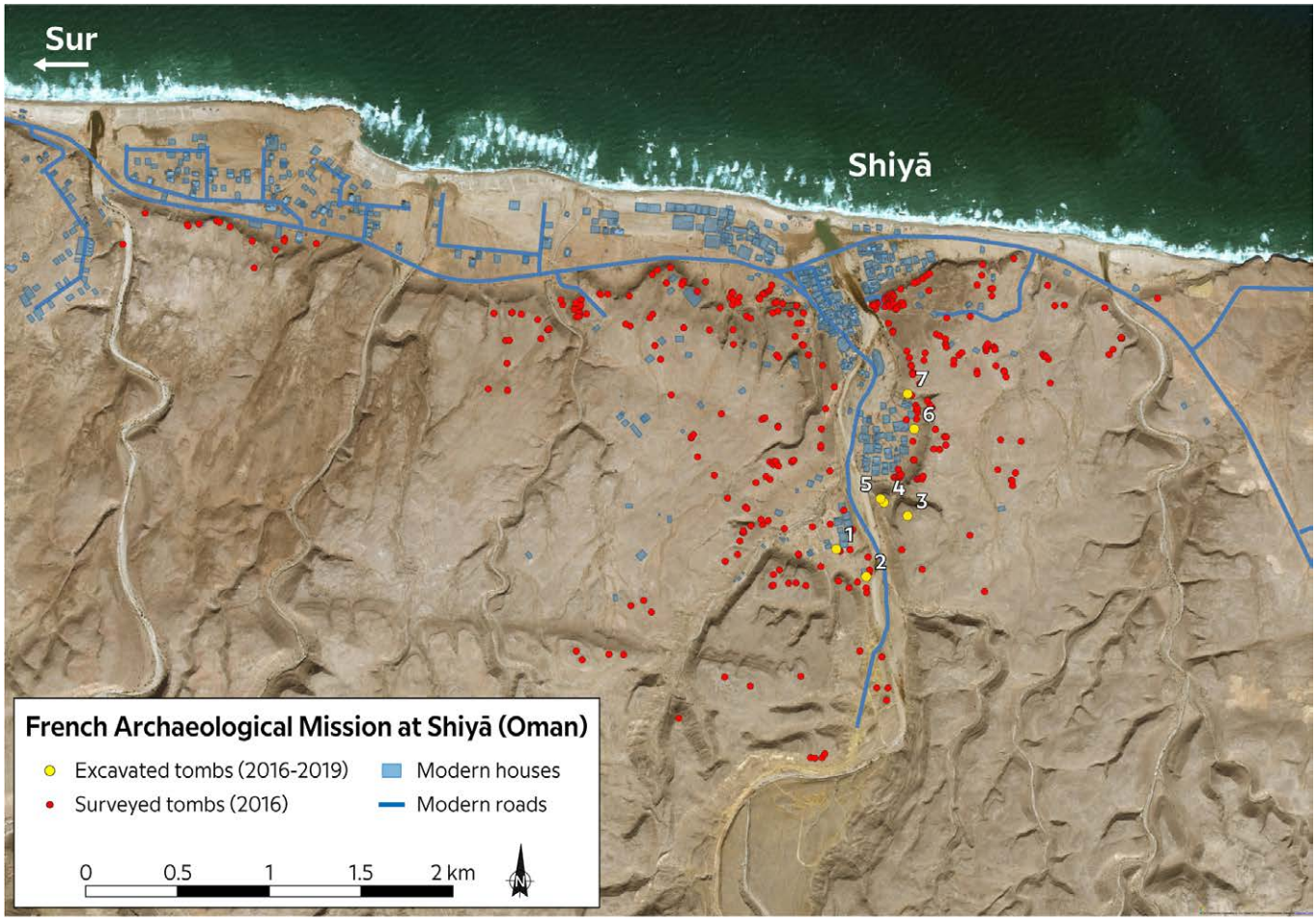


Figure 2.25. Map of the area with excavated (yellow dots) and surveyed tombs (red dots) (O. Munoz)

Figure 2.26. Tombs of the Shiyā necropolis, on the cliff and in the wadi bed, near the modern houses (O. Munoz)

To date, seven tombs have been excavated, located on the upper terrace (T. 3, 4 and 5), the lower terrace (T. 1 and 2), and in the bed of the wadi (T. 6 and 7) close to the modern houses.

The excavations revealed important variability in the structure of the tombs, which can sometimes be related to their position in the landscape and their dating. Interestingly, the oldest tombs are dated to the first centuries of the 4th millennium BC and thus bring the funerary tradition of the cairn tombs back several centuries in the commonly accepted chronology of the Hafit period. These tombs are also the most rudimentary (tumulus type), and are implemented on high rises, on the most visible ridges of the terrace (T. 4 and 5; Figure 2.26). Conversely, the recent and better structured ones (attributable to the Hafit-type) are located lower down (T. 1, 2, 6 and 7; Figure 2.27, Table 2.2). This trend needs to be verified since it is not systematic, as attested by Tomb 3, contemporary with Tomb 2, located on the higher terrace and relatively well structured. No identifiable access to the tomb have been observed, suggesting they might have been accessed by the top.

Although the state of preservation of the human remains is very poor, it was possible to determine the minimum number of individuals of each tomb. Tombs 1, 4, 5, and 6 contain the remains of a single adult individual deposited in a flexed position on one side. In Tomb 3, an adult (Individual C) was deposited at the base of the tomb in the early 3rd millennium BC, and then the tomb was re-used in the Iron Age for the deposition of another adult (Individual A) associated with a right femur in a secondary position (Individual B; Table 2.2). Tombs 2 and 7 each contained the remains of at least three individuals belonging to the same stratigraphic layer: Tomb 2 included a perinate, a child, and an adult; Tomb 7 contained a 1-4 year old child, a 9.5-13.5 year old child, and an adult female.

In many tombs, the deceased were accompanied by grave goods, mainly elements of adornment, but also shells and copper items (Figure 2.28). Tombs 2, 5, and 7 contained a significant number of beads made of shell, stone, and other materials, while they were much rarer in the other tombs. In particular, in Tomb 2, hundreds of microbeads were found in association with the perinatal remains. In Tomb 7 a fine pearl and a mother-of-pearl pendant were associated with numerous beads (Figure 2.28).

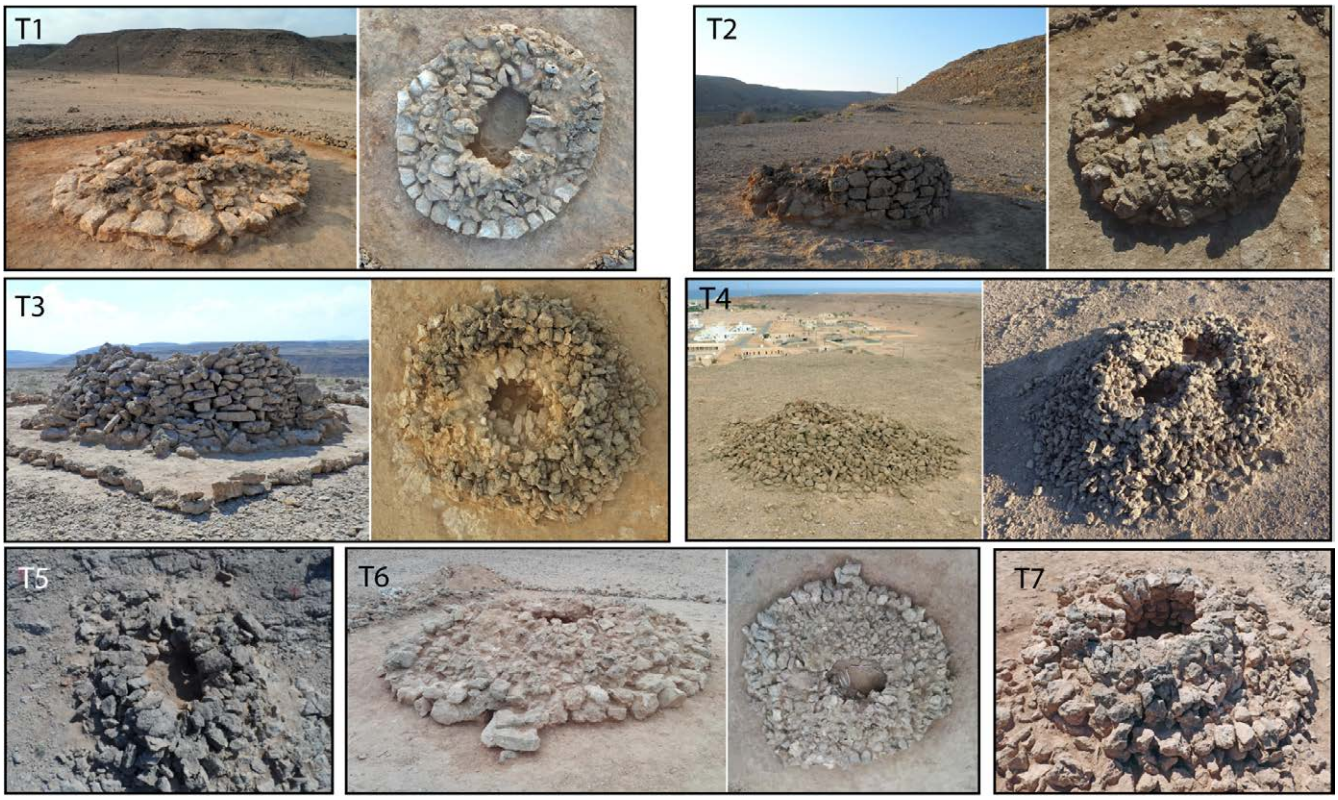


Figure 2.27. Oblique and zenithal views of excavated tombs in Shiyā (O. Munoz)

The large number of funerary monuments identified at Shiyā reflects a territorial anchoring of ancient populations in the area. Moreover, such a density raises the question of occupational patterns. This coastal ecological niche would have allowed mixed subsistence strategies, relying on exploitation of both marine and terrestrial resources, enabling a permanent or semi-nomadic occupation, as known at site Ras Al-Hadd HD-6 (e.g. Azzarà 2015). In order better to explore these issues, future research will aim not only at detecting evidence of settlements, but also at defining the human diet through the analysis of bioarchaeological remains. Furthermore, the strategic position of Shiyā might have been another factor determining this long-term attachment. The favorable position of the area - connected to the inland through the wadi bed - to other important coastal locations and possibly to extra-regional contexts as a harbor, might have made it a key spot at the crossroads of exchange networks during the 3rd millennium BC. Evidence from further excavations of funerary and settlement contexts is needed to confirm this hypothesis and include Shiyā in the interregional network of exchange that connected the Oman peninsula to nearby regions.

Table 2.2. Radiocarbon dates from Shiyā

Tomb#	Indiv.#	Lab#	Sample	Age 14C BP	calBC/AD, 2σ		Reference
5		Beta-470767	Charcoal	4990±30	-3940	-3650	Munoz 2022
4		Beta-526837	Charcoal	4940±30	-3780	-3645	Munoz 2022
3	C	SacA-47069	Human apatite	*4620±30	-3515	-2235	Munoz 2022
3		SacA-47065	Charcoal	4350±30	-3080	-2895	Munoz 2022
3	A	SacA-47068	Human apatite	*2295±30	-410	620	Munoz 2022
6		Beta-470768	Charcoal	4480±30	-3345	-3030	Munoz 2022
1	A	SacA-47062	Human apatite	*4415±30	-3320	-1965	Munoz 2022
2	A	SacA-47064	Human apatite	*4355±30	-3085	-1895	Munoz 2022
2		SacA-47063	Charcoal	4350±30	-3080	-2895	Munoz 2022

*= human apatite with possible marine diet: calibrated 2σ age ranges are calculated with Curve Marine20 (Bronk Ramsey 2020), according to a 0-100% proportion of marine resources in the diet, taking into account the local marine reservoir effect (Δ R= 210 ± 15; Saliège *et al*. 2005). See Munoz 2022 for more details on radiocarbon dating issues in coastal contexts.

The variability of the architectural layout and disparity in grave good wealth may reflect different investments in tomb construction and furniture, which could correspond to a chronological evolution, since it turns out that the necropolis was used over a long period. This would support the hypothesis of growing social complexity during the Hafit period, suggested by funerary evidence and by domestic contexts. More generally, during the Early Bronze Age, the investment of workforce connected with the edification of the tombs intensified over time, indicating an increasing specialization of work (Munoz 2019). On the other hand, the imbalance between the tombs' furniture can be partly explained by episodes of looting, which occurred shortly after the deposit. Such episode is attested in Tomb 6, in which the upper part of the skeleton had been disturbed and where only four beads were found, wedged under the stones of the chamber wall. Finally, we must also consider the possibility of differential mortuary treatment of individuals according to their status in the community. Here, it is interesting to note that the tombs most richly provided with beads, are those that contained the remains of children and adolescents, which has also been observed for the Neolithic period at Al-Buhais BHS-18 (De Beauclair 2008).

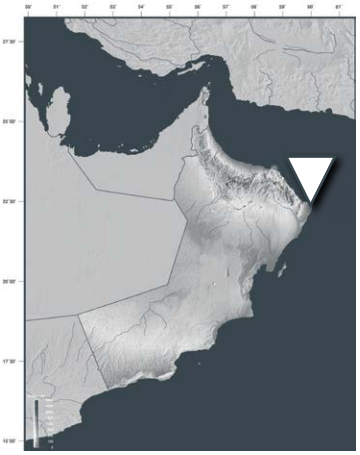
Figure 2.28. Grave goods from the tombs of Shiyā (O. Munoz)

Key Citation

Munoz, O., V. Azzara, P.-H. Giscard, R. Hautefort, F. San Basilio, and L. Saint-Jalm, 2017. First campaign of survey and excavations at Shiyā (Sūr, Sultanate of Oman). *Proceedings of the Seminar for Arabian Studies* 47: 185-92.

Spotlight 6 | Ras Al-Hadd HD-7.3 necropolis, Ash-Sharqiyah, Oman

Olivia Munoz and Guillaume Seguin



The necropolis of Ras Al-Hadd is located near the modern city of Ras Al-Hadd in the governorate of Ash Sharqiyah. It consists of several groups of tumuli representing about 70 monuments distributed along the low rocky terrace (15-16 m above sea level) overlooking the ancient lagoon of Ras Al-Hadd, where two important Middle Holocene settlements HD-5 and HD-6 and other archaeological sites have been explored (Borgi *et al.* 2012; Marcucci 2012; Azzara 2013; Borgi and Maini 2020; Figure 2.29). The group on the southern edge of the terrace, labelled HD-10, was investigated by S. Salvatori between 1997 and 2000 (Salvatori 2001). In the site HD-7.3, located on the eastern terrace, one tomb (T1) was excavated by the Italian team in 2000. The other five tombs of the site presented here (T2-6) were the subject of emergency excavations by the French team of the Joint Hadd Project in 2007, as they were threatened by the construction of a government building.

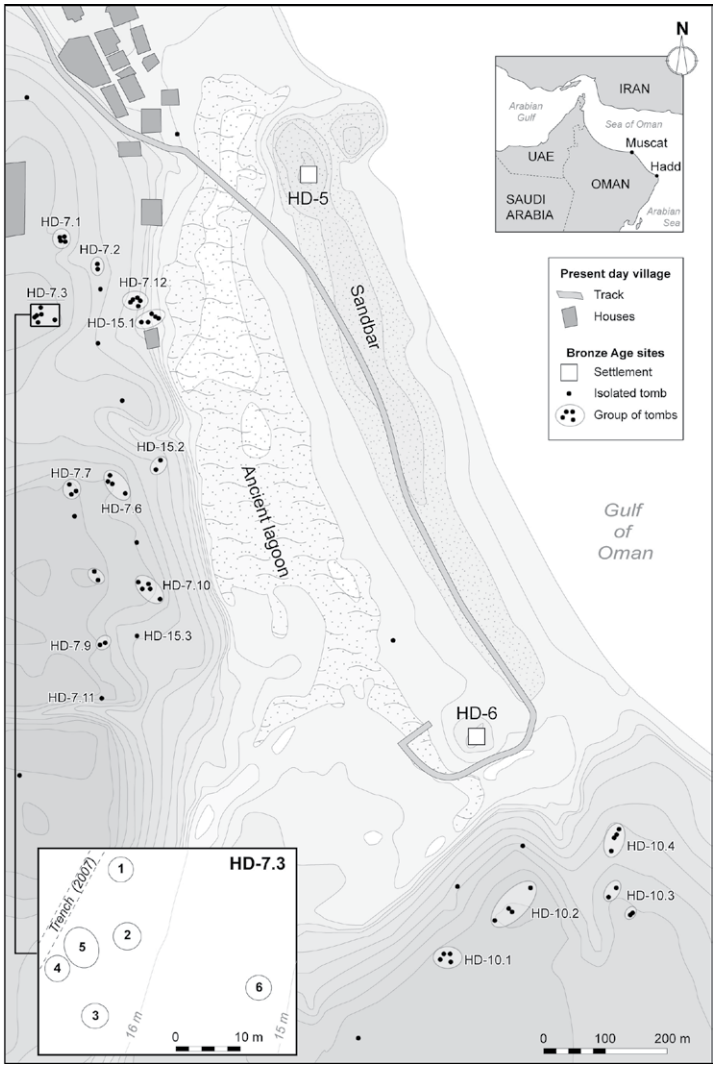


Figure 2.29. Localization of the site HD-7.3 and the other necropolises and main archaeological settlements in the area of Ras Al-Hadd (O. Munoz)

The bioanthropological study of the human bones from tombs 2-6 was carried out as part of a PhD thesis at the University of Paris 1 - Panthéon-Sorbonne (Munoz 2014). Tomb 6 is located at the edge of the terrace on a rocky outcrop overlooking the ancient lagoon and the site HD-6, while tombs 1-5 are grouped on a flat surface about 20 meters further west (Figures 2.30 and 2.31).

A long use of the burial site

One of the peculiarities of the site is that it has several architectural tomb types that testify to a long use of this area for burial purposes. Radiocarbon dates obtained on the bones of three graves confirm a staggered use throughout the 3rd millennium (Table 2.3), which is also evident from the architectural observations, burial practices, and objects deposited in the graves. The resolution of dating human bones in a coastal context is poor: given the high probability that the dated people consumed marine resources, they are subject to the marine reservoir effect, which artificially ages their radiocarbon ages. To calibrate them at a reasonable resolution, we would need to know the proportion of marine food for each individual. Considering this pitfall, we have to be careful and consider a marine calibration between 0-100%, which prevents a fine resolution (range of about 900 years). Tomb 6 is the oldest with a deposit probably dating to the first half of the 3rd millennium BC, and Tomb 5 is the youngest, probably dating to the end of the 3rd millennium - beginning of the 2nd millennium BC. Tomb 4 was probably used around the middle of the 3rd millennium BC.

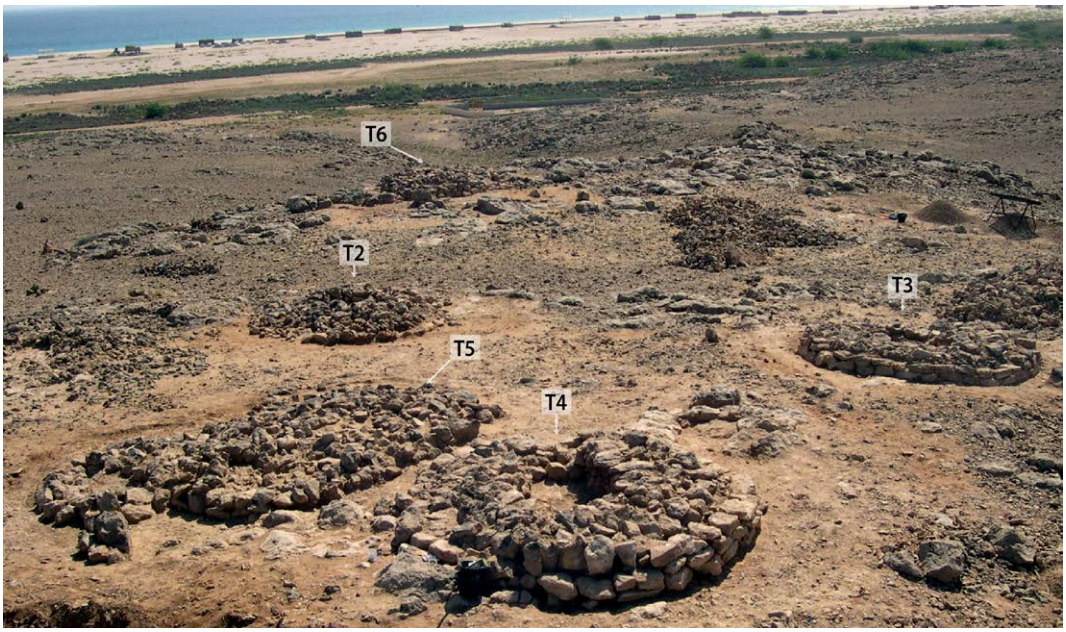


Figure 2.30. The tombs at HD-7.3 view from west (O. Munoz, G. Seguin)

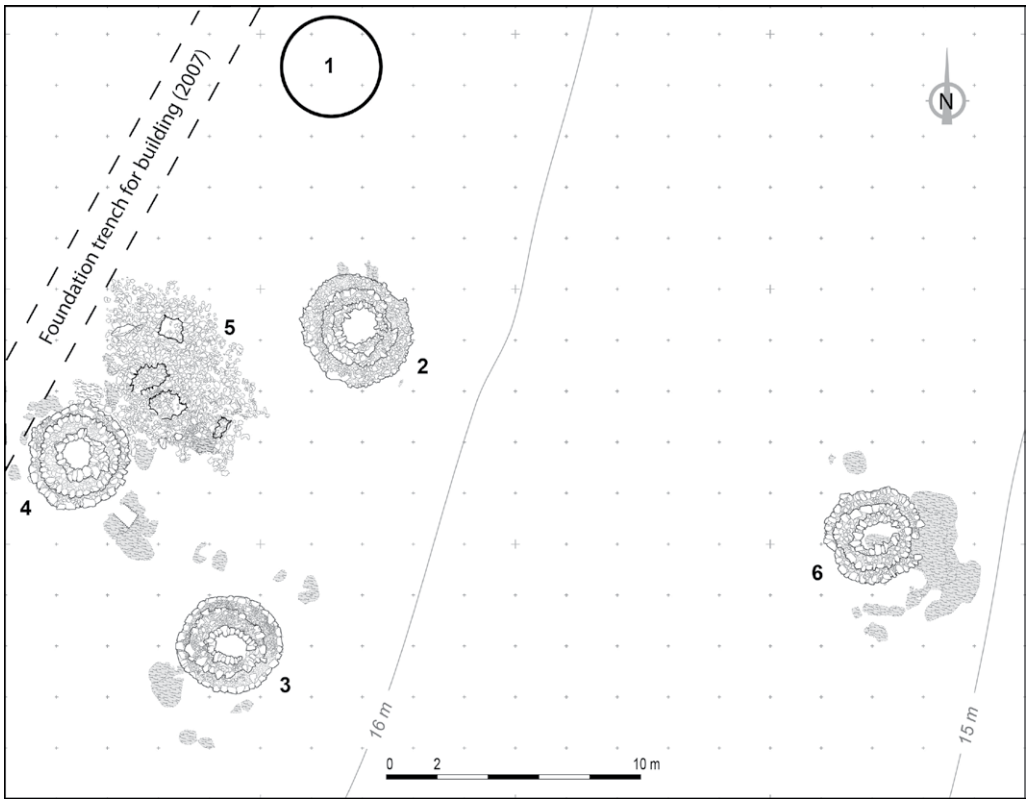


Figure 2.31. Layout of the tombs in necropolis HD-7.3 (O. Munoz)

Table 2.3. Radiocarbon dates from Ras Al-Hadd HD-7.3

Tomb#	Context	Lab#	Sample	Age 14C BP	calBC/AD, 2σ		Reference
6	Chamber base	SacA-11378	Human bone, apatite	*4730±30	-3635	-2656	Munoz 2014
4	Chamber fil-ling, top	SacA-11381	Human bone, apatite	*4485±30	-3344	-2328	Munoz 2014
5	Compartment 3, base	SacA-11374	Human bone, apatite	*4100±30	-2863	-1786	Munoz 2014

*= human bone/apatite with possible marine diet: calibrated 2σ age ranges are calculated with Curve Marine20 (Bronk Ramsey 2020), according to a 0-100% proportion of marine resources in the diet, taking into account the local marine reservoir effect (Δ R= 210 ± 15; Saliège et al. 2005). See Munoz 2022 for more details on radiocarbon dating issues in coastal contexts. Radiocarbon dating on bioapatite was performed by Antoine Zazzo (CNRS UMR 7209 /MNHN).

Architecture

The tombs of HD-7.3 appear at first sight like large cairns, roughly circular, sometimes with a central depression corresponding to the chamber. Apart from tomb 5, whose configuration is clearly different from the others, the diameters of the tombs range between 3.6m and 4.2m, showing a fairly high degree of homogeneity (Figures 2.31 and 2.32). The shape of the monuments is generally circular, although some of the tombs are slightly elongated along one axis. The chambers are semicircular to oval and their surface area is about 1 m².

The circular wall surrounding the chamber is thick and always consists of three sides of blocks separated by a fill of small rubble. The differences in the appearance of the tombs are related to the exclusive use of square blocks of white conglomerate in the outer lining, which do not occur here. In tombs 3 and 4, this facing formed a kind of regular plinth - 3 layers high - around the monument, whose white color contrasted with the local stones used for the rest of the structure. Although the use of non-local stones is not documented there, "plinths" are also observed at some tombs in Ras Al-Jinz RJ-6 and Shiyā, about 10 km and 20 km away respectively as the crow flies. The appearance was less regular at the other tombs, whose cladding was mixed.

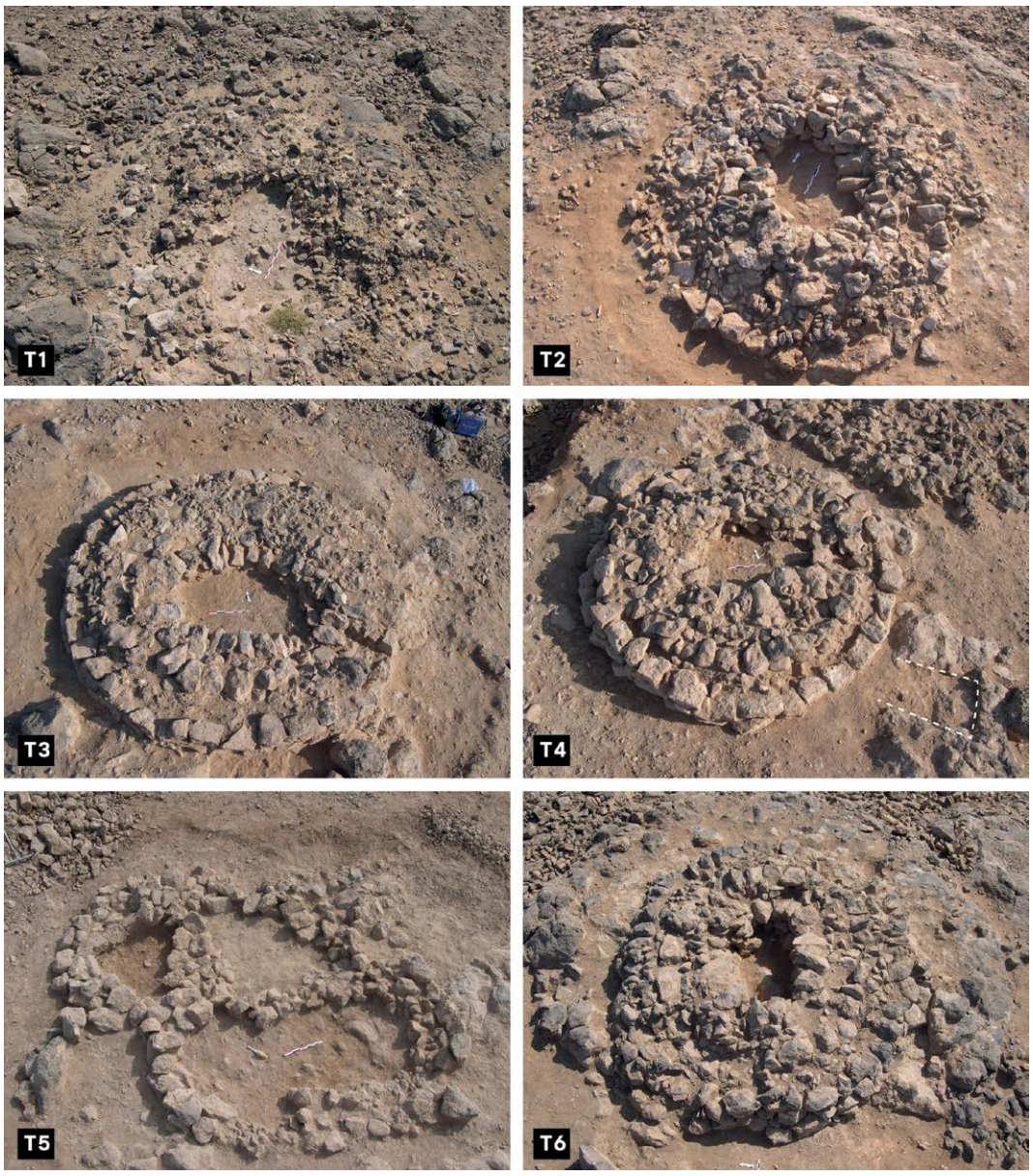


Figure 2.32. Zenithal views of the tombs from HD-7.3. Note the bedrock arrangement outside Tomb 4 (O. Munoz, G. Seguin)

Access to the graves was not always clear, but various clues indicate that they faced east in three cases and southeast in one. In at least two graves the access seems to have been deliberately closed.

The height of tombs T2, 3, 4 and 6 was executed with a corbelled vault, as evidenced by the *contrefruit* observed on the inner facing of the chambers and the small flat drop slabs discovered in some chambers, corresponding to the collapsed roof.

Tomb 5 has an architecture that is clearly different from the others: It is very low (preserved between 10-30 cm high) and contains several cells of irregular shape and size, roughly trapezoidal, at least four of which were identified during the excavation (Figures 2.31 and 2.32). Their identification was based on the observation of stone hollows and the boundaries of bones and materials that could indicate internal limits. The partitions consisted of unworked stones placed directly on the ground. The external limit could not be observed around the whole tomb, but the overall shape is roughly ellipsoidal and irregular, covering an area of no more than 5.80 x 7.80m. It is reminiscent of some of the 'honeycomb tombs' identified in the Batinah Plain (Deadman 2017:124), which appear to be of Iron Age date. However, some of the grave goods found in Tomb 5 of HD -7.3 appear to date to the late Umm an-Nar period as also indicated by the radiocarbon date performed on human bones.

Human remains

Most of the human remains found were in a very poor state of preservation and consisted mainly of small fragments and splinters. The rare tooth elements that were found were always isolated and fragmented. This poor preservation severely limited analyses, but the excavation and investigation allowed some important observations.

In Tombs 2, 5 and 6, the altered remains of adult skeletons or parts of skeletons were found in primary position. In Tomb 5 they probably correspond to the last use of the tomb, while in Tomb 6 the skeleton uncovered at the bottom of the chamber seems to be the only one deposited in the burial chamber. For all these individuals, the state of preservation does not allow a definite conclusion, but the position of the bones indicates that they were lying on the left side in a flexed position. In Tomb 6, the skull was oriented to the east; the skull of the individual in compartment 2 of Tomb 5 was oriented to the northeast; in tomb 2 it was oriented to the west.

Minimum number of individuals

In Tomb 2 at least two children under one year and two adults are represented. In Tomb 3, at least one adult is represented by very few identifiable fragments. In Tomb 4 at least one adult is represented. In Tomb 5, the remains of at least six individuals, including four adults, one child under one year of age and one adolescent aged 12 to 18 years. In Tomb 6, at least one adult is represented by skull fragments, some teeth and fragments of long limbs, and a few foot phalanges.

Use of fire

With the exception of Tomb 6, all the graves examined contained burned and unburned bones (Munoz 2014: 235-236). This suggests that cremation was not carried out systematically for all the deceased, but that it played an important role in the use of the graves. The observations made for Tomb 2 suggest that a fire was set when at least one of the individuals had not yet fully decomposed, and before other deceased were placed in the tomb. In this case, a plausible explanation is that this intervention was aimed at accelerating the decomposition of the flesh of an already existing corpse on the occasion of a new insertion.

Human remains outside the chambers

Fragments of human bones, none of which had been burnt, were found outside the chamber of most tombs between the collapsed stones of the outer wall. They all showed a very poor state of preservation and considerable changes due to weathering. In one case (Tomb 4) there was a collection of bone fragments of different bone types, which rules out the hypothesis of a contribution by a small animal. No anatomical connections were found for these bones, but several foot bones were grouped in the same area, suggesting that connections may have existed at the time of interment of these remains. It is important to note that some of the human bones found were not

at ground level: since the laws of gravity prohibit these remains from rising from the ground to the upper layers, this suggests that they could have been placed in the walls (niche?), on a slightly elevated structure near the walls (made of perishable material or stone and unrecognized), or that they correspond to a deposit made after part of the tomb walls had already collapsed.

Grave goods

Jewelry elements were found in all graves without a strict relationship to a person being established: rings, beads, and bracelet parts were found in the chambers. Nearly 500 beads were found in the tombs, with Tombs 4 and 6 being the richest. Most of the beads were made of stone (61.6%) and almost a third of marine shells (30.8%). Only a small proportion (2.9 %) of the beads are made of artificial material (faience, heated steatite) and very few are made of bone (0.6 %) or metal (0.6 %). There are, however, differences in the materials used between the tombs, possibly related to their chronological assignment: Tomb 6, for example, has a larger proportion of shell beads, while Tomb 5 has the most carnelian beads.

For the sake of brevity, we do not present here all the grave goods found, which have been described elsewhere (Munoz 2014), but would like to point out important finds in two tombs:

- In Compartment 3 of Tomb 5: A softstone box with two compartments from the "recent series" was placed on a "spatula" or "razor" with a metal stick, against the thigh of an adult individual (Figure 2.33). In this case, the deposit is clearly attributable to an individual. Although their exact function is difficult to determine and would require analysis, these three objects may be associated with cosmetic use.
- In the presumed entrance of Tomb 4, a "recent series" softstone bowl was associated with an elongated pebble, suggesting a mortar and pestle. Their location and the fact that they are not associated with any particular individual, suggests that they were used in ceremonies associated with the funerals rather than a personal object; analysis of the residue and traces on these objects would advance the investigation.

Activities around the tombs

Interestingly, in addition to the human remains sometimes found outside the chambers, a large amount of grave goods and animal remains were found around the tombs, testifying to activities and deposits around the tombs. In particular, in the south-east of Tomb 4, about 50 cm from the outer wall, the bedrock has been altered: a flat rectangular area has been created by regular excavations within a higher rock outcrop (Figure 2.32). At the contact of this area, measuring about 0.80 x 0.60 m, a layer of gypsum may indicate that some vegetal material was deposited there; two "razors" or "spatulas" as well as two hooks and two gorges made of a copper alloy connected to two shells (*Ficus* sp.) lay flat on this area. To the south, several pieces of jewelry, fragments of softstone, pottery, and copper vessels lay scattered in the spaces between the falling stones, about 10 cm above the bedrock. In the south-western quadrant, numerous bivalves, mainly *Mytilus* sp., lay under the fallen stones, in contact with the bedrock, on the stones of the outer facing. These were joined by coral fragments and some fragments of sea urchin shells. There was also a *Mimachlamys townsendi* shell, the outside of which was burnt, and several pebbles at the base of the first layer in contact with the outer wall. Fragments of large fish bones were also found on the outside of the tomb, as were six shark teeth and three dolphin teeth.

Concluding remarks

In summary, this group of tombs, based on their appearance and location, was initially attributed to the Hafit period, i.e. the period between the extreme end of the 4th millennium and the beginning of the 3rd millennium BC, but their excavation and subsequent investigation have revealed a more complex picture. They indicate a long use of the site for burial purposes during the 3rd millennium BC and thus a strong persistence of the cultural substrate of the Hafit period in the following centuries.

While it is very likely that Tomb 6 was the first to be built and Tomb 5 the last, the other tombs could have been built in the meantime and used several times until they were finally abandoned after the middle of the 3rd millennium.

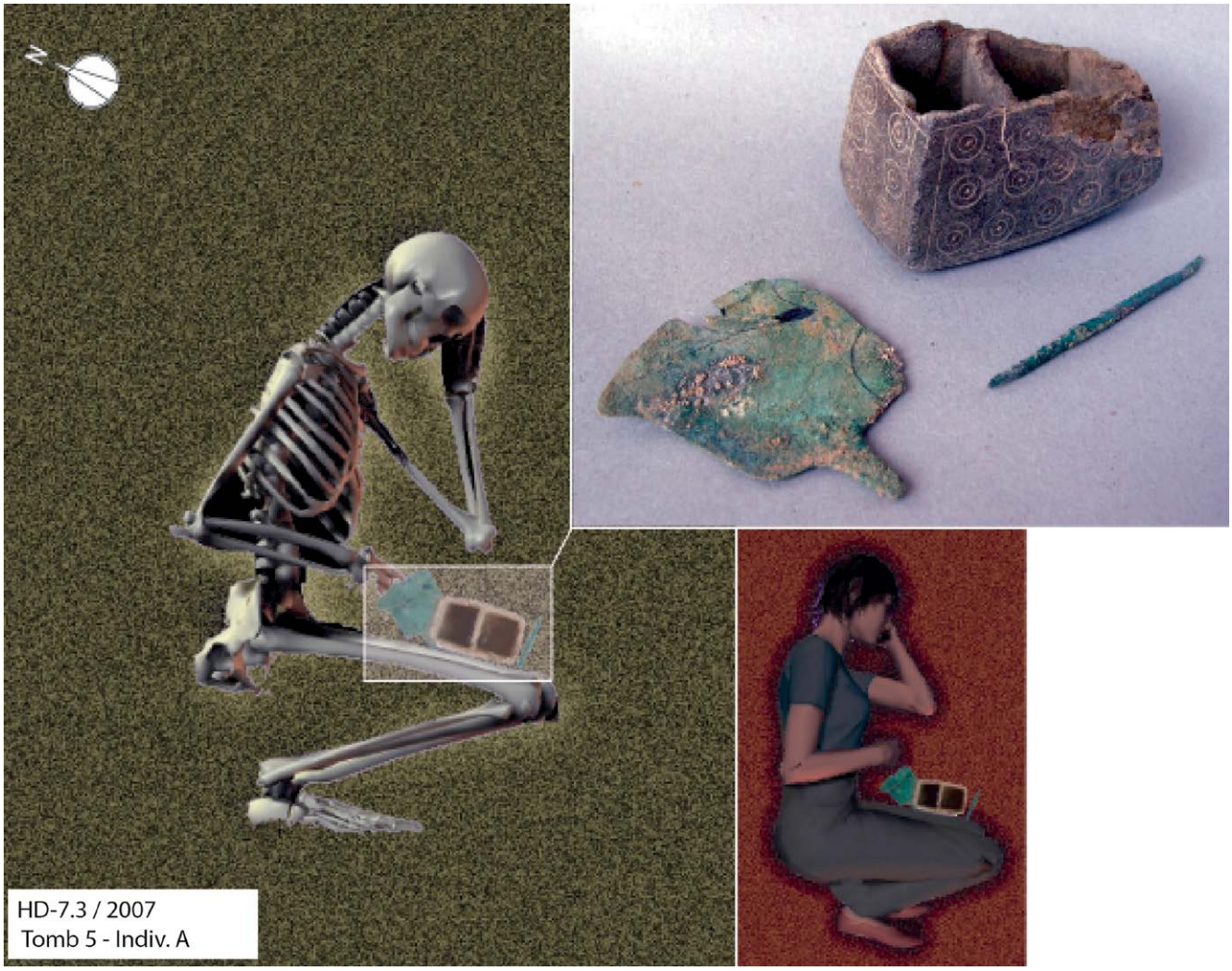


Figure 2.33. Objects associated to the individual A of tomb 5 of Ras Al-Hadd HD-7.3: "razor" or "spatula" in copper alloy, decorated compartmentalized box in soft stone, and stick in copper alloy ; and restitution of the position of the deposited individual (O. Munoz)

During the excavation, we paid special attention to the space around the tombs when we removed the collapsed stones around the outer facing. These stones helped to preserve certain traces of activity around the tombs by retaining aeolian sediment. This approach led to the discovery of numerous objects, concentrations of materials (faunal remains, stones), human bones as well as structures (bedrock arrangement, hearth). All these traces and the deposited objects testify to activities around the tombs, related to funerals or commemorative ceremonies and possible devices now disappeared, which could be arranged around the tombs.

The richness of the objects deposited around Tomb 4 attracts attention and raises several questions. Do they all belong to a single gesture made at a specific time, or were they deposited on different occasions? Are they individual grave goods intended to accompany a person deposited in this space, collective grave goods or elements used in ceremonies and left in place?

This approach shows how interesting it is to consider these sites as ensembles where the burial chamber is not the only witness to funerary practices. It would of course have been desirable to examine the entire site to discover such traces outside the immediate vicinity of the tombs, but the conditions of the excavation did not permit this.

Key Citation

Munoz, O. 2014. *Pratiques funéraires et paramètres biologiques dans la Péninsule d'Oman du Néolithique à la fin de l'âge du Bronze ancien (Ve-IIIe millénaires av. N.E)*. PhD Thesis, Université Paris 1 Panthéon-Sorbonne / Università di Roma La Sapienza, Paris.

Figure 2.34. Early Bronze Age cairns at the UNESCO World Heritage site Al-Ayn (P. Yule).

Frifelt continued to focus on the region around Bat and Amlah (Frifelt 1976, 1985). Around the same time, the Harvard Archaeological Survey extended further east and south of Jebel Hafit, specifically presenting evidence of hundreds of cairns in Wadi Andam, Wadi Samad, Wadi Ithi, Wadi Far, and Wadi Bani Kharus to name just a few prominent locations (Hastings *et al*. 1975; Meadow *et al*. 1976). Weisgerber (1980) also documented cairns at Al-Muyassar.

Survey has been part of most expeditions since these initial discoveries, but there are relatively few published reports. Instead, much of these data languish in site reports. Some of these reports have been more widely circulated than others. For example, much good data about the distribution of cairns can be found in the site reports from the Italian Mission to Oman, specifically the Joint Hadd Project (e.g., Cleuziou and Tosi 1986, 1987; Cleuziou *et al*. 1990). This long-standing project has elucidated important information about the prehistoric exploitation of the coastal environment (Biagi *et al.* 1984; Charpentier 1993; Biagi and Nisbet 2006), the chronology of coastal shell middens (e.g., Biagi 1994; Biagi and Nisbet 1999), and Neolithic and Bronze Age (Hafit and Umm an-Nar) settlements (Biagi 1988a; Cleuziou and Tosi 2000). While centered on the significant sites at Ras Al-Hadd, Ras Al-Hamra, and Ras Al-Jinz, this project also performed intensive survey in the Ja'alan region. The first published surveys and excavations were conducted by Beatrice de Cardi and colleagues (de Cardi *et al*. 1977) along Wadi Al-Batha, but the Italian Mission to Oman has worked much more extensively across all of the Ja'alan since 1985. Pedestrian surveys along the coast from Bandar Khayran to Ras Sharbitat (Biagi 1988b, 2004) documented many cairns, and Edens (Cleuziou *et al*. 1990) presented important information from the Bilad Bani Bu Hassan cairn field, which had suffered destruction from then recent bulldozers and stone quarry behavior. In the rubble that remained of many cairns, material culture and skeletal remains were discovered. This was important because these kinds of observations can provide important diagnostic data that can contribute to our understanding the use of these monuments

rather than relying solely on labor- and fund- intensive excavations. Specifically, they noted Jemdet Nasr, Umm an-Nar, Iron Age, Sasanian, and Early Islamic ceramic sherds, as well as both Bronze Age and Iron Age softstone sherds. Additionally, bronze/copper rivets, Iron Age arrowheads and bracelet fragments, and beads were recovered from the rubble. These data suggest several things. First, the presence of Jemdet Nasr ceramics suggests that a monument was built in the Early Bronze Age rather than during the Iron Age when similar cairns were also built for the dead (see Spotlight: Dating Early Bronze Age Mortuary Monuments). Second, reuse events occurred as evidenced by the more recent ceramics recovered. In fact, these data indicate multiple reuse events across millennia. Therefore, while these cairns were badly damaged, we can surmise that many were built and used during the earliest part of the Early Bronze Age, and that they were reused by people until the late pre-Islamic period when this manner of interring the dead was discontinued.

For the study of cairns in the region, the work of Jessica Giraud (Giraud and Cleuziou 2006, 2009; Giraud 2010) has been most significant. Thousands of cairns have been mapped and classified thru the examination of the external morphology. Giraud (2010) classified Hafit-type cairns as those with a single burial chamber and typically two concentric walls with gravel fill between them. She observed that at least 50% of these cairns were at least 1.0m tall and a smaller number (25%) were between 1.0m and 2.5m tall. Through her documentation of 2,661 cairns at 54 necropolis over 3000 km^2 she characterized the spatiality of the Early Bronze Age mortuary landscape and developed important hypotheses about the way prehistoric people chose to organize spaces for the dead (Table 2.4). Giraud (2010) also asserted that people during the Hafit period chose to build their monuments to the dead at high places to be visible from a great distance. By calculating the spatial correlation between the center of the necropoles and the location of some unidentified stone structures (hypothesized to be remnants of Hafit occupation), she concluded that the tombs were built also to be visible from the space used by the living.

Figure 2.35. Early Bronze Age cairns at the UNESCO World Heritage site Al-Ayn (P. Yule).

Table 2.4. Characteristics of necropoles from Ja'alan survey (Giraud 2010).

Necropolis size	Example sites	Notes on placement in the landscape
Small (12-30 cairns)	Naked; Roqum; Marafass; Jaltin; Iref; Shama	Near large or very large necropoles; maybe found in groups
Medium (30-100 cairns)	Al-Ayn; Ras Al-Hadd; Khatam; Jli'a; Haseed; Wadi Sa'l; as-Suwayh; el-Massawy; Al-Menkeb north	Found throughout the region
Large (100-150 cairns)	Bu Fsheqa; Bu Mdara; Al-Menkeb	Inland between coast and Jebel Khamis
Very Large (300-450 cairns)	Malahi; Ras Al-Jinz; Kwar Jarama-Jsas; Shiya	On coast, near to lagoons

West of the region surveyed by the Italian Mission, Nasser Al-Jahwari (Sultan Qaboos University) surveyed a large region surrounding Wadi Andam (Al-Jahwari and Kennet 2008; Al-Jahwari 2011, 2013). This work documented 1,987 cairns and discussed the possibility that the Hafit-type cairn was built by nomadic pastoralists. He also found that Hafit-type cairns were not often built near to later Umm an-Nar settlements. This could indicate that prehistoric people moved to new locations when they developed settlements. Later Iron Age use was still observed, so the areas were not abandoned for good. Instead, it seems that in the Wadi Andam region, people moved to new locales after the Hafit period when they started to form settlements in the Umm an-Nar period, but resumed use in the Iron Age. This is in contrast to the findings at most other sites and regions on the Oman Peninsula such as Hili (Cleuziou 1978), the eastern Ja'alan (Giraud 2010), and Bat (Cable and Al-Jabri 2019) that suggest continuous use or at least a shorter period of disuse.

The spatial analyses of the more recent surveys in the eastern Ja'alan and Wadi Andam region were possible because of advances in GPS technologies that allow for more accurate mapping and lower costs for professional equipment. High quality mapping of cairns that result in errors of less than 10cm in some cases, allow for testing a variety of models to explore the relationship between the cairns and the surrounding environment. While it is difficult to classify monuments from imagery alone, some scholars have demonstrated the utility of using this methods to develop hypotheses regarding landscape use (Deadman 2012; Deadman and Al-Jahwari 2016).

Another example of extensive survey is the work by Charlotte Cable in and near the UNESCO World Heritage site of Bat, which has added important information about the spatial distribution of cairns and other 3rd millennium BC monuments (Cable 2019; Cable and Al-Jabri 2019). Over a 124 km^2 area, Hafit-type cairns (and other archaeological features) were mapped, and while they report that most of these monuments were in poor condition due to reuse, stone quarrying, and other destructive activities, the detailed survey still produced important results. In addition to documenting 382 Hafit-type cairns, they found that the later Umm an-Nar occupation encompassed the Hafit cultural landscape, matching the land use pattern documented in the eastern Ja'alan (e.g., Giraud 2010).

Dhofar

Relatively few projects have surveyed the Wilayat of Dhofar for Early Bronze Age cairns. In general, compared with the eastern and northern Oman Peninsula there has been less archaeological research published from

this region. Nonetheless, there is important diversity of sites and monuments across this wilayat (see Al-Shari 1991 for a review of tomb types in region). Early travelers to Oman such Bertram Thomas (1932) and Wilfred Thesiger (1946, 1950, 1959) both noted the cairns ("tumuli") that are the subject of this volume, in addition to triliths, early Islamic cemeteries, and the remains of settlements along the southern coast and in the mountains on their way to the site of Shisr.

The earliest archaeological team to publish about cairns in Dhofar was the team from the American Foundation for the Study of Man (1952-1960), but it is not clear that these were the Early Bronze Age cairns that are the subject of this volume (Cleveland 1960). More often, survey and excavation in Dhofar has focused on the Paleolithic and Neolithic periods (e.g., Pullar and Jackli 1978; Whalen and Schatte 1997; Rose 2004, 2006, 2007) or settlements and ports from more recent periods of history (e.g., Costa and Kite 1985; Costa 1994). Cairns were among the tomb types identified by Al-Shahri (1991), and Bronze Age sites and cairns (tombs with tails) near Mudhai were also noted by Newton and Zarins (2010).

The most extensive documentation of Early Bronze Age mortuary monuments has been the Dhofar Monument Survey by the Ohio State University Arabian Human Social Dynamics (AHSD) project (Harrower *et al.* 2014; McCorriston *et al.* 2014), which mapped a large variety of monuments in the four major environmental zones of Dhofar, including Early Bronze Age cairns called "high circular tower tombs." Compared with northern Oman Peninsula, there are many fewer cairns in Dhofar. Harrower and colleagues (2014) recorded 60 High Circular Tombs (HCT) and 34 possible HCTs. Elevation ranged 135-956m above sea level, with the majority between 400m and 700m above sea level. The authors further demonstrated that the placement of these cairns, clustered around the oases of Mudhai (see Spotlight: Mudhai), Hanun, and Andhur, was near to water sources that were fundamental to later oases development. McCorriston and colleagues (2014) argue that the construction of these monuments followed Neolithic collective building projects and accompanied the development of dedicated pastoralist lifestyles. The mortuary monuments represent the shift to genealogical narratives tied to their placement and use.

Part of the reason that few studies have reported cairns in Dhofar (and elsewhere) is the fact that they are distributed at high places and in terrain that is often rugged (Schuetter *et al.* 2013). This work in Dhofar by the ASHD team relied heavily on methodology developed during their extensive surveys and excavation in southern Yemen (e.g., McCorriston *et al.* 2011). Indeed, the Early Bronze Age cairns in Dhofar share more architectural features with the cairns seen in the Hadramawt than the contemporaneous cairns found on the northern Oman Peninsula, including upright stones often forming the inside wall of the chamber, entrance on the top, and the general size and quality of construction (Figure 2.36). Examination of the cairns in Dhofar and the Hadramawt (Figure 2.37) lead these researchers to interpret them as territory markers because they were often found in clusters and on ridges overlooking wadis that were likely used as transportation routes (Schuetter *et al.* 2013). Importantly, compared with the prevalence of these mortuary monuments in the northern Oman Peninsula, there are many few cairns, and they are substantially smaller. Further, they are not organized into necropoles, thus suggesting a smaller population density and a different land use pattern.

Excavations

Despite the fact that Early Bronze Age cairns are very prevalent in the landscape, relatively few have been excavated and published. Those cairns that have been published are described here chronologically.

Figure 2.36. Example of Early Bronze Age cairn in Dhofar (photo courtesy of RASA project, Joy McCorriston).

Figure 2.37. Example of cairn in Hadramawt, Yemen (photo: K.D. Williams; courtesy of RASA project, Joy McCorriston).

Jebel Hafit

The first of the Early Bronze Age cairns to be excavated on the Oman Peninsula were at Jebel Hafit, led by Karen Frifelt. These excavations between 1961 and 1971 led to the term "Hafit-type cairns" and provided the first evidence of the how these tombs were built and what they contained.

Frifelt (1971, 1975b) published preliminary results of the excavations of some 25 "Jemdet Nasr graves" as part of an examination of the ties between the Umm an-Nar period tombs from Umm an-Nar Island. She noted heavy stone quarrying and ancient disturbances of these tombs. She reported three empty tombs, four tombs with only bone fragments, and 18 tombs that contained material culture and in some cases skeletal material. More recently (Madsen 2017) plans, photographs, and details of the interments in a total of 46 cairns (19 of these were partially reported in Frifelt 1971) were published. These cairns provide important information about the architecture and use of the cairns in the Early Bronze Age and later periods, material culture interred, and some data regarding the placement of the body within the chamber. For example, this work provides excellent documentation of entrances and sealing stones, which can be difficult to identify if a cairn is poorly preserved. Most cairns opened to the south, but not necessarily exactly south, indeed the orientations of tomb entrances at Jebel Hafit fell into five categories of direction (see Figure 2.18).

The evidence suggests that a minimum of 44-47 individuals were interred in these cairns during the Hafit Period (the skeletal remains in Tomb 1051 and Tomb 1312 may have been part of a reuse event and Tomb 1309 reported 5-6 individuals). Another 4-6 individuals were certainly deposited in the cairns at a later time. In fact, 12 of the cairns bore evidence of reuse in later periods: the Umm an-Nar, Wadi Suq, and later Iron Age periods. This is differentiated from repeated use of the cairn in the Hafit Period – use that may be considered part of the original intent of the cairn. For example, if the cairn is used as a receptacle for the dead for a single family, that is part of the original use of the cairn. If it is used again hundreds or thousands of years later, this reuse event may be part of a discourse that attributes a familial tie with the original interred individuals or it may not and simply serve as a tomb that is appropriate to use to inter the dead at a later time with little or no regard for the individual(s) already inside the cairn.

Importantly, 18 of the cairns excavated at Jebel Hafit held no skeletal remains. In most cases, material culture was present. Generally, several interpretations may be put forward to explain the absence of skeletal material in a tomb. Tombs have been the target of looters both in ancient and modern times across the world. In those cases, evidence of a looters trench may be seen or the structure of the tomb may be damaged in some way to indicate that it was opened. It is possible that during the robbery of a tomb that the skeletal remains are damaged, discarded, or simply compromised so that they deteriorate due to exposure, fluctuating temperatures, sunlight, and scavenging. Still, even if there is no evidence of looting, skeletal material may not be present or may become disarticulated due to taphonomic processes which might include animal activity (e.g., burrowing animals) or environmental conditions inside the tomb. This is seen very often in Dhofar where the chamber diameters are smaller and the limestone degradation likely changes the pH of the sediment that accrues inside the chamber. Skeletal elements that are closer to the wall (either placed there or moved there from rodent activity or pushed there during a reuse event) will degrade more quickly than those not in direct contact with the degraded limestone. This gives the appearance of an incomplete skeleton, so care must be taken to consider this rather than expecting a full skeleton to be present and interpreting the contents as partial interments.

Six additional cairns from the western side of Jebel Hafit were reported by Cleuziou (1978). One of these cairns was too badly robbed to provide information (Cairn 4), but the remainder produced near identical results to the work of the Danish team (Tables A.5 and A.6). All of these cairns had been victim to either

Figure 2.38. Early Bronze Age cairns at the UNESCO World Heritage site Al-Ayn (photo: P. Yule).

Figure 2.39. Early Bronze Age cairn at the UNESCO World Heritage site Al-Ayn (photo: P. Yule).

robbing, stone quarrying, or both. Despite this, these excavations revealed single or double interments and in at least one instance, a partial skeleton in a flexed position. Grave goods included the expected Jemdet Nasr ceramics, beads, and small copper/bronze objects. A socketed copper/bronze spearhead in Cairn 2 may have been from a reuse event sometime later than the Hafit Period.

Bat

The tombs at Bat are an element of the sites UNESCO World Heritage Site status, but few of the cairns have been excavated and published. Frifelt (1975b) presented published partial results for one cairn near to Bat, located at Hijar at the foot of Jebel Fajj Raybeh about 3 km from Ibri (Table A.2). This cairn had been heavily disturbed and only contained two Jemdet Nasr ceramics jars.

Tawi Silaim

A couple of years after the initial reports on Early Bronze Age cairns from Jebel Hafit, the excavation of four cairns at the site of Tawi Silaim in Ash-Sharqiyah were published. These four cairns produced results that demonstrated that they shared some characteristics with cairns built and used on the Eastern coast south of Muscat and just north of Ash-Sharqiyah Sands. Moreover, this work introduced new cairn features that were not seen at Jebel Hafit or until that time, elsewhere in the region. Cairn 1 is discussed later in this volume, but the remaining cairns excavated are considered here (Figure 2.40 and Tables A.2-4).

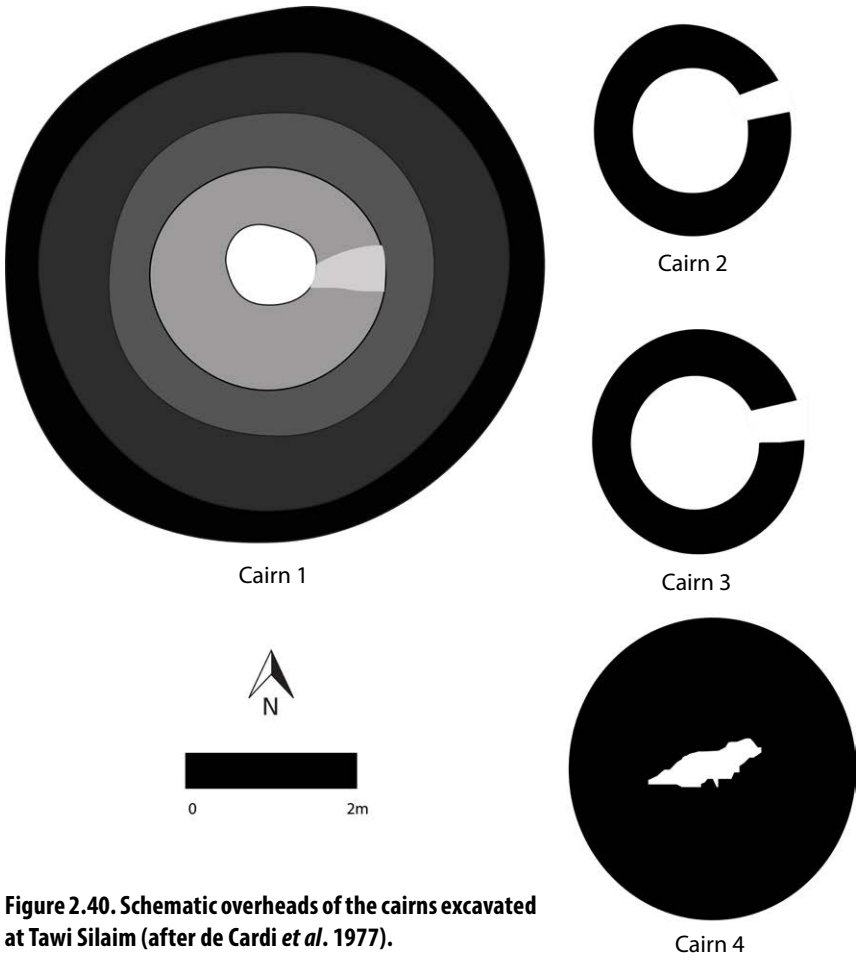


Figure 2.40. Schematic overheads of the cairns excavated at Tawi Silaim (after de Cardi *et al*. 1977).

Cairns 2 and 3 were very similar to each other. Both had corbelled circular double ringwalls. The external diameters were nearly identical (3.8 m and 3.6 m, respectively) and both had a limestone slab pavement of the circular chamber. The chamber dimensions were not specifically published, but the plans can be used to infer that these each measured approximately 3.0 m in diameter. While both of these cairns were disturbed and victims of erosion and windblown sediment accumulation, eastern facing entrances approximately 0.60m wide and less than 1.0 m long were identified. Both were blocked by piles of limestone rubble outside of the cairns, which is de Cardi and colleagues (de Cardi *et al*. 1979) identified as both different from cairns at other sites such as Jebel Hafit, but also different from the "beehive tombs" at Tawi Silaim. They suggested that this may be a signal of differential social status, a practical way to seal the cairn in anticipation of its use in the near future, or that it could be evidence of a change in architectural style where thick concentric walls that all open to the outside were falling out of fashion or function (1979: 70).

A minimum of one individual was represented in each of the cairns. The material culture in the cairns was not useful for aiding chronological interpretation of the monuments when it was originally excavated, but since that time, the six vessels recovered from Cairn 2 are known to fit within the corpus of Early Bronze Age ceramics from other cairns and the beads and shell rings from both Cairn 2 and 3 are seen in Bronze and Iron Age contexts across the Peninsula. Cairn 3 had a possible robber's trench that may have resulted in the removal of ceramics and other materials that were originally interred with the deceased.

Cairn 2 had not been robbed by looters or stone quarry activities, but at some later time the cairn was reused for an interment on the north-eastern side of the monument. This oval encroachment into the monument was approximately 1.0 m in diameter and cut into the paved floor of the chamber. The individual was placed on their right side and with their head to the west with no mortuary goods. This reuse event utilized a different technique for closing the interment. Unlike the original use of the cairns during the Hafit Period where the individual was placed in the cairn and then the structure was closed around them but not on top of the body, this later interment was covered with gravel, sand, and pebbles and the cairn stone structure was built up again around this new interment. This is important stratigraphical data that allows us to see that the people who chose this monument for reuse not only identified it as a suitable resting spot for their deceased, but also that the way they understood the treatment of the body had changed between the first use of the cairn and this second use at some later date.

The results of the excavation of Cairn 4 were also reported, and this monument differed from the other cairns at Tawi Silaim because it had an elliptical chamber and circular outer appearance. The external diameter was considerably smaller (diameter: 2.6 m). It was similar to the other cairns in that the chamber was paved with limestone slabs and the entrance opened to the east, but it was narrower (0.35-0.40 m wide). No skeletal remains were recovered from this cairn, but a large number of beads and a Jemdet Nasr jar were found. Human skeletal remains and a fragment of an Iron Age ceramic vessel were found on the top and sides of the cairn, which demonstrates that this cairn was also used for a later reuse event, but that this reuse did not dig into the original chamber. It may be that the deceased was placed on top of the old cairn and that a stone superstructure was built on top of them. Over time, this eroded and the skeletal material and grave goods were scattered on top and down the sides of the cairn. While many or most reuse events are more intrusive of the original chamber, this less secure interment of a later corpse is not unprecedented (see Figure 6.1 for another example, Individual A).

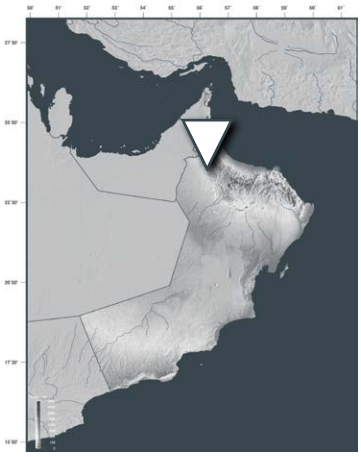
Dhank Region

There are six Early Bronze Age necropoles in and around Dhank, and these have been the subject of survey and excavation since 2009 (Figure 2.42). Seven of the tombs excavated were Hafit-type cairns (Williams and Gregoricka 2013) and the remainder fall into the categories of tumuli (Williams and Gregoricka 2020), transitional tombs (Williams and Gregoricka 2013, 2019), and Iron Age long rectangular tomb(s) (Williams *et al.* forthcoming). Dhank occupies an interesting geographic location along the ancient (and modern) route between Jebel Hafit/Al-Ain/Buraimi and Ibri/Bat. There are more than 1,500 Early Bronze Age cairns on the six necropoles and most are undisturbed.

The majority of the cairns excavated in the Dhank region were at the Al-Khubayb necropolis (Figure 2.43) – a small landform just south of the Wadi Khubayb. This is the last necropolis along this route along the Al-Hajar mountain range until one comes to Mayzad and Jebel Hafit. The cairns in this area are visible from the roadway, but far enough away from any settlements that they are largely undisturbed. With the exception of ancient stone quarrying to build new tombs, it appears that none of the cairns have been robbed. The lack of disturbance is excellent for preserving evidence of Hafit period mortuary rituals and reuse events in later eras. Like all other Early Bronze Age sites, these cairns are built from local materials and the quality of these stones led to poor preservation of many of the monuments. Most monuments have experienced substantial erosion and excavation often leads to significant dismantling of the remaining structure.

Figure 2.41. Early Bronze Age cairn from the site of Shenah (photo: Y. Al-Rahbi; courtesy of Dr. Mohamed Al-Belushi, Sultan Qaboos University).

Spotlight 7 | Al-Khubayb, Dhank, Oman



The Al-Khubayb necropolis is located at the entrance of Wadi Khubayb near to the modern village of Dhank, Oman (Figure 2.42). More than 400 cairns are found at this location (Figure 2.43), and they include simple Hafit-type cairns (Figure 2.44a), transitional cairns (Figure 2.44b), and tumuli (Figure 2.44c). To date, a dozen Early Bronze Age cairns have been excavated at this site (Williams and Gregoricka 2013, 2019, 2020; Weber *et al.* 2019) and these tombs have produced important radiocarbon dates (Table 2.5) and information about the mortuary rituals surrounding the use of each of these types of cairns.

At the Al-Khubayb necropolis, there is no evidence of looting and little evidence of stone quarrying for later construction (there are only a few instances of stone quarrying to build a new cairn). This presents a special situation where all the cairns contain the individuals and material culture interred with them. Preservation issues for the skeletal remains are the most significant limiting factor in understanding these past practices.

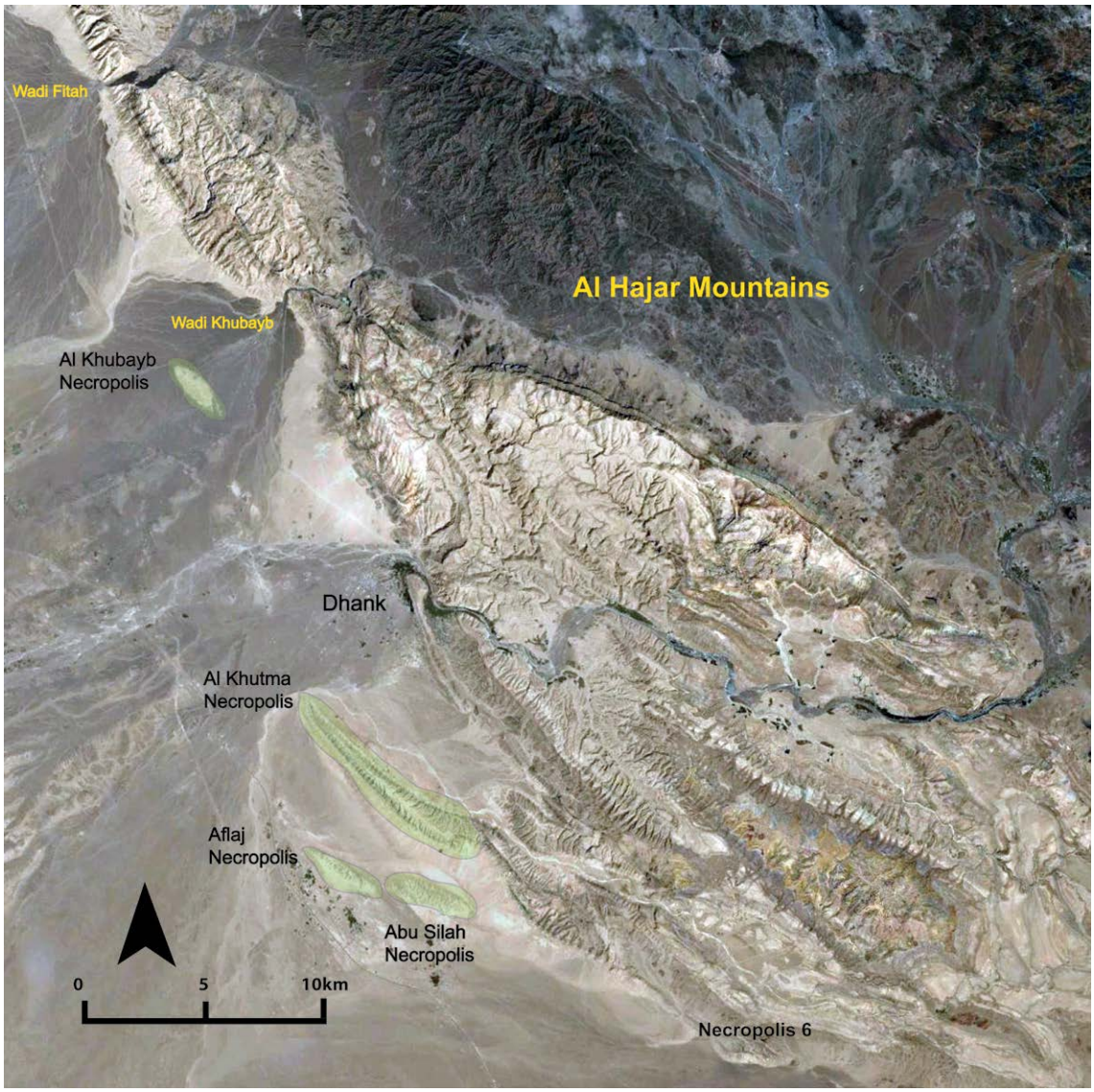


Figure 2.42. Map of necropoles in the Dhank region

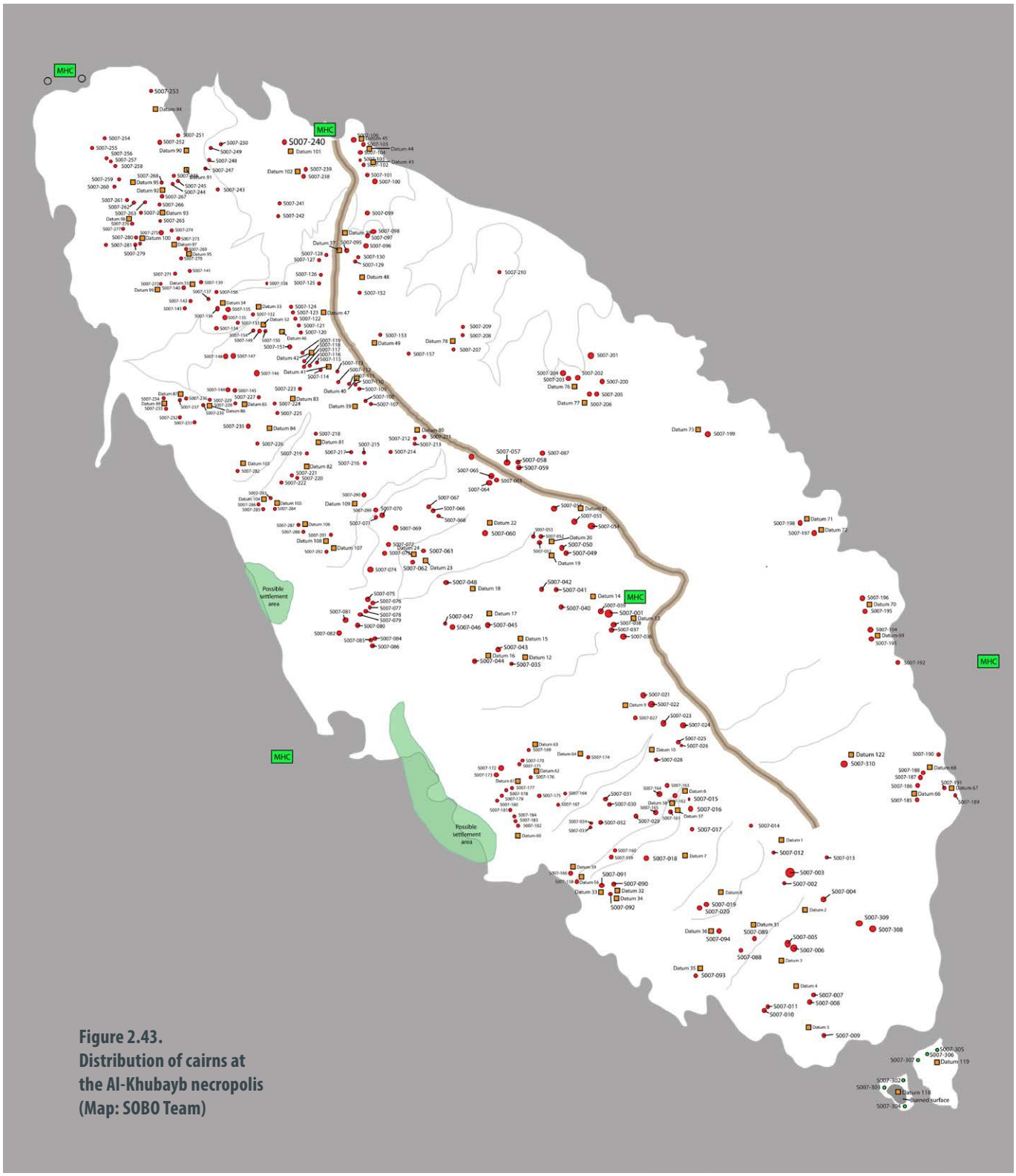


Figure 2.43.
Distribution of cairns at the Al-Khubayb necropolis (Map: SOBO Team)

The three different tomb constructions were not found to be used in discrete periods. Rather, all three tomb types seem to have been in use at the same time. These data, when considered with other cairns found in the Dhank region point to a diversity of tomb types in use during the Early Bronze Age (Williams and Gregoricka 2020). This complicates the picture of cairn use at this time and forces us to consider the possibility that differences in cairn structure may only reflect local variation in mortuary ritual and not strictly a chronological pattern. It is very likely that the same variation can be observed across the Oman Peninsula, thus highlighting the need for systematic excavation of these tombs in order to understand this part of the cultural heritage of the region.

Key Citations

Weber J., K.D. Williams and L.A. Gregoricka 2019. Animals and the changing landscape of death on the Oman Peninsula in the Third Millennium BC. In K.D. Williams and L.A. Gregoricka (eds.), *Life and death in Bronze Age Arabia: Mortuary and bioarchaeological perspectives*. University Press Florida, Gainesville, pp. 163-181.

Williams K.D. and L.A. Gregoricka 2013. Social, Spatial, and Bioarchaeological Histories of Ancient Oman: mortuary archaeology of Dhank, Oman 2009-2013. *Arabian archaeology and epigraphy* 24: 134-150.

Williams K.D. and L.A. Gregoricka 2019. The Hafit/Umm an-Nar transition of the Third Millennium BC: evidence from the architecture and mortuary ritual at Al-Khubayb necropolis. In K.D. Williams and L.A. Gregoricka (eds.), *Life and death in Bronze Age Arabia: mortuary and bioarchaeological perspectives*. University Press Florida, Gainesville, pp. 76-107.

Williams K.D. and L.A. Gregoricka 2020. New evidence of prehistoric tomb diversity in Dhank, Oman. *Journal of Oman Studies* 21: 102-127.

Figure 2.44.
(a) Example of Hafit-type cairn at Al-Khubayb necropolis; (b) Example of Hafit/Umm an-Nar transitional cairn at Al-Khubayb necropolis (S007-001; Williams and Gregoricka 2013, 2019); (c) Example of tumulus at Al-Khubayb necropolis (S007-169; Williams and Gregoricka 2020)

Figure 2.45. Hafit-type cairns at the Al-Khubayb necropolis

Table 2.5. Published dates for Al-Khubayb Early Bronze Age cairns

Tomb #	Tomb Type	Material	Individual	Bone	UGAMS Lab #	Uncalibrated	2-sigma (cal. BC)	Citation
S007-001	Hafit/Umm an-Nar Transitional Cairn	bone bioapatite	C	femur	11156	4110 ± 30	2865-2575	Williams and Gregoricka 2013
		wood charcoal	C	n/a	11161	4230 ± 25	2904-2707	
S007-003	Hafit/Umm an-Nar Transitional Cairn	wood charcoal	B	n/a	11160	4030 ± 25	2619-2475	
		bone bioapatite	C	femur	11158	4170 ± 25	2880-2690	
S007-011	Hafit/Umm an-Nar Transitional Cairn	bone bioapatite	A	femur	17148	4045±25	2831-2481	Williams and Gregoricka 2019
S007-012	Hafit/Umm an-Nar Transitional Cairn	bone bioapatite	A	femur	17149	4030±25	2619-2475	
S007-057	Hafit/Umm an-Nar Transitional Cairn	bone bioapatite	A	femur	14212	4030 ± 20	2618-2477	
		bone bioapatite	D	femur	14213	4050 ± 25	2832-2487	
S007-100	Hafit-Type Cairn	bone bioapatite	A	radius	20184	4020±25	2617-2473	Williams and Gregoricka 2020
		bone bioapatite	B	radius	20185	4010±25	2575-2474	
S007-101	Hafit-Type Cairn	bone bioapatite	A	fibula	20186	3950±20	2564-2348	
		bone bioapatite	B	fibula	20187	3970±20	2567-2462	
S007-167	Tumulus	wood charcoal	n/a	n/a	17150	4130±25	2870-2585	
		bone bioapatite	A	femur	17151	4040±25	2827-2478	
S007-169	Tumulus	bone bioapatite	A	femur	17152	3900±25	2468-2299	

Figure 2.46. Example of Hafit/Umm an-Nar transitional cairn surrounded by Hafit-type cairns at Al-Khubayb necropolis

Summary

Mortuary cairns are the most common Early Bronze Age archaeological features on the Oman Peninsula. Hundreds of thousands of them stand as memorials to the long ago dead. The vast majority of these tombs were built in the Early Bronze Age and hold the remains of the dead and traces of a mortuary ritual that included the interment of Jemdet Nasr ceramics, beaded jewelry, shells, and small bronze/copper objects such as blades, awls/pins, and arrow points. The construction of these cairns shows local and regional variation. For example, in Dhofar the dead were not interred with ceramics or bronze objects and the cairns are smaller, more simply built, and far fewer than those in northern regions. Along the eastern coast and across the northern parts of the peninsula, at least three types of cairns were in use during the Early Bronze Age: 1) the typical dry stone circular tomb; 2) a transitional cairn that is larger, more complex, and was used for contemporaneously with the communal Umm an-Nar tombs that characterized the later part of the Early Bronze Age; and 3) tumuli – a tomb form that mounting evidence suggests developed during the Neolithic period.

Many Early Bronze Age cairns have been excavated and mapped, but there are still unanswered questions about the people who lived at this time. Modern techniques are poised to answer many more questions about how ancient people used and reused these monuments over time. Their place on the landscape makes them the scene of repeated use, and because of this it is reasonable to argue that in the millennia since they were constructed that later ancient people used them to appropriate belonging and rights over territory and resources.

Chapter 3

Mortuary Monuments: Umm an-Nar Period Communal Tombs (2700–2000 BC)

Unlike the more simple cairns seen throughout Arabia during the first part of the Early Bronze Age (3200-2700 BC), communal Umm an-Nar tombs are only seen north of the Rub Al-Khali desert and across the northern Oman Peninsula (e.g., Figure 3.1). Surveys that yielded copious information about the distribution of Early Bronze Age cairns also reported the distribution of Umm an-Nar tombs. These surveys have demonstrated that there were far fewer Umm an-Nar tombs than earlier cairns (e.g., Al-Jahwari 2013b). In the region around the site of Bat, 128 tombs were identified and interestingly while Umm an-Nar tombs were found near to Umm an-Nar towers, they were also found in spaces without towers or other traces of settlement (Cable and Jabri 2019). Cable (2019) has argued that Umm an-Nar communities were built near to the earlier Hafit communities, drawing on the cairns of this earlier period as "cultural capital," thereby allowing people to legitimize themselves and promoting the building of new monuments that elaborated on the Hafit period histories in the region as the population increased social differentiation and reduced equal access to resources. This conforms well with observations in the Ja'alan where Giraud (2010) argued that the communal Umm an-Nar tombs were built in locations not to be seen, but rather so that earlier Hafit-type cairns were in view of the newer tombs. In this way, the new tombs were drawing on the social capital of the previous tombs either because they were known descendants or so that these new death practices were performed in literal view of the descendants.

Figure 3.1. Umm an-Nar tomb A at UNESCO World Heritage site of Bat (photo courtesy of C. Schmidt).

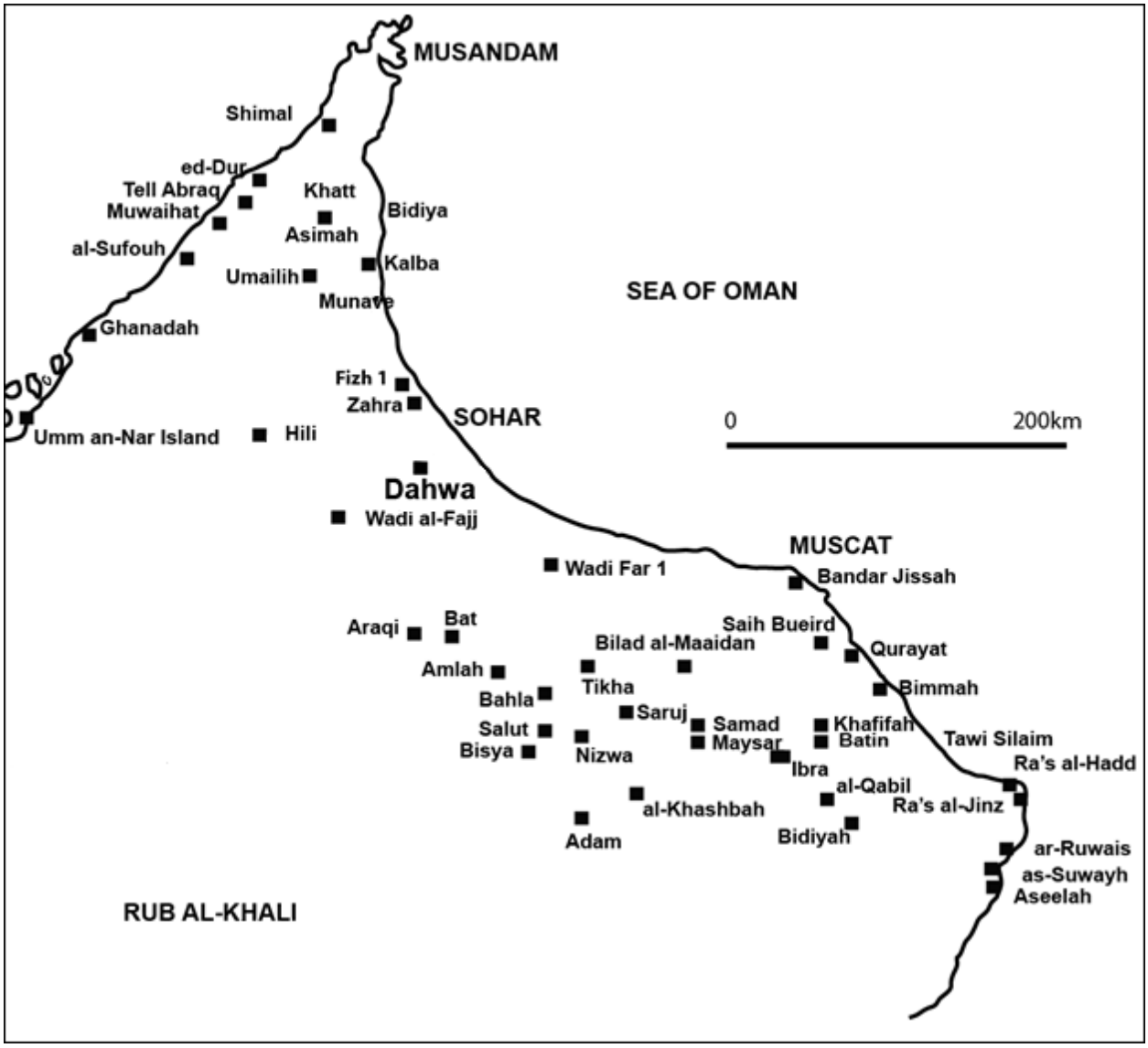


Figure 3.2. Location of published Umm an-Nar sites (after Al-Jahwari *et al*. 2019).

At this point in history, mortuary rituals in Dhofar do not change in the same way that they do in the northern Oman Peninsula. There is no evidence of communal tombs, no evidence of early settlements with monumental architecture, and we can only assume that life continued as it had been with pastoral nomadic communities. In the north, it is clear from the simple fact of the change in monumental mortuary architecture that significant changes in social organization occurred during this time. Changes in the way people deal with the dead often act as harbingers of important changes in society in general. It seems that across this region, small settlements developed and that finely built communal tombs (coinciding with the construction of monumental towers) were positioned in or near to these settlements, in contrast to the placement of cairns at high places.

The fact of cultural continuity at least with regard to mortuary rituals during the Umm an-Nar period does not mean that there is no variation in construction and ritual. Reasons for this variation include chronological development, population size, and differential interaction with foreign agents. The manner of

Figure 3.3.
Examples of white ashlar stones that formed the façade of most Umm an-Nar circular tombs from the site of Shokur, Dhank.

construction and placement of these tombs has also led to preservation challenges that do not plague Early Bronze Age cairns as seriously, and this hinders our ability to fully assess the range of practices surrounding these monuments. Specifically, the well-cut stones used to construct Umm an-Nar tombs made them desirable building material for later architectural projects. Reuse of Umm an-Nar stone blocks (Figure 3.3) has been documented in Wadi-Suq tombs and structures built from the Iron Age thru the Islamic period on the Oman Peninsula (e.g., Jasim 2012; Williams and Gregoricka 2013; Williams *et al.* 2021). Reuse of the stones for slightly newer Umm an-Nar tombs has also been inferred.

Subsequent erosion of any remaining stones, plinths (if present), flooring (if present), and subterranean compartments (if present) have in some cases compromised the remaining archaeological deposit and in other cases protected it. Furthermore, the placement of these tombs in settlements means that continuous and/or repeated occupation of these settlement areas led to reuse of the tombs or building on top of Umm an-Nar period tombs (Figure 3.4), as well as examples of their erasure from the visible landscape if they were built over as time went on (e.g., Shokur; Williams and Gregoricka 2013).

Figure 3.4. Rounded wadi cobbles from Iron Age cairns built on top of Umm an-Nar Tomb 1 at DH7 (Dahwa). These stones covered the earlier Umm an-Nar tomb and helped to protect the Early Bronze Age context. Roof stones and ringwall from the Umm an-Nar tomb were visible as the remains of the cairn stones were removed (photo: Yaqoub Al-Rahbi).

Umm an-Nar Island, U.A.E.

Like the story of the Early Bronze Age cairns, the discovery of communal, Umm an-Nar tombs begins with Danish exploration of Umm an-Nar Island, United Arab Emirates (see Figure 3.2). Here, the first tombs were excavated and the first evidence of complex mortuary rituals and interregional trade during the Early Bronze Age was identified beginning in 1959 with the Fifth Danish Archaeological Bahrain expedition (Thorvildsen 1962). The team identified 49 "cairns" and here we should consider the use of this term as a word to describe the pile of stones that the long disused monuments presented as before excavation. As a result, in this volume, the monuments are called Tomb I, II, etc. rather than Cairn I, II, etc. as they are in the original publications so that confusion does not arise between the mortuary tradition of construction and use of cairns built of unworked stone and the more complex tradition practiced in the Umm an-Nar period with the monumental communal tombs. In the more complete report on the mortuary monuments on Umm an-Nar Island, Frifelt (1991) presents basic information for 49 tombs and detailed examination of five of these (Figure 3.5), some of which have become iconic examples of Umm an-Nar tombs. Thorvildsen (1962: 212) makes clear that not all tombs here are of the same type. Indeed, Tomb I, Tomb II, and Tomb V fit what we understand to be Umm an-Nar tombs. Others may be more appropriately assigned to the Hafit period, although special consideration of Tombs IV and VI is warranted.

We learned from these first tombs (published in less detail in Thorvildsen 1962 and During Caspers 1970) that certain characteristics are common to this mortuary tradition. These included a double ring wall built on a plinth, where the inner wall was made from rough-hewn stones but the outer wall (façade) was made of finely carved stone, creating an elegant exterior appearance for these monuments. Some of the tombs had façade stones with carved reliefs of anthropomorphic figures and animals, and some stones placed or found near to entrances had apparent handles (Table A.7). Exterior diameters for these circular monuments ranged from 6.5–12.0 m and most of the chambers were paved with flat stones. In addition to these architectural details, the monuments that were soon coined "Umm an-Nar tombs" possessed internal architecture, walls which divided the circular interior space into a variable number of chambers and which were used to support flat stone slabs that served as roofing. Where preserved, evidence of modest corbelling of the interior walls generated a relatively shorter distance for the slabs (Figures 3.6a and 3.6b). At this site, it was observed that much of the stones used to build the double ring walls was present, if collapsed. As a result, Thorvildsen (1962) was able to estimate that these tombs stood 1.5–2.5 m tall when originally constructed.

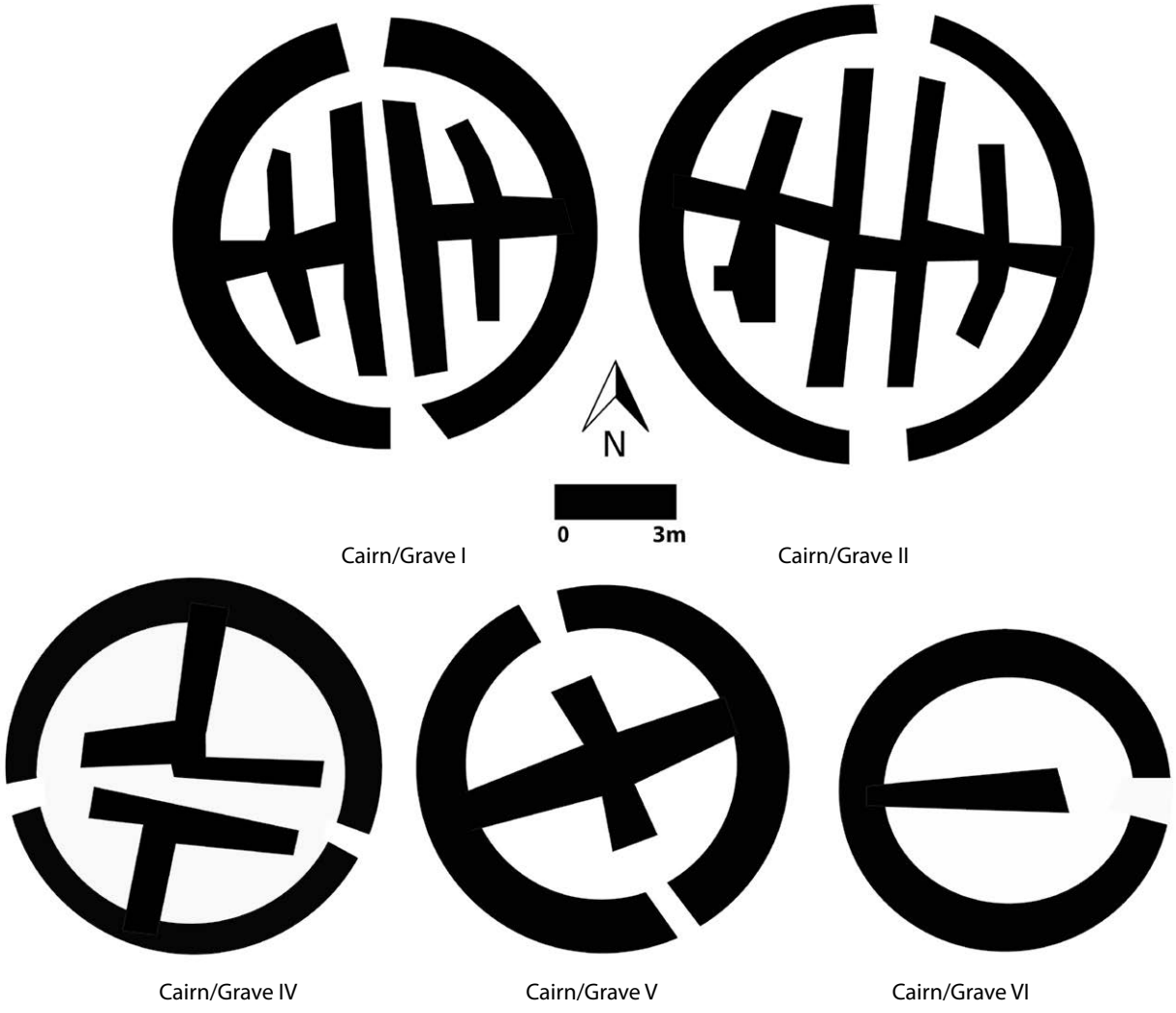


Figure 3.5. Umm an-Nar Island tombs excavated by Danish Archaeological Expedition (after Thorvildsen 1962).

Figure 3.6. Example of Umm an-Nar tomb roof slabs from Dahwa site: (a) Tomb 1, DH7 roof stones circled, (b) close up of roof stone from Tomb 1, DH7.

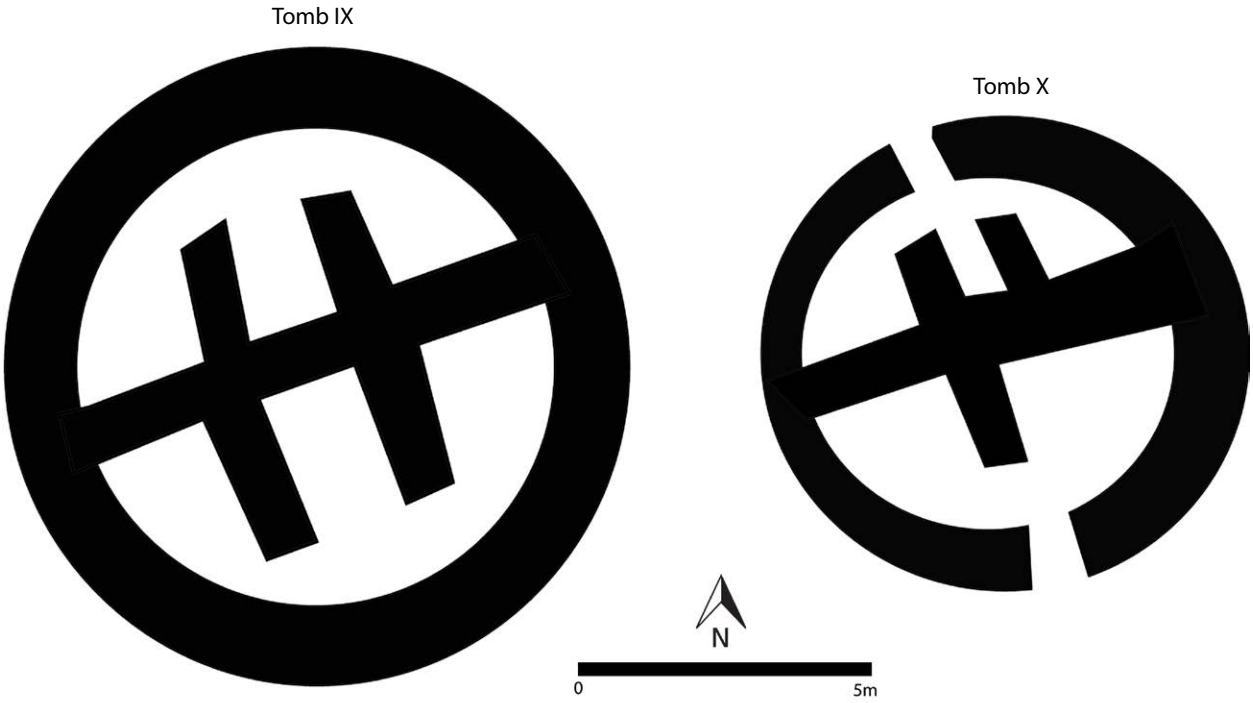


Figure 3.7. Umm an-Nar Island tombs excavated by Iraqi Archaeological Expedition (after Al-Tikriti 1981).

Skeletal remains were found in heaps in all of the tombs and no pattern of body placement could be discerned from the archaeological deposits. Thorvildsen (1962) reported that it seemed that bones were pushed aside with new interments. Within the Umm an-Nar type tombs, the minimum number of individuals ranged from 20 to 37 (Table A.9). Interred material culture included ceramic and softstone vessels, bronze/copper daggers and fragmentary small objects, and a large quantity of beads of various sorts (Table A.10). During Caspers (1970) elaborated further on these by drawing attention to the similarity in ceramics and the associated burial of quern stones. Extramural graves were found against the exterior walls of Tombs V, VI, and VII and were initially interpreted as possible human sacrifices (Thorvildsen 1962: 218), but the practice of extramural graves and extramural construction of stone structures for interments is now known from Iron Age reuse of many tombs and settlements (e.g., Al-Jahwari 2013b).

An Iraqi excavation in 1975 produced results on four more tombs (Al-Tikriti 1981). Two of these tombs are likely Umm an-Nar type tombs (Tombs IX and X; Figure 3.7, this volume) and two are Hafit-type cairns (Tombs XI an XII) based on the description of the architecture. These excavations documented tombs with a new internal architecture configuration resulting in six (Tomb IX) and four (Tomb X) chambers. Additionally, they observed a new architectural feature: a shelf in chamber four and chamber six of Tomb IX (Al-Tikriti 1981: 138). Upon these shelves were human skeletal material and the interpretation was that earlier interments were placed on the floor and later interments were placed onto the shelves.

The material culture found in the tombs of Umm an-Nar Island, specifically the ceramic vessels interred with the dead, helped to situate them chronologically. Soon the evidence from Umm an-Nar Island, as well as the sites of Hili and Bat helped to form a nascent understanding of the "Umm an-Nar culture" (e.g., During Caspers 1970; Frifelt 1975a, 1975b).

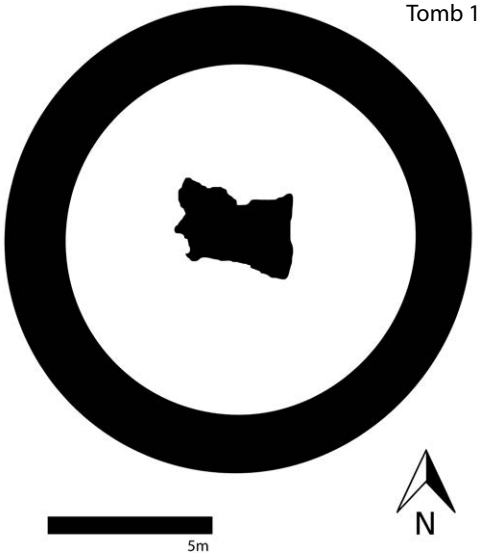


Figure 3.8. Tomb 1001 at Adam (courtesy of G. Gernez).

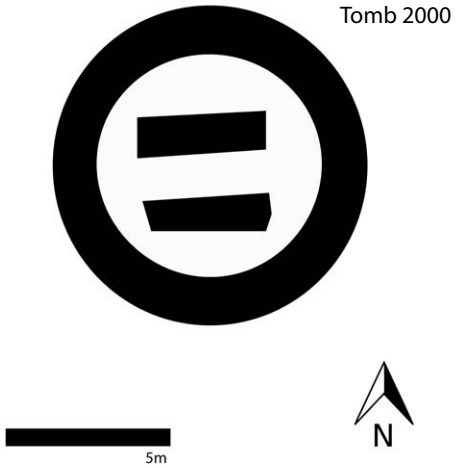


Figure 3.9. Tomb 2000 at Adam (after Gernez and Giraud 2019).

Adam, Oman

There is limited data on the Umm an-Nar period from Adam (Gernez and Giraud 2019). The data that do exist are from Tomb 1001 (Figure 3.8) and Tomb 2000 (Figure 3.9).

Tomb 1001

Tomb 1001 (Gernez and Giraud 2019) is a communal circular tomb with a diameter of 6.0 m and paved chambers (two chambers created by a central dividing wall that still allowed communication throughout the tomb). Near complete looting removed all but bone fragments and a single bead.

Tomb 2000

Tomb 2000 (Gernez 2019; Gernez and Giraud 2019) is a communal circular tomb with a diameter of 9.5 m, divided into 2-3 chambers (the central "chamber" may be a corridor, see Gernez 2019). It was heavily disturbed (stone quarrying and looting), but the skeletal remains of at least 25 individuals were identified. Material culture included domestic ceramics, imported ceramics, softstone vessels, small bronze/copper objects, and beads.

Bat, Oman

The Early Bronze Age settlements and tombs at Bat (Frifelt 1971, 1975a,b, 1976, 1985; de Cardi et al. 1976; Gentelle and Frifelt 1989; Böhme and Al-Sabri 2011; Cable and Thornton 2013) to-gether form the UNESCO World Heritage Site Bat, Al-Khutm and Al-Ayn, inscribed in 1988. The settlement has been and is still under excavation. This work continues to reveal the importance of this site and the role it played in the region during the Early Bronze Age. The well-preserved architecture of the mortuary monuments has shed light on the mortuary practices of people during the Hafit Period, the Umm an-Nar period, and importantly, the transition between these two modes of mortuary practices (See also, Chapters 2 and 4). Frifelt (1975a) published the schematic plans of Bat tombs 53, 54, 55b, 84, and 87 (Figure 3.10), but the most detailed excavation reports come from the excavations of the German Expedition to Bat in recent years. These

include Tomb 153, Tomb 154, Tomb 155, Tomb 156, Tomb 401, and two burial pits excavated by the German Expedition to Bat (Bohme 2012; Bohme & Al-Sabri 2011; Döpper and Schmidt 2014a,b; Schmidt and Döpper 2014). Tombs 155 and 156, as well as the two burial pits are described here.

Tomb 155

Tomb 155 was excavated in 2012-2013 and published by the German Expedition to Bat (Döpper and Schmidt 2011; Döpper and Schmidt 2014; Schmidt and Döpper 2014). This circular tomb has a diameter of 6.5 m and it is divided into two chambers by an internal wall that runs east-west but does not extend the full width of the chamber (Figure 3.10). There is a single west facing entrance. Poorly preserved fragmentary skeletal remains were found in addition to material culture (see Table A.10) including beads, softstone vessels (fragmentary and complete), and ceramic vessels (including typical Umm an-Nar black-on-red fine red ware and imported incised grey ware). A reuse event likely occurred in the Samad period, and that interment was found with arrowheads, metal objects, fragments of a softstone vessel, and a ceramic vessel.

Tomb 156

Tomb 156 (Döpper and Schmidt 2011; Döpper and Schmidt 2014; Schmidt and Döpper 2014) is another circular Umm an-Nar tomb, with two chambers (Figure 3.10). These chambers are fully separated by a north-south internal wall and they each have entrances: chamber A opens to the east, and chamber B opens to the west. The total exterior diameter is 8.10 m. Chamber A yielded few fragmentary human and faunal skeletal material, metal fragments, few ceramic sherds, a whetstone, and beads. Chamber B yielded poorly preserved fragmentary skeletal ma-terial, beads, grinding stones, marine shells, copper sheets and pins, iron fragments, softstone vessel fragments, and a larger amount of Iron Age period ceramics (see Table A.10). Another Samad reuse event of this tomb also included arrowheads, metal objects (including 74 iron fragments), ceramics, and burned ovicaprid remains at the entrance. The authors note the difficulty of determining the interment date of some material culture.

Burial Pit A-Inst 0006 and Burial Pit A-Inst 0025

Two Umm an-Nar burial pits have been identified and published from the site of Bat. Burial Pit A-Inst 006 (Döpper and Schmidt 2011; Schmidt and Döpper 2014; Döpper 2015) is between Tomb 154 (Böhme 2012) and Tomb 155, whereas Burial Pit A-Inst 0025 is 0.80 m east of the entrance to Tomb 156 (Schmidt and Döpper 2014; Döpper 2015). Both of the pits are oval and are close to a circular Umm an-Nar tomb with which they are likely intertwined with regard to mortuary ritual. Both pits were dug directly into the natural gravel. Both pits contained very fragmented skeletal material and material culture.

Burial Pit A-Inst 0006 revealed better preserved larger fragments and complete skeletal elements closer to the bottom of the pit. This includes an unusual, largely complete articulated skeleton and portions of other articulated skeleton(s) (Döpper and Schmidt 2014: 202). While not complete skeletons, the amount and types of articulations support the assertion that was more than one primary interment in this pit. This is unusual for Umm an-Nar burial pits which do seem to be the primary resting place for some children (e.g., Hili Tomb N, Mowaihat, and Sufuh) and which do occasionally present evidence for movement of desiccated remains or incompletely decomposed remains into bone pits (RJ-1 bone pit, Hili Tomb N, Mowaihat, Sufouh) or later primary interments (Hili N). Primary interments early in the use of bone pits has not been documented before. This suggests that this bone pit was used in an unusual way or that it was dug and used in the later part of the Umm an-Nar period.

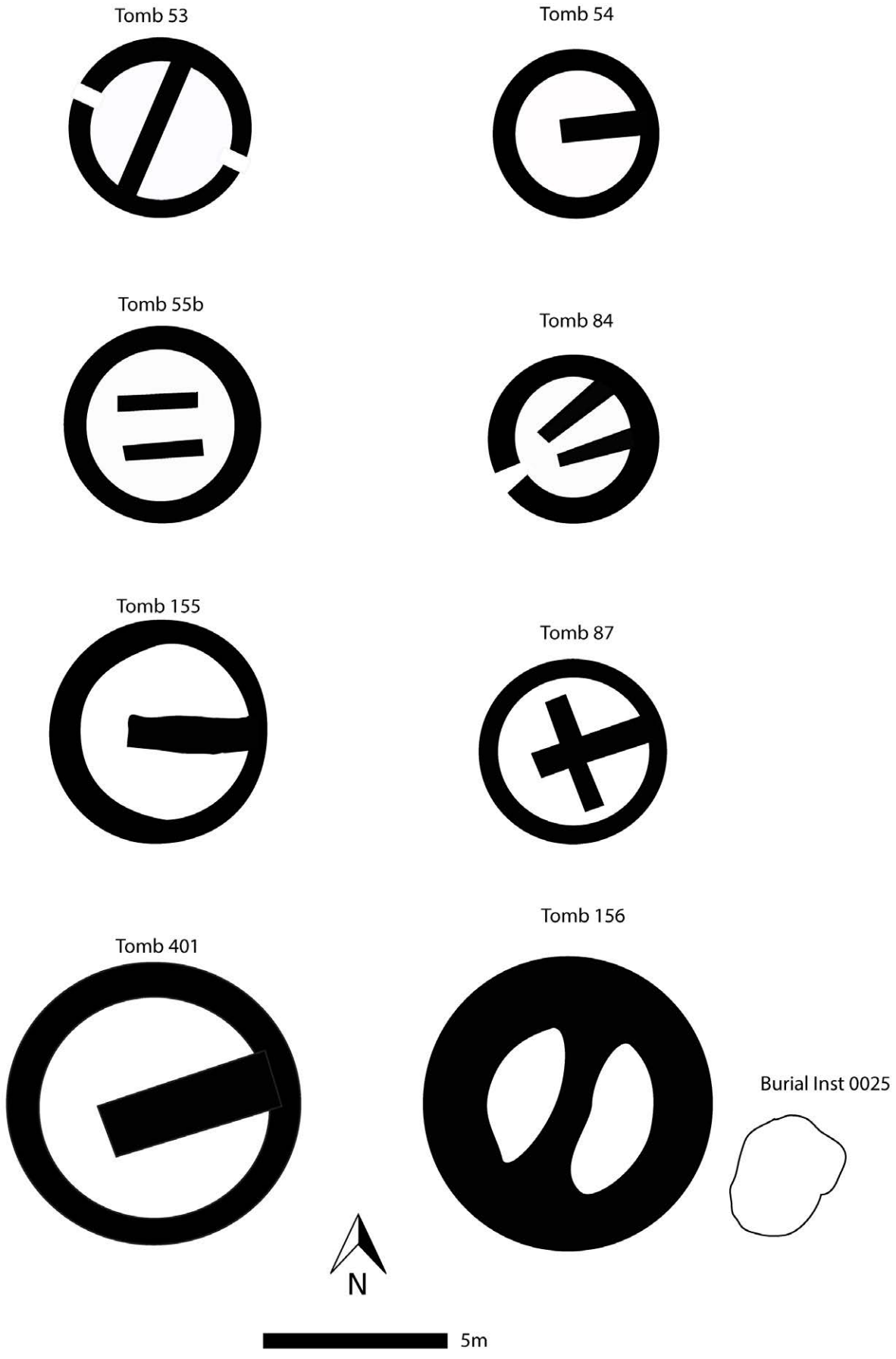


Figure 3.10. Sample of tombs at Bat (Tombs 53, 54, 55B, 84, and 87 after Frifelt 1975; rest after Schmidt and Döpper 2014).

Burial Pit A-Inst 0025 was excavated in 5-10 cm layers. While this pit was filled with more than 38,000 bone fragments (in addition to complete and fragmentary material culture), the controlled excavation revealed important characteristics of the deposit that help us understand the process by which the pit was filled. For example, long bones and skulls found along the eastern edge of the pit appear to have been intentionally placed there. Material culture included Umm an-Nar black-on-red fine ware and imported incised grey ware, beads, an ivory comb, and a cylinder seal (see Table A.10).

Hili, U.A.E.

The Umm an-Nar mortuary structures built in and around the settlement of Hili (Figure 3.11; Table A.7, used limestone from a nearby quarry at Jebel Aqlah (Méry 2010). Work on these tombs expanded scholars understanding of the Umm an-Nar monuments and provided the first comparisons to the tombs on Umm an-Nar Island. Three of these tombs have been published extensively (e.g., Frifelt 1975a; Cleuziou and Vogt

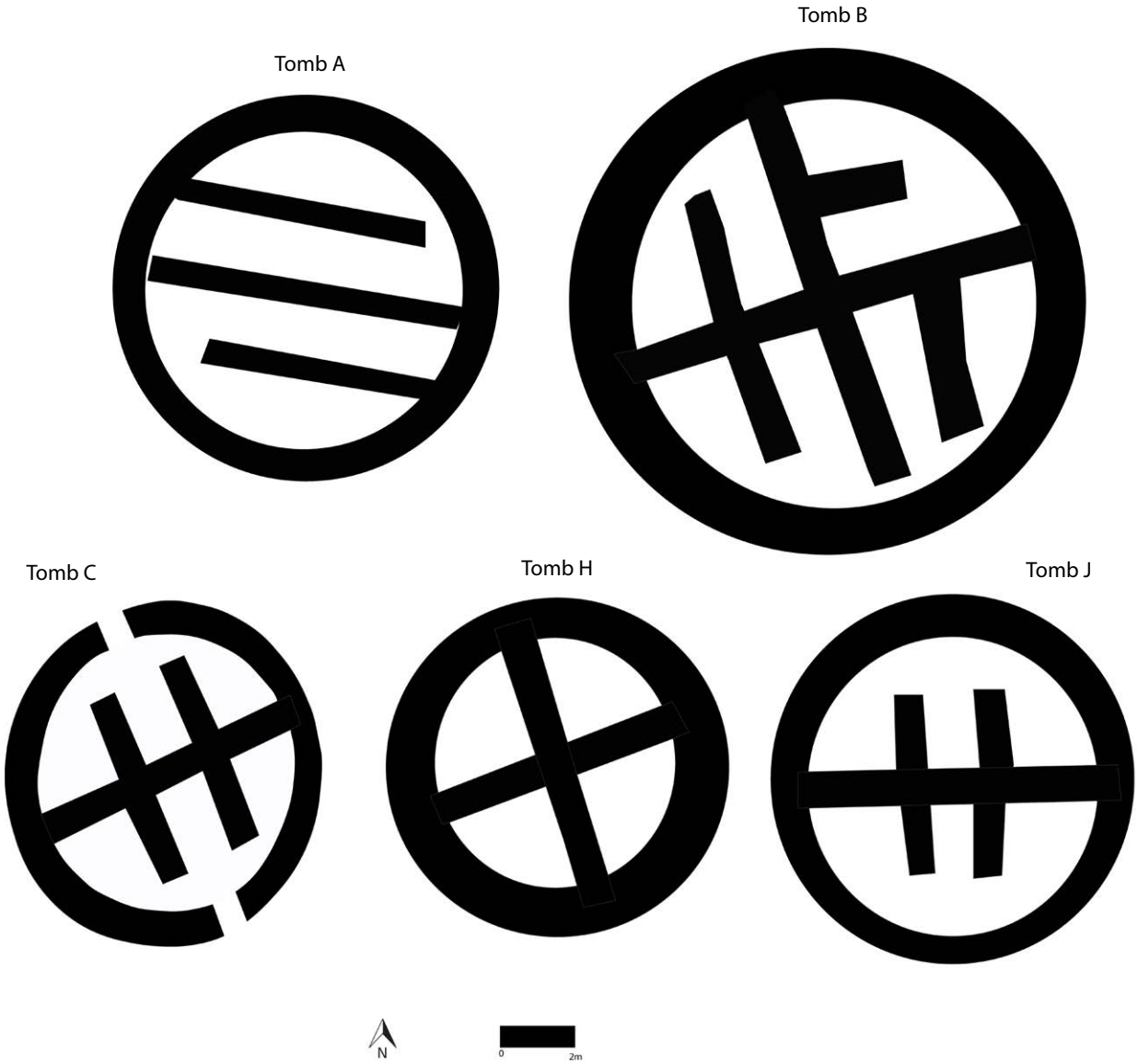


Figure 3.11. Sample of tombs at the Hili site (after Al-Tikriti 1981; Cleuziou and Vogt 1985).

Spotlight 8 | Tomb A, Hili North, U.A.E.

Type: Communal circular tomb
Diameter: 10.7 m
Number of stories: 2 (second story not preserved)
Number of chambers: 4 parallel
Communication between chambers: Between northern chambers and between southern chambers only
Entrance(s): East and west
Carved reliefs: No
Depth of subterranean element: 1.4 m
Flooring: None, may have been removed during looting
Evidence of burning: Yes
MNI: 300

Evidence of mortuary ritual

- Bones pushed to sides of chambers
- Primary interments observed on floor of chamber 1; placed in flexed position (left arm extending over next body)
- Some skeletal material burned
- Cut marks observed
- Hypothesized that bones were moved to top story after decomposition and sorted by element
- All ages and both sexes represented

Summary of Material Culture

- At least 662 ceramic vessels
  - Domestic wares
  - Imported: Iranian grey ware, Indus, Mesopotamian
- At least 80 softstone vessels
- Small copper/bronze objects
- Beads

Figure 3.12. Schematic plan of Hili, Tomb A (after Cleuziou and Vogt 1985)

Key Citations

Bondioli L., Coppa A., and R. Macchiarelli 1998. From the coast to the oasis in Prehistoric Arabia: what the human osteodental remains tell us about the transition from a foraging to the exchange economy? Evidence from Ra's Al-Hamra (Oman) and Hili North (U.A.E.). In M. Tosi (ed), P*roceedings of the XIIIth Congress, 8-I4 Sept. 1996, of the International Union of Prehistoric and Protohistoric Sciences*, A.B.A.C., Forli, pp. 229-234.

Cleuziou S. and B. Vogt 1983. Umm an-Nar burial customs: new evidence from Tomb A at Hili North. *Proceedings of the Seminar for Arabian Studies* 13: 37-45.

Cleuziou S. and B. Vogt 1985. Tomb A at Hili North (UAE) and its material connections to southeast Iran and the greater Indus Valley. *South Asian Archaeology 1983. Papers from the seventh international conference of the association of South Asian Archaeologists in Western Europe, Vol. 1*: 249-277.

McSweeney K., S. Méry, and R. Macchiarelli 2008. Rewriting the end of the Early Bronze Age in the United Arab Emirates 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: 1-14.

Spotlight 9 | Hili Tomb N, U.A.E.

Type: Subterranean communal bone pit (oval)
Dimensions: Length: 6.6m; Width: 2.2m; Depth: 2.5m
Entrance(s): Top
Evidence of burning: Yes
MNI: 700
Architectural features: (Support?) Wall; Extended in length and width

Evidence of mortuary ritual

- Bones likely moved from Tomb E into pit, given close proximity
- Complete vessels may indicate interment with fragmentary skeletal material from Tomb E
- Some primary interments (likely in latest phase)
- Some skeletal material burned

Summary of material culture

- At least 850 ceramic vessels
  - Domestic wares
  - Imported: Indus, Baluchistan, Makran, Mesopotamian
- Softstone vessels
- Small copper/bronze objects
- Beads
- Shells
- Two softstone seals

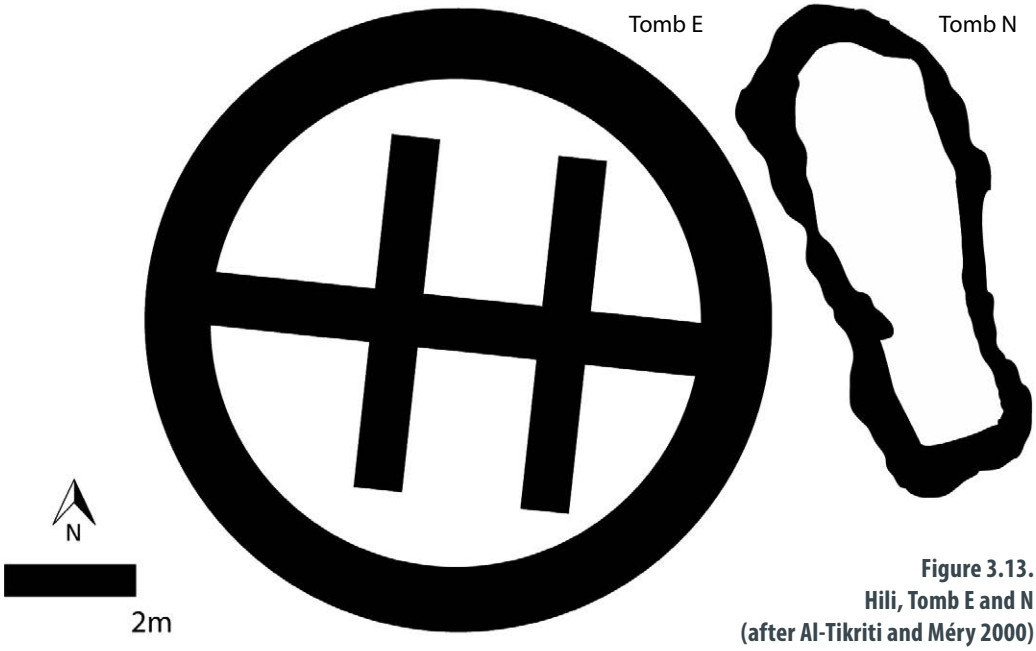


Figure 3.13.
Hili, Tomb E and N
(after Al-Tikriti and Méry 2000)

Key Citations

Al-Tikriti W.Y. and S. Méry 2000. Tomb N at Hili and the question of the subterranean graves during the Umm an-Nar period. *Proceedings of the Seminar for Arabian Studies* 30: 205-219.

McSweeney K., S. Méry, W.Y. Al-Tikriti and S. Van Der Leeuw 2004. New approaches to a collective grave from the Umm an-Nar Period at Hili (UAE). *Paléorient* 30(1): 163-178.

McSweeney K., S. Méry and W.Y. Al-Tikriti 2010. Life and death in an Early Bronze Age community from Hili, Al Ain, UAE. In L. Weeks (ed.), *Death and burial in ancient Arabia and beyond: Multidisciplinary perspectives*. Archaeopress, Oxford, pp. 45-54.

Méry S., K. McSweeney, S. Van Der Leeuw, and W.Y. Al-Tikriti 2004. New approaches to a collective grave from the Umm an-Nar Period at Hili (UAE). *Paleorient* 30(1): 163-178.

Gatto E., G. Basset, S. Méry and K. McSweeney 2003. Paleodemographic study and fire use at Hili N: an Early Bronze Age collective pit-grave in the United Arab Emirates. *Bulletins et Memoires de la Societie d'Anthropologie de Paris* 15(1-2): 25-47.

Méry S., K. McSweeney, J. Rouquet, G. Basset and W.Y. Al-Tikriti. 2008. New Evidence of Funerary Practices at the end of the Early Bronze Age at Hili, United Arab Emirates. In E. Olijdam and R.H. Spoor (eds.), *Intercultural relations between South and Southwest Asia. Studies in commemoration of E.C.L. During Caspers (1934-1996)* (Bar International Series 1826). Archaeopress, Oxford, pp. 200-208.

1983, 1985; El Najjar 1985; Vogt 1985; Méry 1997; Bondioli *et al.* 1998; Al-Tikriti and Méry 2000; Méry *et al.* 2001; Gatto *et al.* 2003; Méry *et al.* 2003a,b; Méry *et al.* 2004; McSweeney *et al.* 2004; McSweeney *et al.* 2008; McSweeney *et al.* 2010; Méry and Tengberg 2009; Méry 2010) and the remainder we know of from the dissertation research of Professor Walid Al-Tikriti (Al-Tikriti 1981) and a chronological assessment from Professor Sophie Méry (2010). Tomb A and Tomb N are the most well understood mortuary structures at Hili and are considered in detail here.

Tomb A

Hili Tomb A was excavated by the French Archaeological Mission starting in 1981 (Figure 3.11). This large circular tomb has an external diameter of 10.7 m, was constructed of the same double ring wall technique seen on Umm an-Nar Island (external ringwall well-shaped limestone blocks, internal ringwall rough stones). At Hili, Tomb A and the other circular tombs, employed mortar to stabilize the internal ringwall as well as the partition walls found inside (Vogt 1985). Tomb A has four parallel chambers created by three partition walls. These walls are configured in such a way that there is communication between the two northern chambers as well as between the two southern chambers, but not between the northern and southern halves of the tomb. An entrance was located in the eastern ringwall and it was assumed that a symmetrically placed entrance was originally in the western ringwall as well. This tomb was heavily damaged in antiquity. Evidence of this includes 1) absence of roof slabs, an oblong robbers trench on top of the division walls between chambers 1 and 2 (and fragmentary façade stones in this trench), 3) a platform built in chamber 1 (which cannot be firmly dated, but is noted to most likely postdate the original use of the tomb, and apparent systematic looting which included removal of the presumed paving stones (Vogt 1985). Further, unlike the tombs on Umm an-Nar Island, this tomb had a significant subterranean element built 1.4 m into the soil. This, and the monolithic doorstone (~2.0 m tall) led researchers to infer a second story, which has been destroyed by time, stone quarrying, and looting (Vogt 1985). There is no evidence for carved reliefs on the façade wall.

Hili Tomb A provided important information about Umm an-Nar mortuary ritual. It had been clear from the Umm an-Nar Island tombs that these were communal tombs that were used for many interments and that older interments seemed to be pushed to the sides so that the tomb could accommodate new people. Evidence from Tomb A further elucidated this process. Cleuziou and Vogt (1983) described well preserved skeletal material found in piles along walls and documented individuals found in undisturbed primary position on the floor of chamber 1. The bones were mixed with copious grave goods including ceramics, softstone, copper/bronze artifacts, and beads (Table A.10). While largely fragmentary, Méry (1997) reported 662 ceramic vessels of various shapes and sizes, most of which (65%) were sandy red ware, 19% were red fine ware, and 6% were unclassified/undetermined. Imported wares included Iranian grey ware (5%), Indus fine red ware (1%), and one Mesopotamian sherd. Additionally, 80 softstone vessels, small copper/bronze artifacts, and a variety of beads were recovered (Cleuziou and Vogt 1983; 1985).

Early osteological examinations identified evidence of burning of the skeletal material and cut marks on at least one adult male mandible (Bondioli *et al.* 1998). Researchers estimate that the tomb was in use for 200-300 years (2300-2100 BC; Cleuziou and Vogt 1983) and during this time, bodies were placed in a flexed position in the floor of the subterranean chamber floor. A total of 31 articulated skeletons lay on the floor of chamber 3 in a loosely flexed position, right arm extended in front of their faces and left arm extending over the body next to them (Cleuziou and Vogt 1985, fig. 3; McSweeney *et al.* 2008). Bondioli and colleagues (1998) hypothesized that following decomposition, skeletal remains were disarticulated and moved to the upper levels of the tomb where they were sorted by skeletal element, and finally approximately 50% of the

bones were burned (McSweeney *et al.* 2008). This early analysis estimated at least 300 people interred, and reported high infant and young adult mortality, moderate to marked sexual dimorphism, and a few cases of cranial porosity (e.g., cribra orbitalia and/or porotic hyperostosis), osteoperiostitis, and trauma. Moreover antemortem tooth loss and the spina bifida occulta (primarily seen with dietary insufficiency of folic acid during pregnancy) were also observed.

Tomb N

Another important Umm an-Nar period tomb from Hili is not a circular tomb with a finely carved ashlar façade. Very different from these iconic monuments that occupy important spaces in and near 3rd millennium BC settlements, this new type of receptacle for the dead, an oval pit dug directly into the ground surface, was entirely subterranean and invisible on the landscape (Méry *et al.* 2001; Méry *et al.* 2008). Tomb N at Hili is unique among these Umm an-Nar "bone pits" (Méry *et al.* 2004) for a number of reasons including the fact that unlike others seen elsewhere on the Oman Peninsula (see Sufouh and Ras Al-Jinz later in this chapter) this oval shaped receptacle had subterranean stone support walls and evidence of a flat roof and is clear that this bone pit was used for primary interments in the later stages of its use. The tomb was 6.6 m long (4.8 m original length, an addition on the southern side created this larger total length), 2.2 m wide, and 2.5 m deep (Al-Tikriti and Méry 2000). These features that make Tomb N unique may simply be evidence of long term use and possible need to build reinforcement given how close it was dug to Tomb E (Figure 3.13).

Radiocarbon dating of charcoal and bone produced calibrated dates (Table 3.1) ranging 2455-1984 BC (Méry *et al.* 2008). More than 850 ceramic vessels of the same types seen in Umm an-Nar circular tombs: black-on-red fine ware, sandy red ware, and a smaller number of imported vessels including Indus, Baluchistan, Makran, and Mesopotamian wares) were interred with the dead in Tomb N (Méry *et al.* 2004). Other funerary goods included alabaster vessels, copper/bronze small artifacts, beads, shells, and two softstone seals (Al-Tikriti and Méry 2000; McSweeney *et al.* 2004; see Table A.10).

The dense fill of human skeletal remains and associated funerary goods presented a significant excavation challenge (Méry *et al.* 2008). Al-Tikriti and Méry (2000) reported that most of the skeletal material was fragmentary, but that complete fragile ceramic vessels were recovered from the same deposits (in addition to fragmentary vessels) suggesting that the bones were moved from Tomb E into the bone pit (Tomb N) and that new funerary goods were interred with the deposit(s). No fully articulated skeletons were found in

Table 3.1. Published radiocarbon dates from Umm an-Nar tombs.

Site	Tomb	Sample	c14 date	2-sigma calibrated date BC	Reference
Hili	Tomb N	Pa 1835	3800 ± 60	2455-2034	Méry *et al.* 2008
Hili	Tomb N	Pa 1840	3760 ± 70	2451-1950	Méry *et al.* 2008
Hili	Tomb N	Pa 1844	3730 ± 30	2198-1987	Méry *et al.* 2008
Hili	Tomb N	Pa 1978	3745 ± 40	2287-1984	Méry *et al.* 2008
Hili	Tomb N	Pa 1979	3755 ± 45	2294-1984	Méry *et al.* 2008
RJ-1	Tomb 1	SacA 11376	4015 ± 30	2873-2583	Munoz *et al.* 2012
RJ-1	Bone Pit 1	SacA 11370	4105± 30	2866-2503	Munoz *et al.* 2012
RJ-1	Bone Pit 2	SacA 11375	4135 ± 30	2621-2467	Munoz *et al.* 2012
RJ-1	Bone Pit 3	SacA 11380	4160 ± 30	2879-2631	Munoz *et al.* 2012

Tomb N, but there was evidence that at least some of those interred were placed in Tomb N either as primary burials or before complete decomposition. Given the delicate articulations observed, it is more likely that these were primary burials in the latest phase of use of the bone pit (Méry *et al.* 2001; Méry *et al.* 2008). These final interments may have been subsequently 'disturbed' during a final ritual act - a single small-scale burning event near to the end of the use of the bone pit (Méry *et al.* 2008).

Analyses of the skeletal material have estimated a minimum number of individuals (MNI) of more than 700 interred individuals (McSweeney *et al.* 2010). All members of the community are represented in this bone pit, just as they are in the circular Umm an-Nar mortuary structures (Méry *et al.* 2003a). It is remarkable that this included unborn fetuses and term babies - remarkable both that these very young individuals were placed into the communal tomb used by all the subadult and adult members of the community, but also remarkable that these fragile materials were preserved well enough for study. A reason for this may be that these young members of the community were placed into the bone pit prior to decomposition (Méry *et al.* 2008). This modification to the burial ritual has interesting implications for how their role in the community may have been seen in Umm an-Nar culture.

Mleiha, U.A.E.

The Umm an-Nar tomb at Mleiha in the Emirate of Sharjah, United Arab Emirates, has a unique internal architecture, as well as an ashlar stone with a carved relief (bell shape and four projecting balls) and an additional carved stone feature that may have acted as a gutter (Jasim 2003). The internal compartments were separated by a wall oriented from the NW of the ringwall and extending approximately half of the tomb's internal diameter. Eight corbelled chambers and a corridor (immediately apparent from the SE facing entrance) comprised the interior architecture (Figure 3.14). Communication between the chambers was facilitated by space between each wall and the ringwall, creating the opportunity to move around the tomb next to this ringwall.

Figure 3.14.
Umm an-Nar tomb at Mleiha (after Jasim 2003).

Despite the fact that this tomb was heavily disturbed prior to excavation, a modest amount of human skeletal remains and a variety of material culture were recovered. The material culture include Umm an-Nar black-on-red ware, imported grey ware, softstone vessel(s), at least one bronze blade, beads, feeding shells, and stone tools.

Mowaihat Tomb A and B / Ajman Tomb A and B, U.A.E.

Mowaihat is a coastal site on the border between Ajman and Sharjah, United Arab Emirates. Tomb A, a circular tomb with diameter of 8.25 m and Tomb B is a rectangular subterranean bone pit 3 m north of Tomb A, 3.9 m long and 2.1 m wide (Al-Tikriti 1989; Haerinck 1991; Phillips 2007). These mortuary monuments (Figure 3.15) were found during construction projects. Part of Tomb A and Tomb B were lost, but were described initially by Dr. Walid Al-Tikriti (Al-Tikriti 1989). It is estimated that Tomb A originally stood 3.0 m tall. The limestone facade stones are interesting for two reasons: first, there is no nearby limestone source and so like the Umm an-Nar tomb at Tell Abraq, limestone must have been quarried some distance away whereas the inner ringwall and the partition walls were constructed of local beach rock. Second, these stones were carefully carved with corner notches (also seen in some tombs at Hili). Although the tomb only had four chambers when it was excavated, it appears that in its original form, it likely had a central passage with four chambers on each side, for a total of eight chambers. There was some evidence for a western facing entrance and so if the tomb had two symmetrically placed entrances, the second would have been facing east. Due to ancient looting and modern construction, the tomb lost most of its contents. Al-Tikriti (1989) reported that typical Umm an-Nar black-on-red fine ware sherds, softstone vessel fragments, a silver/lead ring, a copper ring, and beads among the material culture finds and very few fragmented skeletal remains.

Tomb B was also damaged by looting and construction, but very important architectural and mortuary ritual data were reported (Al-Tikriti 1989; Haerinck 1991). These details include the fact that this subterranean bone pit was 0.85-0.95 m deep and had limestone walls made from eight courses of limestone, a flat slabbed paved floor, and it contained a number of primary interments from the later period of use of the pit. A minimum number of 120 individuals were interred in Tomb B and was reported that some of the skulls may have been arranged upright (Haerinck 1991).

More material culture was recovered from this pit than in Tomb A including typical Umm an-Nar black-on-red fineware, a few sherds of black-on-grey ware, and one possible Indus vessel (Al-Tikriti 1989; Haerinck 1991). Notably, this tomb lacked a number of ceramic types that are typically seen in Umm an-Nar circular tombs and bone pits: lugged suspension vessels, imported incised grey ware, and other imported ceramics (Haerinck 1991). Other finds included at least 10 softstone vessels, small copper/bronze finds (beads, rings, awls, and small tools), shells, and shell rings (Haerinck 1991). One stone cylinder seal, one stone stamp seal, and more than 3,200 beads (323 carnelian, 2,856 frit, 45 stone of various types, 9 clay, and 10 bone beads) were also discovered (Al-Tikriti 1989; Haerinck 1991).

Qumairah, Oman

Recent new evidence of an Umm an-Nar settlement and tombs from the site of Qumairah include tomb QA1-1 (Figure 3.16). Preliminary results (Rutkowski 2018) have been published that reveal a circular tomb 10.8 m in diameter, divided into 4 chambers by two inner partition walls, and possibly roughly paved. Thus far, commingled and fragmented human remains have been recovered, as well as domestic ceramics,

Spotlight 10 | Mowaihat (Ajman) Tomb A and B, U.A.E.

Tomb A

Type: Communal circular tomb
Diameter: 8.25 m
Number of stories: Possibly 2 (second story not preserved)
Number of chambers: 4 preserved, likely 8
Communication between chambers: between northern chambers and between southern chambers only
Entrance(s): Possibly east and west
Carved reliefs: No
Depth of subterranean element: 1.4 m
Flooring: None, may have been removed during looting
Evidence of burning: Yes
MNI: 300

Summary of Material Culture

- Heavily looted and modern construction damage
- Ceramic vessel sherds
- Softstone vessel sherds
- Silver/lead ring
- Copper ring
- Beads

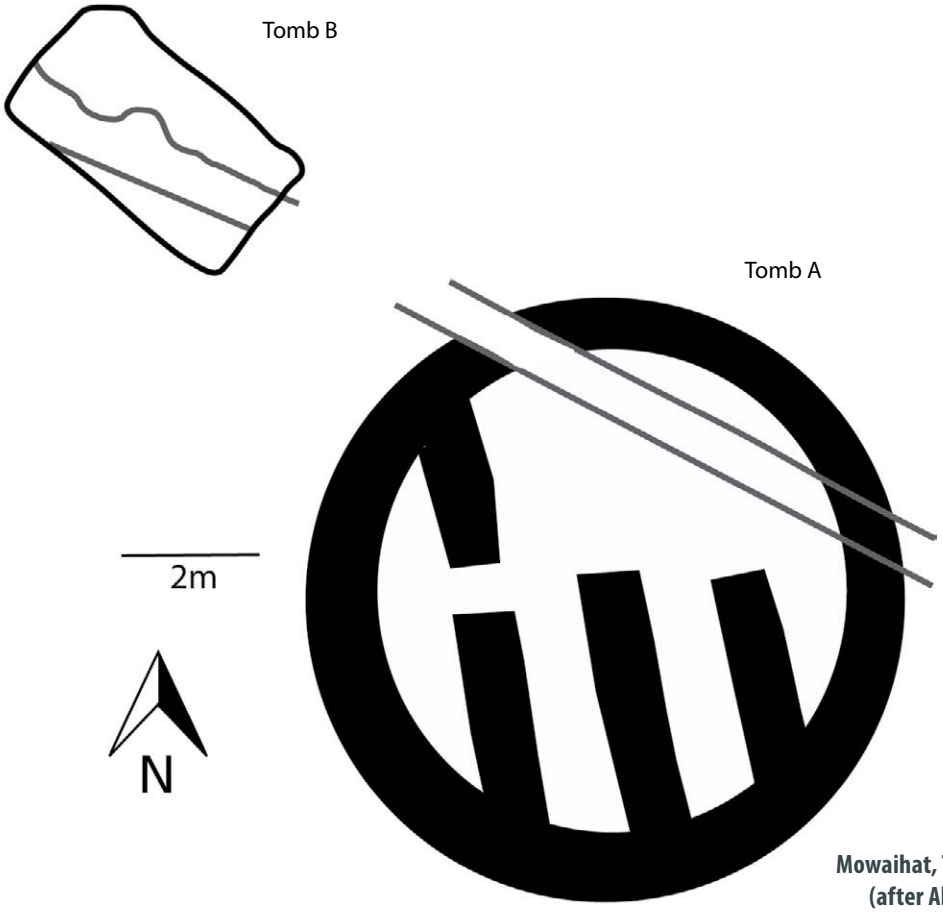


Figure 3.15.
Mowaihat, Tomb A and B
(after Al-Tikriti 1989)

Tomb B

Type: Subterranean communal bone pit (rectangular)
Dimensions: Length: 3.9 m; Width: 2.1 m; Depth: 0.85-0.95 m
Architectural features: 8 course limestone wall; flat slabbed paved floor
Entrance(s): Top
Evidence of burning: No
MNI: 120

Evidence of Mortuary Ritual

- Bones likely moved from Tomb A into pit, given close proximity
- Some skulls may have been arranged upright
- Some primary interments (likely in latest phase)

Summary of Material Culture

- Ceramic vessels
  - Domestic wares
  - Lacked ceramics seen in other Umm an-Nar tombs and pits: lugged suspension vessels, imported ceramics (except for one possible Indus vessel)
- At least 10 softstone vessels
- Small copper/bronze objects
- More than 3,200 Beads
- Shells
- One stone cylinder seal; One stone stamp seal

Key Citations

Al-Tikriti W.Y. 1989. *Umm an-Nar Culture in the Northern Emirates: Third millennium BC tombs at Ajman*. Archaeology in the United Arab Emirates, Vol. 5. Department of Antiquities and Tourism, Al-Ain, pp. 89-100.

Haerinck E. 1991. The rectangular Umm an-Nar-period grave at Mowaihat (Emirate of Ajman, United Arab Emirates). G*entse Bijdragen, tot de Kunstgeschiedenis en Oudheidkunde* 29: 1-30.

Phillips C. 2007. The third-millennium tombs and settlement at Mowaihat in the Emirate of Ajman, UAE. *Arabian archaeology and epigraphy* 18: 1-7.

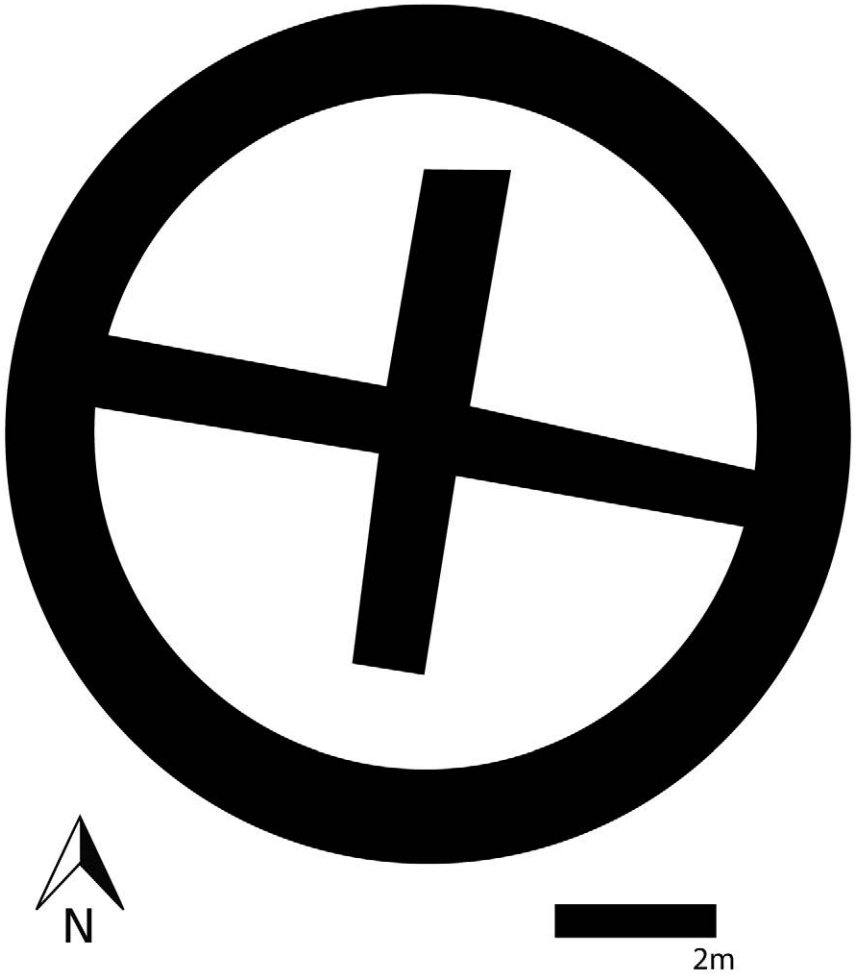


Figure 3.16.
Tomb QA 1-1 at site of Qumairah (after Rutkowski 2018).

imported ceramics (such as incised grey ware), softstone vessels, few bronze/copper artifacts, and beads. At this early stage some artifacts suggest reuse of this monument in the Iron Age, but further analyses and publications will reveal the full extent of this.

Ras Al-Jinz, Oman

Tomb 1 and bone pits 1 -3 (Figure 3.17) at the site of Ras Al-Jinz (RJ-1; Monchablon *et al*. 2003; Munoz and Cleuziou 2008; Munoz *et al*. 2012) are located on the eastern coast of the Sultanate of Oman and as such, this site is the best example of Umm an-Nar mortuary practices this far east and south on the Peninsula. These mortuary contexts were examined by the Joint Hadd Project 2002-2004. Monchablon and colleagues (2003) described the construction and architecture of the tomb, as well as the excavation of the fill. The mortuary context includes a monumental circular tomb (maximum diameter: 7.90 m) with an east-west internal partition wall that created two halves and that did not allow communication between the northern and southern sides of the tomb. Each of these halves was then partitioned further, resulting in eight chambers; the north and south sides of the tomb were symmetrical. This tomb was dug to and into the bedrock so that there was a subterranean compartment of 0.30-0.40 m depth. The researchers interpreted the remains of the tomb as the first story of a two-story structure that has been dismantled/destroyed, and they further understood these chambers as spaces below the original flooring that were not used as part of the mortuary ritual.

Spotlight 11 | Ras Al-Jinz RJ-1, Ash-Sharqiyah, Oman

Tomb 1

Type: Communal circular tomb
Diameter: 7.9 m
Number of stories: 2 (second story mostly destroyed)
Number of chambers: 8
Communication between chambers: Between northern chambers and between southern chambers only
Entrance(s): Northeast and southwest
Carved reliefs: No
Depth of subterranean element: 0.30-0.40 m
Flooring: 4 of 6 chambers paved
Evidence of burning: Yes
MNI: 74 (full context, Tomb 1 and three bone pits combined)

Evidence of mortuary ritual (tomb and pits)

- Preserved skeletal articulations interpreted as dessication before movement into bone pits
- Possible interment of infants in bone pits
- Some organization of long bones and skulls in bone pits
- Tomb 1 filled with yellow clay from wadi after use
- Tomb 1, Bone Pit 1, and Bone Pit 3 used around same time; Bone pit 2 used slightly later

Burial Pits 1-3

Type: Subterranean communal bone pits (oval)
Dimensions: Depth: 0.40 m
Architectural features: None, dug directly into sand
Entrance(s): Top
Evidence of Burning: Yes

Key Citation

Munoz O., R. Ghazal, H. Guy 2012. Use of ossuary pits during the Umm an-Nar period: new insights on the complexity of burial practices from the site of Ra's Al-Jinz (RJ-1), Oman. In J. Giraud and G. Gernez (eds.), *Aux marges de l'archeologie, Hommage a Serge Cleuziou*. Travaux de la maison Rene-Ginouves, De Boccard, Paris.

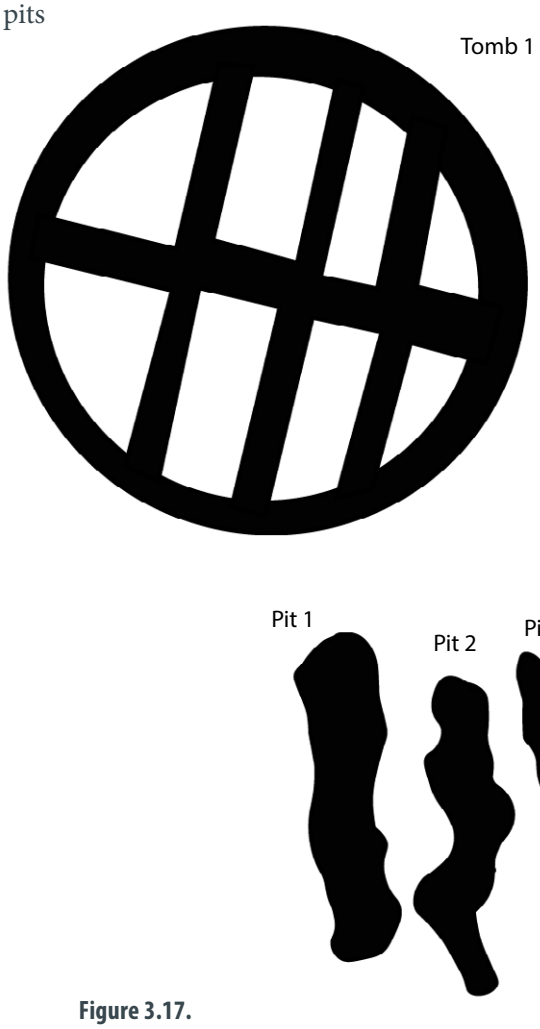


Figure 3.17.
Ras Al-Jinz, Tomb 1 and bone pits (after Munoz *et al*. 2012)

Unlike most other Umm an-Nar tombs, this tomb does not appear to have been abandoned mid-ritual where some of those interred were left in the tomb as new practices were adopted and the tomb fell into disuse. Instead, Tomb 1 was purposefully filled with yellow clay and the remaining fragments of human bone and material culture (300 sherds, 2,506 beads, small copper artifacts, and a softstone vessel) found in this fill were interpreted as accidental mixing. The three associated bone pits appear to have received all of the skeletal material (and the bulk of the material culture) interred with the dead. While it is unfortunate that so much of Tomb 1 was destroyed, what remains is remarkable and demonstrates the way that this tomb ended its use as a receptacle for the dead in this period, and providing a glimpse into the end of the cycles of mortuary ritual practiced by people of the Umm an-Nar period.

Three parallel oval bone pits, dug approximately 0.40 m into bedrock and covered with flat slabs of stone were found approximately two meters south of Tomb 1 (see Table A.8). Munoz and colleagues (2012) reported the full analyses of the tomb and bone pits following complete excavation and analyses. More than 18,600 fragments of poorly preserved human skeletal material were recovered from the full funerary context representing a MNI of 74 males and females of all ages (Table A.9). Some very important information was understood from the deposits examined. First, researchers revealed that some anatomical connections were observed during excavation. These connections were rare (<1% of the bones) and were not significant enough to support primary interment of corpses that decomposed in the bone pit. Rather, this evidence supported natural mummification of some joints or deposition of the remains into the pits before complete skeletonization occurred (Munoz *et al*. 2012: 457). There was also evidence of possible primary interments of term infants in the pits just as there had been in bone pit Tomb N at Hili (Méry *et al.* 2008). Next, this work revealed some organization of the skeletal elements in their secondary placement, specifically long bones and skulls (Munoz *et al*. 2012: 457).

The material culture recovered from RJ-1 Tomb1 and Bone Pits 1, 2, and 3 has not been fully published so the number of objects (including for example, the distribution of complete or fragmentary ceramic vessels) is not publicly available, but we do know that the assemblage included the black-on-red ware and softstone vessels that are seen in other Umm an-Nar tombs and bone pits. Additionally, imported wares included Indus ceramics (as well as Indus type beads) but not Iranian grey ware seen at contemporaneous sites further north and west of Ras Al-Jinz. Radiocarbon dating supports the assertion that Tomb 1, bone pit 1, and bone pit 3 were used around the same time while bone pit 2 was used slightly later (Munoz *et al*. 2008: 462, figure 9; Table 3.1, this volume).

Al-Sufouh, Tomb I - IV, U.A.E.

The Al-Sufouh Tombs I-IV (Figure 3.18), located at on the coast of the Arabian Gulf near to the modern city of Dubai consists of one circular Umm an-Nar tomb and three oval bone pits. The excavation, finds, and osteological analysis were thoroughly reported by Jodi Benton (1996).

Tomb I

Tomb I is a circular tomb 6.5 m in diameter with an internal dividing wall that runs NE-SW, dividing the tomb into two non-communicating halves. Each half is further subdivided into three chambers that also do not allow communication between them. There are two entrances; one is roughly facing NW and other

roughly faces SE. Unlike some other coastal sites, this tomb used beach rock for both external ringwalls and also for the partition walls inside the tomb. The exterior facade of beach rock was carved in the typical Umm an-Nar fashion. Four of the six chambers were paved. Benton (1996) reported that recent looting disturbed the tomb, but despite this fact, important information was gleaned.

Evidence of primary interments that did not undergo any part of the Umm an-Nar mortuary ritual that would have broken and moved the skeleton include semi-articulated skeletons, areas of regional articulation in chambers 2, 3, and 4, and a significant number of beads found in alignment. It is uncommon for the burning event to be identified as it was in Tomb I. Evidence of the burning ritual included burned sand and beach rock fragments along with human skeletal remains and beads found inside the tomb. This was interpreted as a possible deposit that was scooped up from a funeral pyre outside the tomb. Again, this is a significant deviation from what has been documented in other Umm an-Nar circular tombs as there is no other published evidence of this practice.

Benton (1996) reported a MNI of 13 individuals in Tomb I. Of these individuals five were subadults and eight were adults. Material culture interred with the dead included typical Umm an-Nar black-on-red fineware, a small amount of domestic ware, imported grey ware, imported black-on-grey ware, 6,300 beads, copper/bronze objects (including 9 daggers, 1blade/axe, 6 awls/pins, and 6 rings), a single softstone vessel, a softstone cylinder seal, lapis lazuli amulets, a stone pendant, a silver/tin spiral ring/bead, and shell artifacts (shells and 4 shell rings).

Tomb II

Tomb II was an oval bone pit (2.0 m long and 1.0 m wide) dug directly into the sand (0.65 m deep). Benton (1996) reported that there was no clear stratigraphy, so the pit was excavated in 16 layers; using this technique it was possible to discern differences in the size of bone fragments (upper layers had larger bone fragments than the lower levels), skulls and intact bones were found on the edges, and color differences in bone were discerned between layers 3 and 5. Benton also observed that artifacts were scattered throughout including Umm an-Nar Black-on-red ware, suspension vessels, domestic ceramics, imported grey ware, imported black-on-grey ware, 2 copper/bronze daggers, 3 copper/bronze rings, and 5,212 beads. These material items accompanied a minimum of 57 individuals.

Tomb III

Tomb III was an oval bone pit of the same length and width as Tomb II, but with a slightly more shallow depth (0.63 m). The types and condition of the materials in this pit were identical to those found in Tomb II, except that there was evidence of primary human interments in the upper levels and in the very bottom of the pit were five complete and several incomplete fish skeletons that were interpreted as a possible offering. A minimum of 48 individuals were interred in this bone pit. Material culture included 2,273 beads, 4 copper/bronze daggers, small copper/bronze objects (rivets, rings, and fragments), as well as ceramic sherds.

Tomb IV

Tomb IV was scatter of fragmented burned human bones, objects, and farush stone. The scatter/bone pit was 1.0 m long, 0.5 m wide, and no more than 18 cm deep. A minimum of 3 individuals were accompanied by ceramic sherds, beads, and a stone pendant.

Spotlight 12 | Al-Sufouh Tombs I–IV, U.A.E

Tomb I

Type: Communal circular tomb
Diameter: 6.5 m
Number of stories: 1
Number of chambers: 6
Communication between chambers: Between northern chambers and between southern chambers only
Entrance(s): Northeast and southwest
Carved reliefs: No
Depth of subterranean element: No subterranean space
Flooring: 4 of 6 chambers paved
Evidence of burning: Yes
MNI: 13

Evidence of mortuary ritual

- Largest amount of burned skeletal material (compared with associated bone pits)
- Author suggests that burning happened outside Tomb I (funeral pyre because of burned sand and beach rock) and added to Tomb I
- Unburned skeletal remains as well
- 88% of all bone in Tomb I-IV was burned
- Possible deliberate breaking of some bones

Tomb II

Type: Subterranean communal bone pit (oval)
Dimensions: Length: 2.0m; Width: 1.0m; Depth: 0.65m
Architectural features: none, dug directly into sand
Entrance(s): Top
Evidence of burning: Yes
MNI: 57

Evidence of Mortuary Ritual

- Bones likely moved from Tomb I into pit, given close proximity
- Skulls and intact bones on edges

Tomb III

Type: Subterranean communal bone pit (oval)
Dimensions: Length: 2.0m; Width: 1.0m; Depth: 0.63m
Architectural features: None, dug directly into sand
Entrance(s): Top
Evidence of burning: Yes
MNI: 48

Evidence of mortuary ritual

- Bones likely moved from Tomb I into pit, given close proximity
- Some evidence of articulated bones – could be primary interments
- At base of pit, 5 complete fish skeletons: may be offering

Tomb IV

Type: Subterranean communal bone pit or scatter
Dimensions: Depth: 0.18 m
Architectural features: None, dug directly into sand
Entrance(s): Top
Evidence of burning: Yes
MNI: 3

Key Citation

Benton J.N. 1996. *Excavations at Al-Sufouh: A Third Millennium site in the Emirate of Dubai*. Brepols.

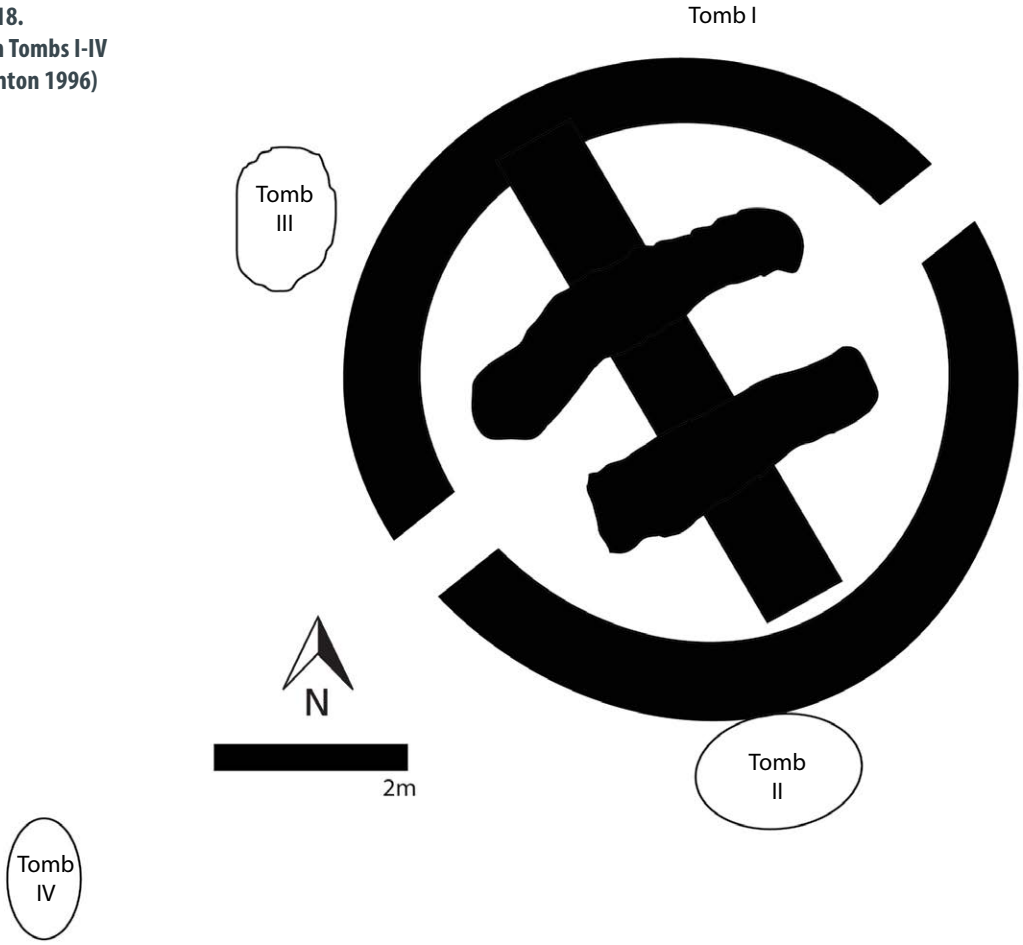


Figure 3.18.
Al-Sufouh Tombs I-IV
(after Benton 1996)

Figure 3.19.
Schematic overhead plan of Tomb Unar 2
(after Blau 2001b).

Tell Abraq, U.A.E.

The Umm an-Nar tomb at the coastal site of Tell Abraq is another tomb that has been studied in conjunction with its associated settlement (e.g., Potts 1989; 1993a,b,c; 1994). This circular monumental tomb (Figure 3.20) was 6.0 m in diameter and an internal division wall created eastern and western chambers. Interestingly, the internal ringwall and division wall was constructed with local beach rock (*farush*) whereas the exterior façade was made from limestone that would have had to be acquired at a quarry site at least 50 km from the site (Martin *et al*. 2019: 186). While partly destroyed (northwest and south ringwall and pavement), settlement debris from continuous use of the settlement beyond the Umm an-Nar period helped to preserve the remaining portions of the tomb well (Potts 2000; Martin *et al*. 2019). Specifically, the identification of 2nd millennium BC Barbar red-ridged ceramic sherds in the fill on top of the tomb demonstrates that it has been covered since at least that time (Potts 1993c).

This tomb was used for approximately 200 years, 2200-2000 BC (Potts 2000, 2003). Ceramics that appear to have Umm an-Nar/Wadi Suq transitional qualities indicate that the tomb was still in use in the late 3rd millennium/early 2nd millennium BC. Like other Umm an-Nar tombs, the interred remains and material culture were commingled and fragmented. The pattern of disturbance of the skeletal material due to the mortuary ritual performed over the use of the tomb also matches other documented Umm an-Nar tombs that do not retain many (there was one articulated skeleton found in this tomb, see discussion in Chapter 4) or any articulated skeletons. It also matched the pattern of some articulated joints (of the hand or feet, for example) likely due to incomplete skeletonization before the remains were manipulated during subsequent use of the tomb. In total, there was a MNI of 403 (276 adults and 127 subadults, see Chapter 4) and very few bones were burned from this context.

The interred material culture recovered from this tomb included the Umm an-Nar black-on-red ware seen in all other Umm an-Nar period tombs, softstone vessels, small bronze artifacts, bronze spearheads, feeding shells, ostrich shells, ivory artifacts including hair combs, and beads (Potts 1993). Importantly, the material culture recovered here demonstrated a slightly different foreign interaction sphere compared with Umm an-Nar sites located further from the coast and on the northern Al-Batinah and eastern Oman coastlines. Specifically, evidence includes ceramics and softstone sherds from Iran, Mesopotamia, Bahrain, and/or Saudi Arabia, and the Indus valley, as well as Bactrian style ivory combs (Potts 1994, 2000).

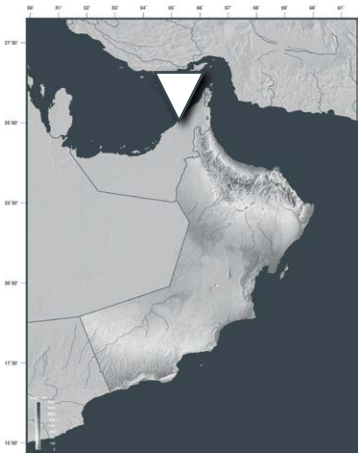
Unar, U.A.E.

Two Umm an-Nar circular tombs have been excavated and published from the emirate of Ras Al-Khaimah: Unar 1 and Unar 2. Of these, Unar 1 is mentioned in publications (e.g., Blau and Beech 1999), whereas Unar 2 has had more extensive study (Blau and Beech 1999; Blau 2001a,b).

Unar 2

Unar 2 (Figure 3.19) is the largest documented Umm an-Nar circular tomb with a diameter of 14.3 m, and the chamber is divided into 12 chambers (Blau 2001b). A carved relief of a human right foot is part of the exterior façade of the tomb (Blau 2001b: fig. 4). Unlike most other Umm an-Nar tombs, less attention has been given to publication of the interred material culture compared with the osteological analyses of the contents. Nevertheless, it is reported that the recovered material culture does include domestic and

Spotlight 13 | Tell Abraq, U.A.E



Type: Communal circular tomb
Diameter: 6.0 m
Number of Stories: Possibly 2 (Potts 1990: 55)
Number of Chambers: 2
Communication between chambers: Dividing wall does not prevent access to other chamber
Entrance(s): Possibly southeast
Carved reliefs: No
Depth of subterranean element: None
Flooring: Yes
Evidence of burning: Yes
MNI: 403

Evidence of mortuary ritual

- Tomb used for ~200 years (2200-2000BC)
- Unburned skeletal remains as well
- 88% of all bone in Tomb I-IV was burned
- Evidence of some primary interments: one articulated skeleton and other examples of partially articulated skeletons

Summary of material culture

- Ceramic vessels
  - Domestic wares
  - Imported: Iran, Indus, Bahra
- Softstone vessels
- Small copper/bronze objects
- Beads
- Shells
- Ivory combs

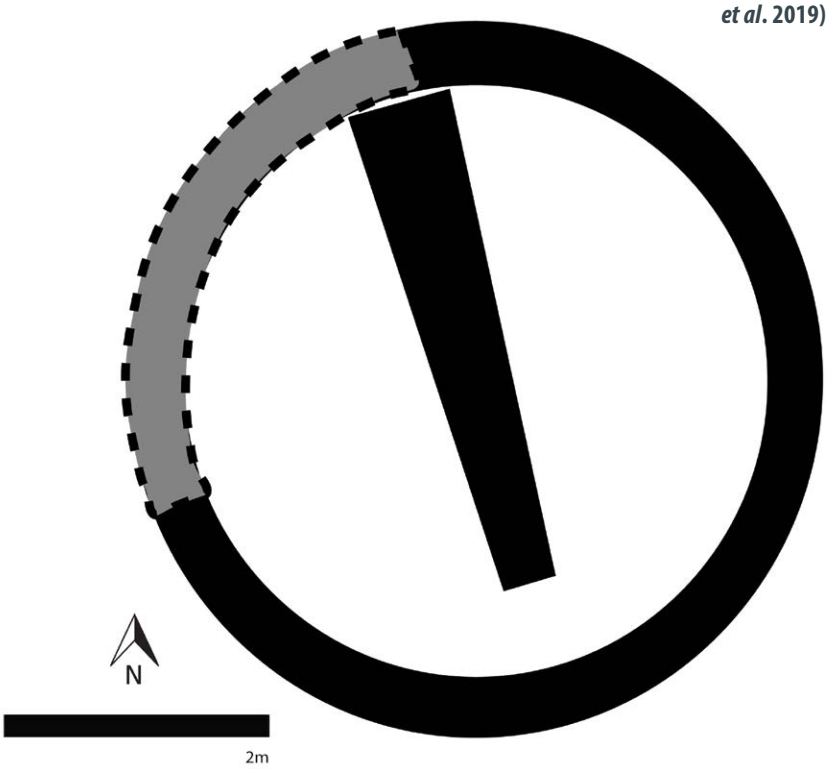


Figure 3.20. Tell Abraq (after Martin *et al*. 2019)

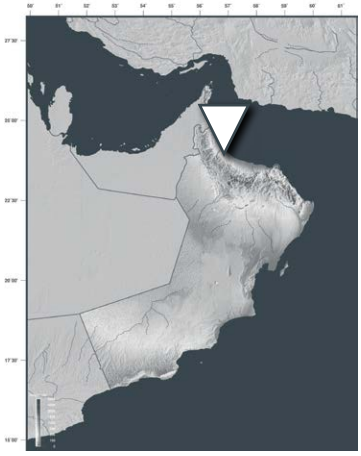
Key Citations

Baustian K. and D.L. Martin 2010. Patterns of mortality in a Bronze Age tomb from Tell Abraq. In L. Weeks (ed.), Death and burial in Arabia and beyond: multidisciplinary perspectives. Archaeopress, Oxford, pp. 55-59.

Martin D.L. K.M. Baustian and A.J. Osterholtz. 2019. The tomb at Tell Abraq (ca. 2100-2000BC): Demographic structure and mortuary complexity. In K.D. Williams and L.A. Gregoricka (eds.), Life and death in Bronze Age Arabia: mortuary and bioarchaeological perspectives. University Press Florida, Gainesville, pp. 182-200.

Potts D.T. and L. Weeks 1999. An AMS radiocarbon chronology for the late Umm an-Nar type tomb at Tell Abraq. Tribulus, Bulletin of the Emirates natural history group 9.1: 9–10.

Spotlight 14 | Dahwa, Al-Batinah, Oman



Type: Communal circular tomb
Diameter: 8.4 m
Number of Stories: 1 (second possible, but no conclusive evidence)
Number of Chambers: 6
Communication between chambers: All, via corridor except Chamber C which was closed at later time
Entrance(s): Assumed northwest and southeast aligned with corridor
Carved Reliefs: Yes
Depth of Subterranean Element: 1.5 m
Flooring: None; repeated plaster events
Evidence of Burning: Yes

The tomb and bone pit at DH7 are currently undergoing analyses of the human skeletal remains and material culture. The tomb has been spared looting and the only reuse events happened on top of the ruined tomb and did not intrude on any of the chambers. The bone pit is suffered from water and wind erosion over the millennia since its use, but revealed repeated deposition events. In this early stage of analyses, more than 180,000 bone fragments (burned and unburned) have been recovered representing all ages and sexes. Material culture includes the typical domestic ceramics, imported ceramics, softstone vessels, beads, small amounts of bronze/copper objects, and at least six Indus ivory combs.

Key Citation

Williams K.D., G. Robbins Schug, M.J. Walsh, M. Calleja, K. Douglas and N. Al-Jahwari, *forthcoming*. Umm an-Nar Death Practices at the Dahwa Site, North Batinah Coast, Oman.

Figure 3.21. Overhead view of DH7-T1 and bone pit (photo: M. Al-Mamari)

Figure 3.22. Row of white ashlar façade stones found face down

Figure 3.23. DH7-001 facing west. From this view one can see the position of DH7-001 on a low hill

Figure 3.24. One example of Indus ivory hair comb found in DH7-001 under a poorly preserved skull

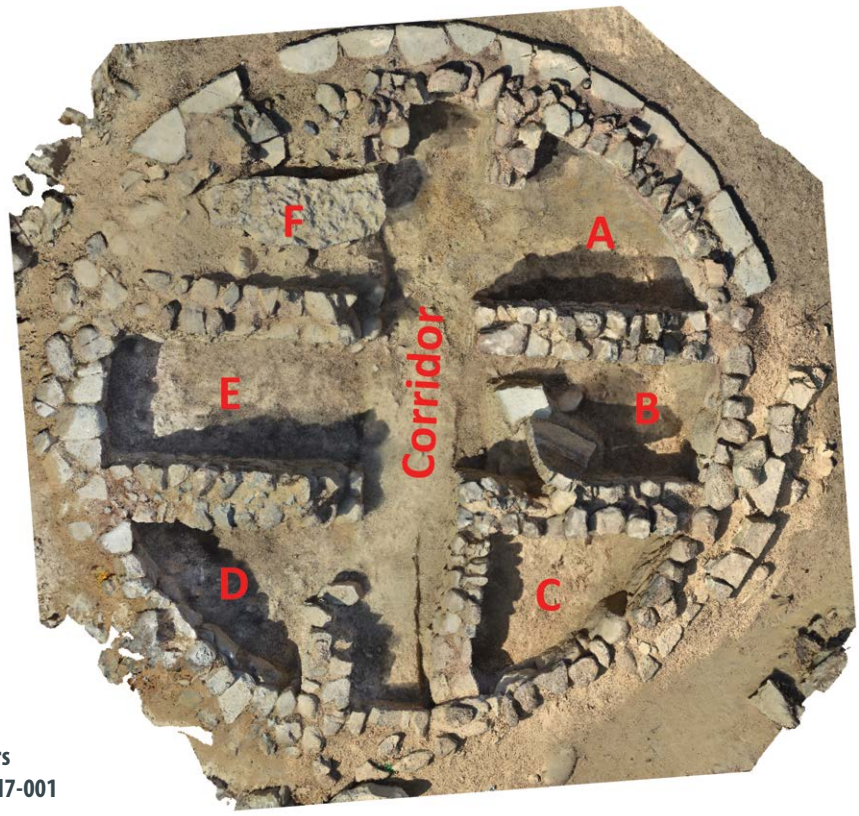


Figure 3.25.
Detail of chambers
and corridor of DH7-001

imported ceramics, softstone vessels, bronze/copper objects, and thousands of beads (Blau 2001b: 564).

Unar 2 is a rare Umm an-Nar tomb not only because of its size, but also because it was documented to be a 2-story structure (Blau 2001b). This allowed more specific documentation of the mortuary ritual. Specifically, Blau suggested that primary interments were on the lower level (bodies placed in flexed position on right or left side), then moved aside for new interments as needed, and finally remove, burned, and placed back in the tomb as a secondary event. This idea has interesting implications for Umm an-Nar tombs that do not have an associated bone pit (see Chapter 5).

Summary

Around 2700 BC a dramatic change in mortuary practices emerged on the northern Oman Peninsula. Monumental communal tombs, round in shape and constructed with fine shaped white ashlar facades, were built in or near emerging small scale settlements. These tombs received almost all of the dead regardless of age or sex (see sporadic cairn reuse during Umm an-Nar period detailed in Chapter 5). Not only did the community share these tombs, the remained of interred were moved, broken, and burned as part of a mortuary ritual that may have intended to remove individual identity in death. This egalitarian treatment of the dead occurred with the simultaneous interment of copious material culture, often including valuable trade goods. This material too was broken and burned as part of a ritual that obscured much of the data about the health and lifestyle of these people while providing insight into the trade relationships and death practices of these people during a time of increased interaction and trade with foreign powers.

Chapter 4

Evidence of Transitions

It is tempting to assume that there were two distinct and non-overlapping mortuary traditions in the Early Bronze Age on the Oman Peninsula. Indeed, the cairn mortuary tradition and the Umm an-Nar period communal tombs do point to radically different concepts of the afterlife and the responsibilities of the living to the dead, but rarely do such changes happen overnight without precursors and intermediate stages and behaviors. In this chapter, the evidence for transitional tombs is presented as well as the evidence of repeated and continuous use of monuments during the Early Bronze Age (3200-2000 BC), which sometimes led to structural changes to the original monument. Where possible, this is contrasted with reuse events that occurred in post-Early Bronze Age contexts after some period of disuse.

Hafit-type Cairn/Umm an-Nar Transition of Northern Oman Peninsula

Soon after the study of Early Bronze Age mortuary monuments began, researchers suggested that some of the mortuary cairns documented on the Oman Peninsula possessed traits that strongly suggested that

Figure 4.1.
Tomb at site of Zukayt.

they may be transitional forms between the Hafit-type Early Bronze Age cairn (Early Bronze Age cairn) and Umm an-Nar communal tombs (e.g., Frifelt 1975a). Across the northern Oman Peninsula, the term "Beehive tomb" has been used to suggest a slightly different structure than the typical Early Bronze Age cairn (e.g., Brunswig 1989; Frifelt 1976, 1985; Yule and Weisgerber 1998). Examples of internal architecture such as dividing walls and cairns with even more elaborate internal architecture that created several chambers or spaces within the burial chamber were soon documented. At two sites (Asimah and Shiya), double vaulted cairns are known (Vogt 1994; Yule and Weisgerber 1998).

The inclusion of Umm an-Nar material culture and radiocarbon dates (bone bioapatite dates of the interred and standard radiocarbon dating of charcoal from the burial chamber) strongly support the use of some of these "transitional cairns" in the later part of the Hafit period (3200-2700 BC) and the early part of the Umm an-Nar period (2700-2000 BC). Changes to the architecture suggest changing ideas about the form that these monuments should take and the way the corpse was to be treated within it. Specifically these while these monuments are still cairns, they are different from earlier cairns for the following reasons (Figure 4.2):

- They are often more finely built and sometimes include worked stones in the outer ringwall;
- They are larger both in diameter and height;
- They occasionally include internal architecture suggesting change in the use of space within the chamber;
- They include evidence of a different burial ritual within the chamber;
- They are placed at similar, but slightly different locations on the landscape.

More recently, these questions have been approached with modern bioarchaeological research and using bioapatite dating techniques which can be performed even with bone with no preserved collagen content (e.g., Williams and Gregoricka 2013, 2019; Weber *et al.* 2019). This work has provided evidence of transitional mortuary ritual including a different use of space in transitional tombs, and has provided radiocarbon dates that rest between the Hafit and Umm an-Nar periods. Importantly, these mortuary contexts are free from Umm an-Nar period ceramics and instead include typically Hafit Period funerary offerings, thus removing the issue of Umm an-Nar reuse of earlier monuments from these examples.

Use of Cairns during Umm an-Nar Period

Additional evidence demonstrates that Early Bronze Age cairn (e.g., Hafit-type cairns and tumuli) use continued into the Umm an-Nar period, reusing even small cairns with no alteration of the structure (Figure 4.3). In some cairns (e.g., S007-100, S007-101, and S007-003 (Williams and Gregoricka 2019, 2020)) there was not Umm an-Nar material culture interred with the deceased, while in other cases it was included (e.g., S020-002 (Williams and Gregoricka 2020); BHS 76, BHS 88, BHS 89 (Jasim 2012); tombs 1034 and 1312 at Jebel Hafit (Frifelt 1971; Madsen 2017); Asimah As 6 (Vogt 1994); and Cairn 1 at Tawi Silaim (de Cardi *et al.* 1977). It remains difficult to parse the difference between the construction and use of a transitional cairn in the early parts of the Umm an-Nar period versus the reuse of an earlier cairn.

Figure 4.3 explains some of the evidence of the use of cairns during the Umm an-Nar period (2700-2000 BC). In addition to interment in large communal tombs and bone pits, some people were interred in earlier cairns (typical Early Bronze Age cairns, tumuli, and transitional cairns). This use of these cairns instead of a communal Umm an-Nar tomb suggests that: 1) there was transitional period when unusual cairns were built

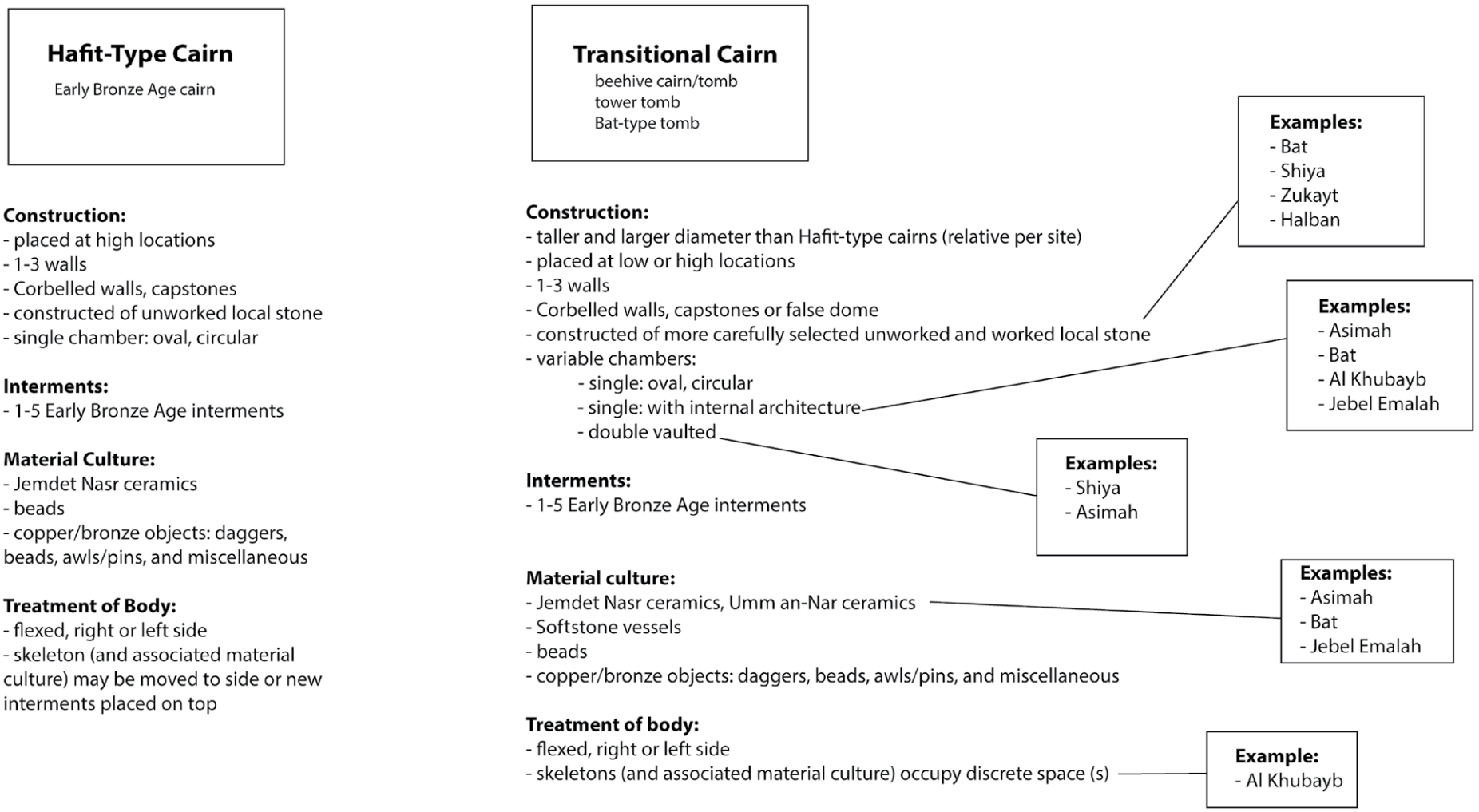


Figure 4.2. Hypothesized general differences between Hafit-type cairns and transitional cairns.

Umm an-Nar Period Reuse of Cairns

Chronometric Dating

Interred Material Culture **not** UAN-specific

Examples
(Bone bioapatite dates (see **Table 5.1**))

Al Khubayb Necropolis, Dhank
S007-100, Individual A: 2617-2473 calBC
S007-100, Individual B: 2575-2474 calBC

S007-101, Individual A: 2564-2348 calBC
S007-101, Individual B: 2567-2462 calBC

Al Khutma Necropolis, Dhank
S002-023, Individual A: 2468-2299 calBC
S002-052, Individual A: 2463-2233 calBC
S002-058, Individual A: 2472-2298 calBC
S002-059, Individual A: 2194-2033 calBC

Material Culture Evidence

Examples

Jebel Buhais, Sharjah
BHS 76: Mesopotamian pottery, white marble macehead

BHS 89: infant interment with copper alloy bracelet and sotstone box; commingled remains accompanied by UAN period ceramics

Jebel Hafit, Abu Dhabi
Tomb 1034: UAN period ceramics
Tomb 1312: UAN period softstone

Umm an-Nar Period Use of Transitional Cairns

Chronometric Dating

Interred Material Culture **not** UAN-specific

Example

Al Khubayb Necropolis, Dhank
S007-003, Individual C: 2880-2480 calBC (bioapatite)
2600-2490 calBC (charcoal)

Material Culture Evidence

Examples

Asimah, Ra's al Khaimah
As 6, UAN period domestic ceramics

Jebel Buhais, Sharjah
BHS 88: UAN domestic ceramics

Jebel Al-Emalah, Sharjah
Tomb I: ceramics characterized as between Hafit/UAN

Umm an-Nar Period Use of Tumuli

Chronometric Dating

Also, Interred UAN Material Culture

Examples
(Bone bioapatite dates (see **Table 5.1**))

Al Khubayb Necropolis, Dhank
S007-169, Individual A: 2468-2299 calBC

Aflaj Necropolis, Dhank
S020-002, Individual A: 2473-2342 calBC
S020-002, Individual B: 2471-2302 calBC

Material Culture Evidence

Examples

Jebel Al-Emalah, Sharjah
Tomb IV: UAN period ceramics

Tawi Silaim, Sharquiyah
Tomb IV: UAN period ceramics & softstone

Figure 4.3. Cairn use during Umm an-Nar period.

and used, sometimes interring Jemdet Nasr ceramics and other "Hafit period" goods with the deceased and sometimes interring "Umm an-Nar period" goods, suggesting that this transition may have been occurring when the shift in material culture occurred (e.g., production of Umm an-Nar wares); and/or 2) some individuals were interred in older style cairns when communal tombs were in use due to a) convenience (e.g., if a death occurred far from an appropriate communal tomb), or b) because of the persistence of the previous belief system where some people still considered cairn use to be the appropriate way to inter the dead. Figure 4.3 summarizes evidence of Umm an-Nar period use of cairns. Material culture of an ambiguous period designation is not mentioned. For example, in some cases certain bead styles were produced during the entire Early Bronze Age and cannot be linked to the earliest cairn use or a reuse event. See Tables A.4 and A.6 for full details of interred material culture (and see Chapter 5 for further discussion of reuse of cairns after the Early Bronze Age), as well as Tables 5.3, A.3, and A.9 for details of interments.

Bat

Karen Frifelt (1975a) recognized the architectural difference between Hafit-type cairns and so-called Beehive tombs very early, but she made her observations on some of the more visible cairns at Bat and Al-Ayn (see also Döpper and Schmidt 2011; 2014). These tombs had been disturbed over time and very little material culture or skeletal material remained in the tomb chambers. She observed that some of the tombs did not fit into the Hafit/Umm an-Nar typology. While her architectural observations were compelling, without diagnostic material culture, radiocarbon dating, and more examples it was difficult to move this hypothesis further. While many Beehive tombs contained Umm an-Nar ceramic material, this was not enough evidence to place their construction during this time; indeed, that ceramic material may have been deposited in the tombs through well-known reuse events. She asked if the "complex" and "refined" Umm an-Nar tombs developed from the simple Early Bronze Age cairn forms. Architectural features such as overall size, selected and occasionally worked stones, and internal architecture all differentiate transitional cairns (e.g., beehive tombs, tower tombs) from the typical Early Bronze Age cairn (e.g., Hafit-type cairn) with a single oval or circular chamber. Figure 4.5 provides examples of the internal architecture of potential transitional cairns. Support for this assertion comes from absolute dating and interred material culture. More research is needed to understand the reason(s) these changes occurred.

Later, close examination and reconstruction of several of these tombs at Bat led Böhme (2011) to propose that the tombs at this site might represent a regionally specific tomb type which included a plinth topped doorway, an internal support wall, and locally sourced and shaped stones used for the façade ringwall. A growing number of sites include some of these architectural traits as well, so others (e.g., Williams and Gregoricka 2019) have argued that this certainly may represent regional variation, but that this variation does not necessarily mean that regional variants need to be treated as different tomb type (e.g., Bat-type tomb). Instead, these data from Bat are interpreted as excellent evidence of a transitional cairn form that employed some of the features seen in later Umm an-Nar tombs. An interesting question remains concerning the timing of use of standard Hafit-type cairns, transitional cairns, and Umm an-Nar tombs at Bat. Possible patterns of use include: 1) earliest use of Hafit-type cairns, construction and use of transitional cairns just prior to the construction of Umm an-Nar tombs, then some overlap of use of the transitional cairns and Umm an-Nar tombs during the earliest part of the Umm an-Nar period; 2) contemporaneous use of transitional cairns and Umm an-Nar cairns; or 3) a stepwise use of these monuments: first Hafit-type cairns, then transitional cairns, then Umm an-Nar tombs.

Figure 4.4. Example of reconstructed transitional cairn from the UNESCO World Heritage site of Bat/Al-Ayn (photo: Sulieman Al-Jabri).

Jebel Emalah (Tomb I)

Tomb I at Jebel Emalah (Benton and Potts 1994; Potts 2012) looked like a deflated cairn before excavation, but was revealed to have internal architecture that divided the interior space into four chambers (Figure 4.5). Inside these four chambers, six individuals were interred. This tomb provide some of the most compelling data regarding tomb architecture and interred material culture that support a transition between the Hafit-type cairn and Umm an-Nar tomb burial traditions.

This tomb is different from the typical Early Bronze Age cairn of the northern Oman Peninsula because on either side of the entrance there were semi-worked stones and inside the burial chamber, internal walls created a corridor from the entrance and two chambers on either side of this corridor. While not the same size (length and width) of the corridors seen in some Umm an-Nar tombs, this architectural feature does suggest that cairns were being built to accommodate movement within the burial chamber, possibly to aid the continued use of the cairn for further interments and mortuary rituals. Material culture interred in the cairn included two Jemdet Nasr ceramic vessels, a feeding shell, and shell beads. Potts (2012) noted that the inclusion of these two Jemdet Nasr ceramic vessels inside of this tomb in addition to the division of the internal space into four chambers demonstrates that this mortuary context is clearly intermediate between the Hafit and Umm an-Nar traditions. Importantly, this tomb was disturbed both with a later reuse event and by recent looting. The presence of Umm an-Nar ceramics in association with this cairn may be the result of a reuse event (Benton and Potts 1994: 31).

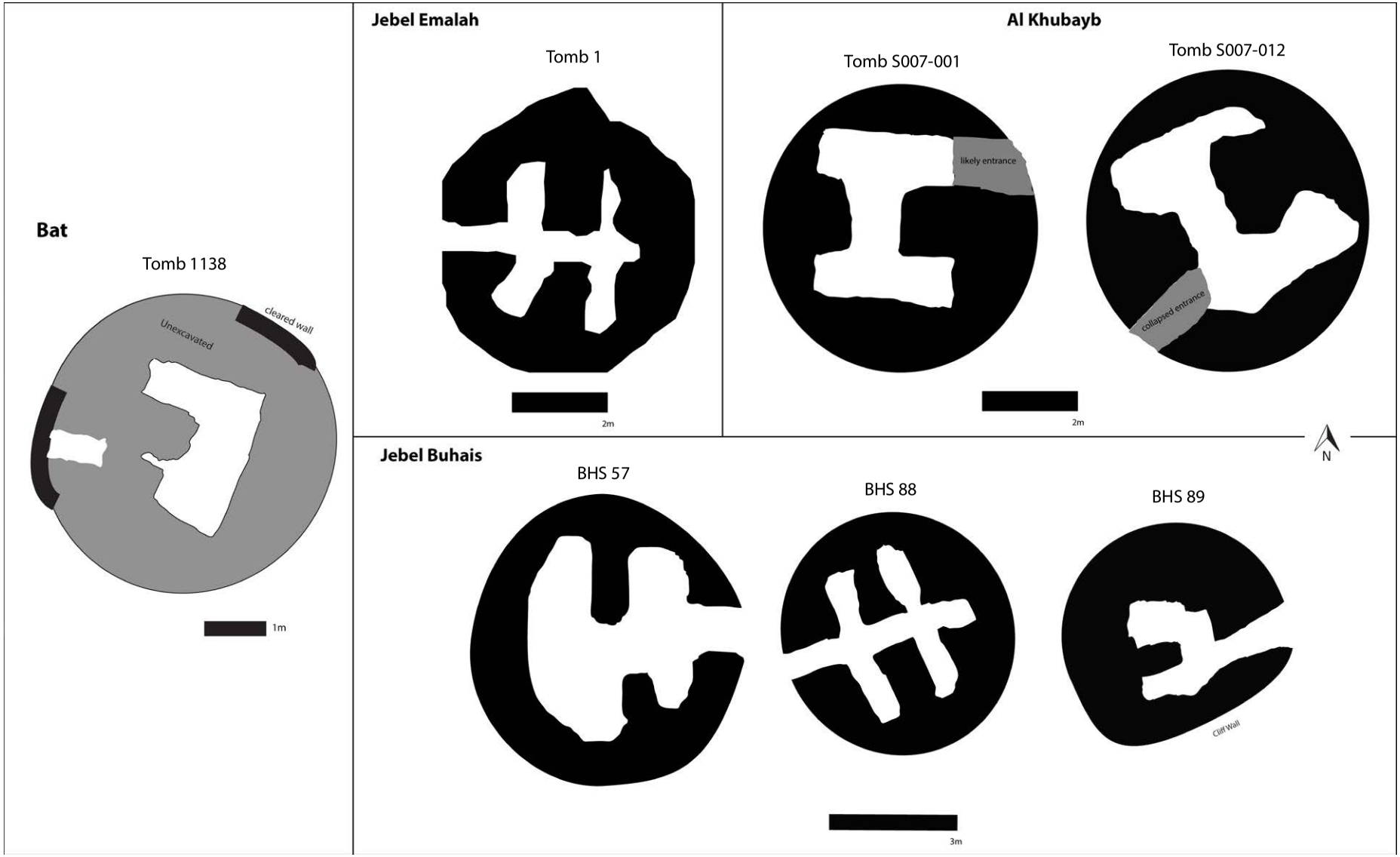


Figure 4.5. Schematic plans of transitional period cairns with internal architecture (Bat Tomb 1138 after Frifelt 1975b; Jebel Emalah Tomb I after Benton and Potts 1994; Al-Khubayb S007-001 and S007-012 after Williams and Gregoricka 2019; Jebel Buhais BHS 57, BHS 88, and BHS 89 after Jasim 2012).

Shir

Yule and Weisgerber (1996, 1998) visited 58 tombs at the site of Shir. They provided compelling evidence of a good deal of variation in tomb form in this region. Specifically, they proposed that there were up to five tomb types:

- Conical towers with a corbelled vault;
- Conical towers with inner wall and façade, more carefully dressed stones, some double vaulted (Shi2, Shi6, Shi9, and Shi10);
- Igloo-shaped, triangular entrance (Shi 51);
- No entrance, squat, vertical wall (Shi14, Shi16, Shi30) Shi 14 partly built of dressed stones from earlier tombs so this type is later;
- Cairn comprised of low heap of stones.

It is not clear that all of these tomb types date to the Early Bronze Age, but certainly many do and may represent transitional forms between the Hafit-Type cairn and Umm an-Nar tomb. Specifically, the tombs described as conical towers (e.g., Figure 4.6) and those described with double vaults are good candidates for transitional cairn forms. No cairns of these types have been excavated and published to date from this site, but this tomb form incorporates two stories in the mortuary ritual and this is intriguing because we know that some Umm an-Nar tombs have two stories. This cairn form could be evidence of this concept developing while the cairn building tradition was still in use.

Another possible example of this type of cairn was seen at Asimah. Tomb AS6 (Vogt 1994) was a circular two-story grave mound with two stone cists. The architecture and material culture of this tomb is confusing. The presence of Umm an-Nar ceramic sherds suggests that it was at least used during this time, but the architectural features rest somewhere between the Early Bronze Age cairn building tradition and Wadi Suq tombs. It may well be that this is an example of a Hafit/Umm an-Nar transitional tomb built during the early Umm an-Nar period but reused and modified during the Wadi Suq period.

Al-Khubayb

More than 400 Early Bronze Age cairns have been mapped at the Al-Khubayb necropolis near to Dhank, Oman (Williams and Gregoricka 2013, 2019, 2020; Weber *et al.* 2019). Hafit-type cairns, tumuli, and Hafit/Umm an-Nar Transitional tombs are included in this count. This necropolis and several others in the region have been under investigation since 2009. Five transitional tombs have been excavated and the architecture, evidence of mortuary ritual, and radiocarbon dates from material recovered from these structures provide strong evidence of the Hafit/Umm an- Nar transition.

Tomb S007-001

Tomb S007-001 (Williams and Gregoricka 2013, 2019, 2020) appeared to be a very large deflated Hafit-type cairn, but it was selected for excavation because sections of the exterior ring wall were visible thru the partial collapse and it was clear that the wall was more organized and better built than other nearby cairns. Excavation revealed and H-shaped chamber (see Figure 4.5) nearly identical to Tomb 1 at Jebel Emalah (Benton and Potts 1994; Potts 2012). The four "chambers" were quite small and led to the descriptor "alcove." While the space along the center of the chamber could be used to move between these alcoves/chambers, the space inside the tomb (exterior diameter 7.0m, 2.75m east-west into alcoves, 3.0m north-south) was quite limited.

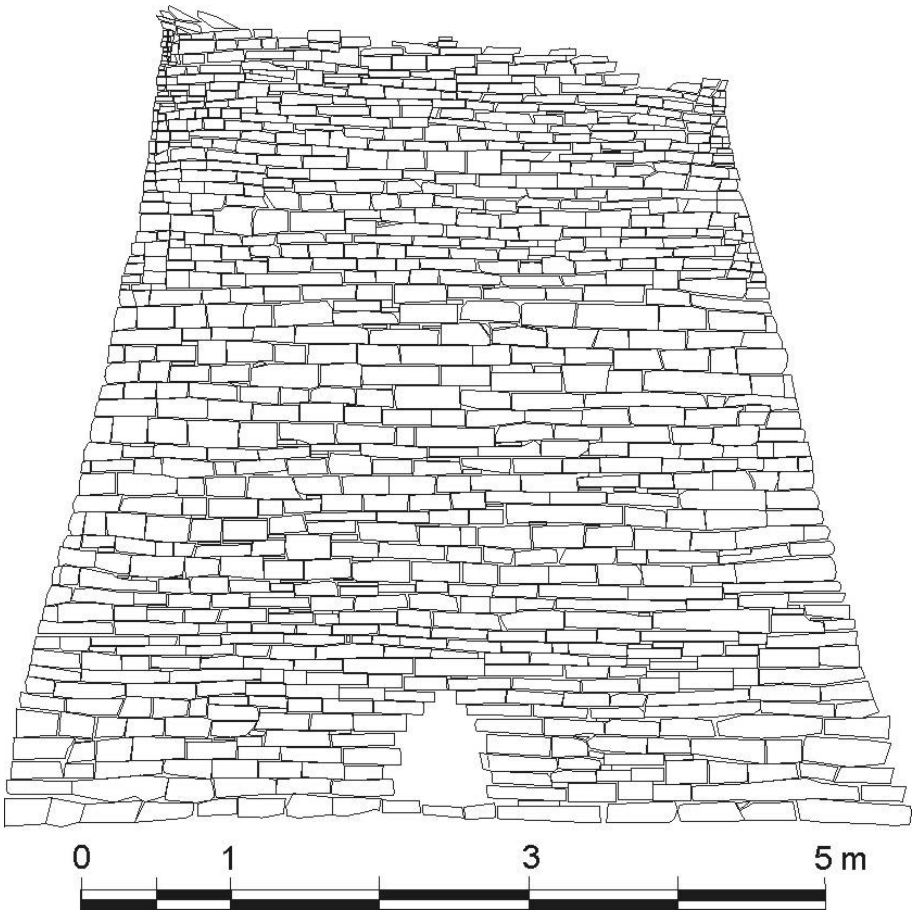


Figure 4.6. Shi1 at the Shir site (drawing: Paul Yule).

Three individuals were interred in this tomb and associated material culture included one Jemdet Nasr ceramic vessel and two small steatite beads. Two samples have yielded radiocarbon dates (Williams and Gregoricka 2013) of 2861-2580 cal. BC (individual C, bone bioapatite) and 2910-2750 cal. BC (charcoal). These dates situate the use of this tomb in the later part of the Hafit and start of the Umm an-Nar period. The combination of architecture and radiocarbon dates support the hypothesis that this tomb was used during a transition between these two periods (see Chapter 5 for further discussion of mortuary ritual).

Tomb S007-003

Tomb S007-003 is a transitional tomb that stood 3.9m tall before excavation (Williams and Gregoricka 2013, 2019, 2020). While there was a good deal of deflated ringwall around the entire cairn, the domed roof was intact and the chamber was undisturbed. The internal circular chamber was 4.0m in diameter and opened to the southwest. Five individuals were interred (Individuals A-E) on an unpaved bedrock floor. Interred material culture included two Jemdet Nasr ceramic vessels (one with each Individual A and Individual C), beads (Individual A), copper/bronze daggers (one with each Individual D and Individual E), copper/bronze pin/awl (Individual A), and butchered ovi-caprid pelvis portion (Individual B). Importantly, this tomb provided clear evidence for the way that each individual was placed inside the chamber as well as the material culture that was interred with the dead. Two radiocarbon dates (Williams and Gregoricka 2013), one from bone bioapatite (Individual C; 2880-2670 cal. BC) and one from charcoal (2600-2480 cal. BC) place the use

Spotlight 15 | Shenah, Al-Qabil, Oman

Sultan Qaboos University archaeologists surveyed the Shenah region tombs in the Wilayat of Al-Qabil southeast of the Al-Hajar mountains, focusing on the areas of Al-Dulayi, Al-Fujayj, Al-Qufasysi, Sayh Al-Qattarah, and Hamra Safra. During this work they documented rock art sites, settlements, and the distribution of a variety of mortuary monuments. Early Bronze Age "Beehive tombs" were excavated and reported (Al-Belushi and ElMahi, 2009). A total of 325 "Beehive" and 10 "pre-Umm an-Nar" tombs were documented on hills or on the edge of higher ground overlooking wadis in this region.

Six "beehive tombs" and two "pre-Umm an-Nar" burial structures were excavated (see Table A.2-A.4 for details). Many of the these structures had been robbed of their contents, but these excavations yielded important data on the architecture of this tomb type. Additionally, the documentation of two other transitional monuments ("pre-Umm an-Nar" structures) show an added layer of complexity at this site, demonstrating a further elaboration of the Early Bronze Age cairn prior to the construction of Umm an-Nar tombs. These monuments (ST149 and ST151) were both constructed of worked and interlocking limestone blocks and while they were found to be empty, the fine construction technique led these researchers to believe that this represented a precursor to the development of Umm an-Nar tombs.

Key Citation

Al-Belushi M.A. and A.T. ElMahi 2009. Archaeological investigations in Shenah, Sultanate of Oman. *Proceedings of the seminar for Arabian Studies* 39: 31-41.

Figure 4.7.
Tomb SG 82 at the Shenah site (photo: Yaqoub Al-Rahbi, Courtesy of Mohamed Al-Belushi, Sultan Qaboos University)

Figure 4.8.
Tomb SG 269 at the Shenah site (photo: Yaqoub Al-Rahbi, Courtesy of Mohamed Al-Belushi, Sultan Qaboos University)

Figure 4.9.
View from inside cairn of corbelled walls and capstone roof (photo: Yaqoub Al-Rahbi, Courtesy of Mohamed Al-Belushi, Sultan Qaboos University)

Figure 4.10.
Example of square entrance, Tomb SG 277, Shenah (photo: Yaqoub Al-Rahbi, Courtesy of Mohamed Al-Belushi, Sultan Qaboos University)

Figure 4.11.
Example of triangular entrance, Tomb SG 271, Shenah (photo: Yaqoub Al-Rahbi, Courtesy of Mohamed Al-Belushi, Sultan Qaboos University)

Spotlight 16 | Trait-Based Analysis of Early Bronze Age Tombs

Eugenio Bortolini

Structural change and tomb typology

All the archaeological evidence presented in this volume points to a clearly visible change over time in monumental funerary architecture of Early Bronze Age Oman. Archaeologists have been able to dissect such a great amount of variability by grouping tombs into definite types. These are categories based both on architectural features and on tomb content (grave goods and remnant traces of funerary practices). Early Bronze Age funerary structures in particular have been analysed over the last thirty years adopting the traditional chronological typology suggested by Frifelt (1975a) comprising Hafit-type tombs (ca. 3200-2700 BC) and Umm an-Nar-type tombs (ca. 2700-2000 BC). Such a neat division worked well in laying the foundations of archaeological research in Oman. Nevertheless, many issues still remain debated. For example questions are raised about continuity/discontinuity in the structural development of monumental tombs (among others Potts 1986, 1993, 1997; Cleuziou 2002; Gagnaison *et al*. 2004; Méry 2010; Bortolini 2012; Böhme 2013), and on the presence of actual transitional forms (Potts 2012; Williams and Gregoricka 2013, 2019).

A hypothesis to work with

Serge Cleuziou (2002) in particular offered a well-documented critique of chronological typologies as an effective heuristic tool if we want to reach a deeper understanding of cultural and socio-economic variability in Oman prehistory. He suggested to focus on mechanisms of gradual change and continuity rather than on the temporal sequence of arbitrary classes. Following his advice we can try and investigate change over time in Bronze Age monumental funerary structures in this region by targeting processes of continuous variation. The easiest way to do it is to avoid considering a tomb as an indivisible entity, and start focusing on its structural components. These are the same structural elements on which traditional types are based. Architectural traits of interest include the relationship between depth and width, the presence of inner partitions and their articulation, type of entrance, type of raw materials employed, the level of complexity in external dressing, the presence of paving and plinth (Bortolini 2012).

Exploratory Data Analysis

Different expressions of the above mentioned architectural features were recorded across northern Oman and the UAE in 159 structures dated to the 3rd millennium BC (Figure 4.12). Data are derived from both published and unpublished research (Bortolini 2014). Each tomb was assigned to a specific temporal interval based on contextual diagnostic findings and to the few available 14C dates (Potts and Weeks 1999; McSweeney *et al*. 2008). The diachronic distribution of the most diagnostic traits in the present sample (type of entrance, number and disposition of chambers, and inner structural articulation) was visualized through a series of Kernel Density Estimates (i.e. estimates of the occurrence of a particular trait over a predetermined geographical buffer, in this case a 30 km one; Figure 4.13). Results exhibit sub-regional trends and potential co-evolutionary patterning between pairs of traits. Since 2700 BC, the transition from single-chambered cairns to articulated structures is accompanied by the emergence of a specific type of double entrance and a clear preference for ashlar-like dressing. These traits seem to develop on the Emirates coast and then spread to the heartland of Oman, while in latest centuries of the 3rd millennium BC they are once again more frequent in the northern coastal areas. Central and eastern Oman present instead different, sub-regional and local trends, especially during the second half of the 3rd millennium BC.

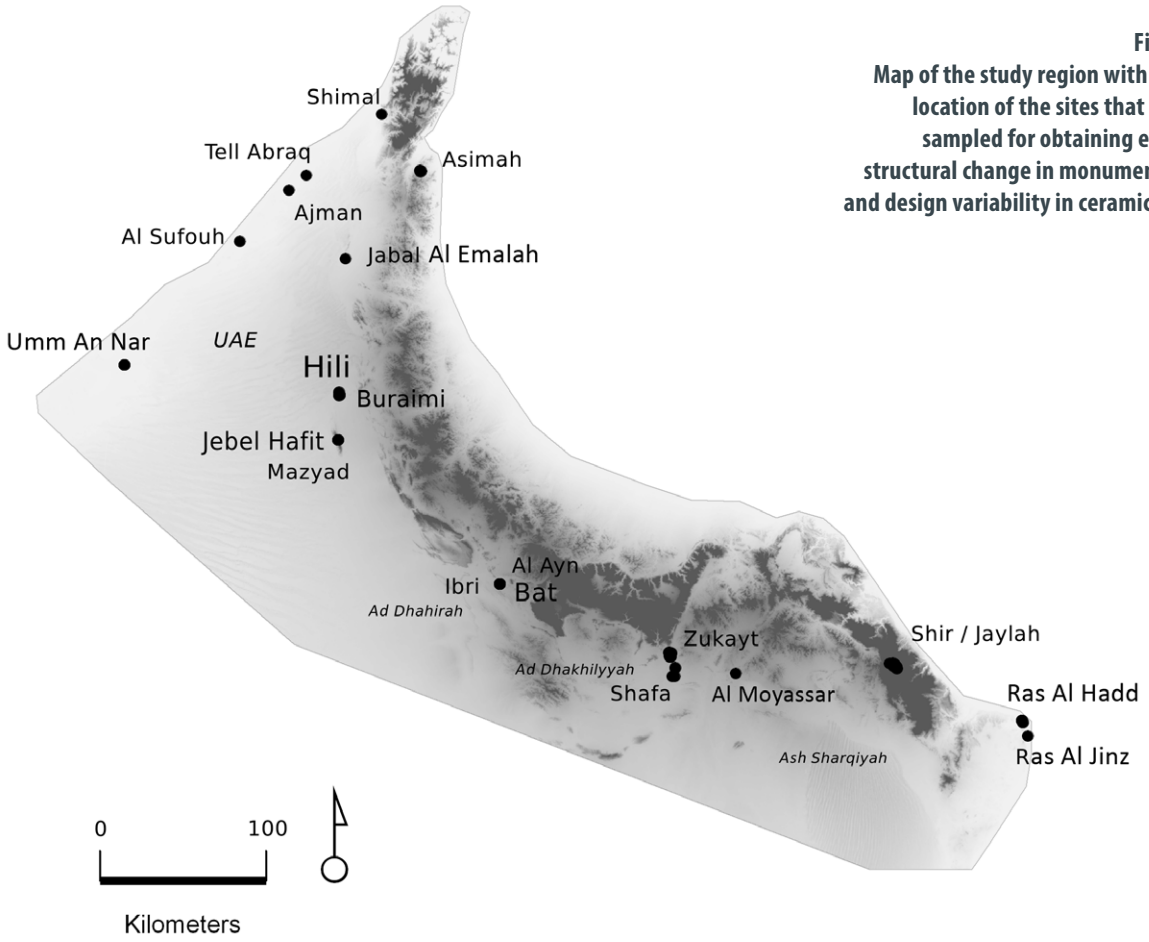


Figure 4.12.
Map of the study region with name and location of the sites that have been sampled for obtaining evidence of structural change in monumental tombs and design variability in ceramic materials

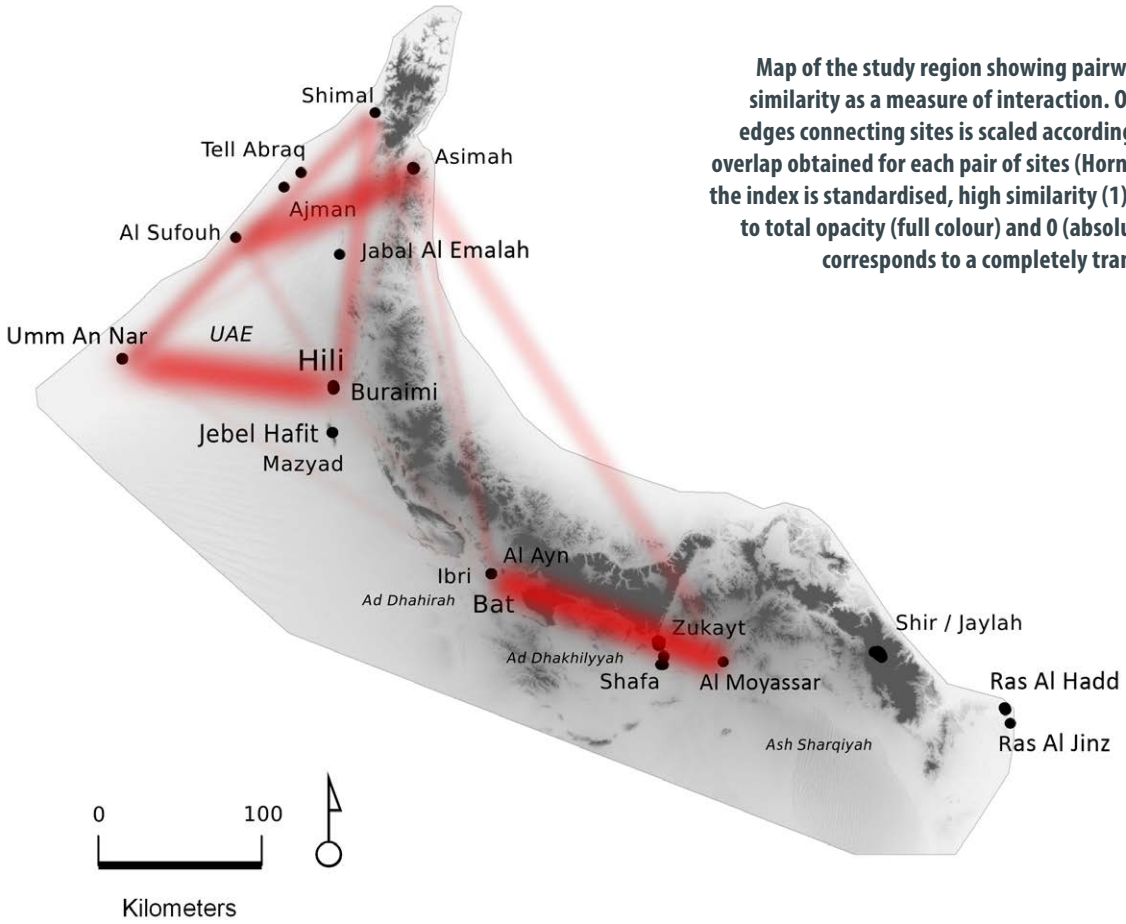


Figure 4.13.
Map of the study region showing pairwise inter-site similarity as a measure of interaction. Opacity of the edges connecting sites is scaled according to the Horn overlap obtained for each pair of sites (Horn 1966). Since the index is standardised, high similarity (1) corresponds to total opacity (full colour) and 0 (absolute diversity) corresponds to a completely transparent line

Table 4.1. Pairwise inter-site similarity for tomb entrance type. Values are measured as Morisita-Horn indices of overlap (Horn 1966). Mean regional value = 0.63

	Hili	Bat	Umm an-Nar	Asimah	Shimal	Al-Sufouoh
Bat	0.24	–	–	–	–	–
Umm an-Nar	0.93	0.29	–	–	–	–
Asimah	0.26	0.42	0.35	–	–	–
Shimal	0.58	0.35	0.76	0	–	–
Al-Sufouoh	0.28	0	0.39	0.86	0	–
Al-Muyassar	0	0.91	0	0.451	0	0

Diversity and interaction

To further explore the possibility of observing sub-regional trends in tomb design (i.e. increasing isolation between different areas of the study region) pairwise inter-site similarity was calculated as a Morisita-Horn index (Horn 1966; Jost 2007). If we consider similarity as a proxy for contacts and exchange of information, different degrees of similarity may inform us on local connectivity and on the structure of a potential regional network of interaction. Type of entrance (Table 4.1) yielded the most interesting results and suggests the presence of a highly connected network in the UAE area, as well as of a second local network connecting Ad-Dakhiliyah and Ad-Dhahirah. These two local systems are interlinked through a number of more ephemeral channels. Eastern Sharqiyah, on the other hand, appears to be considerably more isolated. Through aoristic analysis (Ratcliffe 2000; Johnson 2004; Crema 2012) it is possible to compute diversity measures on estimates of trait frequency at fixed temporal intervals (e.g. every 100 years) and to observe change over time as a continuum. Average inter-site distance (the inverse of similarity) was therefore calculated for each 100-year bin both as Jaccard and squared Euclidean distance. Intra-site diversity was also computed for each time interval based on trait distribution in each site using Neiman's empirical diversity *tF* (Neiman 1995). External dressing (Figure 4.15) exhibits a first moment of increase in intra-site diversity between 2750 and 2500 BC and a second, much higher peak between 2450 and 2200 BC. Inter-site distance shows the expected decrease in conjunction with the former, while both distances are stable during the latter. Tomb entrance (Figure 4.16) exhibits an initial phase in which both intra-site diversity and inter-site distance increase, followed by a steady decrease in within-site diversity and bumps in between-site distance. Inner structural articulation (Figure 4.17), on the other hand, is the more likely to vary as a function of interaction between tomb builders, since the above mentioned measures always exhibit opposite trends. In other words, when sites are more different from one another and possibly more isolated, each site presents with higher internal homogeneity.

A narrative of seamless architectural change

Results suggest that the development of a number of architectural traits might be intertwined with the pattern of other traits at different geographical scales. Intra-site diversity increased first in tomb entrance and external dressing, while inner structural articulation became more diverse only later on in the study period. In the second half of the 3rd millennium BC, however, diversity in external dressing exploded while variability in entrance and internal structure steadily decreased to fixate on fewer modal variants. External dressing may have undergone forms of local competition, that might in turn point to the emergence of social stratification or to an increasing level of specialisation. In the same timeframe average regional distance between sites increased, hinting at isolation and localism. The latter may be due to intensified investment in farming and sedentary subsistence strategies by Omani communities (Al-Jahwari 2009). The possible lower degree of direct interaction between groups generated small-world networks (i.e. scenarios in which a person interacts only with her immediate neighbours most of the time, while occasionally meets someone who works overseas) that different areas developed in the context of broader, trans-regional exchange networks.

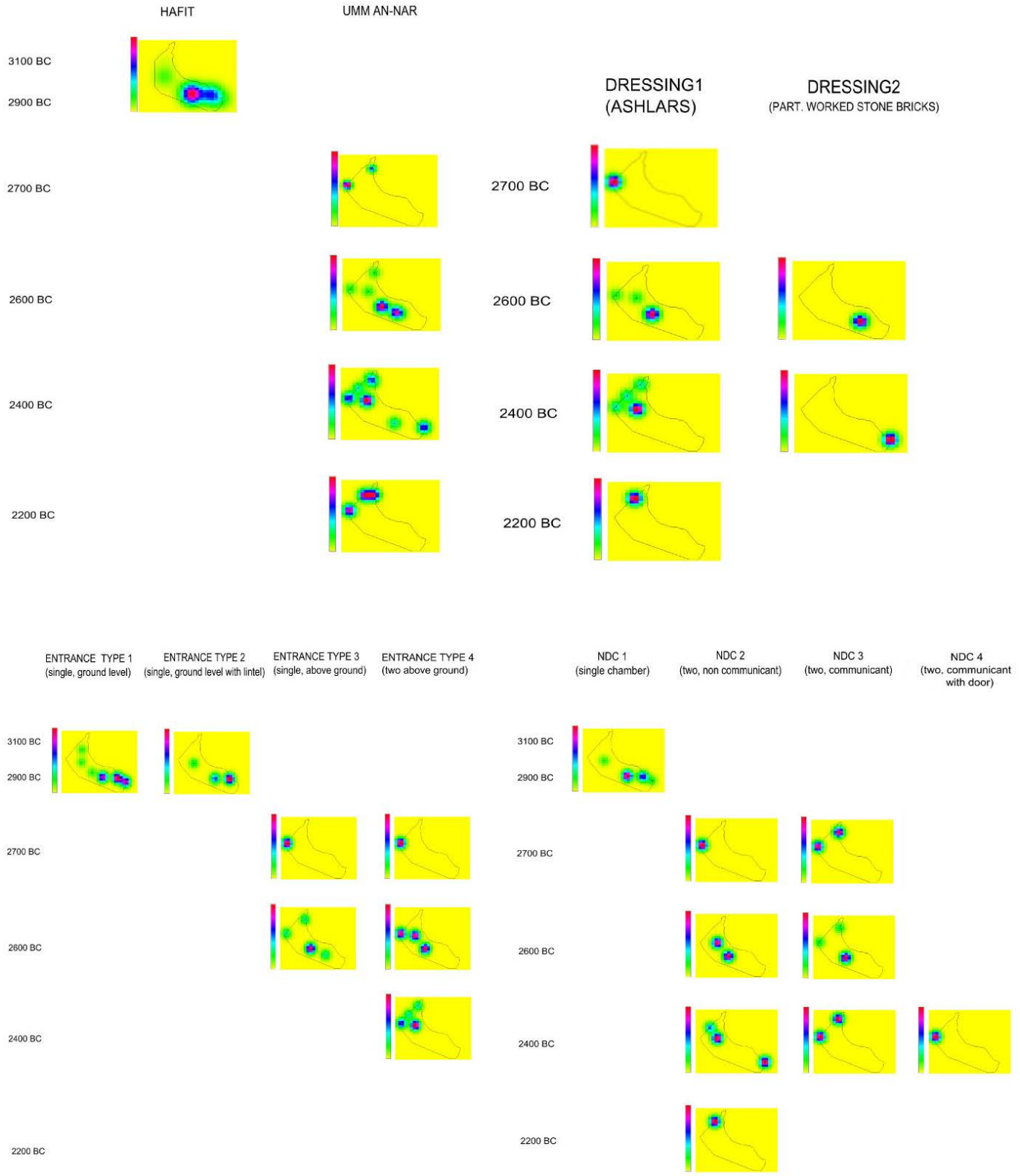


Figure 4.14. Diachronic density estimation of (from top left): 1) Hafit and Umm an-Nar types; 2) Dressing types; 3) Inner structural articulation; 4) Entrance types.

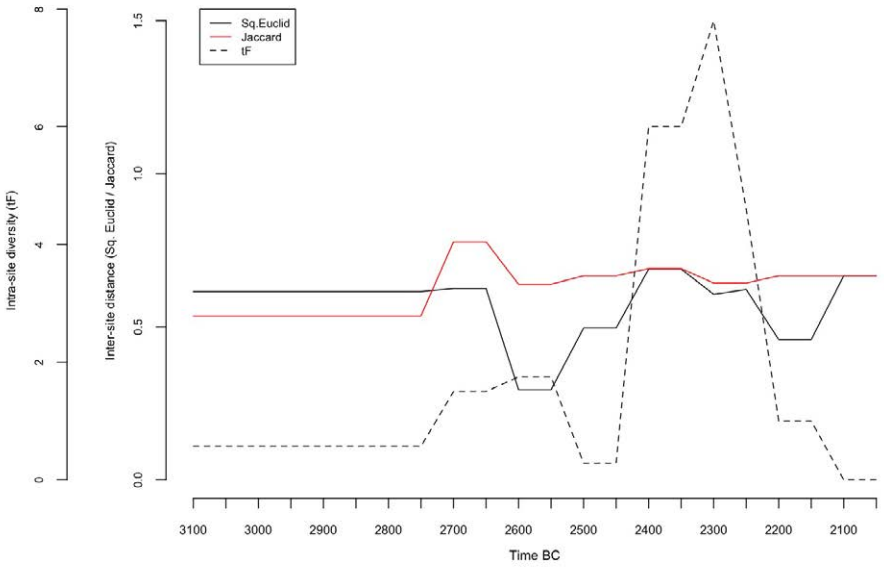


Figure 4.15.
Average values of intra-site diversity (*t F*), inter-site Jaccard distance and inter-site squared Euclidean distance measured for tomb dressing in each 100-year time-step

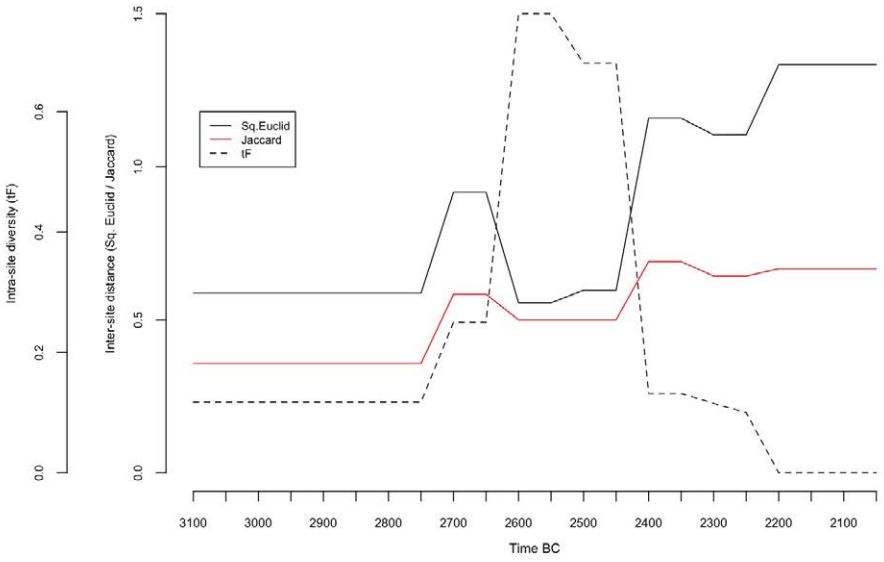


Figure 4.16.
Average values of intra-site diversity (*t F*), inter-site Jaccard distance and inter-site squared Euclidean distance measured for tomb entrance in each 100-year time-step

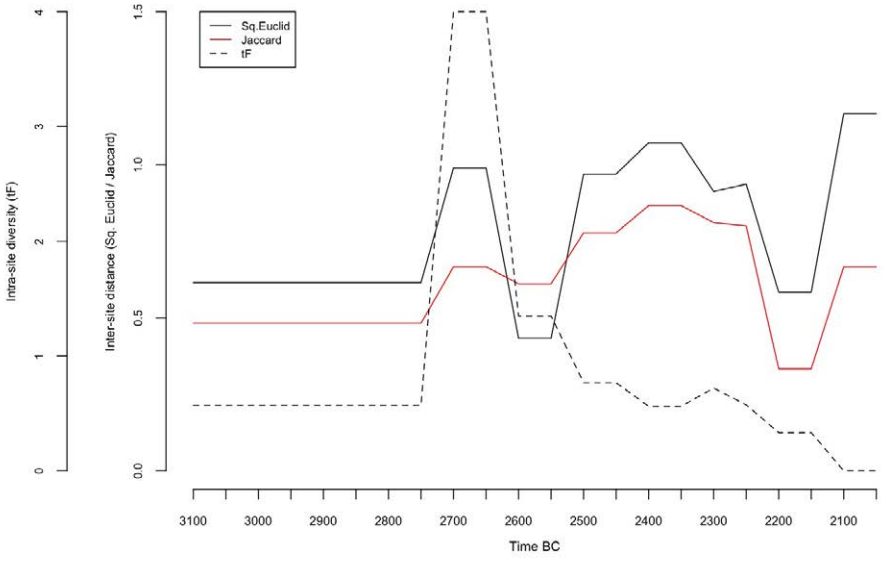


Figure 4.17.
Average values of intra-site diversity (*t F*), inter-site Jaccard distance and inter-site squared Euclidean distance measured for tomb inner articulation in each 100-year time-step

of this tomb between the Hafit and Umm an-Nar periods. The large size of the tomb, fineness of construction, and mortuary ritual also support the hypothesis that this tomb represents transitional mortuary practices.

Tomb S007-011

Tomb S007-011 (Williams and Gregoricka 2019) is an interesting example of a transitional cairn tomb. There was a very sizable deflation cone surround the monument. The maximum standing height before excavation was 3.0m, but it was clear from the large volume of fallen stone that this cairn was significantly taller when it was originally built. The unworked limestone rocks used to build the walls were so copious that it was impossible to excavate the exterior of the cairn without compromising the integrity of the tomb walls. As a result, it was not possible to determine the external diameter; the internal diameter of the chamber was 3.3m. A single individual was interred with large bronze rivets, a large shell pendant, an ovi-caprid astragulus, and badly eroded ceramic sherds of a single Jemdet Nasr vessel. A single radiocarbon date (bone bioapatite) dates the use of this tomb to 2831-2481 cal. BC.

Tomb S007-012

Tomb S007-012 (Williams and Gregoricka 2019) is another transitional cairn built approximately four meters to the west of Tomb S007-011. Like S007- 011, this tomb had a very sizable wall deflation (12.1m diameter), indicating that the tomb stood significantly taller than the 2.8m standing height before excavation. The exterior of the tomb was circular, but the chamber was H-shaped (3.2m NW-SE), resulting in four small chambers (see Figure 4.5). One individual was interred along with an ovi-caprid astragulus, an offering of a portion of ovi-caprid (shoulder cut represented by a humerus and scapula), a copper/bronze rivet, and a steatite seed bead. A radiocarbon date from this interment indicates use of this cairn between 2619 and 2475 cal. BC).

Tomb S007-057

Tomb S007-057 (Williams and Gregoricka 2019) is a transitional tomb and like many of these tombs on the Al-Khubayb necropolis, the poor quality of the local limestone means that the stones of the monuments have become heavily degraded over the millennia. Extensive wall fall made it impossible to excavate the exterior of the cairn without compromising the integrity of the standing walls. This cairn still stood 4.5m tall, making it the tallest of the transitional tombs excavated at the Al-Khubayb necropolis.

The burial chamber was circular and measured 5.8m in diameter. Five individuals were interred in this tomb along with a Jemdet Nasr ceramic vessel (Individual E), an ovi-caprid astragulus (Individual A) and faunal remains (Individual C and Individual D). Two radiocarbon dates (bioapatite) date the use of this cairn to 2618-2477 cal. BC (Individual A) and 2832-2487 cal. BC (Individual D).

Al-Khubayb Tomb

This tomb was located on the road connecting the village of Al-Khubayb and Dhank (Döpper 2017). It is not part of the Al-Khubayb necropolis, but instead rests closer to the opening of Wadi Khubayb. It was threatened by road construction and so it was excavated by the German Team to Bat as part of a rescue operation. This tomb is interesting because it has features both of Hafit-type cairns and Umm an-Nar tombs. Specifically, it is a cairn tomb with a double wall construction, but the exterior walls are made from shaped ashlar stones similar to those seen in the transitional tombs at the site of Bat. It was 5.45m in diameter and

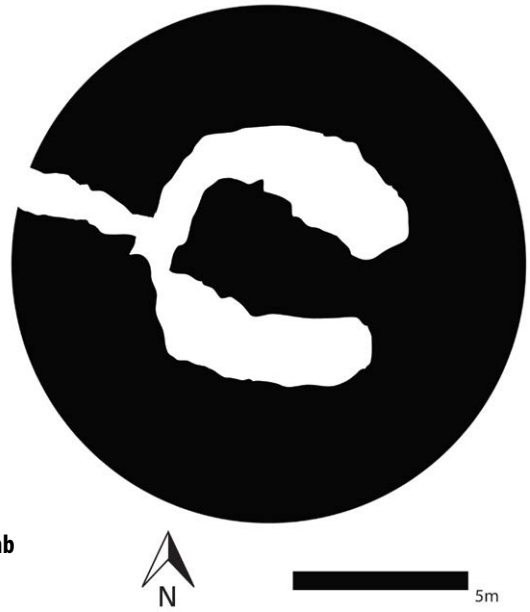


Figure 4.18.
Schematic of Al-Khubayb tomb (after Döpper 2017).

still stood 1.40m before excavation. The walls are corbelled and narrow toward the top, but the walls were damaged in antiquity. An entrance opened to the west. A dividing wall inside the round burial chamber divided it into two chambers, similar to BH89 (Jasim 2012, see Figure 4.5). Considered together, these architectural features suggest that this tomb was built during a transitional period between the Hafit Period epitomized by the construction of mortuary cairns and the Umm an-Nar period, which saw exterior ring walls made from finely cut limestone blocks. The interior wall and resulting chambers are a feature of some transitional cairns on the Oman Peninsula. The tomb was reused during the Samad period and no evidence of Early Bronze Age interments was recovered.

Summary

The differences in monumental architecture and mortuary ritual between the Early Bronze Age cairns and Umm an-Nar tombs are significant. Nevertheless, intermediate tomb forms and subtle changes in the use of space inside these cairns may be seen as precursors to Umm an-Nar monuments and death practices. Several scenarios complicate the "dramatic" shift that occurred around 2700 BC.

First, it is difficult to imagine that populations across the northern Oman Peninsula decided to construct Umm an-Nar mortuary monuments simultaneously and seemingly instantly. Instead, transitional cairns may be evidence of a more gradual shift in practice and spiritual life. Perhaps more slowly than has been appreciated, Early Bronze Age people in this region started to build more cairns with worked stone. Changing ideas about the afterlife may have encouraged a change in the use of space inside the interment chamber. Perhaps the chamber and tombs were built larger and had more fine appearance. Perhaps the increased size led to internal architecture to support the size of the cairn and further differentiate the way space was used. Slowly the idea of a large communal tomb may have become the predominant ideal. These transitional tombs appear to have been constructed in the late Hafit and Early Umm an-Nar period. Perhaps there was a century of overlap between the use of the smaller cairns and these transitional forms and a similar period of overlap between the use of transitional cairns and communal Umm an-Nar tombs. During this time of transition it may have been acceptable to use either of the tomb forms, depending on proximity when a

community member died. For a population that was likely still considerably mobile despite burgeoning small settlements during the Umm an-Nar period, it is reasonable that parts of a population may have been slow to adopt new practices or find themselves too far from the communal tomb their community might prefer to use. In these cases, the recent memory and perhaps recent use of more simple cairns may have led to the use of cairns during the Umm an-Nar period (see Chapters 5 and 6 for more discussion).

Finally, the symbolism inherent in Umm an-Nar mortuary practices where the skeleton is destroyed through the repeated use of the tomb and small scale burning rituals, is very different from the cairn interments seen in the early 3rd millennium BC. Given these differences and the persistent use of cairns at least sporadically, it is reasonable to argue that not everyone would have adopted the new practices – that there was some diversity in how people handled the dead, and perhaps by extension, diversity in spiritual practices. The question of transitional cairns is far from settled, but currently evidence is mounting that there was less uniformity in practice than many have assumed. This evidence does support Frifelt's notion that the "beehive" cairns of the Oman Peninsula were a step in the architectural evolution of mortuary rituals in this region.

Chapter 5

Early Bronze Age Death Practices and Bioarchaeological Analyses (3200–2000 BC)

Central to any investigation of human funerary contexts must be a goal to better understand the lives of past people and to tell their stories to a modern audience. If human burials are to be disturbed, this inquiry must go beyond inventories of material culture and attempt to understand the mortuary practice and the life history of individuals interred as well as the larger population. Further, this work should try to integrate these data and inform other scholars and lay people about how people lived in the past and how they saw their place in the world.

Modern research in mortuary archaeology and bioarchaeology combine the traditional realms of "archaeology" and "anthropology" into a discipline where holistic inquiry can be performed. Everything about a burial or interment and this ritual begins before evidence is created that can be discerned in the archaeological record. This means that starting before the time of death of any individual, a set of norms have been established that define the roles of individuals in the community with regard to death practices that will follow. These obligations and duties may depend on the relationship between the deceased and those still living (for example, the expected actions of a child upon the death of a parent versus the expected actions of an acquaintance upon the death of the same individual), the role of the individual within the community when they were living (for example, perceived importance based on socioeconomic status), the cause of death of the individual, the gender of the deceased, the age of the deceased, and many other aspects of individual and group identity.

Archaeological inquiry on the Early Bronze Age death practices on the Oman Peninsula has established two primary sets of death customs: the use of cairns (3200-2700 BC) and the use of communal tombs (2700-2000 BC). The community norms surrounding these mortuary contexts are very different (Figure 5.1). These differences in how the living dealt with the dead demonstrate divergent mortuary systems that suggest a radical change in social organization. They also leave different archaeological residues that obscure some aspects of these people's lives and spiritual beliefs while illuminating others. This chapter will summarize what we know about the Early Bronze Age mortuary rituals and the life histories of the people who lived on the Oman Peninsula.

Early Bronze Age Cairn Mortuary Ritual (3200-2700 BC)

It is remarkable that mortuary cairn building was practiced across all of the Oman Peninsula (as well as across most of Arabia) during the earliest part of the Early Bronze Age, roughly 3200-2700 BC. Local variations have been observed, but we know with certainty that there were fundamental features that reflect a common ideal across this region with regard to the disposition of the dead. While we have only very limited information about the living spaces of these people, we can tell that the mortuary ritual involving Early Bronze Age cairns was an important part of daily ancient life in a number of ways.

Extensive surveys and excavations of cairn mortuary landscapes have produced a large volume of data on the density, distribution, and variation in Early Bronze Age cairn mortuary structures on the Oman Peninsula (see Chapter 2). In the archaeological record, we see these cairns and we can observe variation in where they are placed, the materials used for construction, the size and quality of construction, the orientation of the entrance, the material culture interred, the number of individuals interred in each monument, and in some cases, how the monument was reused and maintained by the same community, and

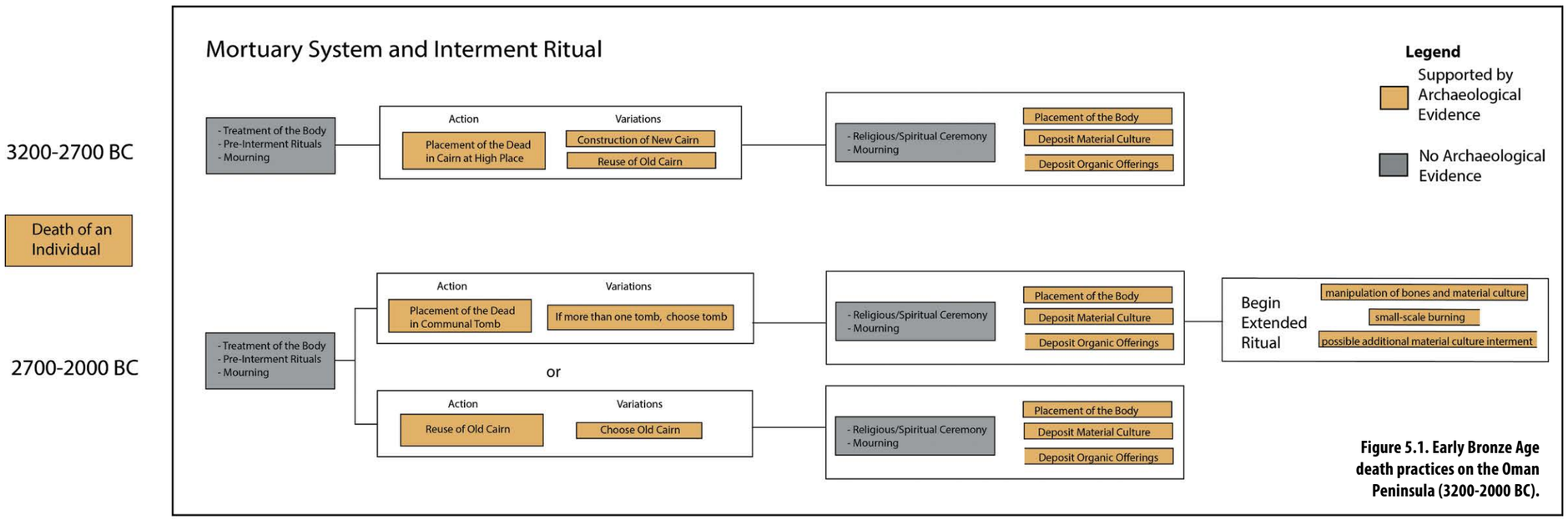


Figure 5.1. Early Bronze Age death practices on the Oman Peninsula (3200-2000 BC).

This variation indicates that while the use of a mortuary cairn was universal at this point in history on the Oman Peninsula, the expression of this practice was susceptible to the availability of local materials, variable skill of the builders, and opportunity. It also suggests that the most important result of these practices was the simple act of placing the dead in a stone-built cairn. The community could be flexible about the materials they used, about the richness of the grave goods, and about the location. Referring to Figure 5.1, there are still a number of stages that cannot be seen in the archaeological record and which may have been important to the spiritual or cultural integrity of the mortuary ritual and the experience of the community who practiced it. These include the treatment of the body, any pre-interment rituals, and mourning of the dead. We also cannot see who built the tombs, and we are not privy to the decision making process to place a tomb in a particular location or to reuse an existing cairn. This leaves open questions regarding the number of people involved in the building of a cairn, the identity of the builders (e.g., close family of the deceased, community members of a certain age, specialist builders, etc.), and the decision making process that led to the placement of the deceased in specific cairns.

In other archaeological contexts, details of these parts of the process might be found in texts or artwork. There is no known system of writing on the Oman Peninsula during the Early Bronze Age, and the art associated with funerary monuments does not directly depict the funerary ritual. Carved stones that are part of later Umm an-Nar tombs depict anthropometric images and animals, and we might assume that these images evoked important spiritual themes related to life and death, but we cannot know this for certain. The inclusion of faunal material (e.g., portions of bovid and ovicaprid) may provide clues about the concept of an afterlife as they do not seem to represent food offerings for the dead. For example, faunal innominates were interred with the deceased in Early Bronze Age cairns at Al-Khubayb necropolis (Weber *et al*. 2019; Williams and Gregoricka 2019). In one example, a portion of cut left ovicaprid innominate accompanied an adult female aged 30-40 years and a child aged 4-5 years of age. In another tomb, two innominates from different animals (both bovid) were interred with an adult female and a child aged 8-9 years. Ovicaprid astragali were found in four tombs, and various other fragmented limb bones were recovered from three tombs. Weber and colleagues (2019) carefully considered these skeletal elements with regard to their potential as food offerings since goats, sheep, and cattle were known food sources in this region during this time. There is an argument that the limb bones may well have been food offerings interred with the deceased, but the innominates and the astragali do not fit this model. Instead a more parsimonious explanation of these modest data suggests that these elements may not have been interred as "food" but as representations of the whole animal, symbolically signaling the importance of these food sources and a desire to recognize that during the mortuary ritual. They further speculate that the interment of innominates with females and children (and not with males) may signal association with birth or reproduction.

There has been speculation that Early Bronze Age cairns were used as family tombs. Without genetic analyses of the interred from a large number of cairns, it is not possible to establish this practice. Therefore, we cannot be sure that tombs were thought of in this way or if they were used according to some other social system. Ancient DNA analyses of human skeletal remains require careful ethical consideration (see Wagner *et al*. 2020). Data from these analyses can add important information to complement archaeological inquiry into the past, including pathogen evolutionary history (Stone and Ozga 2019), but too often the genetic analyses seeking to understand migration or human origins are seen as objective evidence of past human history and fail to incorporate archaeological evidence (e.g., Callaway 2018). Ancient DNA analyses of Early Bronze Age skeletal remains from the Oman Peninsula are potentially very problematic. First, all skeletal materials from these cairns are devoid of collagen (although it is important to note that collagen content is important,

but not the only predictor of preservation of DNA; Campos *et al*. 2012), which limits both ancient DNA and standard radiocarbon dating (see Spotlight: Dating Early Bronze Mortuary Monuments). This obstacle can sometimes be addressed by testing the petrous portion of the cranium, which is often better preserved than the rest of the skeleton in challenging preservation environments and for very old skeletal material (Pinhasi *et al*. 2015). Next, the skeletal material in Early Bronze Age cairns is often commingled, and it can be difficult to know if the Early Bronze Age interment is sampled. This obstacle can be overcome by the simultaneous radiocarbon dating of the same bone sample (e.g., Korlevic *et al*. 2018). Third, Early Bronze Age sample sizes are very small due to poor preservation. Sequencing the genome of very few individuals may provide some insight into those individuals, but cannot represent the entirety of the Early Bronze Age populations in this region. This is where it becomes essential to favor the archaeological evidence and interpret the sequenced genomes of individuals in the context of what we understand about the populations they were part of, not as definitive data about the origins and migrations of past whole populations.

Archaeological Evidence of Early Bronze Age Mortuary Rituals (3200-2700 BC)

There is little if any evidence of potential ceremonies performed when the cairn was built, when body was brought to the cairn, when the body was placed, or when the tomb was closed. Despite all of these gaps in knowledge, we know that death in the Early Bronze Age was an event marked by the community by the use of these monuments, and we can design excavation programs to test hypotheses surrounding this process. During the Early Bronze Age, we can be sure of the following aspects of the cairn mortuary ritual from the archaeological record:

- Communities had established ideas about the location where cairns should be built: high places usually with significant visibility from afar and high inter-visibility with other contemporaneous cairns (Figure 5.2).
- Communities had established ideas about how these cairns should be built: circular (or roughly circular) chamber, double ringwall filled with rubble in between rings (see discussion at pages 101-102 for evidence of three ring walls), and corbelled walls, and a single entrance (Figures 5.4 and 5.5).
- Adults and subadults should be placed into a cairn upon death. There is no other method of mortuary practice known for Early Bronze Age populations on the Oman Peninsula.
- Relatively few mortuary goods were interred with the dead. These goods included Jemdet Nasr ceramics (Figure 2.4), beaded jewelry made from a variety of materials such as carnelian, shell, baked steatite, and a variety of other stone materials (Figures 2.5a and 2.5b), small copper/bronze artifacts (including awls, pins, rivets, and daggers (Figures 2.6a and 2.6b), marine shells, and shell pendants (Figure 2.5b).
- Cairns were used for single or small order multiple (≤5 individuals) primary interments:
    - Individuals were placed in flexed or semi-flexed position;
    - Individuals were placed on their left or right side;
    - Male and female adults are interred in Early Bronze Age cairns;
    - Children and subadults of undetermined sex (it is not possible to determine the sex skeletal remains before maturity ~18 years) are interred in Early Bronze Age cairns;

Figure 5.2. (a) Early Bronze Age cairns on high ridge of Abu Silah necropolis, Dhank, Oman; (b) Early Bronze Age cairns on Abu Silah necropolis with view of Aflaj necropolis in the distance. On clear days some cairns are visible to viewers standing on either necropolis; (c) Early Bronze Age cairns facing south toward the open desert; (d) Example of Early Bronze Age cairn necropolis where cairns are not organized in lines on a ridge, Al-Khubayb necropolis, Dhank; (e) Example of Early Bronze Age cairns organized in lines at Al-Khubayb necropolis, Dhank.

- Infants under the age of 3 are rarely observed in Early Bronze Age cairns. This missing demographic may be because infants received different mortuary treatment or this could be a product of a difficult preservation environment where the bones of these very young individuals are not well preserved;
- There are no documented cases of infants, children, or subadults interred alone in Early Bronze Age cairns. The sample size here is too small to say conclusively that non-adults were never interrred alone in Early Bronze Age cairns, but emerging data provides so-far anecdotal evidence that this may be the case.

- Individuals interred in Early Bronze Age cairns have been observed to suffer from all of the pathological conditions seen in other populations (Table 5.3). This includes dental caries, cranial porosities, degenerative joint disease, healed fractures, and localized infections. It is not possible to determine average height, age-at-death, or prevalence of any pathological conditions with the current published data.

Variation in Early Bronze Age Cairn Mortuary Ritual (3200-2700 BC)

Variation in Cairn Placement

The archaeological record has demonstrated that there is variation in placement of cairns on the landscape. We can see that while placing a cairn at a high place is important, the idea of a high place can vary and is relative to the surrounding landscape. In some geographic locations there are no very high ridgelines to use and smaller, slightly elevated landforms must be used instead. The Al-Khubayb necropolis near Dhank is a good example of this. This necropolis uses a relatively low landform whereas several kilometers away, contemporaneous cairns were also built on much higher ridgelines at the Khutma, Abu Silah, and Aflaj necropoles. Indeed, the stretch of the Al-Hajar Mountains from Dhank to Ibri (Frifelt 1975a, 1975b) still holds thousands of cairns, some at very high locations and others closer to the ground. With the exception of some cairns found in the wadis that have been dated to the Neolithic period (e.g., Williams and Gregoricka 2020), there is no clear chronological development of these necropoles in the Dhank region or elsewhere. Cairns are placed in lines on ridges and/or wadis without clear pattern (Figures 5.2a to 5.2e).

The placement of these cairns may also influence the orientation of the entrances. It is true that the entrance cannot be known for the vast majority of cairns because of erosion and deflation of the walls in the millennia since they were first built. For those cairns where the entrance (Figures 5.4a and 5.4b) can be seen, they have be observed facing in every cardinal direction (see Tables A.2 and A.5).

Variation in Construction Materials

Archaeological research has also demonstrated that the builders of the cairns could be flexible in the materials they used to build these monuments. Without exception, local materials were used (see Figure 2.15) and the quality of the construction suffered or benefited from these materials of opportunity. Again, cairns in the Dhank region are good examples of this point. The limestone available to cairn builders has deteriorated over the millennia, contributing to the ruined look of the Early Bronze Age cairns which make them appear of lesser quality than those at other sites where the local stone resources were more resilient to environmental erosion over the millennia (Figures 5.5a to 5.5f). In addition to variability in the quality of stones used to build Early Bronze Age cairns, stones of different colors have been observed (e.g., Al-Jahwari 2013). No patterns of use of these cairns (e.g., by gender, age, or chronology) have been demonstrated to explain this practice.

Cairns built with worked stones have been observed at a few sites (e.g., Bat, Shir, Halban), but this is less common than the use of unworked local stones. Those cairns constructed with worked stones may date to a transitional period just prior to the start of use of Umm an-Nar communal tombs, which used finely shaped stones for their outer façade wall. Excavation of more of these tombs is needed to demonstrate conclusively that worked stones are a hallmark of the transitional tomb form.

Spotlight 17 | Dating Early Bronze Age Mortuary Monuments

The dating of Early Bronze Age cairns is an important dilemma in the archaeology of Oman. Many researchers have identified this problem (e.g., Al-Jahwari 2013; Williams and Gregoricka 2013) and have attempted to solve this issue through examination of the architecture, placement on the landscape, material culture interred, and radiocarbon dating of organic materials interred. A key problem is the well-documented reuse of these cairns over time as well as the possibility that these cairns may have been built across multiple time periods. Current data supports the following classification of Early Bronze Age cairn monuments:

- Early Bronze Age Cairns: 3200-2200 BC
- Transitional Cairns/Tombs: 2600-2200 BC
- Tumuli (entire Oman Peninsula; ~4,000 BC – AD 600)

***Early Bronze Age Cairns*:** Single, central chamber with no internal architecture; placed at high locations; 1-3 ringwalls made from unworked stone; corbelled roof construction or flat roof stones.

Northern Oman Peninsula ► ***Hafit-type cairns*:** Corbelled roof construction, triangular/rectangular side entrance (variable orientation) or top entrance (less common); entrance passageway varies based on width of ringwalls. Chamber may be round, oval, or irregular round/oval. Chamber may or may not be paved. Includes previously named cairns, Hafit tombs/cairns, Hafit-type cairns.

Dhofar ► ***High Circular Tower tombs (HCT)*:** Flat roof construction, upright stones form internal ringwall, top entrance.

***Transitional Tombs*:** Single chamber; larger diameter and standing height than Early Bronze Age cairns; side entrance; with or without internal architecture; 2-3 ringwalls made from unworked stone or minimally worked stone; one or two-story. Chamber may be round, oval, or irregular round/oval. Includes previously named Beehive tombs/cairns, tower tombs (Shiya), Bat-type tombs (Bat), transitional tower tombs (Dhank) and some other Early Bronze Age cairns with ambiguous features.

***Tumuli*:** Single central chamber: round, horseshoe/C-shaped, or other irregular shapes. Round or oval external appearance. Located at lower elevations and in wadis under ridgelines with Early Bronze Age cairns. Construction includes 1-5 ringwalls of decreasing height made from irregular local stone.

Architecture

Variation in architectural features has been observed both in pedestrian survey and excavation. In the northern Oman Peninsula, the distinction between Early Bronze Age cairns and Transitional Tower tombs has been observed since the earliest investigations on the Oman Peninsula. Frifelt (1975a) proposed that this an intermediate tomb form marked the evolution of architecture that bridged the simple single chambered Early Bronze Age cairn form and the more complex Umm an-Nar tomb form. In Dhofar, less variation in tomb form has been observed. Importantly, tombs recorded and excavated in Dhofar have demonstrated that tombs were smaller both in diameter and height, less well built, and often include an internal ringwall comprised of upright stones.

Distribution and Density

Early Bronze Age mortuary monuments have been documented throughout the entirety of the Oman Peninsula except in central Oman in the sands of the Rub Al-Khali. Of the three categories demarcated here, Early Bronze Age cairns are most numerous; some estimates suggest that several hundred thousand of these monuments were built. Transitional cairns/tombs are the second most prevalent tomb type, and these are placed both at high places and in plateaus. Tumuli are the least well understood category. It is likely that the deflation all of these tomb types has led to generalized classification of Early Bronze Age cairns. The few reported surveys that mention tumuli report that they are found in flat locations and in wadis under the ridgelines that often contain Early Bronze Age cairns. The few excavations that have documented the architectural features of this category, have examined monuments that are not placed at high locations, suggesting that this tomb class may not have been placed in high places, regardless of the time period they were built.

Material Culture Interred

Many of these monuments were reused in the millennia since their construction. This is a common feature across the Oman Peninsula and throughout Arabia. The first documented and indeed the earliest built and used Early Bronze Age cairns on the northern Oman Peninsula were initially called Jemdet Nasr Graves (Frifelt 1971) because of the common inclusion of Early Dynastic Jemdet Nasr pottery. It is clear that many of the cairns included this type of artifact for individuals interred during the Hafit Period (3200-2700 BC). Additionally, individuals were interred with items such as beaded jewelry (made from materials such as carnelian, agate, steatite, shell, and other materials), copper/bronze objects (e.g., knives/daggars, pins/awls, and various other small objects and or personal adornments), and shell. Even if the monuments were not reused during later periods, many were used to inter more than one individual and in those cases, the original interments were moved to the side, or if enough time elapsed and wind-blown silt accumulated over the earlier interments, new corpses may have been placed on top. This creates a situation where it is difficult to deliminate which artifacts were interred with each individual. This is especially problematic with beads since certain styles or materials may have been in use over a long period of time and are not necessarily temporally diagnostic.

Radiocarbon Dating of Organic Material

Charcoal: Burning events are not common in Early Bronze Age cairns, therefore charcoal is not commonly encountered during the excavation of these monuments. It is not unheard of, but it is often problematic because it may derive from a burning event on the surface that predates the construction of any given monument or it may come from windblown material that entered the monument and is unrelated to the mortuary ritual for that tomb. Despite these issues, there are examples of charcoal recovered from the monuments that help to situate their construction and/or use.

Skeletal Material: Both human and faunal skeletal remains are often options for dating the use of a monument. Caution should be taken with faunal remains since it is possible that these derive from scavenging behavior of rodents who may alter the stratigraphy of the tomb contents or even introduce material that is not relevant to the mortuary ritual. A preferable material for establishing the date of use of a mortuary monument is the skeletal material from the individual(s) interred. In arid prehistoric environments, collagen preservation is generally not adequate for traditional radiocarbon dating. Recent advances in dating using bone bioapatite (Cherkinsky 2009; Zazzo and Saliege 2011; Zazzo *et al*. 2014; Zazzo *et al*. 2016) have produced important dates that have for the first time provided absolute dates for interments in these monuments (Williams *et al*. 2014; Williams and Gregoricka 2013, 2019, 2020). Only a small amount of bone is necessary for these analyses, but researchers need to be aware of the influence of local reservoir effects that may obscure the date specifically by generating a more recent date (Zazzo *et al*. 2014; Zazzo *et al*. 2016).

Key Citations

Cherkinsky A. 2009. Can we get a good radiocarbon age from "bad bone"? Determining the reliability of radiocarbon age from bioapatite. *Radiocarbon* 51(2): 647-655.

Williams K.D., T. Steimer-Herbet and L.A. Gregoricka, Saliege J.-F., McCorriston J.2014. Bioarchaeological analyses of 3rd millennium BC high circular tower tombs in Dhofar, Oman. *Journal of Oman Studies* 18: 153-173.

Williams K.D. and L.A. Gregoricka 2013. Social, Spatial, and Bioarchaeological Histories of Ancient Oman: mortuary archaeology of Dhank, Oman 2009-2013. *Arabian archaeology and epigraphy* 24:134-150.

Williams K.D. and L.A. Gregoricka 2019. The Hafit/Umm an-Nar transition of the Third millennium BC: evidence from the architecture and mortuary ritual at Al Khubayb necropolis. In Williams K.D. and L.A. Gregoricka (eds.), *Life and Death in Bronze Age Arabia: mortuary and bioarchaeological perspectives*. University Press Florida, Gainesville, pp. 76-107.

Williams K.D. and L.A. Gregoricka 2020. New evidence of prehistoric tomb diversity in Dhank, Oman. *Journal of Oman Studies* 21: 102-127.

Zazzo A. and J.-F. Saliège 2011. Radiocarbon dating of biological apatites: A review. *Palaeogeography* 310(1-2): 52-61.

Zazzo A., O. Munoz and J.-F. Saliege 2014. Diet and mobility in a Late Neolithic population of coastal Oman inferred from radiocarbon dating and stable isotope analysis. *American journal of physical anthropology* 153(3): 353-364.

Zazzo A., O. Munoz, E. Badel, F. Genchi and L.G. Marcucci 2016. A revised radiocarbon chronology of the aceramic shell midden of Ra's Al-Hamra 6 (Muscat, Sultanate of Oman): Implication for occupational sequence, marine reservoir age, and human mobility. *Radiocarbon* 58(2): 383-395.

Table 5.1. Published radiocarbon dates for Early Bronze Age cairns. Calibrations calculated with OxCal 4.3 (Bronk Ramsey 2009) with IntCal13 Atmospheric Curve (Reimer *et al*. 2013).

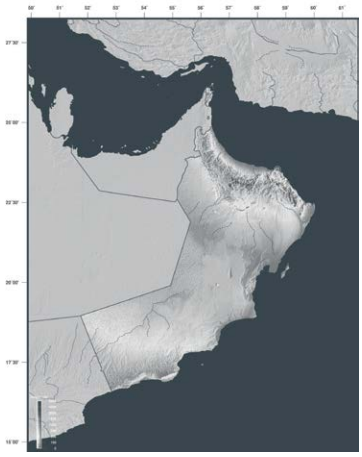
	Monument	Tomb type	Material	Individual	Uncalibrated ^{14}C age (BP)	2σ calibrated range BC (95.4% confidence)	Cit.
Mudhai	D001-001	High Circular Tower	bioapatite	Indiv. A	4980±140	4221-3379	(1)
	D001-001	High Circular Tower	bioapatite	Indiv. B	4315±43	3082-2879	(1)
	D001-001	High Circular Tower	bioapatite	Commingled, Indiv. C and E	4452±42	3339-2935	(1)
	D001-004	High Circular Tower	bioapatite	Indiv. A (solitary)	1533±36	AD 510 ±55	(1)
	D001-005	High Circular Tower	bioapatite	Indiv. A (solitary)	1533±36	AD 464 ±50	(1)
Al-Khubayb	S007-001	Transitional	bioapatite	Indiv. C	4110±30	2861-2580	(2)
	S007-001	Transitional	charcoal	n/a	4230±25	2910-2750	(2)
	S007-003	Transitional	bioapatite	Indiv. C	4170±25	2880-2670	(2)
	S007-003	Transitional	charcoal	n/a	4030±25	2600-2480	(2)
	S007-100	Hafit-type cairn	bioapatite	Indiv. A	4020±25	2617-2473	(3)
				Indiv. B	4020±25	2575-2474	(3)
	S007-101	Hafit-type cairn	bioapatite	Indiv. A	3950±20	2564-2348	(3)
				Indiv. B	3970±20	2567-2462	(3)
	S007-167	Tumulus	charcoal	n/a	4130±25	2870-2585	(3)
			bioapatite	Indiv. A	4040±25	2827-2478	(3)
	S007-169	Tumulus	bioapatite	Indiv. A	3900±25	2468-2299	(3)
Al-Khutma	S002-001	Hafit-type cairn	bioapatite	Indiv. B	4490±25	3340-3100	(2)
	S002-001	Hafit-type cairn	bioapatite	Indiv. A	1710±25	AD 255-400	(2)
	S002-023	Hafit-type cairn	bioapatite	Indiv. A	3990±20	2571-2468	(3)
	S002-046	Tumulus	bioapatite	Indiv. A	4170±25	2880-2640	(3)
	S002-049	Hafit-type cairn	bioapatite	Indiv. A	4160±25	2871-2636	(3)
	S002-050	Hafit-type cairn	bioapatite	Indiv. A	4130±25	2870-2585	(3)
	S002-052	Hafit-type cairn	bioapatite	Indiv. A	3870±25	2463-2233	(3)
	S002-053	Hafit-type cairn	bioapatite	Indiv. A	2410±20	727-404	(3)
	S002-058	Hafit-type cairn	bioapatite	Indiv. A	3910±30	2472-2298	(3)
	S002-059	Hafit-type cairn	bioapatite	Indiv. A	3710±20	2194-2033	(3)
	S002-082	Hafit-type cairn	bioapatite	Indiv. A	4250±25	2912-2765	(3)
Abu Silah	S021-001	Tumulus	bioapatite	Indiv. A	1330 ± 20	AD 652-763	(3)
			bioapatite	Indiv. B	4070±25	2849-2492	(3)
			bioapatite	Indiv. C	4330±25	3013-2897	(3)
			bioapatite	Indiv. D	4130±25	2870-2585	(3)
			bioapatite	Indiv. F	4140±25	2872-2624	(3)
Aflaj	S020-001	Tumulus	bioapatite	Indiv. A	6280±25	5310-5218	(3)
			charcoal	Northern Hearth	4620±25	3499-3353	(3)
			charcoal	Western Hearth	4560±25	3484-3115	(3)
	S020-002	Tumulus	charcoal	Western Hearth	4960±30	3793-3659	(3)
			bioapatite	Indiv. A	3920±20	2473-2342	(3)
			bioapatite	Indiv. B	3910±25	2471-2302	(3)
Necropolis 6	S022-012	Tumulus	bioapatite	Indiv. A	4850±25	3695-3539	(3)
	S022-048	Tumulus	bioapatite	Indiv. A	3010±20	1376-1133	(3)

(1) Williams *et al*. 2014

(2) Williams and Gregoricka 2013

(3) Williams and Gregoricka 2020

Spotlight 18 | Haluf, Dhofar, Oman



In Wadi Haluf and at Mudhai in Dhofar, three examples of a previously unknown tomb type were observed in 2009-2010 (McCorriston *et al*. 2014). The first of of two of these tombs were excavated at Haluf (thus the name of the tomb type "Haluf tomb", Figure 5.3). Both of these tombs contained material that indicate use during the Early Bronze Age (Table 5.2), but neither of them contained human skeletal remains, thus leading McCorriston and colleagues to suggest that these could have been cenotaph monuments rather than tombs functioning to hold the dead. The rarity of these tombs suggests that this was not an extensive practice in Dhofar.

The excavated examples of this tomb type reveal some similarities such as the long rounded rectangle or ovoid shape with a central chamber. The exterior of both consisted of black and white limestone slabs and cobbles. Both tombs also present with stone line formations, but the researchers are careful to acknowledge that the dates of these stone features, both the possible hearths and the rock piles, are not known.

Tomb D001-006 may have been built on top of an existing Early Bronze Age cairn. If D001-006 was built on top of an existing cairn, this kind of reuse of mortuary space is somewhat different from the documented reuse of other cairns in the Dhofar region which were used after the Early Bronze Age (e.g., D001-004, D001-005, D036-002 McCorriston *et al*. 2014). Another possibility is that these cairns were not reused, but that mortuary cairns continued to be built and used as the primary receptacle for the dead past the Early Bronze Age in Dhofar.

Table 5.2. Summary of features of "Haluf tombs"

	Tomb	Dates cal BC	Length	Shape	Construction Materials	Chamber size	Contents
Haluf	D014-003	3222-2902	7.0 m	Rectangle with rounded corners	Worked white limestone slabs, black dolomitic limestone cobbles	central oval-shaped; 1.10 x 0.7 m	None in chamber; charcoal under construction; bronze dagger in southern interior wall
	Other features: West facing false door of black stone in center of tomb; 3 lines of stone piles (possible hearths) parallel to tomb						
Mudhai	D001-006	3009 +/165	8.4 m	Ovoid	Worked white limestone slabs, black dolomitic limestone cobbles	oval-shaped	Faunal material from rodent burrow (possibly intrusive)
	Other features: entral chamber may have been reused Early Bronze Age cairn; line of black dolomitic cobbles (62.7 m); Cobble piles 112 m						

Figure 5.3.
Early Bronze Age "Haluf tomb" (facing south) in Haluf, Dhofar (Photo courtesy of RASA project, Joy McCorriston, after McCorriston *et al*. 2014)

Key Citation

McCorriston J., M.J. Harrower, T. Steimer-Herbet, K.D. Williams, *et al*. 2014. Monuments and landscape of mobile pastoralists: the Dhofar Monument Survey 2009-2011. *Journal of Oman Studies* 18: 117-144.

Figure 5.4. (a) View of cairn entrances at the UNESCO World Heritage site of Bat/Al-Ayn; (b) Close-up of cairn entrance at the UNESCO World Heritage site of Bat/Al-Ayn.

Figure 5.5. (a) Erosion of exterior wall of this Early Bronze Age cairn reveals the inner wall, UNESCO World Heritage site of Bat/Al-Ayn; (b) View of corbelled walls and roof of an Early Bronze Age cairn from inside the chamber, UNESCO World Heritage site of Bat/Al-Ayn, (c) Example of erosion and deflation of cairn at the Al-Khubayb necropolis; (d) Detail of the stone used to construct the cairns at the Al-Khubayb necropolis. These stones have suffered significant erosion which lead to a more "ruined" appearance. This cairn, however, was not disturbed and contained an intact burial chamber; (e) Detail of stone used to construct the cairns at the UNESCO World Heritage site of Bat/Al-Ayn. This stone suffered less erosion as a result the cairn more closely resembles its original appearance; (f) Example of erosion at the site of Zukayt.

Variation in Construction Style

The number of ringwalls that a typical Early Bronze Age cairn had is a point of debate. Most cairns have been found with a double ringwall – a two walls filled with rubble between them (Figures 5.5 and 5.6) Clearly, there is evidence for single ringwalls (e.g., Al-Belushi and ElMahi 2009; Frifelt 1971; Madsen 2017) and for cairns with three or more walls (e.g., de Cardi *et al.* 1977; Frifelt *et al.* 1977; Al-Belushi and ElMahi 2009; Al-Jahwari 2013; Williams and Gregoricka 2020). It is clear that some cairns were "closed" after their final use with the construction of a third wall that obscured the previously used entrance, but more than three ringwalls is

Figure 5.6. Example of cairn at site of Halban. Rubble fill between the outer and inner walls of the cairn can be seen.

exceptional. Recent evidence about tumuli, which have three or more walls and may appear to be deflated Early Bronze Age cairns, presents the possibility that these may have been documented as Early Bronze Age cairns when in fact they may be "tumuli" (Williams and Gregoricka 2020). This also suggests an explanation for some "cairns" that have been observed in wadis or other low elevation areas (e.g., de Cardi *et al.* 1977).

In the northern Oman Peninsula, other variation in construction style includes the use of capstones or slabs to close a cairn, the degree of corbelling of the walls, internal architecture (e.g., support walls or benches seen in some transitional cairns), possibly the construction of a second story/upper burial chamber in some presumably transitional cairns (see Chapter 4), shape of the burial chamber, standing height at time of construction, external and chamber diameters, and wall thickness (see Tables A.2-A.5).

Dhofar adds more diversity in Early Bronze Age cairn construction style. There have been no cairns documented in Dhofar that used side entrances. In fact, all documented cairns in this region have been more simple structures (smaller in diameter and height) compared with their contemporaries to the north, and all use a top entry. These cairns are often made with wadi boulders and occasionally use upright slabs to define the chamber. There is very slight corbelling of the walls compared with the larger cairns outside of Dhofar.

Finally, also in the northern Oman Peninsula, at least two sites (Yule and Weisgerber 1998; Vogt 1985) have presumed Early Bronze Age cairns built with double vaulted chambers (see Chapter 4). These tombs are less well understood, and it is likely that they represent a type of intermediate tomb form that was not widely constructed.

Variation in Cairn Use

It was obviously an important part of the mortuary ritual to determine if a new cairn would be built or if an old cairn would be reused. There is no archaeological evidence for the decision making process on this topic, with one exception: subadults (individuals under the age of ~18 years). Very few data exist on this topic in this region due to often poor preservation and disturbance in the cairn chambers, but there are some clues about the placement of subadults in cairns that had previously been used to inter adults. For example, at the Al-Khutma necropolis in Dhank, a subadult was interred in a cairn 3,000 years after the cairn had been used to inter an elderly woman (Williams and Gregoricka, 2013). The subadult skeleton rested ~30 cm above the older woman and it was clear that this individual was placed on top of windblown sediment that covered the woman for millennia. In this case, the Iron Age community who interred this child may not have known that there was a woman in this cairn from centuries before, but they did know that this was a cairn for the dead and did choose to place this child into a previously used cairn rather than inter them alone. All children excavated from cairns in the Dhank region (Williams and Gregoricka 2013, 2019, 2020; Weber *et al.* 2019) and in Dhofar (Williams *et al.* 2014) were placed into cairns that already held deceased adults. To this author's knowledge, there has not been any example of a child interred alone in a cairn during the Early Bronze Age.

Variation in Placement of the Deceased

Due to typically poor preservation, cairn reuse, taphonomic processes, looting of the chamber, and stone quarrying, the burial chambers of Early Bronze Age cairns provide little information about the placement of the deceased in the chamber. Where data are available (see Table A.3), one uniform practice seems to have been placement of the dead in a flexed (contracted) or semi-flexed position (e.g., Williams and Gregoricka 2013; Madsen 2017; Williams and Gregoricka 2019, 2020). They were placed on their left or right side (e.g., Benton and Potts 1994; Hellyer 1998; McCorriston *et al.* 2014; Williams *et al.* 2014; Williams and Gregoricka 2013, 2019, 2020; Madsen 2017). There are examples of crania resting on stone "pillows," which are in some cases black stones in contrast to the light colored limestone that was used to build the cairn (Williams and Gregoricka 2013; McCorriston *et al.* 2014; Madsen 2017).

Variation in Mortuary Goods

In the northern Oman peninsula, offerings include small bronze artifacts (daggers, awls/pins, rings, and rivets), shells, beads (from jewelry and possibly beaded clothing), Jemdet Nasr ceramics, and occasional uncommon small artifacts (see Tables A.4 and A.6). Méry (2010) has characterized these offerings as communal and it is often not possible to determine their original placement and relative to the number of interred. An alternate hypothesis is that these were not communal offerings, but rather that Early Bronze Age cairns were modestly furnished and that the disconnect between the number of individuals and the number of objects is due to reuse of the cairns in later times where more and more individuals were added and the disturbance of the tomb contents conflated the Early Bronze Age deceased with the later added deceased who may not have been accompanied by mortuary offerings. In transitional period cairns (see Chapter 4) this is more apparent because of the generally larger and in some cases more complex chambers where mortuary goods have been clearly placed with individuals and there is less of sense that these spaces were communal (see tombs S007-001, S007-003, and S007-057 in Williams and Gregoricka 2019).

Table 5.3. Published data on health and demography of individuals interred in Early Bronze Age cairns.

Location	Site	Tomb/Grave	Individual	Age/Sex	Preservation	Position	Dental Health	Degenerative Joint Disease	Cranial Porosities	Osteoperiostitis	Non-Specific Infectious Disease	Trauma	Nutritional Deficits	Citation(s)
Dhank	Al Khubayb	S007-001	A	male, 40+ years	well preserved; taphonomic disturbance of position	placed in NE alcove; flexed; head facing east	teeth too poorly preserved	Axial Skeleton Articular Surfaces: none; Osteophytosis: minor lipping of thoracic vertebrae	exfoliation of bone made observation impossible	none	none	Healed fracture, proximal left tibia (affected patella); healed fracture distal left tibia	Bowed tibia suggestive of rickets; spina bifida occulta	Williams & Gregoricka 2013, 2019
Dhank	Al Khubayb		B	Probable female, 20-30 years	poorly preserved; taphonomic disturbance of position	placed in SE alcove	Poor preservation made observations impossible							Williams & Gregoricka 2013, 2019
Dhank	Al Khubayb		C	subadult, ~3years	poorly preserved; taphonomic disturbance of position	placed in SE alcove	Poor preservation made observations impossible							Williams & Gregoricka 2013, 2019
Dhank	Al Khubayb	S007-003	A	female, 30-40 years	well preserved; minor taphonomic disturbance - mostly in articulation	flexed; head facing NE	moderate attrition of posterior dentition	Axial Skeleton Articular Surfaces: marked porosity of left acetabulum; Osteophytosis: minor lipping of all thoracic and lumbar vertebrae (cervical vertebrae unremarkable)	none	none	none	none	none	Williams & Gregoricka 2013, 2019
Dhank	Al Khubayb		B	female, 30-40 years	well preserved; minor taphonomic disturbance - mostly in articulation	flexed; head facing NE; placed with Individual E	Antemortem loss:	some compression of cervical vertebrae bodies	none	none	none	possible healed fracture of sternum	none	Williams & Gregoricka 2013, 2019
Dhank	Al Khubayb		C	subadult, 8-10 years	poorly preserved; minor taphonomic disturbance - mostly in articulation	flexed; head facing S	Poor preservation made observations impossible							Williams & Gregoricka 2013, 2019
Dhank	Al Khubayb		D	male, 40+ years	well preserved; minor taphonomic disturbance - mostly in articulation	flexed; head facing NE	Antemortem loss; severe attrition of anterior dentition (destruction of crowns and part of roots)	Degenerative change in shape of TMJ; Degenerative changes of pubic symphysis	none	none	lesion on thoracic vertebrae body	none	none	Williams & Gregoricka 2013, 2019
Dhank	Al Khubayb		E	subadult, 4-5 years	moderate preservation; minor taphonomic disturbance - mostly in articulation	flexed; head facing NE	none	none	none	none	none	none	none	Williams & Gregoricka 2013, 2019
Dhank	Al Khubayb	S007-011	A	adult	poorly preserved; taphonomic disturbance of position	undetermined	-	-	-	-	-	-	-	Williams & Gregoricka 2019
Dhank	Al Khubayb	S007-012	A	adult	poorly preserved; taphonomic disturbance of position	undetermined	-	-	-	-	proximal manual phalanx, lytic lesion & osteoarthritis lipping	-	-	Williams & Gregoricka 2019
Dhank	Al Khubayb	S007-057	A	young adult male	poor-moderate preservatio, minor taphonomic disturbance of position	flexed; head facing N	-	none	yes	none	none	-	none	Williams & Gregoricka 2019
Dhank	Al Khubayb		B	adult	poor-moderate preservatio, minor taphonomic disturbance of position	flexed; head facing S/SW	-	-	-	-	-	-	-	Williams & Gregoricka 2019
Dhank	Al Khubayb		C	adult female	poor-moderate preservatio, minor taphonomic disturbance of position	flexed; head facing SE	-	-	-	-	-	-	-	Williams & Gregoricka 2019
Dhank	Al Khubayb		D	subadult, 8-9 years	poor-moderate preservatio, minor taphonomic disturbance of position	flexed; head facing SE	-	-	-	-	-	-	-	Williams & Gregoricka 2019
Dhank	Al Khubayb		E	adult	poor-moderate preservatio, minor taphonomic disturbance of position	flexed; head facing E	-	-	-	-	-	-	-	Williams & Gregoricka 2019

Location	Site	Tomb/Grave	Individual	Age/Sex	Preservation	Position	Dental Health	Degenerative Joint Disease	Cranial Porosities	Osteoperiostitis	Non-Specific Infectious Disease	Trauma	Nutritional Deficits	Citation(s)
Dhank	Al Khubayb	S007-167	A	Adult (reuse)	poorly preserved; taphonomic disturbance of position	undetermined	Poor preservation made observations impossible	Poor preservation made observations impossible						Williams & Gregoricka 2020
Dhank	Al Khubayb		B	Adult (first use of tomb)	poorly preserved; little/no taphonomic disturbance of position	check notebook	Poor preservation made observations impossible	Poor preservation made observations impossible						Williams & Gregoricka 2020
Dhank	Al Khubayb	S007-169	A	adult	poorly preserved; taphonomic disturbance of position	flexed	Poor preservation made observations impossible	Poor preservation made observations impossible						Williams & Gregoricka 2020
Dhank	Al Khutma	S002-001	A	subadult (IA reuse)	well preserved; little/no taphonomic disturbance of position	flexed; head facing S; head on "pillow" of single black stone	Caries: left mandibular M2 (buccal surface); Antemortem tooth loss: left mandibular second premolar (alveolar bone partially resorbed)	-	-	-	3 LEH on Left Maxillary Canine; 1 LEH on maxillary central incisor; 2 LEH on right maxillary canine; 3 LEH on left maxillary lateral incisor	-	spina bifida occulta	Williams & Gregoricka 2013
Dhank	Al Khutma		B	Adult female	poorly preserved; taphonomic disturbance of position	head facing west	Antemortem loss of mandibular right P1, P2, M1, M2, M3	-	-	-	-	-	-	Williams & Gregoricka 2013
Dhank	Abu Silah	S020-001	A	undetermined	poorly preserved; taphonomic disturbance of position	undetermined	Poor preservation made observations impossible	Poor preservation made observations impossible						Williams & Gregoricka 2020
Dhank	Abu Silah	S020-002	A	adult	poorly preserved; taphonomic disturbance of position	undetermined	Poor preservation made observations impossible	Poor preservation made observations impossible						Williams & Gregoricka 2020
Dhank	Abu Silah		B (reuse event)	adult	poorly preserved; taphonomic disturbance of position	undetermined	Poor preservation made observations impossible	Poor preservation made observations impossible						Williams & Gregoricka 2020
Dhank	Aflaj	S021-001	A (Reuse event)	female, 25-35 years	moderate preservation; minor taphonomic disturbance - mostly in articulation	flexed; facing SW	-	-	-	-	-	-	-	Williams & Gregoricka 2020
Dhank	Aflaj		B	adult male	poor preservation; minor taphonomic disturbance - mostly in articulation	semi-flexed; right side; facing S	-	-	-	-	-	-	-	Williams & Gregoricka 2020
Dhank	Aflaj		C (first use)	female, 40+ years	moderate preservation; minor taphonomic disturbance - mostly in articulation	semi-flexed; right side; facing W	antemortem loss of posterior dentition; severe attrition of anterior dentition	-	degenerative changes	-	-	-		Williams & Gregoricka 2020
Dhank	Aflaj		D	subadult, 5-7 years	poorly preserved; little/no taphonomic disturbance of position	semi-flexed; right side; facing W	-	-	-	-	-	-	-	Williams & Gregoricka 2020
Dhank	Aflaj		E	term/pre-term infant	poorly preserved; little/no taphonomic disturbance of position	semi-flexed; right side; facing W	-	-	-	-	-	-	-	Williams & Gregoricka 2020
Dhofar	Mudhai	D001-001	A	male, 50-60+ years (possible secondary interment)	moderately well preserved	tightly bundled, likely in organic material; placed against wall with semicirlce of stones around and floor on top of bundle	Antemortem loss: mandibular RM1, RN2 (and partially healed abcess)	Osteophytosis of all vertebral bodies	none	none	none	healed middle & distal pedal phalanges; healed trauma to vertebral arches C3-C5; incomplete fusion after trauma vertebral arch C6-T1	none	McCorriston et al. 2014; Williams et al. 2014

Location	Site	Tomb/Grave	Individual	Age/Sex	Preservation	Position	Dental Health	Degenerative Joint Disease	Cranial Porosities	Osteoperiostitis	Non-Specific Infectious Disease	Trauma	Nutritional Deficits	Citation(s)
Dhofar	Mudhai	D001-001	B	male, 20-30 years, (possible secondary interment)	moderately well preserved	tightly bundled, likely in organic material; placed against wall with semicirlce of stones around; placed on top of floor on top of Indiv A	none	none	none	none	none	none	none	McCorriston et al. 2014; Williams et al. 2014
Dhofar	Mudhai	D001-001	C	female, 20-25 years	moderately well preserved	commingled with D, E	none	none	none	none	none	none	none	McCorriston et al. 2014; Williams et al. 2014
Dhofar	Mudhai	D001-001	D	preterm or term perinate	moderately well preserved	commingled with C, E	none	none	none	none	none	none	none	McCorriston et al. 2014; Williams et al. 2014
Dhofar	Mudhai	D001-001	E	male, 40+ years	moderately well preserved	flexed; partially commingled with C&D	none	none	none	none	none	none	none	McCorriston et al. 2014; Williams et al. 2014
Ras Al-Hadd	Ras Al- Hadd	HD-10-3.1		possible female, adult	very poor	Flexed, right side		-	-	-	-	-	-	Salvatori 2001
			Commingled, MNI = 10 adults					Commingled, MNI = 10 adults						
Ras Al-Hadd	Ras Al- Hadd	HD 10-3.2	Commingled, MNI = 6 adults					Commingled, MNI = 6 adults						
Ras Al-Hadd	Ras Al- Hadd	HD 10-4.1	Commingled, MNI = 22 adults					Commingled, MNI = 22 adults						
Ras Al-Hadd	Ras Al- Hadd	HD 10-4.2	Commingled, MNI = 22 adults					Commingled, MNI = 22 adults						
Sharjah	Jebel al-Emalah	Tomb III	IIISk-1	male, 25-29 years (Reuse)	good preservation	flexed; right side; facing W; hands near face	slight attrition	slight degenerative changes in knees		none	none	none		Benton & Potts 1994
Sharjah	Jebel al-Emalah		commingled	adults, subadults, and infant (9-18 months)	poor preservation	.	heavy attrition; few caries	-	-	-	-	-	-	Benton & Potts 1994
Sharjah	Jebel al-Emalah	Tomb IV		male, 25-29 years (Reuse)	good preservation	flexed; right side; facing W; hands near face	-	-	-	-	-	-	-	Benton & Potts 1994
Sharjah	Jebel al-Emalah		MNI = 1		poor preservation; very disturbed		-	-	-	-	-	-	-	Benton & Potts 1994
Sharjah	Jebel al-Emalah	Tomb I	Isk-1	male, 35-39 years	moderate preservation	supine, possibly semi-flexed, left arm extending over pubic area & joining right hand	-	osteoarthritic lipping of proximal ulna and distal radius; and L acetabulum	-	-	-	healed fracture: left clavicle; possible healed trauma of left ribs 2-4	-	Benton & Potts 1994
Sharjah	Jebel al-Emalah		Isk-2	adult, 25+ years	poor preservation	possibly flexed; left arm across body; east-west orientation	-	-	-	-	-	-	-	Benton & Potts 1994
Sharjah	Jebel al-Emalah		commingled remains, MNI=4	adults and at least one subadult	poor preservation	commingled	-	-	-	-	-	-	-	Benton & Potts 1994

In Dhofar, Jemdet Nasr ceramics, bronze daggers, and copious quantities of beads are never observed in the cairns. Instead, small numbers of simple beads and occasional shell or stone pendants are recovered (e.g., Williams *et al*. 2014). This fact in combination with the smaller and less complex construction of the cairns and much lower density of Early Bronze Age cairns in the region might suggest a more nomadic lifestyle that did not lend itself to the development of larger necropoles and and resulted in the deposit of less material culture in the cairns.

Bioarchaeology of Early Bronze Age Cairns (3200-2700 BC)

Bioarchaeological analyses, as opposed to anthropological analyses, consider the entire mortuary context when examining the skeletal biology of the interred individual(s). Prior to modern bioarchaeological approaches, it was customary for skeletal remains to be studied by an anthropologist in a lab setting either in the field or at a research institution. Early reports from archaeologists describe very fragmentary bones in Early Bronze Age tombs and often analyses of these bones were not attempted. New methods inspired by American bioarchaeology (e.g., Buikstra 1977, 1981; Larsen 1997; Armelagos and Van Gerven 2003; Buikstra and Beck 2006) and French archaeothanatology (e.g., Duday 1978, 1981, 1995) are reinvigorating the study of the skeletal remains in Early Bronze Age contexts on the Oman Peninsula. This can be witnessed in publications that seek to understand if interments were primary or secondary through close examination of regions of articulation. For example, a number of Umm an-Nar tombs and bone pits include small articulations like this. By considering these and the region of the body they represent, scholars can discern if an individual rests in the same location where it was interred just after death, or if it was moved when it was partially skeletonized or desiccated. Similarly, in Early Bronze Age cairns, skeletal remains may have been disturbed by human intervention (such as tomb robbing or the reuse of cairns for later interments) or taphonomic activity (e.g., rodent burrows and water flow), but careful excavation of even the most poorly preserved skeletal remains can help discern the position of the individual at interment.

Bioarchaeological research on Early Bronze Age cairns is extremely limited due to the poor preservation of the skeletal remains (see Williams forthcoming). This poor preservation is due to the local environment inside cairns, an environment subjected to rainwater, drought, temperature fluctuations, rodent and reptile burrows, sun exposure, and in some cases looting, reuse, and structural modifications. Over the millennia, the debris that settles in the cairns, reacting with the bedrock or soil where the cairn was built, creates an environment that can destroy the skeletal remains. Differential preservation within cairns can be dramatic. Further, it is important to remember that taphonomic processes inside the tomb (this might include water flowing through the tomb and animal burrows) may displace some parts of the skeleton. So, even if the deceased was placed in the center of the tomb chamber and not against a wall, some skeletal elements might be pushed there through natural processes. Additionally, many Early Bronze Age cairns have been reused and sometimes the earlier bones are pushed to the sides of the tomb in order to create space for the new interment. The practical effects of these preservation issues are:

- The full skeleton is rarely preserved.
- Skeletons may become partially or fully disarticulated over time. Sometimes this is caused by disturbance due to reuse or looting.

- Skeletal elements that one might expect to see better preserved (any bones with dense cortical bone, and adult versus less robust subadult remains) may not be present and instead small fragile bones and those of children may be represented. This can lead to erroneous assumptions about partial burials.
- The surface of most bones is degraded, preventing macroscopic observation of skeletal pathologies.
- Dental remains, often preserved even when the skeletal remains are not in many other contexts, are often fragile and fragmentary, thus preventing dental analyses.
- Skeletal remains are often not able to be lifted from the excavation without further fragmentation that prevents analyses in a lab setting.

As a result, the largest issue with bioarchaeological analyses of Early Bronze Age cairns is sample size. Even though there have been a fair number of cairns excavated (see Chapter 2) in order to understand health status, demography, trauma, or dental health, a much larger sample is needed from specific sites. Overall, this has not been possible because of the lack of specialized excavation of these mortuary contexts in a large number of cairns (see recommendations in Chapter 6).

Dental Health

Teeth are typically more resilient in mortuary contexts compared with other parts of the skeleton. As a result, dental health is often the most well understood in difficult preservation environments. Munoz (2017) examined the dental health of populations from several time periods across the Oman Peninsula, including the Early Bronze Age sites of Ras Al-Jinz 6 (n= 22 individuals) and Jebel Hafit (n=5 individuals). With these data, she was documented attrition (tooth wear), dental calculus, dental caries, alveolar resorption, periapical lesions, and antemortem tooth loss to develop a picture of dental health among these Early Bronze Age individuals. While these sample sizes are too small to be representative of the populations at that time, she was able to demonstrate how patterns of dental health may have differed between the Hafit coastal (RJ-6) and Neolithic coastal populations including a reduction in dental calculus and increased heavy attrition, increased antemortem tooth loss, and increased severe alveolar resorption in the Early Bronze Age (3200-2700 BC). All of these point to generally more poor oral health during this time, which Munoz (2017: 11) suggests could be due to an increase in carbohydrate consumption, although one would expect to see an increase in caries rate if this was the case.

Evidence of Health and Lifestyle

Other recent work (e.g., Williams and Gregoricka 2013, 2019, 2020; Williams *et al.* 2014; Madsen 2017) have also yielded too few individuals to develop a good understanding of the health and life experience of earliest (3200-2700 BC) Early Bronze Age populations. Despite this fact, these research projects and data from excavations allow us to conclude that individuals interred in Early Bronze Age cairns suffered from all of the pathological conditions seen in other populations (Table 5.3). Evidence of medical treatment includes two cases of cranial trepanation have been recorded at Jebel Hafit: one individual from Tomb 1309 and one individual from Tomb 1315 (Littleton and Frifelt 2006; Madsen 2017). Both of these individuals appear to have lived a short time after the procedure(s) as there is evidence of very slight healing. This practice was known in the Neolithic period (Kiesewetter 1999) so it may be that there was an established protocol for when such an intervention would be performed. There is no evidence from these limited remains with regard to the condition that these operations sought to solve (Littleton and Frifelt 2006).

At first glance, these observations may seem like very conservative interpretations of the available data. A close examination of the published data, however, reveals that this caution is warranted because many of the excavated cairns were reused in the Iron Age thru Pre-Islamic periods. Because of the poor preservation of the skeletal material, as well as commingling that may have occurred during reuse and disturbance from tomb looters, it is often not possible to determine which skeletons or skeletal elements are from the Early Bronze Age or from later interments. As a result, there are reports of high numbers of multiple interments in some cairns along with a mix of Early Bronze Age and Iron Age material culture. Sometimes it is possible to distinguish these reuse events if the stratigraphy is intact (e.g., Williams and Gregoricka 2013), but in many other cases it is not. This means that we cannot tell how many Early Bronze Age versus later interments are contained in most cairns; we can only tell that it was used for a large number of interments over time. Likewise, this makes it impossible to use the skeletal remains in a cairn to make determinations about Early Bronze Age skeletal biology because it is often impossible to distinguish between the skeletons. This does not mean that we will never be able to understand these patterns of interment. Rather, it emphasizes the need to excavate Early Bronze Age cairns in a very specific way (see Chapter 6).

Umm an-Nar Mortuary Ritual (2700-2000 BC)

The communal tombs of the Umm an-Nar period were part of a more elaborate mortuary ritual compared with Early Bronze Age cairns. This increase in complexity in mortuary ritual accompanied socioeconomic changes on the northern Oman Peninsula that are visible in the archaeological record including construction of monumental towers and small scale settlements. Umm an-Nar circular tombs are generally larger, more complex, better built, and located near to or in settlements. The exterior ringwall of nearly all Umm an-Nar circular tombs was made from finely carved limestone blocks.

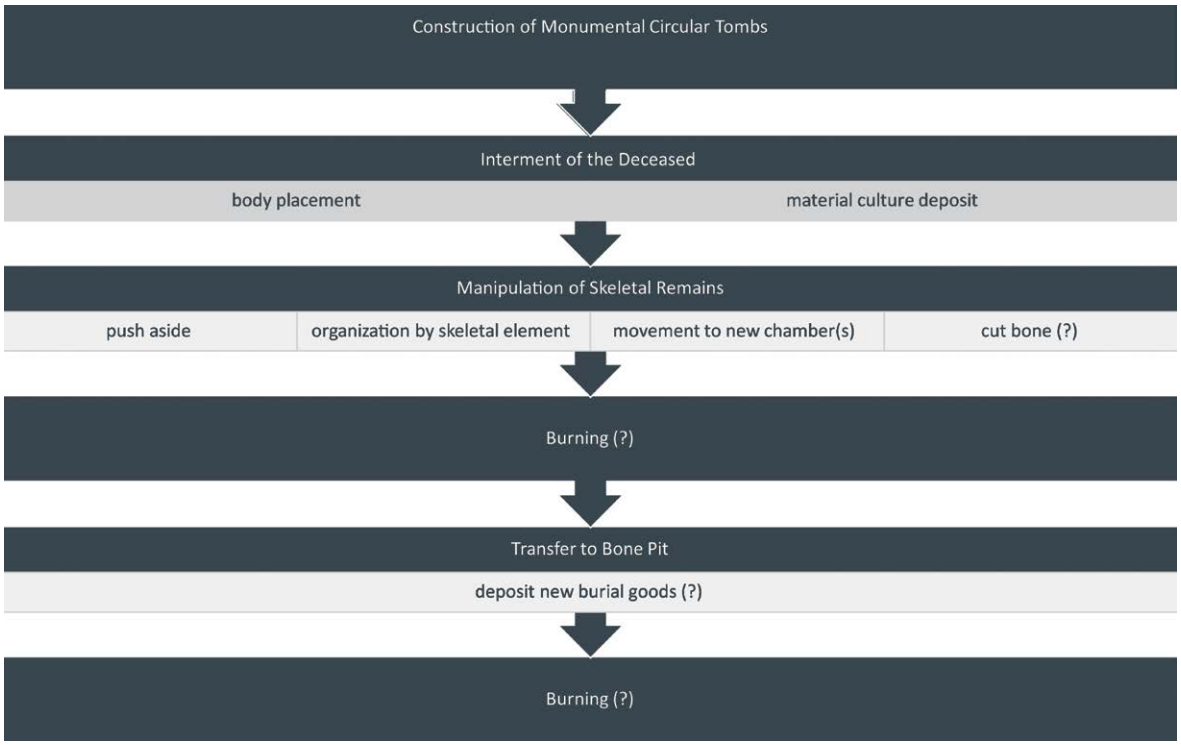


Figure 5.7. Summary of Umm an-Nar mortuary ritual involving the communal tomb and burial pit.

Like the Early Bronze Age cairn mortuary ritual, ideas about the final resting place of the dead should be seen as part of a process that begins before the death of an individual. During the Umm an-Nar period, the decision making process about how to proceed with act of disposing of the body involved different considerations (See Figure 5.1). Upon the death of community member in the Umm an-Nar period, there were fewer choices regarding the monument where the deceased would be placed. A large communal tomb was available for the deposit of this newly dead individual. Because the Umm an-Nar mortuary ritual involved the destruction of the body of the deceased (Figure 5.7), we have only a few examples of the first stages of this ritual. This is also true of the intermediate and final steps which are partially or completely obscured by the mortuary ritual itself.

During the Umm an-Nar period, we can be sure of the following aspects of the communal mortuary ritual from the archaeological record:

- Communities had established ideas about where Umm an-Nar tombs should be built. They were placed near to or inside settlements.
- Umm an-Nar tombs are round, usually large, and consist of two concentric ring walls. The outer façade wall was composed of well-cut stone (usually white limestone), while the inner wall was built of unshaped stones. Tombs could consist of a 1+ chambers. The construction often consisted of subterranean compartments, although this was not always the case. Some tombs were built in two stories.
- All community members, male and female, young and old were interred in Umm an-Nar tombs. Isotopic evidence (e.g., Gregoricka 2013, 2014, 2020) indicates that some non-locally born people were interred in some tombs. These numbers are small, but this opens the door for further questions about how broadly inclusion in the tombs was allowed.
- Primary interments were placed inside communal tombs but it is not clear how the chamber was chosen.
- Following decomposition or significant desiccation, skeletons were disarticulated and moved into other chambers of the tomb. We do not know how many stages this involved, the interval of time between these stages, or the method of (re)organization used. It is possible that this cycle was repeated many times. We also do not know how this ritual was different in cases of single chambered Umm an-Nar tombs.
- Copious material culture was interred with the deceased. We do not know if this was interred with the body as a primary interment or if was added at a later time or multiple later times. Material culture included local ceramics (fineware and domestic), traded ceramics, local and traded softstone vessels, small bronze/copper artifacts (such as pins/awls, spatulas, razors, among others), beaded jewelry and beaded clothing, cylinder and stamp seals, shells, pendants (made of shell or stone), rings (made of copper/bronze, tin alloy, shell, and silver), ivory combs, flora and faunal material (possible food offerings), and other items.
- In some tombs, a discrete space within the tomb was used for small scale burning of the skeletal remains and material culture. In some tombs this was a second story, in others it was a discrete space in one of the chambers.
- In some communities a pit was dug outside the tomb and the final acts of the mortuary ritual were the movement of the skeletal material and grave goods into the pit where small scale fires were burned, presumably to mark the end of the ritual and possibly the signal the incorporation of the dead into the world of the ancestors. This act may have happened once or several times over the use of the tomb. It is unclear if this was part of all Umm an-Nar mortuary contexts or only in some areas.

Variation in Umm an-Nar Mortuary Ritual (2700-2000 BC)

Like the Early Bronze Age cairn mortuary ritual, remarkable similarities in practice are observed across the northern Oman Peninsula regarding Umm an-Nar mortuary ritual (note: Umm an-Nar mortuary rituals were not practiced in Dhofar). Still, there is variation in these practices that are perhaps easier to summarize than the variation in cairn mortuary ritual. Specifically, variation exists in building material, number and complexity of tomb per settlement, complexity of architecture (both number and configuration of chambers and one versus two story construction), decision to incorporate a carved relief on the exterior wall, degree of manipulation of the skeletal remains after primary interment, the presence/absence of an associated bone pits(s), and refurbishment of the tomb over time. Umm an-Nar mortuary ritual is clearly cyclical in that after primary interment of the dead, the skeletal remains and material culture go thru a process of manipulation until the the body is reduced to small fragments. A significant issue with understanding this process is that at many (but not all) sites, this process stopped mid-cycle and the tombs were either no longer used or were used into the Wadi Suq period (2000-1500 BC), but employing new and different mortuary rituals in the preexisting monuments. Therefore, it is best to keep in mind that Umm an-Nar tomb tomb provides only a snapshot of an active process and that by considering as many as possible in tandem, we can develop a better understanding of how this cycle worked in general.

Variation in Construction

As seen in Chapter 3, Umm an-Nar circular tombs range in diameter, internal organization, number of stories, paving of chambers, and inclusion of carved reliefs. Many of these architectural features cannot be observed if the tomb has experienced significant destruction, disturbance, and stone quarrying.

I. *Worked stone*: Méry (2010) considered the size and shape of the shaped limestone ashlar blocks used to construct the exterior façade of the tombs at the site of Hili. She developed a relative chronology based on these observations. Her work argues for sequential construction of the monuments and linear development of technique over time (Méry 2010: 39). While this chronology shed light on the construction of 17 tombs at the site of Hili, it may be generalizable to Umm an-Nar tombs across the Peninsula, especially when trying to understand when an unexcavated Umm an-Nar tomb may have been built. For example, at Hili, the oldest tombs were the simplest and were built with small superficially worked stones whereas the more recent tombs (the youngest tombs, built closer to the end of the Umm an-Nar period) were more complex and built with larger and better shaped stones. Limestone for these monuments was quarried and shaped at nearby locations although there is at least one example of a coastal site where the façade ringwall was made using carved local beach rock (Al-Sufouh). At other coastal sites, people faced with the same problem of no nearby limestone source (Tell Abraq and Mowaihat) clearly traveled some distance to quarry and shape limestone for the construction of their tombs. It is not clear why this effort was extended at these two sites, but not at Al-Sufouh.

II. *Carved Reliefs*: Carved stone reliefs surely held a greater value than simple decoration for the tomb. Images of people and animals may have had some link to the spiritual identity of these people, but this is another "unknowable" facet of the mortuary ritual at this time. We can observe that Umm an-Nar Island, Mowaihat, Hili, Bat, and Dahwa all had carved stone reliefs incorporated in at least one Umm an-Nar tomb,

but surely there have been others and the stones have been destroyed or repurposed and are therefore lost to the archaeological record. Böhme and Al-Bakri (2012) describe a carved Umm an-Nar stone from Al-Qutainah that originally showed two human figures, a male and a female. This stone was not found in association with a tomb, demonstrating that it was moved for some purpose at some point later in time. What is even more interesting about this stone is that was altered repeatedly since Umm an-Nar times, with the addition of animals, other people, and letters. Thus, this stone was reused just as so many Early Bronze Age tombs were reused over the millennia as well.

III. *Internal Configuration*: Umm an-Nar tombs vary in diameter and internal complexity with no clear evidence for linear development in these configurations across the Peninsula. The internal configuration ranges from a single chamber to a maximum of twelve chambers, they are built on and into bedrock, and they occasionally have two story configurations (see Chapter 3).

IV. *Bone Pits*: Umm an-Nar bone pits are known from Hili, Mowaihat, Al-Sufouh, Ras Al-Jinz, Bat, and Dahwa. It is all but certain that there were others in use but that they have not been found since they are subterranean and were not intended to be part of the visible mortuary landscape. In the millennia since their use, they have been built over and covered with windblown silt, potentially obscuring them permanently. These are exceptionally important parts of the Umm an-Nar burial ritual. It has been speculated that these were used for practical purposes, as a place to empty out a well-used Umm an-Nar circular tomb to make way for the newly deceased. This aspect of the ritual need not be purely practical or purely symbolic. Indeed, there is room for the interpretation of this practice to satisfy both arenas of human behavior.

Variation in Use

I. *Evidence of Primary Interment*: While the data are few, it is a reasonable assertion that the dead were interred in Umm an-Nar circular tombs as primary interments. Evidence of this practice is apparent in Umm an-Nar Tomb IX (Al-Tikriti 1981: 138), Hili Tomb A (Cleuziou and Vogt 1985), Al-Sufouh Tomb 1 (Benton 1996), Tell Abraq (Martin and Potts 2012), and Dahwa (Williams *et al*. forthcoming). It is important to note that these primary interments may have happened as part of the Umm an-Nar mortuary cycle, but that the remainder of the cycle did not occur for some reason (for example, the practice may have stopped and new practice was initiated in a different mortuary monument where new dead were placed while the previously interred were left to rest where they were) or these monuments may have been used as part of new practice where the tomb was seen as an appropriate receptacle for primary interment of the dead after the Umm an-Nar period, but during a time when further processing of the skeleton after initial interment was no longer seen as necessary. Good examples of the later are the primary interments in the southern corridor (and only in this area) in Tomb 1 at Dahwa (Williams *et al*. forthcoming). The primary interments were discovered in discrete location and were accompanied by transitional Umm an-Nar/Wadi Suq softstone vessels suggesting that these interments happened either at the close of the Umm an-Nar Period or start of the Wadi Suq Period. Primary interments are also seen in Umm an-Nar burial pits, e.g., Burial Pit A Inst 0006 (Schmidt and Döpper 2014); Hili Tomb N (Al-Tikriti and Méry 2000); Mowaihat Tomb B (Al-Tikriti 1989; Haerinck 1991); and Al-Sufouh Tomb III (Benton 1996).

II. *Evidence of Manipulation of skeletal remains and material culture*: Without written records, it is difficult to fully understand the goals of manipulating the contents of Umm an-Nar tombs. One line of inquiry that does provide insight are the records from other cultures around the world who have practiced the same or similar acts during their mortuary ritual. With few exceptions, the goal of this practice has been to incorporate the identity of each individual into the collective identity of: The Ancestor(s). This practice stands in contrast to that seen relating to the disposition of the dead interred in Early Bronze Age cairns. In that case, each deceased individual is indeed an ancestor but does not necessarily become part of the collective ancestor identity, but rather retains their individual lineage and role in society, expressed by the standing cairn in which they and a few others are interred. On the other hand, the communal Umm an-Nar tombs, and the process of moving bones, breaking bones, burning bones, and the eventual removal of these traces into an invisible subterranean pit, destroys individual identity in the process. All community members become mixed and unrecognizable. Using this model of mortuary behavior, it is helpful to observe where and when this model does not fit. Of course, primary interment of individuals in either the communal round tomb or the bone pit and ending the mortuary ritual with that act is a good example of a bad model fit, but it is striking that with few exceptions (for example, term and very young infants in the tomb at Tell Abraq, and the bone pits at Ras Al-Jinz, Bat burial pit A-Inst 0006, and Tomb N at Hili), this happens at the end of the Umm an-Nar period when we know there was another shift in mortuary ritual at the start of the Wadi Suq Period. Gregoricka and colleagues (2021) examined the cases of two female skeletons who were found articulated at Unar 2 and Tell Abraq. The skeletons of each of these women indicated that they had reduced mobility in life and their special treatment at death suggests that they were treated differently possibly due to disease stigmatization during life or that they held a special status. These anecdotal examples may be few, but the authors make a powerful argument that the treatment of these individuals was special and that there was room in the Umm an-Nar mortuary ritual to honor such a difference. Still more variation is seen in the use of the compartments in various documented tombs and bone pits. For example at Umm an-Nar Island, a shelf was observed in two chambers of Tomb IX (Al-Tikriti 1981) researchers have speculated that this feature was used to place the primary interments as they entered the tomb and that they were moved to the floor as they were processed in the ritual. At Hili Tomb B (Al-Tikriti 1989; Haerinck 1991), Burial Pit A-Inst 0025 (Schmidt and Döpper 2014); Ras Al-Jinz (Munoz *et al.* 2012), and Al-Sufouh (Benton 1996) there is evidence of organization of the skeletal elements including the grouping of long bones and upright skulls along the edges. A final interesting example of variation is the tomb and the bone pits at Al-Sufouh (Benton 1996). At this site there is evidence of burned beach rocks and sand that were transferred into the tomb and bone pits. It is possible that at this single site that the deceased were burned on a funeral pyre that was outside the tomb, and that the burned remains were scooped up and deposited into the tomb and bone pit. This is the only example of this practice and may represent a special ritual used to process a specific individual or group of individuals prior to their entry in the communal structure.

III. *Evidence of Disuse*: The idea of "disuse" in archaeology can be complicated. There are a variety of contexts where a structure may fall out of use for a time, only to be reused in a later period. Sometimes this reuse is related to the original function of the structure in question (e.g., reuse of mortuary monuments for interring the dead), and sometimes the reuse is unrelated to the original purpose of the structure (e.g., the stone tombs built on top of the Umm an-Nar settlement at the site of Dahwa (Williams *et al.* forthcoming). With this caveat, evidence of disuse of Umm an-Nar tombs and bone pits refers to these mortuary structures

ceasing to be used by the people of the Umm an-Nar or Wadi Suq period; in other words, when there is no continuous use and time accumulates between the last use of the structure and the next use or excavation. A good example of this is the tomb at Tell Abraq which fell out of use at the end of the Umm an-Nar period. Researchers established this fact because sediment accrued over the tomb due the settlement remaining in continuous use, but not this tomb (Potts 2000; Martin *et al.* 2019). Other examples of evidence of disuse include all the Umm an-Nar tombs which have been excavated except possibly for the tomb at Ras Al-Jinz. In every instance, the tomb was left with interred individuals who had not completed the Umm an-Nar mortuary cycle, thus providing snapshots at different stages of the cycle. The tomb at Ras Al-Jinz did contain some material from the last interments (and thus may have been abandoned without the full cycle completed), but importantly, the people at this site filled the tomb with yellow silt from a nearby wadi. This act required a good deal of work and demonstrates the intentional closing of the tomb – an act not documented in any other Umm an-Nar tomb.

Variation in Mortuary Goods

The typical Umm an-Nar communal tomb contains far more material culture compared with that interred in any Early Bronze Age cairn (see Table A.10). All Umm an-Nar tombs and bone pits contained local fine red ware (Umm an-Nar black-on-red) and many contained locally produced domestic wares. Additionally a set of typical Umm an-Nar mortuary goods included small copper/bronze artifacts, softstone vessels, and beads. Variation exists in the additional items including imported goods ranging from beads to specialized hair combs and ceramics. This variation appears to be a close match to the foreign communities that were engaged with (for example, there were no Indus ceramics in the tombs on Umm an-Nar island, whereas the sites further east (and perhaps chronologically later) did show evidence of these traded goods. Other examples include the rare Bactrian hair combs seen at Tell Abraq (Potts 1993a) but not elsewhere on the Oman Peninsula or the large quantity of Indus hair combs seen at the Dahwa site which has uncovered evidence of having intensive interaction with the Indus Valley (Williams *et al.* forthcoming; Al-Jahwari *et al.* 2019).

Bioarchaeological Analyses of Umm an-Nar Tombs (2700-2000 BC)

Far more information is available regarding the populations interred in Umm an-Nar tombs compared with Early Bronze Age cairns. There some important practical reasons for this. First, there are far fewer Umm an-Nar tombs (Figure 3.1). These tombs were placed close to small settlements, and they were used for all parts of the community. For some very large settlements (e.g., Hili, Bat), there was more than one Umm an-Nar tomb for the community, but with some exceptions (see Williams and Gregoricka 2020: tab. 3) almost everyone who lived in these settlements received mortuary rituals in the same communal tombs. Unlike Early Bronze Age cairns, we have large sample sizes in these tombs and through study of these individuals we can learn many things about the health and lifestyle of Umm an-Nar peoples. Unfortunately, there are some limitations to these analyses. These include preservation, disturbance and destruction of tombs, and the Umm an-Nar mortuary ritual itself. As described above, the mortuary ritual involved the destruction of the skeleton. Some tombs have yielded larger fragments than others, but all tombs consist of commingled, fragmentary, and sometimes burned bones.

Mowaihat

Blau (2001a) published careful analyses of several Early Bronze Age tombs. At Mowaihat, she demonstrated that evidence of trauma experienced by the people interred in the tomb at this site was very limited. Importantly, she documented that of 3,304 skeletal elements (not 3,304 individuals) only 1% had evidence of trauma including healed and healing long bone fractures, fractures of the bones of the hands, feet, and ribs, as well as trauma to the vertebrae. None of this trauma is particularly unusual as it represents typical life experience of many people. On the other hand, while still limited, she did document some degenerative changes to joints, and a relatively high prevalence of early osteophyte formation of the vertebrae (Blau 2001a: 183-184). Finally, very limited examples of cranial porosities were also recorded.

Tell Abraq

The tomb at Tell Abraq is perhaps the most thoroughly studied and published Umm an-Nar circular tomb. This tomb was 6.0 m in diameter and it was divided into two chambers with a single internal wall. It is estimated that this tomb was used for about 200 years in the latter half of the Umm an-Nar period and start of Wadi Suq period (Potts 2000, 2003). A minimum of 403 people (Table A.9) were interred in this tomb including 276 adults, 127 subadults, and one articulated female who suffered from possible poliomyelitis and was likely interred in the tomb in some sort of cloth or other organic material that acted as a bag (Baustian and Martin 2010). This individual was estimated to be at least 18 years old based on dental eruption, epiphyseal union, and morphology of the pelvis. Her skeleton exhibited signs of chronic sedentism and habitual overuse of her right leg. This in combination with a left foot deformity suggests that she suffered from polomyelitis. Advanced tooth loss and decay of teeth indicate that she was fed a high carbohydrate diet.

Premature and newborn infants (six-nine lunar months; premature: 28% and newborn: 9%) comprised a large number of subadults in the tomb and demonstrate that in this community, infant mortality was quite high (Baustian and Martin 2010; Martin *et al*. 2019), but subadults under the age of 5 years are underrepresented (Baustian and Martin 2010). These researchers point out that this means that the inclusion of the young in the tomb means that even though they lived a short time, these were considered members of the community. The adult population at Tell Abraq were strong and robust (Baustian and Martin 2010), evidenced by robust muscle enthesopathies and degenerative joint disease (DJD). These markers suggest strenuous or repetitive activities. Blau (1996) reported these markers particularly of the feet, knees, and shoulders and suggested that they may be due to grinding grains and maritime activities, both related to subsistence activities of the population. This idea is further supported by the work of Cope (2010) who observed morphology of the ulnae, radii, and bones of the wrist (scaphoid and lunate) that form with physically demanding lifestyles involving the hands and arms.

Evidence of the mortuary ritual (Baustian and Martin 2010) inside this tomb includes the fact nearly all bones in tomb were commingled and fragmented. Most long bones were broken, there were smaller bones that were completely preserved, and there were a small number of cut marks on some long bones. Burning was observed in a small number of fragments and this burning was always superficial and on the exterior of the bone, suggesting small scale burning of candles, and not an attempt to cremate the remains.

Ras Al-Jinz

Tomb 1 and the three associated bone pits at Ras Al-Jinz were excavated and analyzed by a bioarchaeologist Dr. Olivia Munoz (Monchablon *et al*. 2003; Munoz and Cleuziou 2008; Munoz *et al*. 2012), and the resulting data provide important insights into Umm an-Nar funerary customs. Tomb 1 may be the best example of

the end or near end of use of an Umm an-Nar communal tomb. This tomb was filled with yellow clay from a nearby wadi (Monchablon *et al.* 2003), and this act demonstrated that the people who decommissioned this tomb took steps to change the function of the space by filling the tomb and likely disassembling part of it for building material. Indeed, later in the 2nd millennium BC, a new domestic structure was assembled on the southeastern portion of the tomb. Elsewhere in the 2nd millennium BC Umm an-Nar tombs were reused as tombs or abandoned entirely and so this use of space at Ras Al-Jinz suggests even more specifically that the sacred space this tomb once occupied was seen differently as quickly as the 2nd millennium BC.

Munoz and colleagues (2012) examined more than 18,600 bone fragments (Table A.9) from the three mortuary units at Ras Al-Jinz. They reported poor preservation, fragmentation, and commingling. Their analyses went further to report the degree of fragmentation in each space (Tomb 1: 77.2%; Pit 1: 86%; Pit 2: 77.1%; and Pit 3: 84%) and the distribution of the remains with regard primary interments versus manipulated skeletal elements. While acknowledging the inherent incompleteness of the archaeological record, these kinds of observations provide important information about the state of the remains in the tomb compared with the bone pits, and helps us to consider the way the mortuary ritual may have produced these patterns. By examining any observed skeletal articulations (specifically first-rate versus second-rate links), they were able to demonstrate that there were no primary interments in the subfloor level, but that it was likely that there were primary interments on the second story of the tomb which then fell into the subterranean compartment (Munoz *et al.* 2012: 457). As they stated, this is different than the pattern seen in some other Umm an-Nar circular tombs, which adds a degree of variability to the mortuary practice at this time.

Other important observations included the probable use of an organic bag to move the material from the tomb into the bone pits (Munoz *et al.* 2012: 456) and the arrangement of skulls and long bones in Pit 1 and Pit 2. Finally, like other sites, term and pre-term infants were observed and this is unusual due to the fragility of bones and likelihood they would break and disintegrate in the intervening millennia. Indeed, there is increasing evidence that this part of the population were seen as part of the community and individuals who should become part of the communal mortuary structure, but it does seem that they were often not subject to the ritual movement and breaking within the tomb that all other community members experienced as part of the death practice. Perhaps this reflects the valued status of infants as community members, but community members who had not lived long enough to have an identity that the mortuary practice needed to destroy in order for them to become part of the ancestor collective.

Munoz and colleagues (2012) presented their assessment of MNI of 74 individuals in an innovative way (see Munoz *et al.* 2012 Figure 6 and associated discussion). These researchers were faced with a circular tomb and three bone pits, with the bone pits assumed to have acted in service to the tomb. How did the deposits in the bone pits accumulate? Was one pit used, then another, and then the third? Or were these pits used in a selective manner as an additional aspect of Umm an-Nar mortuary ritual? The evidence they present supports the notion that the way the tomb and bone pits were used at Ras Al-Jinz was so-far unique. Specifically, it appears that the there was an "open system" (Munoz *et al.* 2012: 458) accommodating the movement of bones between any or all of these structures and where the circular tomb was used as the location of the majority of the primary interments and that the pits were used to inter certain bones (skulls and long bones) preferentially, but with the three pits seeming to serve a slightly different function between the three of them.

In these mortuary structures, there was an underrepresentation of young children (under the age of 5 years). Recall that the tomb at Tell Abraq reported that children under age 5 were also underrepresented, but that term or preterm infants (6-9 lunar months) were seen in high frequency. Munoz and colleagues

(2012: 459-460) point out anecdotal evidence of children in this age range buried in the floors of houses at the contemporaneous settlement site of RJ-2. While not conclusive, this presents and intriguing possible explanation for why this demographic is underrepresented in Umm an-Nar mortuary contexts. With their absence in the communal structure(s), and their at least occasional inclusion in a different kind of mortuary ritual, this adds a new angle of complexity in the Umm an-Nar mortuary ritual.

Finally, like all other Umm an-Nar mortuary contexts, it is extremely difficult to make general observations about the health, lifestyle, and quality of life when examining a commingled and fragmented osteology corpus. Still, Munoz and colleagues (2012) were able to report that the people interred in these structures (Table A.9) suffered from antemortem tooth loss (~15% of people interred in this tomb), healed (presumed accidental) fractures, and a high percentage of squatting facet of the tibia (30%).

Hili Tomb A

Tomb A (Figure 3.7) was in use for approximately 200-300 years, 2300-2100 BC (Cleuziou and Vogt 1985) and at least 300 individuals were interred (Bondioli *et al*. 1998). Many of the early analyses that reported high subadult mortality (Bondioli *et al*. 1998) and low level of disease (El-Najjar 1985) used a smaller subsample of articulated skeletons which may not be representative of the larger population (McSweeney *et al*. 2008).

Hili Tomb N

Hili Tomb N (Figure 3.8) is a rectangular subterranean bone pit (Al-Tikriti and Méry 2000; Méry *et al*. 2001; McSweeney *et al*. 2004; Méry *et al*. 2008). Like all other Umm an-Nar bone pits, Tomb N contained the commingled and fragmented remains of individuals who were primary interments in circular tomb, likely Tomb E given its close proximity. Unlike other known Umm an-Nar bone pits, there seem to be a substantial number of primary interments placed directly into this bone pit. These may be interments from the later use of the tomb (Méry *et al*. 2001; Méry *et al*. 2008), just as some primary interments in circular tombs are found because they were interred late in the Umm an-Nar period and the signature mortuary ritual of this time was never completed. Indeed, radiocarbon dates ranged from 2455 - 1984 cal BC (Table 3.2), indicating use in the later part of the Umm an-Nar period.

More than 700 individuals were interred in this mortuary structure and true to the Umm an-Nar practice seen across the Oman Peninsula, all ages and both sexes were interred, even preterm and term infants (McSweeney *et al*. 2010). High subadult and young adult mortality, as well as high antemortem tooth loss and non-specific stress indicators (LEH and cranial porosities) were reported (Table A.9; McSweeney *et al*. 2008, 2010), but it is important to stress that in analyses such as these, the data for assessments is difficult to interpret because they rely on observations on bone fragments and not on articulated skeletons. This means that these poor health prevalences could reflect the actual condition of the population, but it is impossible to know if they are too high or too low.

Shimal Unar 1 and Unar 2

Two Umm an-Nar circular tombs are known from Shimal: Unar 1 (Blau and Beech 1999) and Unar 2 (Blau and Beech 1999; Blau 2001a, b). Blau (2007) reported low levels of trauma, non-specific infection, cribra orbitalia, dental health (caries, abscess, dental calculus, and antemortem tooth loss), and linear enamel hypoplasia from both Unar 1 and Unar 2 (Table A.9).

Unar 2 is the better known of the two and Blau (1998, 2001a) reported 21,019 bone fragments, representing a MNI of 431. It was a two story structure; in fact in the description of the relationship between the skeletal

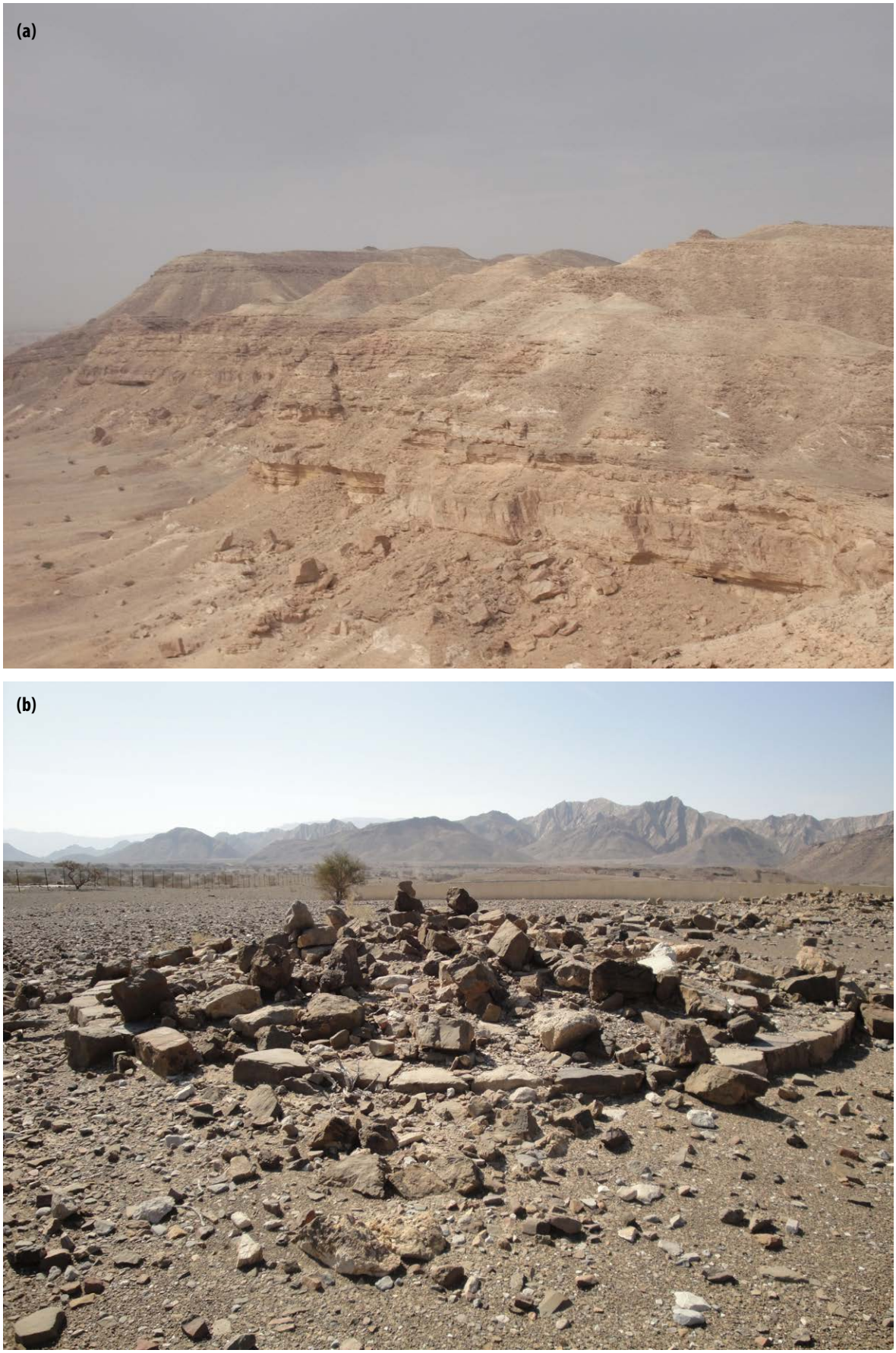


Figure 5.8. (a) Early Bronze Age cairns high on the landscape at the Abu Silah site in Dhank, and (b) an Umm an-Nar communal tomb at the Qumairah site.

remains and the architectural this tomb features some of the best evidence of two story circular tombs (Blau 2001, see Figure 8 Chamber C, Unar 2; and Figure 9 for excellent photo of an Umm an-Nar tomb at Mleiha). Specifically, articulated and burned skeletons and partially complete articulated skeletons were found in the lower compartments. These remains provide strong evidence that when the deceased were initially placed in the tomb, they were placed in the lower compartments (in contrast to other tombs where they were placed in the upper compartments) and that they were placed in a flexed position. The vast majority of bones in this tomb (90.7%) were burned. Blau (2001a) highlights the possibility that after the initial interment of individuals in the lower compartment of Unar 2, that skeletal elements may have been removed, burned, and reinterred since there is no evidence that the bodies were burned in these compartments. Still, she points out that the completeness of the skeletons or rather the representation of small bones of the hands and feet, suggest that the body was not moved, burned, and moved again since these bones are so often lost in this kind of process.

Blau (2001a) reported that 0.05% (of 12,982 bones) exhibited evidence of trauma and 0.2% of =11,113 bones) demonstrated any degree of degenerative change. The fragmentary nature of the skeletal remains prevented much information on infectious or metabolic diseases aside from the documentation of a small number of skeletal elements. These data do not provide too much information about the quality of life or health of the population that used this tomb, but they are a glimpse that demonstrates a typical pattern of traumatic injury, wear and tear, and disease experienced by many populations across the world.

Mortuary monuments are a special kind of structure. As we have seen in the previous chapters, the architecture, placement, and use of these monuments may change over time. Early Bronze Age mortuary monuments of the Oman Peninsula are still part of the landscape, as they have been for millennia. Cairns have fallen into disrepair and may appear as simple piles of stones and Umm an-Nar tombs may have lost their visual grandeur with the removal of the external ashlar façade wall, but both are still part of the landscape and mark the land as a place of rest for the inhabitant of the peninsula nearly 5,000 years ago.

Today these monuments are sometimes not recognized as archaeological features, not to mention the fact that most people who encounter them have little idea that they served a mortuary purpose so long ago. This was not always the case. Indeed, we know from the archaeological record that the memory of their function and their status as sacred locations to inter the dead was recognized by subsequent generations. We can also imagine that as one mortuary ritual changed into another or was completely replaced by new ideas, for several generations it must have been known that people practiced other ways in earlier times.

There are two practices that are visible in the archaeological record regarding the use, reuse, and disuse of the Early Bronze Age mortuary monuments. First, it has been well documented that people reused Early Bronze Age cairns and Umm an-Nar circular tombs and bone pits in subsequent times for a variety of reasons. This pattern of reuse seems to vary by geographic location. Second, long term mortuary rituals can be observed with the evidence of visitation of earlier monuments, with or without the interment of newly deceased individuals. Both of these phenomena will be considered in this chapter.

Cairn Use in Umm an-Nar Period

The start of the Umm an-Nar period on the northern Oman Peninsula bore witness to the development of an elaborate mortuary ritual where all members of the community were interred in beautifully built communal tombs (see Chapter 3). With such a significant change and uniformity in practice, it is hard to imagine that any other mortuary ritual would be considered appropriate for Umm an-Nar people. The

time periods we use to describe the Early Bronze Age (3200-2000 BC) and within that the Hafit (3200-2700 BC) and Umm an-Nar (2700-2000 BC) periods, are somewhat arbitrary on the northern Oman Peninsula. While change seems dramatic and was significant, it may have been accomplished over a lifetime or two, meaning that the two practices likely overlapped for a time. Radiocarbon dating from Early Bronze Age cairns (tumuli) at the Al-Khutma, Al-Khubayb, and Abu Silah necropoles near Dhank range from the late Hafit period to the early/middle Umm an-Nar period (see Table 5.1). Still other Early Bronze Age cairns (e.g., S007-100, S007-101, S007-169, S002-023, S002-052, S002-058, and S020-002) near Dhank have interments that do not span these periods, but instead place their use as contemporaneous with the Umm an-Nar circular tombs and bone pits at nearby sites including Hili and Bat. Importantly, none of these interments were found with material culture that would be diagnostic to the Umm an-Nar period. Perhaps they were people who lived far from Umm an-Nar settlements or they are the remains of the people who retained a semi-nomadic lifestyle even when so many small settlements appeared at the start of the Umm an-Nar period.

Perhaps they were people on the edge of these communities that were not considered community members and so did not gain access to the interment in the communal tomb(s). Perhaps these were people who chose not to adopt these new ideas and retained the tradition of interring the dead in a cairn at a high place.

The site of Jebel Buhais (Jasim 2006; Uerpmann *et al*. 2006; Jasim 2012) has revealed many examples of use of tombs and transitions between burial practices (see Tables A.2-A.4). Of the seven Early Bronze Age cairns documented (Jasim 2012), all but one was reused at a later time. Specifically, this includes reuse during the Umm an-Nar period (BHS 73 and BHS 89), during the Wadi Suq period (BHS 50), and during the Iron Age (BHS 59, BHS 62, BHS 63, and BHS 64). Not only were the chambers reused for later interments, but structural changes were also documented including subsidiary structures added to the exterior of a cairn (e.g., BHS 73) and the construction of an additional chamber on the cairn (BHS 64).

Other evidence for non-conformist burial rituals is seen in diagnostic Umm an-Nar material culture interred with the dead in Early Bronze Age cairns. At Jebel Hafit, Tomb 1312 (Table A.6) contained Umm an-Nar period softstone and ceramics (Madsen 2017). Tawi Silaim Cairn 1 (Figure 2.40) was used in the Umm an-Nar period as evidenced by the inclusion of Umm an-Nar black-on-red fineware and a softstone box (de Cardi *et al*. 1977: 21). The consideration of this cairn and its finds highlights the difficulties in determining which interments and which burial items are associated with one another. Strictly speaking, all interments in this cairn are primary interments, that is, there is no evidence that any of these interments were moved from an initial resting place. The reuse event is a second primary interment, not a secondary interment (the term "secondary interment" implies that the placement of this individual in this cairn was an action taken after initial interment or burial elsewhere). Here, de Cardi and colleagues (1977: 21) argue that the carnelian beads accompanied the "primary burial" meaning the first or the initial interment of the cairn, but point out that since these kinds of beads were in use from the earliest parts of the Early Bronze Age onward, there is no way to further pinpoint the date of this first inhumation. The ceramics and softstone interred with the deceased are diagnostic of the Umm an-Nar period, thus it is the available data present two plausible scenarios: 1) that there was a first interment during the earliest part of the Early Bronze Age (~3200-2700 BC) and there was a second interment (a reuse event) during the Umm an-Nar period, or 2) that both of these interments happened in the Umm an-Nar period. The assumption is that this cairn was built sometime between 3200 and 2700 BC but the architecture of the tomb is unusual for Hafit-type cairns in that region, although elsewhere this architecture is seen in cairns that have been called "tumuli" (see Williams and Gregoricka, 2020).

In other cases, it is not entirely clear if cairns were reused or were constructed and used during the Umm an-Nar period. As seen in Chapter 4, transitional cairns or beehive tombs possess features that indicate that they were built and used during a transitional period between the Hafit and Umm an-Nar periods on the northern Oman Peninsula. The inclusion of Umm an-Nar ceramics and softstone vessels seen in Umm an-Nar contexts could be interpreted as a reuse event of earlier built cairns, but additional evidence of internal architecture in the cairns and/or radiocarbon dates from the Umm an-Nar period (e.g., Williams and Gregoricka 2020) help to situate these events more clearly.

Reuse of Early Bronze Age Cairns and Umm an-Nar tombs bone pits in the Wadi Suq Period

At the conclusion of the Umm an-Nar period, another shift in lifestyle and mortuary rituals occurred. During the Wadi Suq period (2000-1500 BC) many people dispersed from the Umm an-Nar settlements and a smaller population continued to live in and build on the existing Early Bronze Age structures. This includes Early Bronze Age mortuary monuments. A variety of reuse patterns are seen. The first category of reuse may rightly be considered continued use of existing mortuary monuments but employing different mortuary ritual(s). This is seen in Umm an-Nar circular tombs and bone pits. For example, at the site of Dahwa, and somewhat undisturbed primary interments are seen in the southern corridor of the circular tomb (DH7-T1; Williams *et al*. forthcoming). These individuals were interred with a mix of Umm an-Nar period ceramics and softstone, but also with softstone vessels that possess traits that suggest an Umm an-Nar/Wadi Suq transition. At Jebel Buhais, a similar situation was observed in tomb BHS-57, which contained an Umm an-Nar domestic ware vessel that had Wadi Suq type decoration and another ceramic bowl with no clear parallels and may have been a Wadi Suq form itself. In BHS-51 there is more firm evidence of Wadi Suq period reuse in with the recovery of Wadi Suq ceramic sherds.

At Asimah (Figure 3.2) reuse events were also very common. Both of these sites (Jebel Buhais and Asimah) appear to have been used continually from the earliest part of the Early Bronze Age thru the late Iron Age and Pre-Islamic periods. Asimah is an interesting site because so many of the tombs are architecturally unique and while they date to the 3rd millennium BC, it is difficult to pinpoint the dates of construction and reuse. It is clear however that many of these monuments were reused and heavily modified during the Wadi Suq era.

Reuse of Early Bronze Age Monuments in the Iron Age and Pre-Islamic Periods

The reuse of Early Bronze Age cairns is probably the best known of the reuse phenomena on the Oman Peninsula as evidenced by the mention of the practice at most Early Bronze Age necropoles and cairn sites (Döpper forthcoming). Many surveys and excavations report Iron Age ceramics, metal points, and intrusive burials as evidence (Tables A.2-A.4). A well-documented reuse of an Early Bronze Age cairn is Cairn 2 at Tawi Silaim (de Cardi *et al*. 1979). This cairn was reused during the Iron Age and the evidence shows that a pit (diameter: 1.0m) was dug into the chamber of the cairn and 0.50 m below the floor. The deceased was placed in a flexed position on the right side and facing west. This individual was then covered with natural gravel and pebbles and a new superstructure was built over the cairn to close it. Other Iron Age/late Pre-Islamic reuse events were not so careful and were covered in a more superficial fashion. This is the case with many cairn reuse events at necropoles near to the modern town of Dhank. Examples include a number of skeletons roding from the top of Early Bronze Age cairns. Radiocarbon dating on human bone eroding from

two such cairns (Table 5.1) revealed reuse events in S022-048 (1376-1133 cal BC; Williams and Gregoricka 2020) and S021-001 (AD 652-763; Williams and Gregoricka 2020). Still more cairns with eroding human bone that has not be tested will likely also date to this period.

Who is an Ancestor?

A seminal book on the archaeology of the Oman Peninsula is "In the Shadow of the Ancestors", published by Serge Cleuziou and Maurizio Tosi in 2007. Revised, updated, and edited by Dennys Frenez and Roman Garba in 2018, this book provides an excellent survey of the archaeology of the region from the Paleolithic era thru the Iron Age. Along the way it illustrates the magnificent heritage of the people of the Oman Peninsula, not only their mortuary monuments, but also ancient accomplishments of settlements, craft, and trade relationships.

In this volume, the goal is somewhat different. Here the aim is to document Early Bronze Age mortuary ritual and how these practices reflect the beliefs, practices, and relationships of those living at that time. Important to this quest is the definition of "ancestor". ndeed, all those who lived before us are ancestors. They are the people who first founded land and built communities and value systems. Still, not all people who were interred in the Early Bronze Age cairns we examine were venerated as ancestors (see Whitley 2002). As we consider the Early Bronze Age mortuary rituals in this region, it is helpful to develop an understanding of how the monuments and rituals reflected the concept of an ancestor (Williams forthcoming).

The mortuary ritual surrounding the cairns involves the construction of a mortuary monument where the dead are interred, and which we assume had a spiritual valued attached to various features: high location on the landscape, orientation of the entrance, spatiality with regard to other tombs, inter-visibility between tombs, and visibility of the tombs. Each tomb was used by relatively few people during the Early Bronze Age, and there are thousands upon thousands of these cairns still visible on the landscape. Multiple interments may reflect nuclear family units or it could be that there was no need for close relationships between the deceased in order for the dead to share a cairn. In this sense, all the dead did join the category of ancestors. The visibility of the cairns may have communicated a connection to land or resources, as many have proposed. Or, these spatial characteristics might have, as a group on a specific necropolis, been identifiable to passersby as the resting place for a specific family group, tribe, or other community identity. These communications may be lost to modern people, or they may be still visible but indecipherable by modern audiences in the small variations in construction, location, orientation, or use patterns that are still evident. The lack of repeated rituals at these locations suggests that the ancestors as a whole were not venerated by the community, but that individuals likely held on to the lineage histories that were passed down by oral tradition and which were represented by the stone cairns on hills. Evidence of exceptions to this are emerging. For example, in Dhank, several tombs contained Early Bronze Age interments (see Table 5.1) and material culture, but had later Iron Age ceramics placed on the top and walls of the cairns (Williams and Gregoricka 2020).

In contrast, Umm an-Nar Period communal tombs and bone pits involved a mortuary ritual that was fundamentally different from that seen with the cairns. First, consider the structure. A large, circular well-built monument was constructed in or near to a settlement. All community members were interred in this monument and as they decomposed, repeated acts were performed within the tomb to break apart and sort skeletal elements. It is always dangerous to apply the term "ritual" to acts in the past especially when we do not have specific evidence of them, but in this case it is a fair supposition to call the breaking apart

and movement of bones inside a tomb (and in some case into a bone pit) a mortuary ritual. This process may have been performed by a specific individual(s) who had some authority over the spiritual or religious practices of the living. With these repeated actions, we can infer that the goal of these practices was related to the conversion of the identity of each individual deceased into part of the collective deceased, or the ancestor collective. Here we can see the reason for this change in mortuary practice. At some point in the later part of the cairn phase of the Early Bronze Age, communities of the northern Oman Peninsula developed or adopted a belief system which changed the ideal seen practiced throughout Arabia for centuries: the placement of deceased individuals into a burial cairn built at a high place on the landscape. If the location high on the landscape, the form of the structure, and the membership within each cairn held spiritual meaning for the cairn builders, this changed with the construction of the Umm an-Nar communal interment system. With this new practice, no tomb held the remains of any one lineage or any single individual, instead, the communal tomb held the remains of all the deceased from a settlement. Should the tomb be opened, after some time the body of any given deceased individual would be indiscernable from any other individual. Indeed, the remains of the interred would no longer resemble a single body at all. Perhaps the organization of skeletal elements in some structures reflects local variation in the practice, still destroying the individual identity of all interred, but without the need to reduce some skulls and long bones into unrecognizable fragments.

These changes in the Early Bronze Age and the changes that occurred during the Wadi Suq and Iron Age did not change overnight. It would be reasonable to see at least some overlap in practices as the changes were adopted throughout the region. This could be an explanation for the reuse of cairns during the Umm an-Nar period. It does not present a full explanation for the simultaneous use of cairns and Umm an-Nar communal tombs at sites such as Jebel Buhais, but with the available evidence it is not clear that this practice was occurring at the same time, but perhaps at around the same time.

Summary

The death practices of past populations help tell the story of how people lived and saw their place in the world. During the Early Bronze Age (3200-2000 BC), two strategies were employed to dispose of the dead. Both of these methods involved the construction of a stone monument to inter the dead. During the earliest part of this era (~3200-2700 BC) primarily unworked stone cairns were built at high places (Figure 5.8a) to inter single and small scale multiple interments. This death practice was common to all parts of the Oman Peninsula during this time, as well as the rest of Arabia. Local variation has been observed and this seems to be related to local resources, land use, and seasonality. The deceased were placed in these cairns with relatively modest interments of material culture and occasional faunal material. Here too, variation has been observed, but this variation is minor and does not seem to represent fundamental differences in the goals of the living to memorialize the deceased.

During the latter part of this era (~2700-2000 BC), communal monumental tombs (Figure 5.8b) made of far more stylized worked stone and internal configurations and were used in the northern Oman Peninsula. These tombs were placed near to or central to small scale settlements. While these tombs were used to inter the vast majority of the population, some continued use of cairns has been observed, but it is not known how widespread this practice may have been. In addition to the differences in structures, the treatment of the body changed dramatically and it is apparent that efforts were made to break apart skeletons, perhaps to

reduce all individuals to a common mixed deposit. This may reflect a desire to emphasize to the common single identity of all individuals in each community. This same practice is not seen when cairns are reused in this later period.

Between these two apparent ways of dealing with the dead, transitional cairns were built which present intermediate practices including the division of burial chambers into more than one chamber, the maintenance of discrete spaces for the dead inside the burial chamber, and possibly the construction of double vaulted chambers. Little is known about the health and lifestyle of these past populations from the skeletal remains. In the Early Bronze Age, the primary reason for this is poor preservation and the repeated reuse of the cairns in subsequent periods and the extended mortuary ritual in Umm an-Nar communal tombs.

Chapter 6

Future Research and Recommendations

Challenges and Some Research Questions

Work on the Early Bronze Age mortuary monuments of the Oman Peninsula faces a number of challenges. These include preservation issues due to the environment over time, reuse of monuments, ancient and more recent stone quarrying to build other mortuary monuments or settlements, and modern construction of homes and roads. Decades of research sponsored by the Ministry of Culture and Tourism as well as rescue operations (e.g., Kennet and Al-Jahwari 2016; Döpper 2017) have produced a large amount of data on Early Bronze Age mortuary monuments, but significant gaps in knowledge still remain. This provides opportunities for the application of new technologies and research designs to address these gaps, promote understanding of the rich history of the Oman Peninsula, and promote tourism. In this final chapter, some research questions and approaches are proposed.

Representative Samples and Summary Health and Quality of Life Research

Given the preservation issues that prevent archaeologists from working with more representative samples of Early Bronze Age populations, one approach for future work is to shift from more typical models of research where populations are described in terms of health and evidence of quality of life, and instead consider a more holistic mortuary archaeology research agenda. In this case, the complexity of Early Bronze Age monuments and their contents can be viewed not as a barrier to understanding the past, but rather as an opportunity to understand the continuous process of mortuary ritual since the Early Bronze Age.

Early Bronze Age Cairns (3200-2700 BC)

As seen throughout this volume, Early Bronze Age cairns present a challenging preservation environment. While many cairns have been surveyed (Table A.1) and excavated (Tables A.2-A.5), few have produced well preserved skeletal remains (Tables A.3 and A.5). Far more information has been obtained through the study of tomb architecture (Tables A.2 and A.5) and interred material culture (Tables A.4 and A.6). Some of the most important discoveries about these cairns include 1) recognition of variation in cairn architecture and the development of archaeological hypotheses regarding the impetus of these changes (e.g., Frifelt 1976, 1985; Vogt 1985; Benton 1994; Yule and Weisgerber 1998; Potts 2012; Williams and Gregoricka 2013, 2019, 2020; Bortolini 2019 and Spotlight 16), and 2) documentation of the specifics of reuse of these cairns in the millennia since they were first used (e.g., Benton 1994; Jasim 2012; Williams and Gregoricka 2013, 2020). Several actions can be taken to increase our understanding in these areas and promote new research:

1) ***Careful, controlled excavation of more cairns with an emphasis on less well-represented areas:*** For example, the work in Dhofar on Early Bronze Age cairns is very limited (Newton and Zarins 2010; Harrower *et al.* 2014; McCorriston *et al.* 2014; Williams *et al.* 2014) and would benefit from

additional excavations seeking to characterize Early Bronze Age cairn diversity in this region. The documentation of Neolithic/Early Bronze Age rectangular tombs at Al-Hudor (c. 3500-3000 BC; Newton and Zarins 2010) as well as the three known Haluf tombs (McCorriston *et al.* 2014; and in this volume see Spotlight 18: Haluf tombs) already demonstrate that there are additional mortuary rituals practices in Dhofar at the start of and/or during the Early Bronze Age that are not seen in the northern Oman Peninsula. Finally, there are no data on burial rituals between the end of the Early Bronze Age until much later in the Iron Age (Zarins 2001).

2) ***Careful, controlled excavation of more cairns with an emphasis on architectural and chronological diversity:*** In the northern Oman Peninsula more cairns have been excavated and surveyed than in Dhofar, but it can be challenging to discern an Early Bronze Age cairn from an Iron Age cairn during pedestrian survey or while examining satellite imagery. Excavations and surveys have observed that some cairns were built during the Iron Age, but more work is necessary to generate a fuller picture of this practice (e.g., Williams *et al.* 2014; Kennet and Al-Jahwari 2016; During and Olijdam 2015; During *et al.* 2017; Williams *et al.* 2021). This is especially problematic given the reuse of Early Bronze Age cairns during the Iron Age and for surveys that do not include follow-up excavations. Focused excavation of possible Iron Age cairns will help inform surveys and data on distribution of cairns built in Early Bronze Age (and possibly reused in the Iron Age) versus cairns built during the Iron Age. This approach will help researchers understand the construction and use of tumuli during the Neolithic period (e.g., Williams and Gregoricka 2020).

3) ***Careful, controlled excavation of more cairns with an emphasis on documenting poorly preserved and fragmentary skeletal remains:*** The current arid environment and fluctuations in climate over the millennia create a poor preservation environment for skeletal remains in Early Bronze Age cairns. Many reports on excavated cairns (see Tables A.3 and A.5) report fragmentary skeletal remains or bone splinters. It is true that the standard excavation of these materials leads to poor outcomes in a laboratory setting – the bones are too badly broken and disintegrate further as they are excavated and transported. Contrary to common experience, not all preservation environments lead to differential preservation based on the size and porosity of bones. In fact, research on faunal bone in arid an environment (Geelbek Dunes, South Africa) with repeated hot-cold and wet-dry cycles showed an unexpected preservation pattern that was experimentally replicated (Conard *et al.* 2008). The authors explained that the preservation of bones that are commonly thought to be more fragile and less well preserved (due to porosity and cortical bone thickness) such as vertebrae may be better preserved in this kind of thermal shock cycle than teeth or bones with thick cortical bone (Conard *et al.* 2008: 243). The conditions discussed by the authors of this study are very similar to those experienced by the human skeletal remains in Early Bronze Age cairns of the Oman Peninsula and explain some odd preservation observations in Dhofar (McCorriston *et al.* 2014: 139-140) and elsewhere. In nearly all cairns of this era and in this region, the deceased were not covered by soil when interred in the cairns. The decomposition process would have necessarily involved hot/cold and wet/dry cycles since their deposit and while the interred were contained in stone cairns (and thus not exposing the deceased directly to the environment and scavengers), the microenvironment in the cairn would be more similar to open air exposure of these thermal shock cycles than if the deceased were buried in graves. This kind of cycle leads to repeated expansion and contraction

of bone (e.g., Murphy *et al*. 1981), as well as a host of other reactions related to composition of the bedrock or soil the deceased was laid on, the erosion of building materials that fell into the burial chamber, and the windblown sand that accumulated over the millennia. Of course, all of these factors can impact not only skeletal material, but material culture as well, most especially ceramics and bronze/copper objects.

These challenges will continue to limit the possibility of laboratory analyses of skeletal remains from these contexts, but some techniques have helped generate encouraging results. For example, because the Early Bronze Age cairns never contain well preserved skeletal material and the material that is present is often disturbed by taphonomic activity, it is essential that the interments be excavated by a bioarchaeologist/osteoarchaeologist. Unlike other contexts where an anthropologist can examine the bones after the excavation, in most cases on the Oman Peninsula, the bones must be examined in situ and require specialized excavation techniques. These excavation techniques are certainly in the skill set of most archaeologists, but the ability to assess the skeleton for areas of articulation (e.g. Méry *et al*. 2008), age/sex indicators, and evidence of pathology and trauma are not. This work requires expert knowledge of the skeleton and if it is not done as part of the excavation process, little to no data will be available at a later time. Photographing and/or drawing the interment(s) is a solution for more generous preservation environments. In this arid environment, the cycle of thermal shock to the bone is not a process that is reserved only for the time the deceased is out of view. Once an archaeologist begins to uncover the skeleton, the bones are exposed to sunlight and temperature changes that can lead to rapid destruction of the bones. This is often described by archaeologists as bone "turning to dust" or falling apart in dramatic fashion when they are lifted. Recommendations for excavation of bones by a senior bioarchaeologist/osteoarchaeologist who also collects all data on the skeletal remains before they are removed include:

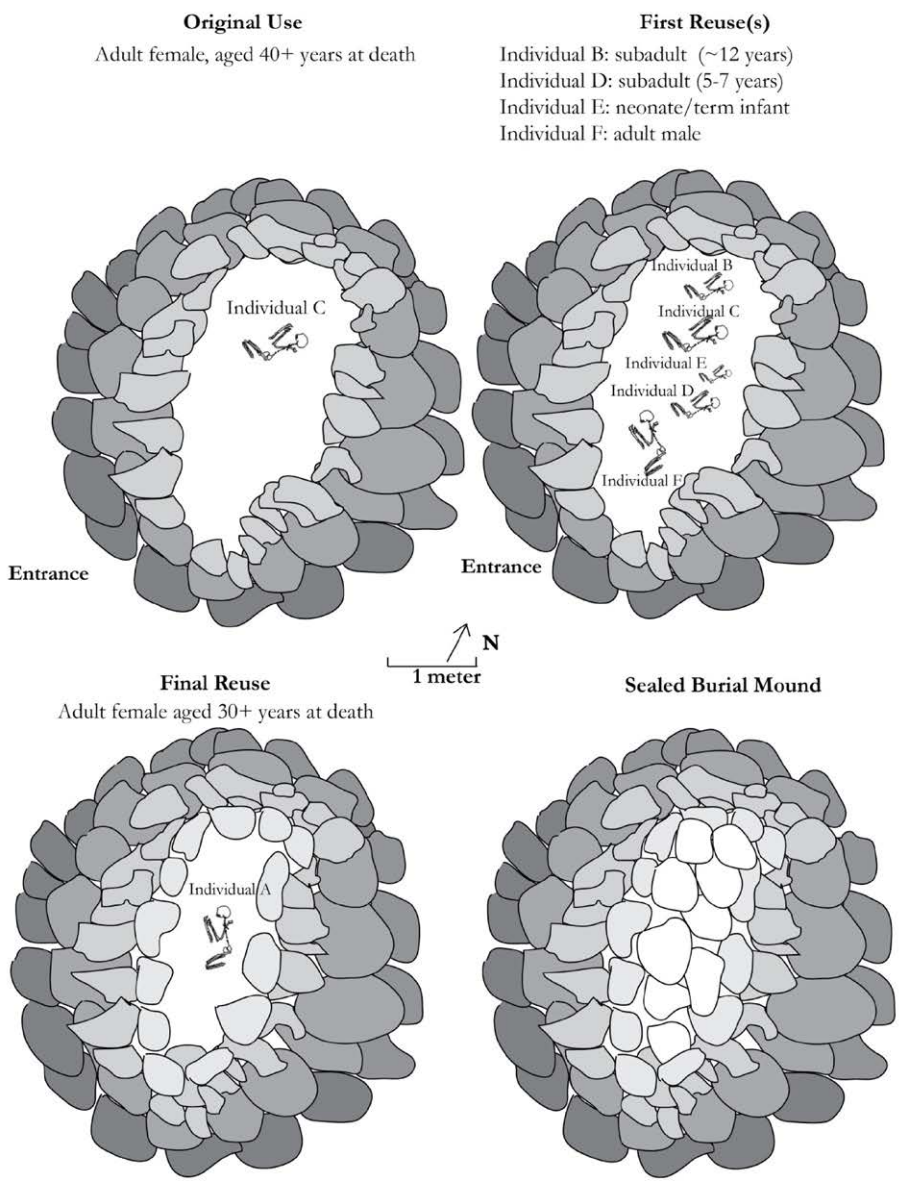
1) Build a tent or tarp over the burial chamber to protect the interments from direct sunlight. If not possible, avoid excavating in direct sunlight by leaving skeletal material covered until morning or later afternoon.

2) Excavate the skeleton or skeletal elements in sections – do not uncover the full skeleton at one time and leave exposed. This is not standard good practice in most settings, but using this approach in this context allows some of the bones to be covered by fill until they are ready to be recorded. One approach is to excavate the skeleton/skeletal elements and lightly cover with the chamber fill (minus material culture or stones of any kind) and once the full extent of the interment has been uncovered, gently brushing the temporary cover. Photos of sections of the skeleton can be mosaicked to provide documentation of the full skeleton using commonly available image processing software.

3) Work quickly. Skeletons in this environment cannot be left exposed for long periods of time or they will undergo changes that make them deteriorate significantly.

4) Aim to collect all data on the skeleton before it is lifted from the burial chamber. Take appropriate measurements, document with photography, drawing, and/or spatial location. Wrap each bone separately (as appropriate), but also have material available to make improvised boxes to help support the bones during transportation. The SOBO team (Social Spatial and Bioarchaeological Histories of Ancient Oman; Williams and Gregoricka 2013) have found that it is useful to have a senior bioarchaeologist perform the excavation with an assistant taking notes as they call out the full description of the skeleton. This practice has also been useful in Umm an-Nar tomb excavations (see Blau 2001b: 563).

STEP 1
This tumulus was built and used to inter Individual C 3013-2897calBC



STEP 2
The first reuse of this tomb involved the interment of 3 children arranged in front of and behind Individual C

Individual B: 2849-2492 calBC
Individual D: 2870-2585 calBC
Individual E: no date
Individual F: 2872-2624 calBC

and one adult male who was placed in front of the entrance and facing south.

STEP 3
Tumulus was opened and used for a late PreIslamic interment accompanied by an ovicaprid astragulus.

Osteological analyses *in situ* allowed for the order of interment be determined during excavation. All data regarding the age, sex, and health indicators were collected before the interments were removed. The difficulty with this kind of tomb is not with discerning the late PreIslamic reuse event, but in understanding the chronology of interments during the Early Bronze Age (*Individuals B-F*).

In this case, aside from the Iron Age copper/bronze arrowheads found eroding from the walls and ovicaprid astragulus found with Individual A near the top of the tumulus, the associated material culture (a small number of beads) could not be specifically attributed to specific individuals. The condition of the bones was poor and had these been examined outside the burial chamber we would:

a) likely underestimated the MNI (*Individual E* was very poorly preserved and the condition of the bones did not allow for a sample to date and would likely not be useful for further osteological analyses);

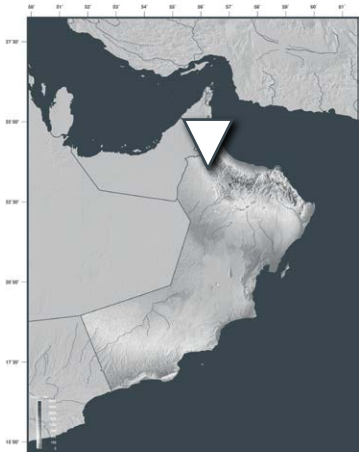
b) not have been able to accurately report the position of the interred in the tomb or the sequence of deposit;

c) not be to accurately submit 5 different samples for dating because the bones were too fragile.

Using the approach outlined in this chapter, bones were studied in situ and successfully moved, allowing radiocarbon analyses and preserving the bones for future study.

Figure 6.1. Use and reuse of tumulus S021-001, Aflaj necropolis, Dhank (adapted from Williams and Gregoricka 2020).

Spotlight 19 | Tomb Reuse: An Example From Al-Khubayb Necropolis, Al-Dhahirah, Oman



Tomb S007-003 is one of the largest cairns at the Al-Khubayb necropolis. The size of the monument, more careful construction, and evidence of a different use of the space within the burial chamber, lead researchers to classify this tomb as a transitional form between Hafit and Umm an-Nar mortuary ritual (Williams and Gregoricka 2019).

Data collection from the skeletal remains helped to make clear that the five individuals were placed directly on the bedrock floor. The use of space is different from that seen in other Early Bronze Age cairns because the interments appear to have been placed within short time of each other and there was no shifting of the remains to the side for new interments.

Material culture items were clearly placed with individuals and there is no ambiguity regarding this. In many other cairns it is not possible to discern the specific items interred with each individual.

Additionally, small burning events were identified in direct association with specific individuals (Williams and Gregoricka 2019: 99). If the chamber was not excavated with goal of collecting osteological data before removing the interments, poor preservation would have led to less information regarding age and sex of the interred as well as the position of the body with regard to the interred material culture and burning events.

Individual A: Female, 30-40 years interred with Jemdet Nasr vessel, beads, and bronze/copper pin;

Individual B: Female, 30-40 years interred with Individual E and cut ovicaprid ilium burning event on thoracic region C14 date (charcoal): 2600-2480 cal. BC;

Individual C: subadult, 8-10 years, Bone bioapatite date: 2880-2690 cal. BC interred with copper/bronze blade and Jemdet Nasr vessel burning event on floor near face;

Individual D: Male, 40+ years interred with Jemdet Nasr vessel burning event on floor near face;

Individual E: subadult, 4-5 years interred with Individual B and cut ovicaprid ilium.

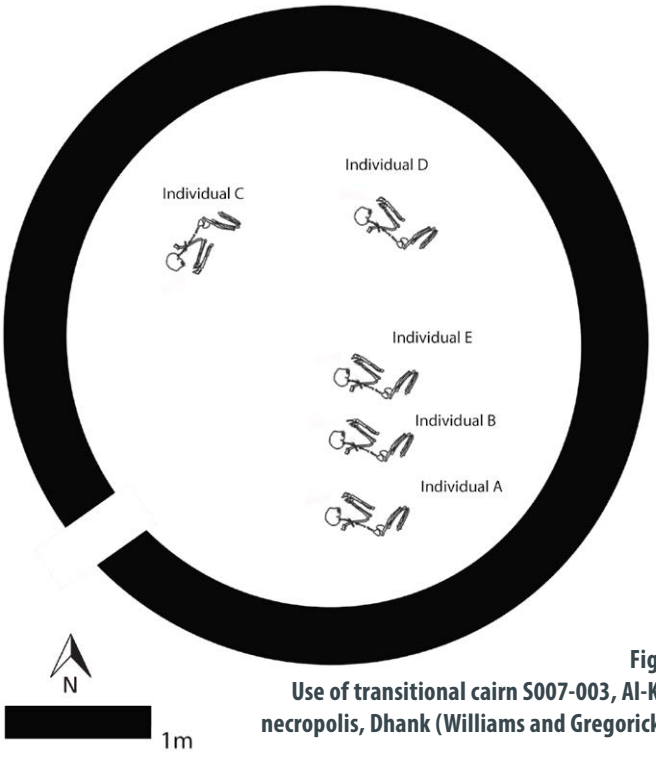


Figure 6.2.
Use of transitional cairn S007-003, Al-Khubayb necropolis, Dhank (Williams and Gregoricka 2019)

Key Citations

Weber J., K.D. Williams, and L.A. Gregoricka 2019. Animals and the changing landscape of death on the Oman Peninsula in the third millennium BC. In K.D. Williams and L.A. Gregoricka (eds.), *Life and death in Bronze Age Arabia: mortuary and bioarchaeological perspectives*. University Press Florida, Gainesville, pp. 163-181.

Williams K.D. and L.A. Gregoricka 2019. The Hafit/Umm an-Nar transition of the Third millennium BC: evidence from the architecture and mortuary ritual at Al Khubayb necropolis. In K.D. Williams and L.A. Gregoricka (eds.), *Life and death in Bronze Age Arabia: mortuary and bioarchaeological perspectives*. University Press Florida, Gainesville, pp. 76-107.

Figure 6.3. An Early Bronze Age mortuary landscape at the site of Abu Silah, Dhank.

This approach allows for observations about articulations that provide insight about the original placement of the deceased and taphonomic changes that can move or otherwise alter the position of the interred within the burial chamber. This can aid in differentiating movement of earlier interments to make room for the new dead as opposed to skeletal elements moved from their original placement due to rodent burrows or water flow, which has implications for understanding mortuary ritual. Excavation and direct data collection on the bones before the bones are removed also allows for observations of the cranium and pelvis that may lead to an age and sex estimation that help build data on the demography of interred. Because the surface of the bones can deteriorate quickly once it is uncovered, this approach allows the documentation of any observable pathology as well.

Umm an-Nar Period Communal Tombs and Pits (2700-2000 BC)

Similar preservation issues related to an arid environment are witnessed in Early Bronze Age Umm an-Nar communal tomb and bone pit contexts. These mortuary contexts, however, were also victim to additional processes that can impact preservation of the interred human remains and material culture. Umm an-Nar tombs are characterized by their fine construction, and even the most simple of these tombs is better built than the most elaborate cairn. While bone preservation in these contexts is still not stellar, it is generally better than that seen in earlier cairns, especially in subterranean compartments and bone pits.

Spotlight 20 | Umm an-Nar Mortuary Ritual and Use of Fire

Umm an-Nar mortuary ritual involves manipulation of the deceased over an undetermined period of time within a communal tomb and sometimes in both a communal tomb and subterranean bone pit (Figure 5.7). The use of fire in this ritual has been documented in both the tombs and bone pits (Table 6.1). The chronology and purpose of these small scale burning events is interpreted differently between sites.

Hili

The central portion of the bone pit at Hili (Tomb N) was excavated very precisely with great attention to detail (see Méry *et al*. 2008). As a result, researchers were able to discern two burning locations that they interpreted as final acts in this context perhaps marking the end of use of this pit. The fire caused changes in bone composition and appearance indicating a relatively low burning temperature with some peaks of very high temperature. Evidence of primary interments directly into Tomb N near the end of its use (as opposed to fragmentary remains moved from Tomb E into the bone pit conform with the observation of at least some burning of fresh bone (Gatto *et al*. 2003).

Dahwa

DH7-001 at the Dahwa site (Williams *et al*. forthcoming) showed several burning events performed after successive deposits of bone from the tomb into the bone pit. As seen at other Umm an-Nar sites, these small scale burning events were not performed to destroy the bone, but rather were part of an extended mortuary ritual. The bone pit at Dahwa may be unique for its preservation of evidence of burning events after multiple deposits into the bone pit, rather than the pattern seen at Hili and Ras Al-Jinz where burning events were possibly marked the last use of that receptacle for the dead.

Ras Al-Jinz

The tomb and bone pits at RJ-1 (Munoz *et al*. 2012) also provide evidence for burning of bones toward the end of the use of the mortuary system (e.g., Tomb 1 and Pits 1-3). In this case, precise excavation allowed for documentation of a hearth built on a pile of long bones and skulls in Pit 1, provided strong evidence that the tomb and Pits 1 and 3 were used at roughly the same time (where as Pit 2 was used somewhat later), and that while there was some high temperature burning in Pit 1, much of the burning was at low temperatures and generally on dry bone (1.7% was burned while fresh; Table 6.1).

Unar 2

The circular tomb at Unar 2 (Blau 2001a, b) produced a very high percentage of burned bones (90.7%; Table 6.1) and most of these bones were found on top of unburned bone (unburned bone also pushed against walls). Blau (2001b) considered the possibility that the dead were interred first on the pavement of the lower level of the tomb and then later removed, burned, and added back to the tomb.

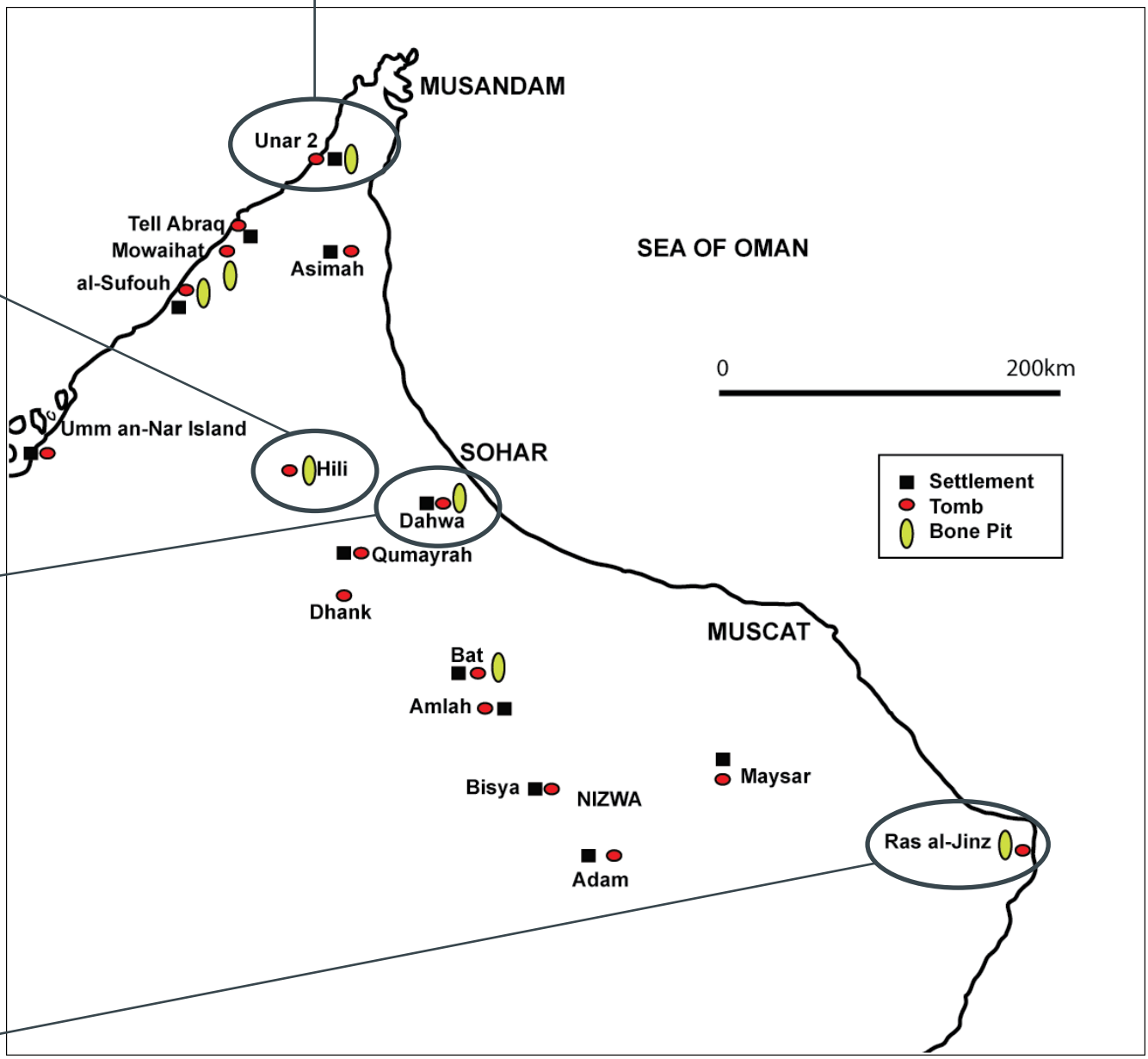


Figure 6.4. Some Umm an-Nar period sites with evidence of burning as part of the mortuary ritual

Table 6.1. Summary of evidence of fire in Umm an-Nar tombs and bone pits

Tomb	Type of Mortuary Structure	Estimated Period of Use	Location of Burning Event(s)	% bone burned	# bones	Additional Observations	Citation(s)
Site: Dahwa							
DH7-001 Tomb	circular tomb	–	washed in or burned in upper level	0.009%	71,497	very small fragments likely washed into chamber	Williams *et al*. forthcoming
DH7-001 Bone Pit	oval bone pit	–	multiple loci	12.0%	88,812	–	
Site: Hili							
Tomb A	circular tomb	2300-2100 BC	burned and unburned bone in all compartments	~50%	not reported (bone weights reported)	bones likely burned in upper compartment(s)	Bondioli *et al*. 1998; McSweeney *et al*. 2008 Al-Tikriti and Méry 2000; Méry *et al* 2004; McSweeney *et al*. 2008; Méry and Tengberg 2009; Gatto *et al*. 2003
Tomb N	Oval bone pit with stone architecture	2200-2000 BC	single event, 2 locations: center and southern side	~20%	not reported (bone weights reported)	some burning of fresh bones; carbonized dates; evidence of stoking of fire; evidence of fuel: jujube wood	
Site: Ras Al-Jinz							
Tomb 1	circular tomb	2550-2350 BC	mainly chamber 3	<1%	18,600	high temperatures	Munoz *et al*. 2012
Pit 1	oval bone pit		hearth on top of pile of long bones and skulls	50.40%		1.7% show evidence of burning fresh bone; high temperatures	
Pit 2	oval bone pit	last use	–	1.60%		low temperatures	
Pit 3	oval bone pit	2550-2350 BC	–	1.60%		–	
Site: Al-Sufouh							
Tomb I	circular tomb	–	burned bone found in Chamber 2 but burning may have occurred outside tomb	~85%	–	possible fuel source: trees, animal dung; some burning of fresh bone; also burned sand and farush stone	Benton 1996
Tomb II	Oval bone pit	–	throughout		–	burned farush stone	
Tomb III	Oval bone pit	–	throughout		–	burned farush stone	
Tomb IV	possible Oval bone pit	–	throughout		–	–	
Site: Tell Abraq							
Tomb	circular tomb	2200-2000 BC	possible very small scale burning of aromatics, possible accidental burning of some bone	–	–	–	Martin *et al*. 2019
Site: Unar 2							
Tomb	circular tomb	c.2300-2100 BC	addition of burned bones on top of unburned bones	90.70%	21,019	majority of bones burned white	Blau 2001a, b

Figure 6.5. Detail of burned and unburned, commingled, and fragmented deposit in bone pit at Dahwa (DH7-001, bone pit)

Figure 6.6. Burned and unburned hamate bone of the hand. These bones are not from the same individual, but they were from the same archaeological context and demonstrate different levels of exposure to fire (Dahwa site, DH7-001, bone pit)

Figure 6.7. Long bone fragment with differential burning (Dahwa site, DH7-001, bone pit)

Figure 6.8. Proximal ulna fragment showing cracking due to heat and color change (Dahwa site, DH7-001, bone pit)

Figure 6.9. Long bone fragment showing cracking, warping, and color changes (Dahwa site, DH7-001, bone pit)

Figure 6.10. Cranial fragments showing differential exposure to heat (a) exterior surface, (b) interior surface (Dahwa site, DH7-001, bone pit)

Figure 6.11. Heated/burned fragment of ivory comb (Dahwa site, DH7-001, bone pit)

The Umm an-Nar mortuary ritual involved the construction of elegant and visible communal tombs that have been victim of stone quarrying for their white ashlar blocks and occasional carved relief. They also contained far more interred material culture and serious looting has been reported. The looting process often results in the loss of material culture, breakage of material culture that is not stolen, damage to the architecture of the tomb, and damage or loss of human skeletal remains.

For some Umm an-Nar tombs and bone pits, these disturbances and environmental factors have impacted preservation of an archaeological context that was already altered through actions of the people who built and used these tombs. This apparent goal of the mortuary ritual to break apart individual bodies (and in some cases going beyond manipulating the bones to include small scale burning events) would have made the osteological analyses very challenging if this was the sole factor influencing the recovered assemblages. Unlike other contexts where there may be large scale multiple interments in a single tomb but skeletons remain articulated or partially articulated, the Umm an-Nar mortuary ritual reduced all the interred to anonymous fragmentary and commingled skeletal elements. The few exceptions where an articulated skeleton remains, marks the end of the practice (e.g., interments near the end of the Umm an-Nar period or start of the Wadi Suq period) or intrusive later burials. This makes it impossible to fully understand the total number of individuals interred in these contexts, and while complicated analyses have produced interesting and important information about the health and life experiences of the people who were interred in these monuments (see Chapter 5), these data are also seriously limited. We do know that there was high infant mortality, poor dental health, and evidence of heavy workload in at least some Umm an-Nar period communities. These data are useful and important, but the fragmentary and commingled state of the bones makes comparison between sites very challenging. As a result, it is hard to get a good picture of what life was like during this period in history.

This is not an argument to discontinue research on these tombs, but rather encouragement to expand consideration of these fascinating contexts to more fully consider the mortuary ritual they represent (e.g., Blau 2001b; Méry *et al.* 2008). One feature of Umm an-Nar communal tombs is the conformity of practice that can be observed. Cairn use did persist into the Umm an-Nar period (Figure 4.3), but where there are Umm an-Nar tombs built and used, there is remarkable conformity in tomb style, death practices inside the tomb, and interred material culture. When there are differences, we are left wondering: What led to these deviations from the typical mortuary ritual practiced across this relatively large area? Why are there bone pits associated with some of these tombs? Why was there more than one tomb at some sites but not others? Because we are limited in the way we can develop health profiles of Umm an-Nar period people, a more fruitful approach may be to work to understand the extended rituals that the deceased experienced in Umm an-Nar communal tombs and bone pits.

Detailed analyses of the contents of each chamber of these tombs may help us understand how these structures fit into the spiritual practices of the Umm an-Nar period people and help us understand the modest variation that is observed in these practices. Perhaps interpretations can go beyond the view of these tombs and their associated bone pits as functional units where one is filled and the other acts as a receptacle to help clean the tomb to make room for the more recently deceased. In lieu of this interpretation, perhaps we can better understand these mortuary contexts as a system whereby the actions of the living on the remains of the deceased reflect aspects of their view of their place in the world and the afterworld.

Excavations at the Dahwa site on the Al-Batinah coast are one example of this approach (Williams *et al.* forthcoming). Spotlight 20 (Umm an-Nar Mortuary Ritual and Use of Fire), which introduces the analysis of burned bone at this site, demonstrates some of the challenges and possibilities of considering Umm an-Nar tombs and bone pits as systems in this way.

Protection and Preservation of Early Bronze Age Mortuary Sites

Early Bronze Age mortuary monuments are an important resource for understanding the past on the Oman Peninsula. Cairns and Umm an-Nar communal tombs and bone pits are the two primary mortuary systems used across the expanse of land known in modern days as the Sultanate of Oman and the United Arab Emirates. The history of this region is not written down as it is in many of the more well-known cultures to the north. Still, we know that this region had a vibrant life during the Early Bronze Age. This would have included many stories of interactions of individual families, tribes, and regional entities. People traded and married and raised families in this place and when their loved ones died, the community built stone monuments to inter them.

Without texts that describe life and what people felt and believed, archaeological research can help learn about these. Death is a universal experience and the way a community responds to the deaths of its members is one of the most powerful ways we can understand people. On the Oman Peninsula we are fortunate to have the remains of many thousands of cairns and far fewer Umm an-Nar tombs. These ruined monuments, even those that lack apparent splendor, are important resources to be protected.

Bibliography

Armelagos G.J. 2003. Bioarchaeology as anthropology. *Archaeological papers of the American Anthropological Association* 13(1): 27-40.

Armelagos G.J. and D. Van Gerven 2003. A century of skeletal biology and paleopathology: contrasts, contradictions, and conflicts. *American anthropologist* 105(1): 53-64.

Azzarà, V.M. 2015. *L'architecture domestique et l'organisation de la maisonnée dans la péninsule d'Oman à l'âge du Bronze ancien*. PhD Thesis, Université de Paris 1 Panthéon-Sorbonne.

Barrett J.C. 1990. The monumentality of death: the character of Early Bronze Age mortuary mounds in southern Britain. *World archaeology* 22(2): 179-189.

Bartel B. 1982. A historical review of ethnological and archaeological analyses of mortuary practice. *Journal of anthropological archaeology*. 1:32-58.

Baustian K., and D. Martin 2010. Patterns of mortality in a Bronze Age tomb from Tell Abraq. In L. Weeks (ed.), *Death and burial in Arabia and beyond: multidisciplinary perspectives*. Archaeopress, Oxford, pp.55-59.

Beck L.A., ed. 1995. *Regional approaches to mortuary analyses*. Plenum Press, New York.

Al-Belushi M.A. and A.T. ElMahi 2009. Archaeological investigations in Shenah, Sultanate of Oman. *Proceedings of the Seminar for Arabian Studies* 39: 31-41.

Bendann, E. 1930. Death customs: an analytical study of burial rites. Alfred A. Knopf, New York.

Benton J.N. 1996. *Excavations at Al Sufouh: A Third Millennium Site in the Emirate of Dubai*. Brepols.

Benton J.N. and D.T. Potts 1994. Jebel Al-Emalah 1993-1994: report compiled for the Department of Culture and Information. Sharjah, UAE: Unpublished report submitted to the Directorate of Antiquities, Government of Sharjah, UAE.

Biagi P., W. Torke, M. Tosi, and H-P Uerpmann 1984. Qurum: A case study of coastal archaeology in northern Oman. *World archaeology* 16(1): 43-61.

Biagi P. 1988a. The prehistoric fisherman settlements of RH5 and RH6 at Qurum, Sultanate of Oman. *Proceedings of the Seminar for Arabian Studies* 17: 15-19.

Biagi P. 1988b. Surveys along the Oman Coast: preliminary report on the 1985-1988 campaign. *East and West* 38 (1/4): 271-291.

Biagi P. 1994. A radiocarbon chronology for the aceramic shell-middens of coastal Oman. *Arabian Archaeology and Epigraphy* 5: 17-31.

Biagi P. 2004. Surveys along the Oman coast: a review of the prehistoric sites discovered between Dibab and Qalhat. *Adumatu* 10: 29-50.

Biagi P. and R. Nisbet 1999. The shell-midden sites of RH5 and RH6 (Muscat, Sultanate of Oman) in their environmental setting. *Archaeologia Polona* 37: 31-47.

Biagi P. and R. Nisbet 2006. The prehistoric fisher-gatherers of the western coast of the Arabian Sea: a case of seasonal sedentarization? *World archaeology* 38(2): 220-238.

Bibby T.G. 1966. Arabian Gulf Archaeology. *KUML* 1965: 133-152.

Bibby T.G. 1967. Arabian Gulf Archaeology. *KUML* 1966: 75-95.

Binford L.R. 1962. Archaeology as anthropology. *American antiquity* 28(2): 217-225.

Binford L.R. 1971. Mortuary practices: their study and their potential. *Memoirs of the society for American archaeology, No. 25, Approaches to the social dimensions of mortuary practices,* pp. 6-29.

Birch J. and R.F. Williamson 2015. Navigating ancestral landscapes in the Northern Iroquoian world. *Journal of anthropological archaeology* 39: 139-150.

Blakely R.L. (ed) 1977. *Biocultural adaptation in prehistoric America*. Univesity of Georgia Press: Athens.

Blau S. 1996. Attempting to identify activities in the past: preliminary investigations of the third millennium BC population at Tell Abraq. *Arabian Archaeology and Epigraphy* 7: 143-176.

Blau S. 1998. Studies of human skeletal remains in the United Arab Emirates:where are we now? *Proceedings of the Seminar for Arabian Studies* 28:7-13.

Blau S. 2001a. Limited yet informative: pathological alterations observed on human skeletal remains from third and second millennia BC collective burials in the United Arab Emirates. *International journal of osteoarchaeology* 11: 173-205.

Blau S. 2001b. Fragmentary endings: a discussion of 3rd-millennium BC burial practices in the Oman peninsula. *Antiquity* 75: 557-570.

Blau S. 2007. Skeletal and dental health and subsistence change in the United Arab Emirates. In M.N. Cohen and G.M.M. Crane-Kramer (eds.), *Ancient health: skeletal indicators of agricultural and economic intensification*. University Press of Florida, Gainesville, pp. 190-206.

Blau S. and M. Beech. 1999. One woman and her dog: an Umm an-Nar example from the United Arab Emirates. *Arabian Archaeology and Epigraphy* 10: 34-42.

Bloch M. 1968. Tombs and conservatism among the Merina of Madagascar. *Man* 3(1): 94-104.

Bloch M. 1971. *Placing the dead. Tombs, ancestral villages, and kinship organization in Madagascar*. London School of Economics and Political Science Seminar Studies in Anthropology, London.

Bloch M. and J. Parry (eds.) 1982. *Death and the regeneration of life.* Cambridge University Press, Cambridge.

Böhme M. 2010. First investigation at the Wadi Al-Ayn Tombs, Oman (poster). *Proceedings of the Seminar for Arabian Studies* 40: 131-134.

Böhme M. 2011. The Bat-type: a Hafit period tomb construction in in Oman. *Arabian Archaeology and Epigraphy* 22: 23-31.

Bohme M. 2012. The restoration of Tomb 154 at Bat. In D.T. Potts and P. Hellyer (eds.), *Fifty Years of Emirates Archaeology*. pp 114-121.

Böhme M. 2013. The petrographic-polychrome style and the symbolic meaning of white stones in Hafit grave architecture. *Proceedings of the Seminar for Arabian Studies* 43: 77–84.

Böhme M, and B.A. Al-Sabri 2011. Umm an-Nar burial 401 at Bat, Oman: architecture and finds. *Arabian Archaeology and Epigraphy* 22: 113-154.

Böhme M. and S.S.N. Al-Bakri 2012. An Umm an-Nar culture stone bas-relief from Al-Qutainah, Sultanate of Oman. *Arabian Archaeology and Epigraphy* 23: 156-164.

Bondioli L., Coppa A., and R. Macchiarelli 1998. From the coast to the oasis in Prehistoric Arabia: what the human osteodental remains tell us about the transition from a foraging to the exchange economy? Evidence from Ra's al-Hamra (Oman) and Hili North (U.A.E.). In M. Tosi (ed), *Proceedings of the XIIIth Congress, 8-I4 Sept. 1996, of the International Union of Prehistoric and Protohistoric Sciences, A.B.A.C.*, Forli, pp. 229-234.

Bongers J.L., Arkush E.N., and M.J. Harrower 2012. Landscapes of death: GIS-based analyses of chullpas in the western Lake Titicaca basin. *Journal of archaeological science, 39*, 1687-1693.

Borgi, F. and E. Maini 2020. Neolithic and Early Bronze Age Occupations at Ras Al-Hadd HD-5, Sultanate of Oman. In S. Cleuziou and M. Tosi (auths.), D. Frenez and R. Garba (eds.), In the Shadow of the Ancestors: The Prehistoric Foundations of the Early Arabian Civilization in Oman - Second Expanded Edition. Oxford: Archaeopress & Ministry of Heritage and Culture of Oman, 130-34.

Borgi, F., E. Maini, M. Cattani, and M. Tosi 2012. The early settlement of HD-5 at Ra's al-Hadd, Sultanate of Oman (4th-3rd millennium BCE). *Proceedings of the Seminar for Arabian Studies* 42: 27-40.

Bortolini E. 2015. The Early Bronze Age of the Oman Peninsula: from chronology to evolution. In J. Giraud and G. Gernez (eds.) *Aux Marges de l'archéologie: ouvrage à la mémoire de Serge Cleuziou*, Collection Travaux de la Maison René-Ginouvés, De Boccard:353-369

Bortolini E. 2014. An evolutionary and quantitative analysis of construction variation in prehistoric monumental burials of eastern Arabia, PhD Dissertation, The Institute of Archaeology, UCL

Bortolini E. 2019. A trait-based analysis of structural evolution in prehistoric monumental burials of Southeastern Arabia. In K.D. Williams and L.A. Gregoricka (eds.), *Life and death in Bronze Age Arabia: mortuary and bioarchaeological perspectives.* University Press Florida, Gainesville, pp. 141-160.

Bortolini E. and O. Munoz 2012. Life and death in prehistoric Oman: Insights from Late Neolithic and Early Bronze Age funerary practices (4th-3rd mill. BC). In *Proceedings of the International symposium, "The archaeological heritage of Oman: An early cradle of Arabian civilization brought to the forefront of cultural resource management".* Ministry of Heritage and Culture, Sultanate of Oman, Muscat, pp. 61-80.

Bradley R.J. 1987. Time regained: the creation of continuity. *Journal of the British archaeological association* 140: 1-17.

Bradley R.J. 1998. Ruined buildings, ruined stones: enclosures, tombs and natural places in the Neolithic of South-West England. *World archaeology* 30(1): 13-22.

Brass L. and G. Britton 2004. An archaeological survey of northern Fujairah, United Arab Emirates. *Arabian Archaeology and Epigraphy* 15: 149-196.

Bretzke K, A. Parton, S. Lindauer, and D. Kennet 2018. Evidence of Neolithic settlement in the foothills of the Western al-Hajar Mountains. *Arabian Archaeology and Epigraphy* 29: 103-114.

Brown J.A. 1995. On mortuary analysis - with special reference to the Saxe-Binford Research Program. In L.A. Beck (ed.), *Regional approaches to mortuary analysis.* Plenum Press, New York, pp. 3-26.

Brunswig R.H. 1989. Cultural history, environment and economy as seen from an Umm an-Nar settlement: Evidence from test excavations at Bat, Oman, 1977/78. *Journal of Oman Studies* 10: 9-50.

Buikstra J.E. 1977. Biocultural dimensions of archeological study: a regional perspective. In R.L. Blakely (ed), *Proceedings of the Southern Archaeological Society*, No. 11. University of Georgia Press: Athen, pp. 67-84.

Buikstra J.E. 1981. Mortuary practices, paleodemography and palaeopathology: a case study from the Koster site (Illinois). In R. Chapman, I. Kinnes, and K. Randsborg (eds.), T*he archaeology of death.* Cambridge University Press, London, pp. 123-132.

Buikstra J.E. and D.K. Charles 1999. Centering the ancestors: cemeteries, mounds, and sacred landscapes of the ancient North American midcontinent. In W. Ashmore and A.B. Knapp (eds.), *Archaeologies of landscape: contemporary perspectives*. Blackwell Press, Oxford, pp. 201-228.

Buikstra J.E. and L.A. Beck 2006. *Bioarchaeology: The contextual analysis of human remains*. Left Coast Press, New York.

Cable C.M. 2019. Tombs in time and towers in space: making sense of the Hafit/Umm an-Nar transition in north-central Oman through its monuments. In K.D. Williams and L.A. Gregoricka (eds.), *Life and death in Bronze Age Arabia: mortuary and bioarchaeological perspectives.* University Press Florida, Gainesville, pp. 108-120.

Cable C.M. and S. Al Jabri 2019. The Wadi al-Hijr (Sultanate of Oman) in the third millennium BC. *Arabian Archaeology and Epigraphy* 30: 1-17

Cable C.M. and C. Thornton 2013. Monumentality and third millennium towers of the Oman Peninsula. In: S.A. Abraham, P Gullapalli, T.P. Raczek, and U.Z. Rizvi (eds), *Connections and complexity: new approaches to the archaeology of South Asia*, Left Coast Press, Walnut Creek, pp.375-400.

Callaway E. 2018. Divided by DNA: the uneasy relationship between archaeology and ancient genomics. *Nature* 555:573.

Campos P.F., O.E. Craig, G. Turner-Walker, E. Peacock, E. Willersleva, and M.T.P. Gilbert 2012. DNA in ancient bone – Where is it located and how should we extract it? *Annals of anatomy* 194: 7-16.

Carr C. 1995. Mortuary practices: their social, philosophical-religious, circumstantial, and physical determinants. *Journal of archaeological method and theory* 2(2): 105-200.

Carter R. 2002. Unar 2 and its Ceramics. *Bulletin of the Society for Arabian Studies* 7: 5-14.

Chapman R. 1981. Archaeological theory and communal burial in prehistoric Europe. In I. Hodder, G. Isaac, and N. Hammond (eds.), *Patterns of the past: studies in honor of David Clarke*. Cambridge University Press, Cambridge, pp. 387-412.

Chapman R. 1981. The emergence of formal disposal areas and the 'problem' of megalithic tombs in prehistoric Europe. In R. Chapman, I. Kinnes, and K. Randsborg (eds.), *The archaeology of death.* Cambridge University Press: London, pp. 71-81.

Chapman R. 1987. Mortuary practices: society, theory building, and archaeology. In A. Boddington, A.N. Garland, and R.C. Janaway (eds.), *Death, decay, and reconstruction: approaches to archaeology and forensic science*. Manchester University Press, Manchester, pp. 198-213.

Chapman R. 1995. Ten years after - megaliths, mortuary practices, and the territorial model. In L.A. Beck (ed.), *Regional approaches to mortuary analysis*. Plenum Press, New York, pp. 29-52.

Chapman R. and K. Randsborg 1981. Approaches to the archaeology of death. In R. Chapman, I. Kinnes, and K. Randsborg (eds.), *The archaeology of death.* Cambridge University Press, London, pp. 1-24.

Chapman R., I. Kinnes, and K. Randsborg (eds.) 1981. *The archaeology of death*. Cambridge University Press: London.

Charles D.K. 1995. Diachronic regional social dynamics: mortuary sites in the Illinois Valley/American bottom region. In L.A. Beck (ed.), *Regional approaches to mortuary analysis.* Plenum Press, New York, pp. 77-101.

Charles D.K. and J.E. Buikstra 1983. Archaic mortuary sites in the Central Mississippi drainage: distribution, structure, and behavioral implications. In J.L. Phillips and J.A. Brown (eds.), *Archaic hunter and gatherers in the American Midwest.* Academic Press, New York, pp. 117-143.

Charles D.K. and J.E. Buikstra 2002. Siting, sighting, and citing the dead. In H. Silverman and D.B. Small (eds.), *The space and place of death.* American Anthropological Association, Arlington, VA. pp. 13-26.

Charpentier V. 1993. A specialized production at regional scale in Bronze Age Arabia: shell rings from Ra's al-Junayz area (Sultanate of Oman). *Annales Academiae Scientiarum Fennicae* pp. 157-170.

Cherkinsky A. 2009. Can we get a good radiocarbon age from "bad bone"? Determining the reliability of radiocarbon age from bioapatite. *Radiocarbon* 51(2): 647-655.

Childe V.G. 1945. Directional changes in funerary practices during 50,000 years. Man 4: 13-19.

Cleuziou S. 1978. Mission archéologique Francaise 1ere campagne decembre 1976/fevrier 1977. Archeologie aux Emirats Arabes Unis. Department of Tourism and Archaeology, Abu Dhabi.

Cleuziou S. 1996. The emergence of oases and towns in eastern and southern Arabia, In: G.E. Afanasev, S. Cleuziou, J.R. Lukacs, and M. Tosi (eds), *Proceedings of the XIIIth Congress, 8-I4 Sept. 1996, of the International Union of Prehistoric and Protohistoric Sciences,* A.B.A.C., Forli, pp. 159-165.

Cleuziou S. 2002. The Early Bronze Age of the Oman Peninsula from chronology to the dialectics of tribe and state formation. In S. Cleuziou, M. Tosi, and J. Zarins (eds.), *Essays on the late prehistory of the Arabian Peninsula*. Serie Orientale 93, Rome, pp.191-236.

Cleuziou S. 2007. Evolution toward complexity in a coastal desert environment: the early Bronze Age in the Ja'alan, Sultanate of Oman. In T. Kohler and S. van der Leeuw (eds.), *The model-based archaeology of socionatural systems*. School for Advanced Research, Sante Fe, pp.209-227.

Cleuziou S., J. Reade, and M. Tosi 1990. The Joint Hadd Project Summary Report on the Third Season (October 1987-February 1988). 65pp. Unpublished report.

Cleuziou S. and M. Tosi (eds.) 1986. The Joint Hadd Project. Summary Report on the First Season December 8-26, 1985. 22pp. Unpublished report.

Cleuziou S. and M. Tosi (eds.) 1987. The Joint Hadd Project. Summary Report on the Second Season November 1987-January 1987. 82pp. Unpublished report.

Cleuziou S. and M. Tosi 2000. Ra's al-Jinz and the prehistoric coastal cultures of the Ja'alan. *Journal of Oman Studies* 11: 19-73.

Cleuziou S. and M. Tosi. 2007. *In the Shadow of the Ancestors: The Prehistoric Foundations of the Early Arabian Civilization in Oman*. Ministry of Heritage and Culture, Muscat.

Cleuziou S. and M. Tosi. 2021. *In the Shadow of the Ancestors: The Prehistoric Foundations of the Early Arabian Civilization in Oman*. Ministry of Heritage and Culture, Muscat.

Cleuziou S. and B. Vogt 1983. Umm an-Nar burial customs: new evidence from Tomb A at Hili North. *Proceedings of the Seminar for Arabian Studies* 13: 37-45.

Cleuziou S. and B. Vogt 1985. Tomb A at Hili North (UAE) and its material connections to southeast Iran and the greater Indus Valley. *South Asian Archaeology 1983. Papers from the seventh international conference of the association of South Asian Archaeologists in Western Europe* 1: 249-277.

Cleveland R.L. 1960. The 1960 American Archaeological Expedition to Dhofar. *Bulletin of the American Schools of Oriental Research* 159, 14-26.

Conard N. Walker S. and A. Kandel 2008. How heating and cooling and wetting and drying can destroy dense faunal elements and lead to differential preservation. *Palaeogeography palaeoclimatology palaeoecology*. 266: 236-245.

Cope J.M., A.C. Berryman, D.L. Martin, D.T. Potts 2005. Robusticity and osteoarthritis at the trapeziometacarpal joint in a bronze age population from Tell Abraq, U.A.E. *American journal of physical anthropology* 126: 391-400.

Costa P. 1994. Khawr Kharfut, Dhofar: a preliminary assessment of the archaeological remains. *Proceedings of the Seminar for Arabian Studies* 24: 27-33.

Costa P. 2006. Dank archaeological project: a preliminary report. *Proceedings of the Seminar for Arabian Studies* 36: 139-149.

Costa P. and S. Kite 1985. The architecture of Salalah and the Dhofar littoral. *Journal of Oman Studies* 7: 131-158.

Crema E.R., T. Kerig, and S. Shennan 2012. Modelling temporal uncertainty in archaeological analysis. *Journal of archaeological method and theory* 19(3): 440-461

Davies D.J. 2000. Robert Hertz: the social triumph over death. *Mortality* 5(1): 97-102.

Deadman W.M. 2012. Defining the Early Bronze Age landscape: A remote sensing-based analysis of Hafit tomb distribution in Wadi Andam, Sultanate of Oman. *Arabian archaeology and epigraphy,* 23: 26–34.

Deadman, W. M. 2017. *Early Bronze Age Society in Eastern Arabia: An Analysis of the Funerary Archaeology of the Hafit Period (3,200-2,500 BC) in the Northern Oman Peninsula with Special Reference to the Al-Batinah Region*. PhD thesis, Durham University.

Deadman W.M. and N.S. Al-Jahwari 2016. Hafit tombs in ash-Sharqiyah, Oman: assessing the accuracy and precision of Google Earth remote-sensing survey and analyzing their distribution in the landscape. *Arabian archaeology and epigraphy,* 27: 19-30.

de Cardi B. 1975. Survey and excavations in central Oman, 1974-1975. *Journal of Oman Studies* 1:109-111.

de Cardi B., C. Vita-Finzi, and A. Coles 1975. Archaeological survey in northern Oman, 1972. *East and West* 25(1/2): 9-75.

de Cardi B., S. Collier, and D.B. Doe 1976. Excavations and survey in Oman, 1974-1975. *Journal of Oman Studies,* 2: 101-187.

de Cardi B. and D.B. Doe. 1971. Archaeological survey in the Northern Trucial States. *East and West*, 21(3/4): 225-289.

de Cardi B., D.B. Doe, and S.P. Roskams 1977. Excavation and survey in the Sharqiyah, Oman 1976. *Journal of Oman Studies* 3:17–33.

de Cardi B., R.D. Bell, and N.J. Starling 1979. Excavations at Tawi Silaim and Tawi Sa'id in the Sharqiya, 1978. *Journal of Oman Studies* 5: 61-94.

De Reu J, J. Bourgeois, P. De Smedt, A. Zwertvaegher, M. Antrop, M. Bats, P. De Maeyer, P. Finke, M. Van Meirvenne, J. Verniers, and P. Crombe. 2011. Measuring the relative topographic position of archaeological sites in the landscape, a case study on the Bronze Age barrows in northwest Belgium, *Journal of archaeological science*, 38: 3435-3446.

Devlin Z.L. and E-J. Graham 2015. *Death embodied: archaeological approaches to the treatment of the corpse*. Oxbow Books, Oxford.

Doe D.B. 1977. Gazetteer of sites in Oman, 1976. *Journal of Oman Studies* 3: 35-58.

Doe B. and B. de Cardi 1983. Archaeological survey in southern Ras al-Khaimah,1982 - Preliminary report. *Proceedings of the Seminar for Arabian Studies* 13: 31-35.

Döpper S. 2017. Rescue excavation of a 3rd Millennium B.C. tomb at Al-Khubayb, Sultanate of Oman, *Arabian archaeology and epigraphy,* 28: 190-208.

Döpper S. (forthcoming), *The Reuse of Tombs in Eastern Arabia*, Arabia Orientalis. Oxford: Archaeopress

Döpper S. and C. Schmidt 2011. Die Grabtürme der Nekropolen von Bāt und Al-Ayn im Sultanat Oman: Bericht über die Vorkampagne 2010, Mitteilungen der Deutschen Orient-Gesellschaft 143: 293–321.

Döpper S. and C. Schmidt 2014a. Chlorite vessels from Tomb 155 and Tomb 156 in Bat, Sultanate of Oman. In Lamberg-Karlovsky C.C. and B. Genito (eds.), *"My life is like the summer rose" Maurizio Tosi e l'archeologia come modo di vivere. Papers in honour of Maurizio Tosi for his 70th birthday*. BAR International Series 2690, pp. 187-192.

Döpper S. and C. Schmidt 2014b. Bericht über die Ausgrabungen 2013 und 2014 in Bat und Al-Ayn, Sultanat Oman. *Mitteilungen der Deutschen Orient-Gesellschaft zu Berlin* 146: 55-85.

Duday H. 1978. Archeologie funeraire et anthropologie. Application des releves et de l'etude osteologique a l'interpretation de quelques sepultures pre- et proto historiques du Midi de la France. *Cahiers d'Anthropologie* 1 : 55-101.

Duday H. 1981. La place de 1'anthropologie dans 1'etude des sepultures anciennes, *Cahiers d'Anthropologie* 1 : 27-42.

Duday H. 1995. Anthropologie « de terrain », Archeologie de la Mort, *in* J.-P. Cros, J.-M. Large (eds), *La Mort. Passe, Present, Conditionnel, Actes du colloque de La Roche-sur-Yon, juin 1994,* Groupe Vendeen d'etudes prehistoriques, La Roche-sur-Yon, p. 33-58.

Duday H. 2009. *The archaeology of the dead: lectures in archaeothanatology*. Oxbow Books, Oxford.

Durante S. and M. Tosi 1977. The aceramic shell middens of Ra's al-Hamra: a preliminary note. *Journal of Oman Studies*, 3: 137-172.

During B.S. and E. Olijdam 2015. Revisiting the Suhar hinterlands: the Wadi al-Jizi Archaeological Project. *Proceedings of the Seminar for Arabian Studies* 45: 93-106.

During B.S., E. Olijdam, and S.A. Botan. 2017. New Iron Age funerary data from collective graves in Wādī Fizh, northern Oman. *Proceedings of the Seminar for Arabian Studies* 47: 75-92.

During Caspers E.C.L. 1970. Trucial Oman in the third millennium B.C.: new evidence for contacts with Sumer, Baluchistan and the Indus Valley. *Origini: preistoria e protostoria delle civilta antiche,* Roma, pp. 205-276.

During Caspers E.C.L. 1971. New archaeological evidence for maritime trade in the Persian Gulf during the Late Protoliterate Period. *East and West* 21(1-2): 21-44.

Durkheim E. 1915. *The elementary forms of the religious life: a study in religious sociology.* Macmillan.

Eddisford D. and C. Phillips. 2009. Kalba in the third millennium (Emirate of Sharjah, UAE). *Proceedings of the Seminar for Arabian Studies* 39: 111-124.

ElMahi A.T. and M. Ibrahim 2003. Two seasons of investigations at Manal site in the Wadi Samayil area, Sultanate of Oman. *Proceedings of the Seminar for Arabian Studies* 33: 77-98.

Fabian J. 1973. How others die: reflections on the anthropology of death. In A. Mack (ed.), *Death and the American experience*. New York: Schocken, pp.177-201.

Frank A. 1993. Bronze Age world system cycles. *Current Anthropology* 34: 383-405.

Frifelt K. 1971. Jemdet Nasr graves in Oman. *Kuml* 1970: 355-383.

Frifelt K. 1975a. On prehistoric settlement and chronology of the Oman Peninsula. *East and West* 5: 359-424.

Frifelt K. 1975b. A possible link between the Jemdet Nasr and Umm an-Nar graves of Oman. *Journal of Oman Studies* 1: 57-80.

Frifelt K. 1976. Evidence of a third millennium B.C. town in Oman. *Journal of Oman Studies* 2: 57-67.

Frifelt K. 1980. 'Jemdet Nasr graves' on the Oman Peninsula. In B. Alster (ed.), *Death in Mesopotamia*. Akademisk Forlag, Copenhagen, pp. 273-279.

Frifelt K. 1985. Further evidence of the third millennium BC town at Bat in Oman. *Journal of Oman Studies* 7: 89-104.

Frifelt K. 1991. *The Island of Umm an-Nar. Volume 1: Third Millennium Graves*. Jutland Archaeological Society Publications XXVI: 1.

Gagnaison C., P. Barrier, S. Méry, and W.Y al-Tikriti 2004. Extractions calcaires eocenes a l'Age du Bronze et architecture funeraire a Hili (Emirat d'Abou Dhabi). *Revue d'Archeometrie* 28: 97–108

Gatto E., G. Basset, S. Méry, and K. McSweeney 2003. Paleodemographic study and fire use at Hili N: an Early Bronze Age collective pit-grave in the United Arab Emirates. *Bulletins et Memoires de la Societie d'Anthropologie de Paris* 15(1-2): 25-47.

Gaultier G., H. Guy, O. Munoz, M. Tosi, and D. Usai 2005. Settlement structures and cemetery at Wadi Shab-GAS1, Sultanate of Oman: report on the 2002 and 2003 field seasons, *Arabian Archaeology and Epigraphy* 16: 1-20.

Gentelle P. and K. Frifelt 1989. About the distribution of graves and settlements in the Ibri area of Oman. In: P.M. Costa and M. Tosi (eds), *Oman Studies: Papers on the archaeology and history of Oman.* Serie Orientalia Roma, 63 Roma: Istituto Italiano per il Medio ed Estremo Oriente, pp. 119- 126.

Gernez G. 2019. Excavations at Adam South Graveyard. *Journal of Oman Studies* 20: 112-142.

Gernez G. and J. Giraud 2019. Exploring continuity and discontinuity from the Early to the Middle Bronze Age in central Oman. In K.D. Williams and L.A. Gregoricka (eds.), *Life and death in Bronze Age Arabia: mortuary and bioarchaeological perspectives.* University Press Florida, Gainesville, pp. 121-140.

Gillespie S.D. 2002. Body and soul among the Maya: keeping the spirits in place. In H. Silverman and D.B. Small (eds.) *The space and place of death.* American Anthropological Association: Arlington, VA. pp. 67-78.

Giraud J. 2010. Early Bronze Age graves and graveyards in the eastern Ja'alan (Sultanate of Oman): an assessment of the social rules working in the evolution of a funerary landscape. In L. Weeks (ed.), *Death and burial in ancient Arabia and beyond: multidisciplinary perspectives* Archaeopress, Oxford, pp. 71-84.

Giraud J., J-F. Berger, G. Davtian, and S. Cleuziou 2005. L'espace social des sociétés de l'Age du Bronze au sultanat d'Oman (région du Ja'alan, IIIe millénaire av. j.- C.). In J-F. Berger, F. Bertoncello, F. Braemer, G. Davtian, and M. Gazenbeek (eds.), *Temps et Espaces de l'Homme en Société, Analyses et Modèles Spatiaux en Archéologies, XXV recontres internationales d'archéolgies et d'historire d'Antibes,* Éditions APDCA, Antibes, pp. 307-316.

Giraud J. and S. Cleuziou 2006. Les prospections dans la province du Ja'alan (Sultanat d'Oman): d'un terrain desertique al l'analyse dy systeme d'habitat au III^{e} millenaire av. J-C. *Cahier des Themes Transversaux ArScAn*. VII: 38-46.

Giraud J. and S. Cleuziou 2009. Funerary landscape as part of the social landscape and its perceptions: three thousand early Bronze Age burials in the eastern Ja'alan (Sultanate of Oman). *Proceedings of the Seminar for Arabian Studies* 39: 163-180.

Giraud J., A.H.S. Al-Mahrooqi, G. Gernez, S. Righetti, E. Portat Sevin-Allouet, C. Sevin-Allouet, M. Lemee, and S. Cleuziou 2010. The first three campaigns (2007-2009) of the survey at Adam (Sultanate of Oman). *Proceedings of the Seminar for Arabian Studies* 40: 175-183.

Glob P.V. 1959. Archaeological investigations in four Arab states. *Kuml* 1959. pp. 233-239.

Gluckman M. 1937. Mortuary customs and the belief in survival after death among the south-eastern Bantu. *Bantu studies* 11: 117-136.

Gluckman, M. 1962. Les Rites de Passage. In M. Gluckman (ed.), *Essays on the Ritual of Social Relations*. London: Manchester University Press.

Goldstein L. 1981. One-dimensional archaeology and multi-dimensional people spatial organization and mortuary analysis. In R. Chapman, I. Kinnes, and K. Randsborg (eds.), *The archaeology of death.* Cambridge University Press, London, pp. 53-69.

Goldstein L. 1995. Landscape and mortuary practices: a case for regional perspectives. In L.A. Beck (ed.), Regional approaches to mortuary analysis. Plenum Press, New York, pp. 101-124.

Gordon C.G. and J.E. Buikstra 1981. Soil pH, bone preservation, and sampling bias at mortuary sites. American antiquity, 46(3): 566-571.

Gregoricka L.A. 2013. Geographic origins and dietary transitions during the Bronze Age in the Oman Peninsula. *American journal of physical anthropology*, 152: 353-369.

Gregoricka L.A. 2014, Assessing life history from commingled assemblages: the biogeochemistry of inter-tooth variability in Bronze Age Arabia. *Journal of archaeological science*, 47: 10-21.

Gregoricka L.A., J. Ullinger, and A. Schrenk 2021. Set apart from within: articulated women in commingled tombs from Early Bronze Age Arabia, *Arabian archaeology and epigraphy*, in press. DOI: 10.1111/aae.12198

Haddu M.M. 1989. Preliminary report on the excavations in Tomb N at Hili. *Archaeology in the United Arab Emirates* 5: 55-71.

Haerinck E. 1991. The rectangular Umm an-Nar-period grave at Mowaihat (Emirate of Ajman, United Arab Emirates). *Gentse Bijdragen, tot de Kunstgeschiedenis en Oudheidkunde* 29: 1-30.

Harrower M.J., M.J. Senn, and J. McCorriston 2014. Tombs, triliths, and oases: spatial analysis of the Arabian Human Social Dynamics (AHSD) Project, archaeological survey 2009-2010. *Journal of Oman Studies* 18: 145-151.

Haser J. 2003. Archaeological results of the 1999 and 2000 survey campaigns in Wadi Bani ʿAwf and the region of al-Hamra (Central Oman). *Proceedings of the Seminar for Arabian Studies* 33: 21-30.

Hastings A., J.H. Humphries, and R.H. Meadow. 1975. Oman in the third millennium BCE. *Journal of Oman Studies* 1: 9-55

Hellyer P. 1998. *Hidden riches: an archaeological introduction to the United Arab Emirates*. Union National Bank, Abu Dhabi.

Hertz R. 1907. Contribution à Une Etude sur la Representation Collective de la Mort. L'*année sociologique* 10: 48-137.

Hertz R. 1960 [1907]. *Death and the right hand: a contribution to the study of the collective representation of death*. Free Press, Glencoe, IL.

Hodder I. 1980. Social structure and cemeteries: a critical appraisal. In P. Rahtz, T. Dickinson, and L. Watts (eds.), *Anglo-Saxon Cemeteries 1979, the Fourth Anglo-Saxon Symposium at Oxford*. BAR British Series 82, pp. 161-170.

Hodder I. 1982a. *Symbols in action*. Cambridge University Press, Cambridge.

Hodder I. 1982b. Theoretical archaeology: a reactionary view. In I. Hodder (ed.), *Symbolic and structural archaeology.* Cambridge University Press, Cambridge, pp. 1-16.

Hodder I. 1985. Postprocessual archaeology. *Advances in Archaeological Method and Theory*. 8: 1-26.

Hooten E.A. 1930. *The Indians of Pecos Pueblo: a study of their skeletal remains. Papers of the Southwestern Expedition, Vol 4*. Yale University Press, New Haven.

Horn H.S. 1966. Measurement of overlap in comparative ecological studies. *The American Naturalist*, 100(914): 419-424

Humphries J.H. 1974. Harvard archaeological survey in Oman, [1973]: II – some later prehistoric sites in the Sultanate of Oman. *Proceedings of the Seminar for Arabian Studies* 4: 49-77.

Ibrahim M. and A.T. ElMahi 2000. A survey between Quriyat and Sur in the Sultanate of Oman (1997). *Proceedings of the Seminar for Arabian Studies* 30: 119-136.

Ingold T. 1986. *The appropriation of nature: essays on human ecology and social relations*. Manchester University Press, Manchester.

Al-Jahwari N.S. 2009. The agricultural basis of Umm an-Nar society in the northern Oman peninsula (2500-2000BC). *Arabian Archaeology and Epigraphy* 20, 122-133.

Al-Jahwari N.S. 2011. Quantified analysis of long-term settlement trends in the northern Oman peninsula. *Proceedings of the Seminar for Arabian Studies* 41: 133-143.

Al-Jahwari N.S. 2013a. The Early Bronze Age funerary archaeological landscape of western Ja'alan: results of three seasons of investigation. *Arabian Archaeology and Epigraphy* 24, 151-173.

Al-Jahwari N.S. 2013b. *Settlement Patterns, Development and Cultural Change in the Northern Oman Peninsula: A Multi-tiered Approach to the Analysis of Long-Term Settlement Trends*. BAR International Series 2483.

Al-Jahwari N.S. and D. Kennet 2008. A field methodology for the quantification of ancient settlement in an Arabian context. *Proceedings of the Seminar for Arabian Studies* 38: 203-214.

Al-Jahwari N.S. and D. Kennet 2010. Umm an-Nar settlement in the Wadi Andam (Sultanate of Oman). *Proceedings of the Seminar for Arabian Studies* 40: 201-212.

Al-Jahwari N.S., K. Douglas, M. Al-Belushi and K.D. Williams 2018. Umm an-Nar Settlement at Dahwa (DH1), Oman: Preliminary Results of the Archaeological Investigation, 2014-2016. *Proceedings of the conference: Beyond tombs and towers – domestic architecture of the Umm an-Nar period in Eastern Arabia*. Harrassowitz Verlag: Wiesbaden, pp. 29-50.

Jasim S.A. 2003. Third millennium culture in the Emirate of Sharjah. In Potts D., Al-Naboodah and P. Hellyer (eds.), *Archaeology of the United Arab Emirates: Proceedings of the First International Conferences on the Archaeology of the UAE.* Trident Press, London, pp. 85-99.

Jasim S.A. 2006. The archaeological sites of Jebal al-Buhais. In: H.-P. Uerpmann, M. Uerpmann, and S.A. Jasim (eds), *Funeral monuments and human remains from Jebel al-Buhais, the archaeology of Jebel al-Buhais, United Arab Emirates.* Department of Culture and Information, Government of Sharjah, United Arab Emirates, pp. 13-63.

Jasim S.A. 2012. *The necropolis of Jebel al-Buhais: prehistoric discoveries in the Emirate of Sharjah, United Arab Emirates.* Department of Culture and Information, Sharjah, United Arab Emirates.

Johnson I. 2004. Aoristic analysis: seeds of a new approach to mapping archaeological distributions through time. In K.F. Ausserer, W. Börner, M. Goriany, and L. Karlhuber-Vöckl (eds.), *[Enter the past] the E-way into the four dimensions of cultural heritage: CAA2003.* Archaeopress, Oxford, pp. 448–452.

Jost L. 2007. Partitioning diversity into independent alpha and beta components. *Ecology* 88(10): 2427–2439.

Kennet D. and N.S. Al-Jahwari (eds.) 2016. *Archaeological Rescue Excavation on Packages 3 and 4 of the Batinah Expressway, Sultanate of Oman.* Ministry of Heritage and Culture, Archaeopress, Oxford.

Kennet D., W.M. Deadman, and N.S. Al-Jahwari 2016. The Rustaq-Batinah archaeological survey. *Proceedings of the Seminar for Arabian Studies* 46: 155–168.

Korlevic P., S. Talamo, and M. Meyer 2018. A combined method for DNA analysis and radiocarbon dating from a single sample. *Nature scientific reports*. 8:4127. DOI:10.1038/s41598-018-22472-w

Kroeber A. 1927. The disposal of the dead. *American anthropologist* 29: 308-315.

Kunter M. 1991. Die menschlichen skelettreste aus den grabern von Umm an-Nar, Abu Dhabi, U.A.E. (3. Jt.v. Chr). In Frifelt K. (ed.), *The Island of Umm an-Nar. Volume 1: Third Millennium Graves* (Jutland Archaeological Society Publications 26.1), pp163-179.

Larsen C.S. 1997. *Bioarchaeology: interpreting behavior from the skeleton*. Cambridge University Press: Cambridge.

Littleton J. and K. Frifelt 2006. Trepanations from Oman: a case of diffusion? *Arabian Archaeology and Epigraphy* 17: 139-151.

Madsen B. 2017. *The Early Bronze Age Tombs of Jebel Hafit*. Jutland Archaeological Society Publications. Volume 93.

Maggi R. 1984. Excavation at the RH5 settlement, Qurm, winter 1984-1985. *East and West,* 34(4): 455-465.

Maggi R., P. Biagi, R.A. Travers, and R. Nisbet 1985. Excavations at the RH5 and RH6 sites, Qurm, Winter 1985-1986. *East and West,* 35(4): 407-417.

Malinowski B. 1944. *A Scientific Theory of Culture, and Other Essays.* University of North Carolina Press.

Marcucci, L. G. 2012. Exploration of HD-60, a Large Bronze Age Deposit of Conus sp. at Ra's al-Hadd, Sultanate of Oman. In J. Giraud and G. Gernez (eds.), *Aux marges de l'archéologie: Hommage à Serge Cleuziou* (Travaux de la Maison René-Ginouvès 16). Paris: De Boccard, 443-50.

Martin D.L. and D.T. Potts 2012. Lesley: a unique Bronze Age individual from Southeastern Arabia. In: A.L. Stodder and A.M. Palkovich (eds.), *The Bioarchaeology of Individuals*. University Press of Florida, Gainesville, pp: 113-126.

Martin D.L., K.M. Baustian, and A. Osterholtz 2019. The tomb at Tell Abraq (ca. 2100-2000BC). In K.D. Williams and L.A. Gregoricka (eds.), *Life and death in Bronze Age Arabia: mortuary and bioarchaeological perspectives*. University Press Florida, Gainesville, pp. 182-200.

McCorriston J., T. Steimer-Herbet, M.J. Harrower, K.D. Williams, J-F. Saliège, and A. Bin 'Aqil. 2011. Gazetteer of small scale monuments in prehistoric Hadramawt, Yemen: A radiocarbon chronology from RASA-AHSD project research 1996-2008. *Arabian Archaeology and Epigraphy* 22, 1-22.

McCorriston J., M.J. Harrower, T. Steimer-Herbet, K.D. Williams, M.J. Senn, M. Al-Hadhari, M. Al-Kathiri, J-F. Saliège, J. Everhart 2014. Monuments and landscape of mobile pastoralists: The Dhofar Monument Survey 2009–2011. *Journal of Oman Studies* 18:117-144.

McSweeney K, S. Méry, W.Y. Al-Tikriti, and S. Van Der Leeuw 2004. New approaches to a collective grave from the Umm an-Nar Period at Hili (UAE). *Paléorient* 30(1): 163-178.

McSweeney K., S. Méry, and R. Macchiarelli 2008. Rewriting the end of the Early Bronze Age in the United Arab Emirates 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, 1–14.

McSweeney K., S. Méry, and W.Y. Al-Tikriti 2010. Life and death in an Early Bronze Age community from Hili, Al Ain, UAE. In L. Weeks (ed.), *Death and burial in ancient Arabia and beyond: multidisciplinary perspectives*. Archaeopress, Oxford, pp. 45-54.

Meadow R.H., J.H. Humphries, and A. Hastings 1976. Explorations in Oman, 1973 and 1975; prehistoric settlements and ancient copper smelting with its comparative aspects in Iran. *Proceedings of the IVth annual symposium on archaeological research in Iran* pp. 110-129.

Méry S. 1997. A funerary assemblage from the Umm an-Nar period: the ceramics from tomb A at Hili North, UAE. *Proceedings of the Seminar for Arabian Studies* 27: 171-191.

Méry S. 2010. Results, limits and potential: burial practices and Early Bronze Age societies in the Oman Peninsula. In L. Weeks (ed.), *Death and burial in ancient Arabia and beyond: multidisciplinary perspectives*. Archaeopress, Oxford, pp. 33-43.

Méry S., J. Rouquet, K. McSweeney, G. Basset, J-F. Saliège, and W.Y. Al-Tikriti 2001. Re-excavation of the Early Bronze Age collective Hili N pit-grave (Emirate of Abu Dhabi, UAE): results of the first two campaigns of the Emirati-French project. *Proceedings of the Seminar for Arabian Studies* 31: 161-178.

Méry S., K. McSweeney, S. Van Der Leeuw, and W.Y. Al-Tikriti 2004. New approaches to a collective grave from the Umm an-Nar Period at Hili (UAE). *Paleorient* 30(1): 163-178.

Méry S., K. McSweeney, J. Rouquet, G. Basset, and W.Y. Al-Tikriti 2008. New Evidence of Funerary Practices at the end of the Early Bronze Age at Hili, United Arab Emirates. In E. Olijdam and RH Spoor (eds.), *Intercultural Relations between South and Southwest Asia. Studies in Commemoration of E.C.L. During Caspers (1934-1996)*. Bar International Series 1826, pp. 200-208.

Méry S. and M. Tengbeng 2009. Food for eternity? The analysis of a date offering from a 3rd millennium BC grave at Hili N, Abu Dhabi (United Arab Emirates). *Journal of Archaeological Science* 36: 2012–2017.

Metcalf P. and R. Huntington. 1991. *Celebrations of Death: The Anthropology of Mortuary Ritual. 2nd Edition*. Cambridge University Press: Cambridge.

Miller D. 1982. Structures and strategies: an aspect of the relationship between social hierarchy and cultural change. In I Hodder (ed.), *Symbolic and Structural Archaeology*. Cambridge University Press: Cambridge. pp. 89-98.

Miller D. and C. Tilley (eds.) 1984. *Ideology, Power and Prehistory*. Cambridge University Press, Cambridge.

Monchablon C., R. Crassard, O. Munoz, H. Guy, G. Bruley-Chabot, and S. Cleuziou 2003. Excavations at Ra's al-Jinz RJ-1: stratigraphy without tells. *Proceedings of the Seminar for Arabian Studies* 33: 31-47.

Morris I. 1991. The archaeology of ancestors: the Saxe/Goldstein hypothesis revisited. *Cambridge archaeological journal* 1(2): 147-169.

Morton S.G. 1839. *Crania Americana; or, a Comparative View of the Skulls of Various Aboriginal Nations of North and South America, to Which is Prefixed an Essay on the Varieties of the Human Species*. J. Dobson, Philadelphia.

Morton S.G. 1844. *Crania Aegyptica*. J. Pennington, Philadelphia.

Munoz, O. 2014. *Pratiques funéraires et paramètres biologiques dans la Péninsule d'Oman du Néolithique à la fin de l'âge du Bronze ancien (Ve-IIIe millénaires av. N.E.)*. PhD Thesis, Université Paris 1 - Panthéon-Sorbonne / Università di Roma - La Sapienza, Paris.

Munoz O. 2017. Transition to agriculture in South-Eastern Arabia: insights from oral conditions. *American Journal of Physical Anthropology* 164.4: 702-719.

Munoz O. 2019. Promoting group identity and equality by merging the dead. In K.D. Williams and L.A. Gregoricka (eds.), *Life and death in Bronze Age Arabia: Mortuary and bioarchaeological perspectives*. Gainesville: University Press Florida, 21-40.

Munoz, O. 2022. Protohistoric cairns and tower tombs in South-Eastern Arabia (end of the 4th-beginning of the 3rd millennium BCE). In L. Laporte, J.-M. Barge, L. Nespoulous, C. Scarre, and T. Steimer-Herbet (eds.), *Megaliths of the world, Vol. 2*. Oxford: Archaeopress, 905-20.

Munoz O. and S. Cleuziou 2008. La tombe 1 de Ra's al-Jinz RJ-1: une approche de la complexité des pratiques funéraires dans la péninsule d'Oman à l'Âge du Bronze ancien. Proceedings of the 5th International Congress on the Archaeology of the Ancient Near East, pp. 627-644.

Munoz O. and S. Cleuziou 2008. La tombe 1 de Ra's al-Jinz RJ-1: une approche de la complexité des pratiques funéraires dans la péninsule d'Oman à l'Âge du Bronze ancien. *Proceedings of the 5th International Congress on the Archaeology of the Ancient Near East,* pp. 627-644.

Munoz O., R. Ghazal and H. Guy 2012. Use of ossuary pits during the Umm an-Nar period: New insights on the complexity of burial practices from the site of Ra's al-Jinz (RJ-1), Oman. In J. Giraud and G. Gernez (eds.), *Aux marges de l'archéologie: Hommage à Serge Cleuziou* (Travaux de la maison René-Ginouvès 16). De Boccard, Paris, 451-67.

Munoz O., S. Scaruffi and F. Cavulli. 2010. The burials of the Middle Holocene settlement of KHB-1 (Ra's al-Khabbah, Sultanate of Oman). In L. Weeks (ed.) *Death and Burial in Arabia and Beyond: Multidisciplinary Perspectives* (BAR International Series 2107). Oxford: Archaeopress, 1-10.

Munoz, O., A. Zazzo, E. Bortolini, G. Seguin, J.-F. Saliège and S. Cleuziou 2008. Reconstructing the diet of the ancient fishermen of Ra's al-Hadd and Ra's al-Jinz (Sultanate of Oman) using radiocarbon dates. Poster presented at *Les Déserts d'Afrique et d'Arabie: Environnement, climat et impact sur les populations* (Colloque de l'Académie des sciences, Institut de France, Paris). doi: 10.13140/RG.2.2.15520.05125

Murphy L., B.G. Barnett, R.G. Holloway, and C.M. Sheldon. 1981. An experiment to determine the effects of wet/dry cycling on certain common cultural materials. *The final report of the National Reservoir Inundation Study. Technical Report*, 8-1.

El-Najjar M.Y. 1985. An anthropological study on the skeletal remains from Tomb A at Hili North. Archaeology in the United Arab Emirates. 4: 38-43.

Neiman F. D. 1995. Stylistic variation in evolutionary perspective: inferences from decorative diversity and interassemblage distance in Illinois Woodland ceramic assemblages. *American Antiquity* 60: 7–36.

Neumann G.K. 1952. Archaeology and race in the American Indian. In: J.B. Griffin (ed.) *Archaeology of Eastern United States*. University of Chicago Press: Chicago.

Newton L. and J. Zarins. 2010. Preliminary results of the Dhofar archaeological survey. *Proceedings of the Seminar for Arabian Studies* 40: 247-265.

O'Shea J.M. 1981. Social configuration and the archaeological study of mortuary practices: a case study. In R. Chapman, I. Kinnes, and K. Randsborg (eds.), *The archaeology of death.* Cambridge University Press, London, pp. 39-52.

Parker Pearson M. 1982. Mortuary practices, society and ideology: an ethnoarchaeological study. In I. Hodder (ed.), *Symbolic and structural archaeology*. Cambridge University Press, Cambridge, pp. 99-114.

Parker Pearson M. 2002. Placing the physical and incorporeal dead: Stonehenge and changing concepts of ancestral space in Neolithic Britain. In H. Silverman and D.B. Small (eds.), *The space and place of death.* American Anthropological Association, Arlington, VA., pp. 145-160.

Parkin R. 1996. *The dark side of humanity: the work of Robert Hertz and its legacy*. Harwood Academic Publishers, Amsterdam.

Phillips C. 2007. The third-millennium tombs and settlement at Mowaihat in the Emirate of Ajman, UAE. *Arabian Archaeology and Epigraphy* . 18: 1-7.

Pinhasi R., D. Fernandes, K. Sirak, M. Novak, S. Connell, S. Alpaslan-Roodenberg, F. Gerritsen, V. Moiseyev, A. Gromov, P. Raczky, A. Anders, M. Pietrusewsky, G. Rollefson, M. Jovanovic, H. Trinhhoang, G. Bar-Oz, M. Oxenham, H. Matsumura, and M. Hofreiter 2015. Optimal Ancient DNA Yields from the Inner Ear Part of the Human Petrous Bone. *PLoS ONE* 10(6): e0129102. doi:10.1371/journal.pone.0129102

Potts D.T. 1986. Eastern Arabia and the Oman peninsula during the late fourth and early third millennium BC. In W. Finkbeiner and U. Rollig (eds.), *Gamdat Nasr: Period or Regional Style?,* Beihefte zum Tübinger Atlas des Vorderen Orients, Reihe B, volume 62, 121–170

Potts D.T. 1989. Excavations at Tell Abraq, 1989. *Paleorient* 15(1): 269-271.

Potts D.T. 1993a. A new Bactrian find from southeastern Arabia. *Antiquity* 76: 591-596.

Potts D.T. 1993b. The late Prehistoric, Protohistoric, and Early Historic periods in eastern Arabia (ca. 5000-1200 B.C.). *Journal of World Prehistory* 7: 163-212.

Potts D.T. 1993c. Four seasons of excavation at Tell Abraq (1989-1993). *Proceedings of the Seminar for Arabian Studies* 23: 117-126.

Potts D.T. 1994. South and Central Asian Elements at Tell Abraq (Emirate of Umm al-Qaiwain, United Arab Emirates), c. 2200 BC – 300 AD'. In: A. Parpola and P. Koskikallio (eds), *South Asian Archaeology 1993*, vol. II. Helsinki, Annales Academiae Scientiarum Fennicae Ser. B-271, pp 615–628.

Potts D.T. 1997. Rewriting the late prehistory of South-Eastern Arabia: a Reply to Jocelyn Orchard. *Iraq* 59:63–71.

Potts D. T. and L. Weeks 1999. An AMS radiocarbon chronology for the late Umm an-Nar type tomb at Tell Abraq. Tribulus. Bulletin of the Emirates Natural History Group, 9.1, 9–10.

Potts D.T. 2000. Ancient Magan. Trident Press, London.

Potts D.T. 2003. Before the Emirates: an archaeological and historical account of developments in the region c. 5000 BC to 676 AD. In I. Al Abed, and P. Hellyer (eds.), *United Arab Emirates: a new perspective.* Trident Press, London, pp. 28-69.

Potts D.T. 2012. The Hafit-Umm an-Nar transition: Evidence from Falaj al-Qaba'il and Jabal al-Emalah. In J. Giraud and G. Gernez (eds.) *Aux Marges de l'archéologie: ouvrage à la mémoire de Serge Cleuziou*, Collection

Travaux de la Maison René-Ginouvés, De Boccard, Paris, pp. 371-377.

Pullar J. and Jäckli B. 1978. Some aceramic sites in Oman. *Journal of Oman Studies* 4: 53-74.

Rakita G.F.M. and J.E. Buikstra. 2005. Introduction. In G.F.M. Rakita, J.E. Buikstra, L.A. Beck, and S.R. Williams (eds.), Interacting with the dead: perspectives on mortuary archaeology for the new millennium. University Press, Gainesville, pp. 1-11.

Radcliffe-Brown A.R. 1922. *The Andaman Islanders*. Cambridge University Press, Cambridge.

Ratcliffe J. H. 2000. Aoristic analysis: the spatial interpretation of unspecific temporal events. *International journal of geographical information science* 14(7): 669-679.ù

Renfrew C. 1976. Megaliths, territories and populations. In S.J. De Laet (ed.), *Acculturation and Continuity in Atlantic Europe*. De Tempel, Brugge, pp. 198-220.

Rose J.I. 2004. The Question of Upper Pleistocene Connections between East Africa and South Arabia. *Current Anthropology* 45(4): 551-555.

Rose J.I. 2006. Origins of early man in Oman during the Middle and Upper Pleistocene. In: H.M. al-Lawati, B. Al-Sabri, R. Al-Farsi and K. Al-Rahbi (eds), *Proceedings of the International Symposium, Archaeology of the Arabian Peninsula Through the Ages*. Muscat: Ministry of Heritage and Culture, pp. 31-51

Rose J.I. 2007. The Arabian Corridor Migration Model: archaeological evidence for hominin dispersals into Oman during the Middle and Upper Pleistocene. *Proceedings of the Seminar for Arabian Studies* 37: 219- 237.

Rutkowski Ł. 2017. Archaeological investigation of Early Bronze Age burial site QA 1 in Wadi al Fajj in northern Oman: Results of the 2016 season. *Polish Archaeology in the Mediterranean*, *26*, 523-542.

Rutkowski Ł. 2020. Some thoughts on the burial space inside QA 1-1, an Umm an-Nar tomb in Wādī al-Fajj (Oman): A case of incomplete paving of the tomb's floor. *Proceedings of the Seminar for Arabian Studies*, *50*, 307–320.

Rutkowski Ł. 2021. Umm an-Nar soft-stone vessel assemblage from Tomb QA 1-1 (Oman) based on finds recovered from half the tomb. *Arabian archaeology and epigraphy*. 32(1): 213-242.

Rutkowski Ł. and M. Parol. 2021. The skeletal remains from Umm an-Nar tomb QA 1-1: Spatial distribution and anthropological analysis. *Polish Archaeology in the Mediterranean* 30.2: 103-27.

Salvatori S. 2001. Excavations at the funerary structures HD 10-3.1,3.2,4.1,4.2 and 2.1 at Ra's Al-Hadd (Sultanate of Oman). *Rivista di Archeologia* 43: 67-83.

Saxe A.A. 1970. Social dimensions of mortuary practices. PhD thesis. University of Michigan.

Saxe A.A. 1971. Social dimensions of mortuary practices in a Mesolithic population from Wadi Halfa, Sudan. In J. Brown (ed.) *Approaches to the social dimensions of mortuary practices. Memoir of the Society for American Archaeology* 25, Washington D.C., pp. 39-57.

Saxe A.A. and P.L. Gall. 1977. Ecological determinants of mortuary practices: the Temuan of Malaysia. In W. Wood (ed.), *Cultural-Ecological Perspectives on Southeast Asia: A Symposium*. Center for International Studies, Ohio University: Athens. pp. 74-82.

Schmidt C. and S. Döpper 2014. German expedition to Bat an al Ayn, Sultanate of Oman: the field seasons 2010 to 2013. *Journal of Oman Studies*, 18: 187-230.

Schmidt C., and S. Döpper 2017. The development of complexity at third-millennium BC al-Khashbah, Sultanate of Oman: results of the first two seasons, 2015 and 2016. *Proceedings of the Seminar for Arabian Studies* 47: 215-226.

Schuetter J., P. Goel, J. McCorriston, J. Park, M.J. Senn, and M.J. Harrower 2013. Autodetection of ancient Arabian tombs in high-resolution satellite imagery. *International journal of remote sensing*. 34(19):6611-6635.

Schreiber J. 2007. "Transformation processes in oases settlements in Oman" 2005 archaeological survey at the oasis of Nizwa: a preliminary report. *Proceedings of the Seminar for Arabian Studies* 37: 263-275.

Schreiber J. and J. Haser 2004. Archaeological survey at Tiwi and its hinterland (central Oman). *Proceedings of the Seminar for Arabian Studies* 34: 319-329.

Al-Shahri A.A.A.M. 1991. Grave types and "triliths: in Dhofar. *Arabian Archaeology and Epigraphy* 2(3): 182-195.

Sofaer J.R. 2006. *The body as material culture: a theoretical osteoarchaeology*. Cambridge University Press, Cambridge.

Stocks R. 1996. Wadi Haqil Survey Nov. 1992. *Proceedings of the Seminar for Arabian Studies* 26: 145-163.

Stone A.C. and A.T. Ozga 2019. Ancient DNA in the study of ancient disease. In J.E. Buikstra (ed.), *Ortner's identification of pathological conditions in human skeletal remains, 3rd edition.* Elsevier (Academic Press), London, pp. 183-210.

Tainter J.A. 1975. Social inference and mortuary practices: an experiment in numerical classification. *World archaeology* 7(1): 1-15.

Tainter J.A. 1978. Mortuary practices and the study of prehistoric social systems. *Archaeological method and theory* 1: 105-141.

Thesiger W. 1946. A new journey in southern Arabia. *The geographical journal*. 108(4/6): 129-145.

Thesiger W. 1950. Desert borderlands of Oman. *The geographical journal*. 116(4/6): 137-168.

Thesiger W. 1959. *Arabian Sands*. E.P. Dutton, New York.

Thomas B. 1932. *Arabia Felix: Across the Empty Quarter of Arabia.*

Thorvildsen K. 1962. Burial cairns on Umm an-Nar. *KUML*. 191-219.

Al-Tikriti W.Y. 1981. *Reconsideration of the Late Fourth and Third Millennium BC in the Arabian Gulf with special reference to the United Arab Emirates* [unpublished PhD thesis, Cambridge University].

Al-Tikriti W.Y. 1989. Umm an-Nar culture in the northern Emirates: third millennium BC tombs at Ajman. *Archaeology in the United Arab Emirates*, Department of Antiquities and Tourism, Al Ain, Vol 5, pp.89-100.

Al-Tikriti W.Y. and S. Méry 2000. Tomb N at Hili and the question of the subterranean graves during the Umm an-Nar period. *Proceedings of the Seminar for Arabian Studies* 30: 205-219.

Tilley C. 1982. Social formation, social structures and social change. In I. Hodder (ed.), *Symbolic and structural archaeology*. Cambridge University Press, Cambridge, pp. 26-38.

Ucko P.J. 1969. Ethnography and archaeological interpretation of funerary remains. *World archaeology* 1(2): 262-280.

Uerpmann H.-P., M. Uerpmann, and S.A. Jasim. 2006. *The Archaeology of Jebel Al-Buhais, Sharjah, United Arab Emirates*. Ministry of Culture and Information, Government of Sharjah, United Arab Emirates.

Ur Rahman S. 1980. Report on the Hili 2 settlement excavations 1976-1979. *Archaeology in the United Arab Emirates* 2.3: 8-18.

Usai D. 2006. A fourth-millennium BC Oman site and its context: Wadi Shab-GAS1. *Proceedings of the Seminar for Arabian Studies* 36: 275-288.

Van Dyke R.M. and S.E. Alcock (eds). *Archaeologies of memory*. Blackwell, Malden, MA.

van Gennep A. 1960 [1908]. *The rites of passage*. University of Chicago Press, Chicago.

Vogt B. 1985. Zur Chronologie und Entwicklung der Gräber des späten 4.– 2. Jahrtausends vor Christus auf der Halbinsel Oman: Zusammenfasung, Analyse und Würdigung publizierter wie auch unveröffenlichter Grabungsergebnisse [unpublished PhD thesis, Georg-August-Universität zu Göttingen.]

Vogt B. 1994. *Asimah. An account of a two months rescue excavation in the mountains of Ras al-Khaimah, United Arab Emirates*. Department of Antiquities and Museums, Ras al-Khaimah.

Wagner J.K., C. Colwell, K.G. Claw, A.C. Stone, D.A. Bolnick, J. Hawks, K.B. Brothers, N.A. Garrison 2020. Fostering responsible research in ancient DNA. *American journal of human genetics.* 107: 183-195.

Weber J., K.D. Williams, and L.A. Gregoricka 2019. Animals and the changing landscape of death on the Oman Peninsula in the third millennium BC. In K.D. Williams and L.A. Gregoricka (eds.), *Life and death in Bronze Age Arabia: mortuary and bioarchaeological perspectives.* University Press Florida, Gainesville, pp. 163-181.

Weisgerber G. 1980. ….und Kupfer in Oman'. *Der Anschnitt* 32(2-3):62-110.

Weisgerber G. 1981a. Evidence of ancient mining sites in Oman: a preliminary report. *Journal of Oman Studies* 4: 15-28.

Weisgerber G.1981b. Mehr als Kupfer in Oman. *Der Anschnitt* 33: 174-263.

Weisgerber G. 1983. Copper production during the third millennium BC in Oman and the question of Makan. *Journal of Oman Studies* 6(2): 269-276.

Whalen N. and K. E. Schatte. 1997. Pleistocene sites in southern Yemen. *Arabian Archaeology and Epigraphy* 8: 1-10.

Whitley J. 2002. Too many ancestors. *Antiquity* 76: 119-126.

Williams K.D. forthcoming. *Early Bronze Age ancestors of the Oman Peninsula*.

Williams K.D. forthcoming. *Health, quality of life, and life experience of Early Bronze Age people of the Arabian Peninsula*.

Williams K.D. and L.A. Gregoricka 2013. Social, Spatial, and Bioarchaeological Histories of Ancient Oman: mortuary archaeology of Dhank, Oman 2009-2013. *Arabian Archaeology and Epigraphy* 24:134-150

Williams K.D. and L.A. Gregoricka 2019. The Hafit/Umm an-Nar Transition of the Third Millennium BC: Evidence from the Architecture and Mortuary Ritual at Al Khubayb Necropolis. In K.D. Williams and L.A. Gregoricka (eds.), *Life and death in Bronze Age Arabia: mortuary and bioarchaeological perspectives.* University Press Florida, Gainesville, pp. 76-107.

Williams K.D. and L.A. Gregoricka 2020. New evidence of prehistoric tomb diversity in Dhank, Oman. *Journal of Oman Studies* 21: 102-127.

Williams K.D., N.S. Al-Jahwari and K. Douglas 2021. Preliminary Analyses of the Bronze Age and Post-Bronze Age Mortuary Monuments at the Dahwa sites, North Batinah Coast, Sultanate of Oman. E*ast and West* 61(2): 27-42.

Williams K.D., Robbins Schug G., Walsh M.J., Calleja M., Douglas K.A., and N.S. Al-Jahwari. Forthcoming, Umm an-Nar Death Practices at the Dahwa Site, North Batinah Coast, Oman.

Williams K.D., T. Steimer-Herbet, L.A. Gregoricka, J-F. Saliège, and J. McCorriston 2014. Bioarchaeological analyses of 3rd millennium BC high circular tower tombs in Dhofar, Oman. *Journal of Oman Studies* 18: 153-173.

Yule P. and G. Weisgerber 1998. Prehistoric tower tombs at Shir/Jaylah, Sultanate of Oman. *Beiträge zur Allgemeinen und Vergeichenden Archäologie* 18: 183-241.

Zazzo A., O. Munoz, J-F. Saliège 2014. Diet and mobility in a Late Neolithic population of coastal Oman inferred from radiocarbon dating and stable isotope analysis. *American journal of physical anthropology* 153(3): 353-364.

Zazzo A., O. Munoz, E. Badel, I. Béguier, F. Genchi, and L.G. Marcucci 2016. A revised radiocarbon chronology of the aceramic shell midden of Ra's al-Hamra 6 (Muscat, Sultanate of Oman): Implication for occupational sequence, marine reservoir age, and human mobility. *Radiocarbon* 58(2): 383-395.

Zarins J. 2001. *The Land of Incense. Archaeological Work in the Governate of Dhofar, Sultanate of Oman, 1990-1995*. Sultan Qaboos University: Muscat.

Zazzo A. and J-F. Saliège 2011. Radiocarbon dating of biological apatites: A review. *Palaeogeography, palaeoclimatology, palaeoecology* 310(1-2): 52-61.

Appendices

A.1 Published surveys that document cairns (the term "cairn" may have been used for structures that are not Early Bronze Age cairns)

A.2 Published excavated Early Bronze Age Cairns: Architecture Summary (does not include Jebel Hafit cairns)

A.3 Published excavated Early Bronze Age Cairns: Interments

A.4 Published excavated Early Bronze Age Cairns: Material Culture (does not include Jebel Hafit cairns)

A.5 Summary of architectural features and interments at Jebel Hafit

A.6 Summary of interred material culture at Jebel Hafit

A.7 Excavated Umm an-Nar tombs: Architecture Summary

A.8 Excavated Umm an-Nar bone pits

A.9 Excavated Umm an-Nar communal tombs and bone pits: Interments

A.10 Excavated Umm an-Nar communal tombs and bone pits: Material Culture

Table A.1. Published surveys that document cairns. NOTE: The term "cairn" may have been used for structures that are not Early Bronze Age cairns

Location	Site	Tomb Type	Notes	External Dimensions	wall thickness	Roof	#Walls	Entrance	Materials	Tomb Shape	Chamber Diameter	Citations
Wadi Bahla	BB-19	stone cairn	# of stone cairns on nearby hillock	–	–	–	–	–	–	–	–	Humphries 1974
Izki	–	cairn	small group of cairns - all opened	–	–	–	–	–	–	–	–	Humphries 1974
al Mudaibi	–	cairns (Beehive)	–	–	–	–	–	–				de Cardi 1975
Aflaj el-Beda	–	cairns (Beehive)	–	–	–	–	–	–				de Cardi 1975
northern Oman	Bukha, site d	beehive Cairns	roughly corbelled	H: 4-5ft	–	corbelled	2	–	–	–	–	de Cardi et al. 1975
northern Oman	Bukha, site d	Pillbox Cairns	similar to those at Kalba	–	–	–	–	–	–	–	–	de Cardi et al. 1975
northern Oman	Wadi Maqaqah, site b	conical burial Cairns	similar to those at Wadi Al Ayn; n=2	H: 4-5ft	–	–	–	–	–	–	–	de Cardi et al. 1975
Al-Ain, Mazyad, Hafit	–	cairn, grave	3km W Ibri, opposite village of Hijar, foot of Jebal Fajj Raybah; at least dozen mounds 4-5km N of Mazyad; Jebel Hafit	–	–	–	–	–	–	–	–	Frifelt 1975a
Wadi Jizzi/Suq	–	Circular cairn	On lower slopes; many hundreds	–	–	–	–	–	unshaped stone	circular	–	Frifelt 1975a
Dhank – Ibri – Bat	–	Cairns, beehive-shaped tombs	Hundreds	H:3-4m; D: 7-8m	–	–	2-3	south or west	Brownish limestone	–	–	Frifelt 1975a
25km East of Ibri	–	circular stone graves	>100	5-10m	–	–	–	–	–	–	–	Frifelt 1975a
Wadi Ibra	Wadi Ibra 2	cairn	–	–	–	–	–	–	–	–	–	Hastings et al. 1975
Wadi Ithli	Wadi Ithli 4	cairn	–	–	–	–	–	–	–	–	–	Hastings et al. 1975
Wadi Far	Wadi Far	cairn	–	–	–	–	–	–	–	–	–	Hastings et al. 1975
	BB-21	cairn	large cairn on nearby hillside from BB-21	–	–	–	–	–	–	–	–	Hastings et al. 1975
Wadi Bahls	Bisyiah	cairn	SE side of Wadi Bahla	–	–	–	–	–	–	–	–	Hastings et al. 1975
	Beni Bu Ali	cairn	900 large cairns	–	–	–	–	–	–	–	–	Hastings et al. 1975
Wadi Samad	Wadi Samad 4	cairn	–	–	–	–	–	–	–	–	–	Hastings et al. 1975
Wadi Halfayn	Zukayt, site 23	cairn; Beehive Tomb; tower tomb	~14 tombs; built of roughly coursed	–	–	corbelled walls; flat slabs on roof	2 rings	one tomb has two entrances (E&W)	honey & light grey stone	–	–	Hastings et al. 1975; de Cardi et al. 1976; Yule & Weisgerber 1998
Wadi Al 'Ayn	Ablah, site 45	beehive Cairn tombs	–	–	–	–	–	–	–	–	–	de Cardi et al. 1976
Wadi al Ithli	Aflaj, site 17	Beehive Tombs	–	–	–	–	–	–	–	–	–	de Cardi et al. 1976
Wadi al Ithli	Aflaj, site 17	Cairn tombs	well contructed; on ridge; attributed to Yemeni tribe	–	–	–	–	–	–	–	–	de Cardi et al. 1976
Wadi Al 'Ayn	Al 'Ayn, site 48	Beehive tomb	–	–	–	–	–	–		–	–	de Cardi et al. 1976
Wadi Al 'Ayn	Al 'Ayn, site 47	Beehive Tomb/ UAN	n=2	–	–	–	–	–		–	–	de Cardi et al. 1976
Wadi Al 'Ayn	Al 'Ayn, site 47	Beehive Tombs	n=21	–	–	corbelled; false domes	1 or 2	E	–	–	–	de Cardi et al. 1976

Location	Site	Tomb Type	Notes	External Dimensions	wall thickness	Roof	#Walls	Entrance	Materials	Tomb Shape	Chamber Diameter	Citations
Wadi Al Hijr	Al Banah, site 53	Beehive tombs	n=7; double skin; horizontal slab walls	–	–	–	2 rings	triangular opening (visible on one tomb)	limestone; one tomb shows kerb stone & white convex shaped stone	–	–	de Cardi et al. 1976
Wadi Al Hijr	Al Banah (site 52)	Cairn tombs	~2 were 2 tier type (seen at Qabal Siya)	–	–	–	–	–	river boulders	–	–	de Cardi et al. 1976
Wadi Ghul	Al Hamra (site 30)	Cairns	located on ridges of hills in plain N of Jabal al-Qal'ah; some cairns converted into sangars; rock art nearby	av D: 4.0m; av H: 2.0m;	–	–	–	–	small stones	–	–	de Cardi et al. 1976
Wadi Tayyib	Araqi (site 62)	Cairns	on hill W of site	–	–	–	–	–	–	–	–	de Cardi et al. 1976
Wadi Al Hijr	Bat (site 58)	Beehive Tombs	–	–	–	–	–	–	–	–	–	de Cardi et al. 1976
Wadi Misfah	Dumm (site 50)	low Cairns	several may have had cross-walls	–	–	–	–	–	river boulders	–	–	de Cardi et al. 1976
Wadi al Ithli	Fath (site 18a)	Beehive Tombs	2 tombs have lintels	one tomb 4.6m external diameter, 3.0m tall	–	–	2 rings	–	made of flat stones	–	–	de Cardi et al. 1976
Wadi al Ithli	Fath (site 18b)	tombs; Cairns	on low hills N of level area of wadi floor;	one tomb 6.2m diameter, ~1.0m tall	–	–	2	–	stone cut/hacked from nearby location & boulders; other cairns nearby only made from boulders	–	–	de Cardi et al. 1976
Wadi Nam/Jabal Al Haymah	Khafifa	Cairn tombs	group of cairn tombs; similar cairns 3km away	2 were 4+m tall	–	–	–	–	river boulders	–	–	de Cardi et al. 1976
Wadi Nam/Jabal Al Haymah	Khafifa (site 12)	pillbox tomb	n=4	D: 4.0m; H: 1.5m	–	–	–	–	–	–	–	de Cardi et al. 1976
Wadi Al Hijr	Khutm (site 57)	Cairn tombs	n~14	–	–	–	–	–	–	–	–	de Cardi et al. 1976
Wadi Al Kabir	Miskin (site 54)	Cairns	n=2; beehive: flat circle base, kerb	4.0m diameter; one 2-tier tomb 5-7m dia, 200mm high, upper tier 300mm high	–	–	–	–	–	–	–	de Cardi et al. 1976
Wadi Al Kabir	Miskin (site 54)	flat circular pillbox tombs	n=3; one was two-tier type like at Qabir;	–	–	–	–	–	–	–	–	de Cardi et al. 1976
Wadi Bu Taynah	Qabil (site 10)	Cairn tomb	n=1; north of trilith	H: 2.5m	–	–	–	–	–	–	–	de Cardi et al. 1976
Wadi Muqniyat	Qarn Kabsh (site 55)	Beehive Tombs	n=6; roughly coursed stone; robbed; in poor state	–	–	–	2 rings	–	–	–	–	de Cardi et al. 1976
Wadi Al 'Ayn	Qubur Juhhal (site 40)	Beehive Tombs	similar to those at Zukayt; built on ridges of hills; masonry-work inferior to Zukayt; n~50 tombs & 36 more nearby	Average D: 4.0m; H:2.0-3.0m	–	corbelled	–	–	white stone facings of random sizes	–	oval	de Cardi et al. 1976
Wadi Al-Ayn	Qubur Juhhul (site 40)	Cairn	large # large stone cairns	–	–	–	–	–	–	–	–	de Cardi et al. 1976

Location	Site	Tomb Type	Notes	External Dimensions	wall thickness	Roof	#Walls	Entrance	Materials	Tomb Shape	Chamber Diameter	Citations
Wadi Al Abyad	Rawdah (site 27)	conical Cairns	4 cairns; looted	–	–	flat tops	–	–	–	–	–	de Cardi et al. 1976
Wadi Sarin	Sa'a Sidri (Zahr Sidrah; site 1)	circular tomb	n=6; exterior robbed	D: 6.0-7.0m; H: ~1-2m	–	–	one tomb has 3 walls visible, decreasing diameter	–	similar sized boulders	round	–	de Cardi et al. 1976
Wadi Sarin	Saih Buerid (site 8)	Cairn tombs	possibly Beehive tomb foundation	D: 5.32m	0.5m	–	–	–	–	–	–	de Cardi et al. 1976
Wadi Sarin	Saih Buerid (site 8)	graves/circular tombs	approx 20 tombs/graves	–	–	–	–	–	–	–	–	de Cardi et al. 1976
Wadi Al-Ayn	Site 41 (site 41)	Cairns, possibly Beehive type	–	–	–	–	–	–		–	–	de Cardi et al. 1976
Wadi Sarin	Siya Haddiya (site 7)	large graves, similar to site 1	on wadi south bank opposite FEG; 15 graves	–	–	–	–	–	–	–	–	de Cardi et al. 1976
Wadi Muqniyat	Tawi Qarn Kabsh (site 56)	Cairn	n>16; large; on tops of two ridges; constructed of rubble; plundered	~6.0m dia, 4.0m tall	–	–	–	–	rubble	–	–	de Cardi et al. 1976
Wadi al Izz (part of W Ibra)	Tawi Silaim (site 9)	Cairn & Beehive tombs	located on south side and ridges, similar to those at FATH (site 18)	–	–	–	–	–	–	–	–	de Cardi et al. 1976
Wadi Sarin	Wadi Gheiran (site 6)	Cairns & Pill Box Type	very large number; most of cairns on lower slopes of eastern side of wadi and across opposite slopes of wadi	–	–	–	–	–	local brown stone	–	–	de Cardi et al. 1976
Jabal Halla (near Bahla)	Wihi al Murr (site 34)	cairn & circular tomb	~20 tombs; heaps of stone; stone circles w kerbs and central stone heaps	–	–	–	–	–	–	–	–	de Cardi et al. 1976
Wadi Halfayn	Zibb (site 22)	Cairn tombs	n= 14; other groups of cairns on low rock outcrops	one cairn is 1.2m tall, D: 4.0m	–	–	–	–	local rubble	–	–	de Cardi et al. 1976
East of Ibri	Bat	Beehive tomb	low terrace between a wadi and a rock outcrop 1-2km NE of Bat; Beehive tombs in northern part	–	–	–	–	–	–	–	–	Frifelt 1976
–	–	cairn, beehive cairn	–	–	–	–	–	–	–	–	–	Meadow et al. 1976
–	Wadi Samad 4	cairn	on hillsides, on floodplain to south	–	–	–	2	–	–	–	–	Meadow et al. 1976
–	Wadi Ibra	rubble cairn	n=23, on high ridge overlook	–	–	–	–	–	–	–	–	Meadow et al. 1976
–	Wadi Andam 16	cairn	–	–	–	–	–	–	–	–	–	Meadow et al. 1976
–	Wadi Andam 19	cairn	–	–	–	–	–	–	–	–	–	Meadow et al. 1976
–	Ithli 4	cairn	–	–	–	–	–	–	–	–	–	Meadow et al. 1976
–	Halfayn 3	cairn	–	–	–	–	–	–	–	–	–	Meadow et al. 1976
–	Zahir 2	cairn	–	–	–	–	–	–	–	–	–	Meadow et al. 1976
–	Zahir 3	cairn	–	–	–	–	–	–	–	–	–	Meadow et al. 1976
–	Batin 1	cairn	–	–	–	–	–	–	–	–	–	Meadow et al. 1976
Quryat	Muhya (site 6)	cairn tomb	group of ~15	–	–	–	–	–	boulders	–	–	Doe 1977
Quryat	Muhya (site 6a)	cairn	small group on south side of road	–	–	–	–	–	river boulders	–	–	Doe 1977

Location	Site	Tomb Type	Notes	External Dimensions	wall thickness	Roof	#Walls	Entrance	Materials	Tomb Shape	Chamber Diameter	Citations
Quryat	Muhya (site 6b)	cairn	n=9	two 3-4m diamter, 1 m tall	–	–	–	–	–	–	–	Doe 1977
Mazara	Lasmu (site 7)	cairn	n=1; 3 more cairns nearby	D: ~8.0m; H: 2.0m	–	–	–	–	large boulders	–	–	Doe 1977
Quryat	Hajr (site 9)	circular cairn tomb	tombs on the cliff edge	–	–	–	–	–	–	–	–	Doe 1977
–	Faw'ah (site 10, group A)	circular tomb	4km east of Faw'ah road junction, two groups of tombs; n=5, stone kerb base	largest: 6.0m diameter, 0.5m tall, chamber ~1.8-2.0m diameter, wall ~1-2m thick, ~0.4m tall	–	corbelled	1-2	–	stone slabs	–	–	Doe 1977
–	Faw'ah (site 10, group B)	circular tomb	4km east of Faw'ah road junction, two groups of tombs; n=4;	largest: 5.0m diameter, 3.0m chamber diameter, inner wall: 0.5m, outer wall:0.65m	–	corbelled	2	–	flat stones	–	–	Doe 1977
Sayh Hatah	Hajr (site 11)	cairn	~4km S Masjid Lugtah on N bank of small wadi; n=8	av 8.0m diameter	–	–	–	–	boulders	–	–	Doe 1977
–	Sawt (site12)	cairn	~14 cairns on both sides of wadi	–	–	–	–	–	–	–	–	Doe 1977
–	Mahlah (site 15)	cairn	~1.5km S Mahlah, 5 cairns (1 double chambers); some stone robbing	–	–	–	–	–	river boulders	–	–	Doe 1977
–	Qurr Hammam (site 17)	cairn	group of cairns, one has double chamber	one cairn with 2 walls (2.5m diameter; each wall 0.6m thick)	–	–	2	–	–	–	–	Doe 1977
–	Mizbar (site 20b)	cairns	cairns noted	–	–	–	–	–	–	–	–	Doe 1977
–	Mizbar (site 20c)	cairns	cairns noted	–	–	–	–	–	–	–	–	Doe 1977
–	Hindarut (site 21a)	cairns	cairns noted	–	–	–	–	–	–	–	–	Doe 1977
–	Hindarut (site 21b)	cairns	cairns noted	–	–	–	–	–	–	–	–	Doe 1977
–	Hindarut (site 21c)	cairns	cairns noted	–	–	–	–	–	–	–	–	Doe 1977
–	Hindarut (site 21d)	cairns	cairns noted	–	–	–	–	–	–	–	–	Doe 1977
Quryat	'Abayah (site 3)	pill-box tomb	oval & rectangular	–	–	flat slabs	–	–	boulders	–	–	Doe 1977

Location	Site	Tomb Type	Notes	External Dimensions	wall thickness	Roof	#Walls	Entrance	Materials	Tomb Shape	Chamber Diameter	Citations
–	Ba'id (site 22)	circular tomb & cairn tomb	group of 6 tombs and cairn tomb	3.0-6.0m diameter, wall 1.2m thick	–	large stone slabs & small pebbles	–	–	flat slabs	–	–	Doe 1977
–	Ba'id (site 22)	cairn & pill-box tombs	>35 tombs NE through small valley	–	–	–	–	–	–	–	–	Doe 1977
–	Bir Sayf (site 24)	cairn	n=4	–	–	–	–	–	–	–	–	Doe 1977
–	Bir Sayf (site 27)	cairn tomb	on east bank of Wadi Andam, oval and circular tombs; stones robbed	–	–	–	–	–	river boulders	–	–	Doe 1977
–	Samad (site 28a)	circular cairn tomb	several tombs near probable 3rd mill BC habitation site.	–	–	–	–	–	–	–	–	Doe 1977
Khudar/Shariah	Maysar (site 29)	cairn tomb	n=7; rough stone kerbs, vertical joint, no doorways (IA?)	–	–	–	2	–	boulders	–	–	Doe 1977
Samad	Maysar (site 30)	circular cairn tomb	n=10; wall stone robbed	–	–	–	2	–	river boulders	–	–	Doe 1977
Jabal Qahwan	Bilad Bani Bu Hasan (site 32)	cairn tomb	n=150-200; 6 trliths nearby	av diameter: ~5.0-6.0m; 1.0-2.0m tall	–	–	–	–	river boulders	–	–	Doe 1977
–	Bilad as Sur (site 33)	cairn	numerous cairns on ridges on east side of Sur road	–	–	–	–	–	–	–	–	Doe 1977
Sur	Fulayj (site 34)	cairn	on ridges and lower areas	–	–	–	–	–	–	–	–	Doe 1977
Al Kamil	Ma'ayah Pass (site 35)	cairn tomb	on ridges and in valleys for ~6km	–	–	–	–	–	–	–	–	Doe 1977
Al Kamil	Ma'ayah Pass (site 36)	cairn or beehive tombs	n~20; near to 2 rows of triliths	–	–	–	–	–	–	–	–	Doe 1977
Sabt	Wadi Murka (site 37a)	cairn	n=2	–	–	–	–	–	–	–	–	Doe 1977
Sabt	Wadi Murka (site 37b)	cairn	n=5	–	–	–	–	–	–	–	–	Doe 1977
Sabt	Wadi Murka (site 37c)	cairn	n=3	–	–	–	–	–	–	–	–	Doe 1977
Jabal Suwadiyah	Az Zahir (site 40a)	cairn	n=10+	–	–	–	–	–	–	–	–	Doe 1977
Az Zahir	Al Hayli (site 41)	cairn	on ridge, W side of wadi	–	–	–	–	–	–	–	–	Doe 1977
Az Zahir, Jabal Suwadiyah	Dibik (site 43)	circular tomb (probably beehive)	kerb base made from roughly cut stones	–	–	–	–	–	–	–	–	Doe 1977
Az Zahir, Jabal Suwadiyah	Dibik (site 44)	cairn	several cairns	–	–	–	–	–	–	–	–	Doe 1977
An Niba'	Nigid Busfa (site 48)	cairn; pill-box tomb	several cairns & pill-box tombs; near to Islamic rock art	–	–	–	–	–	–	–	–	Doe 1977
	An Niba' (site 49)	cairn; beehive tomb	n=5; n ~9 other tombs with three walls; n ~8 tombs; tombs on ridges	D: E-W 4.0m, N-S 3.0m; H: 1.4m	–	corbelled	1-3	w	–	oval	–	Doe 1977
Mudayrib	Fulaj (site 50)	cairn tomb	several cairn tombs - beehive or pill-box tombs	–	–	–	–	–	–	circular	–	Doe 1977

Location	Site	Tomb Type	Notes	External Dimensions	wall thickness	Roof	#Walls	Entrance	Materials	Tomb Shape	Chamber Diameter	Citations
Jabal al Haura	Tawi Silaim (site 51)	circular cairn; beehive tomb	kerbstones; trilith near; n=58 (2.0-9.0m diameter; 0.1-2.0m tall); evidence of disturbance	D: up to 8.0-9.0m	–	corbelled	3	–	–	circular	–	Doe 1977
Jabal al Haura	Tawi Silaim (site 52)	circular beehive tomb	n~30 near peak of Jabal al Haura;	–	–	–	1 or 2	2 with doors 100/110°; some 2 walls w vertical joint and no doorway	thin flat slabs	–	–	Doe 1977
Jabal al Haura	Tawi Silaim (site 53a)	circular tomb	n~6 tombs on level area NE bank of Wadi al Batha	–	–	–	–	–	–	circular	–	Doe 1977
Jabal al Haura	Tawi Silaim (site 53b)	circular tomb	n=2 trilith nearby; 8 more tombs made of flat stones, 3 walls	one tomb:~8.0m external diameter, chamber diameter: 3.9m; H:1.2m	1.0m each wall	–	1-3	–	boulders, flat slabs	circular	–	Doe 1977
Fulaj, Jabal al Haura	Tawi Silaim (site 54a)	circular tomb	n=4; ; 1) human bone, beads, and metal objects visible; 2) one tomb less robbed of stone: made of flat grey local slabs, doorway 0.5m wide, 0.3m tall, 105°, lintel, 4.2m diameter, entrance to W, length of entrance 3.0m, external diameter ~8.2m, corbelled; similar to site 51; evidence of stone quarrying	–	–	–	–	–	boulders	–	–	Doe 1977
Tawi Silaim	Jabal al Hammah (site 59)	circular tomb (beehive type)	n=10, one inspected has 2 walls	–	–	–	–	–	–	–	–	Doe 1977
Tawi Silaim	Jabal al Hammah (site 60)	Cairn & Beehive tomb	several tombs on low ridges	–	–	–	–	–	–	–	–	Doe 1977
Tawi Silaim	Jabal al Hammah (site 61)	Cairn & Beehive tomb	several tombs on ridge, near 2 large trilith sites	–	–	–	–	–	–	–	–	Doe 1977
Wahiba Sands (Ramlat al Wahiba)	Jabal al Hammah (site 62)	circular cairn & beehive tomb	n=15 on principal ridges; >70 tombs on ridges	–	–	–	2	–	flat slabs	–	–	Doe 1977
Tawi Silaim	Jabal al Hammah (site 65a)	cairn	n=1	–	–	–	–	–	–	circular	–	Doe 1977
Tawi Silaim	Jabal al Hammah (site 65b)	cairn	several cairns	–	–	–	–	–	–	–	–	Doe 1977
Tawi Silaim	Jabal al Hammah (site 66)	Beehive tomb	n~10	D: 4.0-6.0m	–	–	2	–	flat slabs	–	–	Doe 1977
Jabal al Haura	Yani Al Raja (site 67)	cairn	n=1 two small cairns built adjacent; cairns on nearby ridges	D: 8.0-9.0m; H: ~2.2m	–	–	–	–	river boulders	–	–	Doe 1977
Nabiq	Gerran Amr (site 69)	Beehive tomb	n=5; 2 tombs with exposed kerbs, 1 tomb evidence of 2 walls	–	–	–	–	–	–	–	–	Doe 1977

Location	Site	Tomb Type	Notes	External Dimensions	wall thickness	Roof	#Walls	Entrance	Materials	Tomb Shape	Chamber Diameter	Citations
–	Nabiq (site 70)	cairn	n=3 on ridges N of Salil	–	–	–	–	–	–	–	–	Doe 1977
–	Qabil Yal Bu Sa'id (site 72a)	cairn	near track to Mudaybi, n=1	~11.0m diameter	–	–	–	–	–	–	–	Doe 1977
–	Qabil Yal Bu Sa'id (site 72b)	cairn	n=4	–	–	–	–	–	–	–	–	Doe 1977
–	Qabil Yal Bu Sa'id (site 72c)	cairn	n=1	–	–	–	–	–	–	–	–	Doe 1977
–	Qabil Yal Bu Sa'id (site 74)	cairn	n=3	one has 4.0m diameter	–	–	–	–	–	–	–	Doe 1977
Mudaybi	Qabil Yal Bu Sa'id (site 76)	cairn	14 tombs S of road & 15 tombs N of road ~5km W of Qabil Yal Bu Sa'd	–	–	–	–	–	–	–	–	Doe 1977
Mudaybi	Fath (site 77)	"flat stone" cairn tombs	n=8; 0.5km N of medieval Fath, no kerb bases; exterior robbed	–	–	–	–	–	–	–	–	Doe 1977
Mudaybi	Fath (site 78)	Beehive tomb	3 foundations with circular kerb bases	–	–	–	–	–	–	–	–	Doe 1977
Mudaybi	Fath (site 79)	cairn tomb	many cairn tombs, not Beehive type	–	–	–	–	–	–	–	–	Doe 1977
Wadi al-Batha	Jabal al Hammah	Beehive tomb	beehive tombs	–	–	–	–	–	–	–	–	de Cardi et al. 1977
Wadi al-Batha	Jabal al Haura, Tiwi Silaim	Beehive tomb	beehive tombs; Cairn 1 excavated; Cairn 26 (west of Cairn 1) surface collection; human bone visible; evidence of reuse	D: 9.0m; H: 2.0m	A: 1.0m; B=1.0m; C=1.5m	–	3	E	–	–	2.0m	de Cardi et al. 1977
Wadi Samad	Maysar 3; Maysar 4; and Maysar 22	cairns	–	–	–	–	–	–	–	–	–	Weisgerber 1980
Bandar Khayran 8	BK8	cairn	cairns	–	–	–	–	–	–	–	–	Biagi 1988
Shawqirah	DF508076	cairn	several cairns	–	–	–	–	–	–	–	–	Biagi 1988
Wadi Lisq	DF62666J	cairn	large cairn graveyards	–	–	–	–	–	–	–	–	Biagi 1988
Wadi Ghadun	DF725735	cairn	large cairn graveyards	–	–	–	–	–	–	–	–	Biagi 1988
Wadi Haytam	DF845795	cairn	large cairn graveyards	–	–	–	–	–	–	–	–	Biagi 1988
Wadi Haytam	DF900826	cairn	large cairn graveyards	–	–	–	–	–	–	–	–	Biagi 1988
Film	FH285865	Cairn	large cairn cemetery on road to Hayy	–	–	–	–	–	–	–	–	Biagi 1988
Film	FH342975	Cairn	large cairn cemetery on road to Hayy	–	–	–	–	–	–	–	–	Biagi 1988
Film 1	Film 1	Cairn	cairn cemetery	–	–	–	–	–	–	–	–	Biagi 1988
Film 2	Film 2	Cairn	cairn cemetery	–	–	–	–	–	–	–	–	Biagi 1988
Ash Shab 7	GAS7	cairn	cairns	–	–	–	–	–	–	–	–	Biagi 1988
Ras Al-Hadd 7	HD7	Cairn	cairns on top of mountain	–	–	–	–	–	–	–	–	Biagi 1988
Khawr Jaramah 18	KJ18	Cairn	maybe EBA cairns	–	–	–	–	–	–	–	–	Biagi 1988
Khawr Jaramah 5	KJ5	–	–	–	–	–	–	–	–	–	–	Biagi 1988
Ras Madrakah 2	MDK2	Cairns	cairns mapped	–	–	–	–	–	–	–	–	Biagi 1988
Ras Madrakah 8	MDK8	Cairn	large cemetery, dozens of cairns	–	–	–	–	–	–	–	–	Biagi 1988
Qalhat 5	QLT5/GL398177	cairn	cairns	–	–	–	–	–	–	–	–	Biagi 1988
Sharbitat 2	SBT2; DE215835	Cairn	several cairns	–	–	–	–	–	–	–	–	Biagi 1988
Shiya	SH13	Cairn	large # stone cairns	–	–	–	–	–	–	–	–	Biagi 1988

Location	Site	Tomb Type	Notes	External Dimensions	wall thickness	Roof	#Walls	Entrance	Materials	Tomb Shape	Chamber Diameter	Citations
Shyial 1	SHI1	Cairns	cairns	–	–	–	–	–	–	–	–	Biagi 1988
Shuwayr 3	SHW3	Cairn	large cairn cemetery	–	–	–	–	–	–	–	–	Biagi 1988
Shuwayr 4	SHW4	Cairn	large cairn cemetery	–	–	–	–	–	–	–	–	Biagi 1988
–	Wadi Haida	Cairn	~ dozen cairns	–	–	–	–	–	–	–	–	Biagi 1988
Ras Wudayyah 2	WD2	Cairn	cairns	–	–	–	–	–	–	–	–	Biagi 1988
Ras Wudayyah 3	WD3	Cairn	cairns	–	–	–	–	–	–	–	–	Biagi 1988
Wadi Gharm 1	WG1	Cairn	many cairns	–	–	–	–	–	–	–	–	Biagi 1988
Wadi Gharm 2	WG2	Cairn	many cairns	–	–	–	–	–	–	–	–	Biagi 1988
Ash Shab 3	GAS3	cairn	n=9	–	–	–	–	–	–	–	–	Biagi 1988; Biagi 2004
Wadi Haidha	–	cairn	n=12 in banks of Wadi Haidha	–	–	–	–	–	–	–	–	Biagi 1988
Ras Al-Hadd 7	HD7	cairn	cairns	–	–	–	–	–	–	–	–	Biagi 1988
Wadi Hijar	Bat	Jemdet Nasr Beehive Cairns	–	–	–	–	–	–	–	–	–	Brunswig 1989
–	Ablah	Beehive tomb	–	–	–	–	–	–	–	–	–	Gentille & Frifelt 1989
Wadi al Hijr	al-Banah	3rd millennium grave	–	–	–	–	–	–	–	–	–	Gentille & Frifelt 1989
Wadi al Hijr	al-Hijr	3rd millennium grave	–	–	–	–	–	–	–	–	–	Gentille & Frifelt 1989
–	Bat	Beehive tomb	–	–	–	–	–	–	–	–	–	Gentille & Frifelt 1989
Ibri	foot of Jabal Fajj Rayibah	3rd millennium grave	–	–	–	–	–	–	–	–	–	Gentille & Frifelt 1989
Dariz	Jabal Dawjah		–	–	–	–	–	–	–	–	–	Gentille & Frifelt 1989
–	S of Yanqul	Beehive	–	–	–	–	–	–	–	–	–	Gentille & Frifelt 1989
–	Wadi Dank	Hafit grave	–	–	–	–	–	–	–	–	–	Gentille & Frifelt 1989
N & NE Dariz	Wadi Maqniyat	3rd millennium grave	mostly beehive tombs	–	–	–	–	–	–	–	–	Gentille & Frifelt 1989
NE part of Jabal Shuwa'i	Zebha	Beehive tomb	–	–	–	–	–	–	–	–	–	Gentille & Frifelt 1989
Abu Dhabi	Ras al-Aysh	circular tomb	resembles type that is transitional between Beehive and UAN; 2 copper pins, a few shells, fragment of cuttle fish; MNI=1	D: 3.0m; H: 4 courses of stones	–	–	1	–	random stones	circular	–	Vogt et al.1989
Abu Dhabi	Jebel Dhanna 1	circular mound	n=12resembles type that is transitional between Beehive and UAN; one sherd UAN fine ware found; Mound 3 may have internal architecture	D: 2.5-5.0m	–	–	1	top	random stones	circular	–	Vogt et al.1989
–	Al 'Ayn	Beehive tomb; Tower Tomb	–	–	–	–	–	–	–	–	–	Gentille & Frifelt 1989; Yule & Weisgerber 1998
Wadi al-Batha	RJ2	Cairn	cairns along wadi (contain RJ shell rings)	–	–	–	–	–	–	–	–	Charpentier 1993

Location	Site	Tomb Type	Notes	External Dimensions	wall thickness	Roof	#Walls	Entrance	Materials	Tomb Shape	Chamber Diameter	Citations
Dhofar	site 6	Pre-Islamic tombs	4-5 tombs built on prehistoric platform; more burials surround structure	–	–	–	–	–	–	–	–	Costa 1994
Dhofar	Site 8	pre/proto- historic Cairns	rock art nearby	–	–	–	–	–	–	–	–	Costa 1994
Wadi Haqil, UAE	Wadi Haqil	cairn	cairns	–	–	–	–	–	–	–	–	Stocks 1996
–	Halban	tower tomb	n=35; some dressed stones; some white shim stones	H: up to 4.0m	–	–	–	–	–	–	–	Yule & Weisgerber 1998
Wilayat Sur	Shir/Jaylah	tower tomb	58 tombs; 5 types identified; sometimes stone dressed; some tombs have two vertical chambers; evidence of reuse	–	–	corbelled	1-2	on ground, often E	local limestine	circular	circular	Yule & Weisgerber 1998
Wadi Khabbah	near Qarn Suwaich	Hafit tomb	several tombs visible	–	–	–	–	–	–	–	–	Yule & Weisgerber 1998
track Shir to Al Shariq	Ism1	Hafit tomb	–	–	–	–	–	–	–	–	–	Yule & Weisgerber 1998
track Shir to Al Shariq	Maqt1	Hafit cairn	~980m ASL	H: 0.8m	inner wall: 0.8m	–	2	–	round stones	–	–	Yule & Weisgerber 1998
track Shir to Al Shariq	Maqt2	Hafit tomb	n=2; 1,560m ASL	–	–	–	–	–	–	–	–	Yule & Weisgerber 1998
track Shir to Al Shariq	Maqt3	cairn	n=2	D: 3.5m & 5.5m; max standing height: 0.8m	–	–	–	–	–	–	–	Yule & Weisgerber 1998
track Shir to Al Shariq	Sha2	"Hafit"-tomb	200m from Sha3; Samad material culture on surface	–	–	–	–	–	–	–	–	Yule & Weisgerber 1998
track Shir to Al Shariq	Sha4	tomb	evidence of stone quarrying	–	–	–	2	–	–	–	–	Yule & Weisgerber 1998
track Shir to Al Shariq	Sha5	Hafit tomb	–	H: >1.0m	–	–	2	S-SE	–	–	–	Yule & Weisgerber 1998
track Shir to Al Shariq	Sha6	cairn	n=2	H: 3.5m; H: 0.7m	–	–	–	–	irregular grey limestone blocks; some white limestones	–	–	Yule & Weisgerber 1998
track Shir to Al Shariq	Sha8	Hafit tomb	n=2; evidence of stone quarrying	1) D:3.0m; 2) H: 1.0m	1) 0.6-0.7m	–	1 wall	2) SE/NW	limestone	–	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi3)	tower tomb	1766.08m ASL	D(base): 5.07m; H: 2.24m	0.75-1.1m	corbelled vault	2	SE	light colored stone slabs; hardly dressed/no shaping	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi4)	tower tomb	1766.33m ASL; sherds near tomb DA12704; evidence of disturbance, but maybe not chamber	D(base): 6.12m; D (top): 4.40m; H: 2.83m	0.7-1.8m	corbelled vault	2	SE	coarse slabs	circular	oval	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi5)	tower tomb	1753.91m ASL; badly preserved	D(base): 3.86m; D (top): 2.90m; H: 1.88m	–	–	2	not visible	limestone slabs	circular	–	Yule & Weisgerber 1998

Location	Site	Tomb Type	Notes	External Dimensions	wall thickness	Roof	#Walls	Entrance	Materials	Tomb Shape	Chamber Diameter	Citations
Wilayat Sur	Shir (tomb Shi6)	tower tomb	1750.78m ASL	D(base): 6.37m; D (top):4.70m; H: 2.55m	0.8-1.1m	double superimposed vaults, corbelled	2	E	limestone slabs, weathered	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi7)	tower tomb	1751.78m ASL; DA12684	D(base): 5.38m; D (top):4.25m; H: 2.56m	–	corbelled vault	2	E	–	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi8)	tower tomb	1746.04m ASL	D(base): 5.07m; D (top):4.00m; H: 2.87m	0.5-0.7m each wall	corbelled vault	2	E; rectangular	coarse blocks	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi9)	tower tomb	1746.78m ASL; ceramic sherds outside tomb DA12684 ; some flooring observed	D(base): 5.54m; D (top):4.00m; H: 4.52m	0.30-1.68m	double superimposed vaults, corbelled	2	SE; trapezoidal	small slabs	circular	2.0m	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi10)	tower tomb	1832.41m ASL; pounding stone & fireplace N of tomb; best preserved in group of 58 tombs	D(base): 5.75m; D (top):3.69m; H: 5.85m	–	double superimposed vaults, corbelled	2	SE; triangular	dressed stones and shims	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi11)	tower tomb	1831.36m ASL; plinth;	D(base): 3.20m; D (top):2.05m; H: 2.51m	0.43-0.89m	corbelled vault	2	E; trapezoidal	large barely worked slabs; some shim stones	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi12)	tower tomb	1828.87m ASL; S of tomb pounding stone	D(base): 4.31m; D (top): 2.40m; H: 3.78m	0.6-1.6m	corbelled vault	2	E; trapezoidal	coarse stones	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi13)	tower tomb	1828.72m ASL; two outer stones DA12685; stone robbing for Shi14	D(base): 5.12m; D (top):4.60m; H: 2.36m	0.95-1.05m	corbelled	2	not visible	selected & worked	circular		Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi14)	cylindrical tomb	1828.15m ASL	D(base): 3.77m; D (top):3.40m; H: 1.27m	0.6-0.8m	corbelled vault	1	none	unworked blocks, stones	circular	oval 1.60x1.8m	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi15)	tower tomb	1824.13m ASL	D(base): 3.87m; D (top):2.40m; H: 1.68m	0.67-1.0m	corbelled vault	2	not visible	coarse stones	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi16)	tower tomb	1826.19m ASL	D(base): 3.80m; D (top):2.40m; H: 1.56m	1.10m	corbelled vault	1	not visible	coarse stones	circular	circular	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi17)	tower tomb	1824.08m ASL	D(base): 4.65m; D (top):3.45m; H: 2.89m	–	corbelled vault	1	N-NW; isoceles	some dressed stones but most are unworked coarse stones	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi18)	tower tomb	1749.56m ASL	D(base): 3.31m; D (top):<3.20m; H: 1.86m	0.70-1.2m	corbelled	1	not visible	local stone, not worked	circular	–	Yule & Weisgerber 1998

Location	Site	Tomb Type	Notes	External Dimensions	wall thickness	Roof	#Walls	Entrance	Materials	Tomb Shape	Chamber Diameter	Citations
Wilayat Sur	Shir (tomb Shi19)	tower tomb	1756.84m ASL	D(base): 3.60m; H: 2.32m	0.74-1.08m	corbelled	1	E; rectangular	coarse stones, do not form flat courses; few stones worked	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi20)	tower tomb	1772.55m ASL	D(base): 3.70m; H: 2.50m	0.60-0.70m	corbelled	1	SE; irregular perhaps trapezoidal	stone slabs; some worked stone	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi21)	tower tomb	1746.35m ASL	D(base): 5.46m; D (top):2.90m; H: 4.51m	façade: 0.50m	corbelled	2	SE	–	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi22)	tower tomb	1745.63m ASL; pounding stones found closeby	D(base): 5.68m; D (top):4.20m; H: 2.53m	0.70-0.90m	–	1	SW or NE	some worked	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi24)	Hafit Tomb	isolated; 1768.57m ASL; pounding stones & Lizq/Rumaylah sherds found outside tomb DA 12684	D(base): 6.38m; H: 2.16m	façade: 0.80-0.90m	corbelled vault	3	not visible	large unworked blocks	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi25)	tower tomb	1728.67m ASL; chamber wall destroyed; Lizq/Rumaylah sherds found outside tomb DA 12684	D(base): 5.14m; H: 2.05m	0.70-1.30m	–	2	E; trapezoidal	local natural material	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi26)	tower tomb	1737.38m ASL; Lizq/Rumaylah sherds & pounding stones found outside tomb; pavement in front of entrance	D(base): 3.73m; D (top):2.40m; H: 2.83m	–	corbelled vault	1	E; trapezoidal	local stones	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi27)	tower tomb	1687.58m ASL; entrance paved	D(base): 3.45m; D (top):2.50-2.60m; H: 2.36m	upper portion 1.0m	corbelled vault	1	E; trapezoidal	very coarse stones	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi28)	tower tomb	1686.24m ASL	D(base): 3.98m; H: 2.0m	0.83-1.05m	truncated cone	1	SE	sinter slabs	circular	E-W: 2.0m; N-S:1.8m	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi29)	tower tomb	1698.07m ASL	D(base): 4.44m; D (top):3.20m; H: 1.20m	façade: 0.55-0.78m	–	2	not visible	stone slabs with sinter	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi30)	cairn; not a tower tomb	1687.75m ASL; very coarsely built	D(base): 2.84m; H: 0.93m	–	–	–	not visible	–	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi31)	tower tomb	1660.0m ASL	D(base): 5.65m; D (top):4.20m; H: 2.94m	façade: 0.70m; inner wall: 0.75m	corbelled vault	2	not visible	–	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi32)	tower tomb	1660m ASL; pounding stones found outside tomb	D(base): 5.23m; D (top):4.60m; H: 2.60m	–	corbelled vault	2	not visible	rare dark brown stone used	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi33)	tower tomb	1655.35m ASL;	D(base): 6.24m; D (top):5.10m; H: 2.78m	façade wall: 1.2m; inner wall: 0.70m	–	2	not visible	–	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi35)	cairn	1674.01m ASL	D(base): 7.0m; D (top):4.70m; H: 2.72m	façade wall: 1.08m; inner wall: 1.0m	–	2	not visible	–	circular	–	Yule & Weisgerber 1998

Location	Site	Tomb Type	Notes	External Dimensions	wall thickness	Roof	#Walls	Entrance	Materials	Tomb Shape	Chamber Diameter	Citations
Wilayat Sur	Shir (tomb Shi36)	tomb	1588.52m ASLI destroyed	D(base): 4.11m; D (top):~4.5m; H: 0.69m	–	–	2	not visible	–	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi37)	tower tomb	1584.48m ASL	D(base): 5.45m; H: 2.48m	façade wall: 0.80m; inner wall: 0.70m	corbelled vault	2	not visible	coarse stone slabs	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi38)	tower tomb	1588.08m ASL	D(base): 3.79m; D (top): 3.50m; H: 0.95m	–	–	2	not visible	unworked stones	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi39)	tower tomb	1582.27m ASL	D(base): 3.61m; D (top): 3.20m; H: 1.40m	S & W sides 0.80m	–	1	not visible	–	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi40)	tower tomb	1755.55m ASL	D(base): 3.62m; H: 1.81m	–	corbelled vault	1	E; trapezoidal	unworked stones	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi41)	tower tomb/ conical tomb	1620m ASL	D(base): 5.24m; H: 1.88m	façade: 0.6+m; inner wall: 0.3m	–	2	–	well fashioned slabs	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi42)	tower tomb	1621.27m ASL; not investigated	D(base): 3.68m; H: 1.28m	–	–	–	–	–	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi43)	tower tomb	1630.34m ASL; not investigated	D(base): 4.11m; H: 1.62m	–	–	–	–	–	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi44)	tower tomb	1623.63m ASL	D(base): 4.64m; D (top): 3.0m; H: 1.94m	–	corbelled vault	2	not visible	–	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi45)	tower tomb	1655m ASL	D(base): 5.37m; D (top): 3.90m; H: 2.72m	façade: 0.65-0.70m	corbelled vault	2	not visible	unworked stones	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi46)	tower tomb; low cairn	~1650m ASL	D(base): ~5.4m; D (top): ~4.5m; H: ~0.9m	–	corbelled vault	1	not visible	unworked stones	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi47)	tower tomb	1602.69m ASL	D(base): 4.59m; D (top): 2.70m; H: 1.11m	–	truncated cone	1	not visible	large rough blocks	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi48)	tower tomb	1603.04m ASL	D(base): 6.68m; D (top): 4.50m; H: 3.37m	0.80-1.0m	–	2	presumably E	–	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi49)	tower tomb	1630.00m ASL; façade has been removed	D(base): 5.66m; D (top): 3.20-2.60m; H: 3.00m	0.64-0.76m	corbelled vault	2	E; rectangular	–	circular	E-W: 2.15m; N-S: 2.58m	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi50)	tower tomb	1625m ASL	H: 1.0m	–	–	2	not visible	well dressed stones	circular	–	Yule & Weisgerber 1998

Location	Site	Tomb Type	Notes	External Dimensions	wall thickness	Roof	#Walls	Entrance	Materials	Tomb Shape	Chamber Diameter	Citations
Wilayat Sur	Shir (tomb Shi51)	unusual tower tomb	1635m ASL; entrance 1.90m tall; single large stone in entrance w 5 hammer strokes	D(base): 5.36m; D (top): 2.65m; H: 3.00m	–	corbelled vault	2	E	coarse stones, sinter stones	circular	circular; E-W: 1.10ml N-S: 1.00m	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi52)	tower tomb	1650m ASL	D(base): 4.80m; D (top):3.15m; H: 1.80m	inner wall: 0.8m	–	2	presumably E	–	circular	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi54)	cairn	1609.78m ASL	D(base): 6.40m; D (top):3.70m; H: 1.27m	–	–	–	E	stone slabs	–	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi55)	tower tomb	1612.46m ASL; poorly preserved; very narrow diameter	D(base): 4.84m; H: 2.04m	0.55-0.70m	not corbelled	2	not recognizable	–	–	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi56)	cairn; conical tomb; different from tower tomb	1640m ASL	D(base): 7.59m; H: 1.60m	–	stone slabs	–	not visible	–	–	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi57)	tower tomb	1760m ASL; isolated tomb	H: 1.5m	–	–	2	SE; rectangular	–	–	–	Yule & Weisgerber 1998
Wilayat Sur	Shir (tomb Shi58)	tower tomb	–	D(base): >4.0m; D (top):3.80m; H: 1.20m	façade: ~0.45m; inner wall: ~0.40m	–	2	not visible	rectangular limestone stones, not worked; shim stones	–	–	Yule & Weisgerber 1998
Wadi Dibab	Jabal al-Qara	cairn	40 oval cairns	–	–	–	–	–	–	–	–	Ibrahim & El Mahi 2000
–	Ras Al-Jinz area	Cairns	–	–	–	–	–	–	–	–	–	Cleuziou & Tosi 2000
–	Sayja (2km N of Manal 1)	Hafit-type cairn	–	–	–	–	–	–	–	–	–	El Mahi & Ibrahim 2003
Wad Bani Awf	–	Hafit-type cairn	~60 tombs	–	–	–	–	–	–	–	–	Haser 2003
al-Hamra	Jabal Al-Qal'ah	Hafit-type cairn	–	–	–	–	–	–	–	–	–	Haser 2003
Ash Shab 2	GAS2	cairn?	n=1; circular stone structure	–	–	–	–	–		–	–	Biagi 2004
Ash Shab 5	GAS-5/GL294295	Cairn	some cairns on terrace	–	–	–	–	–	–	–	–	Biagi 2004
Qalhat 3	QLT3/GL409155	Cairn	many cairns close to edge of terrace	–	–	–	–	–	–	–	–	Biagi 2004
Qalhat 5	QLT5/GL398177	Cairn	n= 10 mouth of Wadi Haidha	–	–	–	–	–	–	–	–	Biagi 2004
Northern Fujairah	Jabal Wamm & Wadi Wamm, Site 1, Area 1	circular tombs	n=32 (also in-cludes oval tombs, not dat-ed); identifiable entrances & roofs	D:1-10m; H:1.4	–	–	–	–	–	–	–	Brass & Britton 2004
	Jabal Wamm & Wadi Wamm, Site 1, Area 1	cairn	n=22; some entrances visible	D:4-15m; H: up to 2.3m	–	–	–	–	–	–	–	
	Jabal Wamm & Wadi Wamm, Site 1, Area 3	cairn	oval tombs; both disturbed	Tomb 54 D:~10m, H:1.2m; Tomb 55 D:~10m, H:1.5m	–	–	–	–	–	–	–	
	Jabal Wamm & Wadi Wamm, Site 1, Area 4	cairn	n=8 circular & oval cairns	D:4.5-11m; H: up to 2m	–	–	–	–	–	–	–	

Location	Site	Tomb Type	Notes	External Dimensions	wall thickness	Roof	#Walls	Entrance	Materials	Tomb Shape	Chamber Diameter	Citations
Northern Fujairah	Jabal Wamm & Wadi Wamm, Site 1, Area 5	cairn	n=13 circular & oval cairns	D:4-12m; H: 0.6-2m	–	–	–	–	–	–	–	Brass & Britton 2004
	Jabal Wamm & Wadi Wamm, Site 1, Area 6	cairn	n=6 circular & oval cairns	D:6-11m; H: 0.8-1.5m	–	–	–	–	–	–	–	
	Wadi Al-Fay & Wadi Khurus, Site 3, Area 1	Beehive tomb	n=2; Tomb 1: well preserved	Tomb 1: 3.5 x 1.3m, H:1.2m; Tomb 2 D: 4m	–	–	–	–	–	–	Tomb 1: 2.2 x 1.3m	
Northern Fujairah	Wadi Al-Fay & Wadi Khurus, Site 3, Area 2	cairn	n=5	D: 4m; H: 0.5m	–	–	–	–	–	–	–	
Northern Fujairah	Wadi Khabb, Site 11	cairn	may not be tomb	3 x 2m; H: 0.8m	–	–	–	–	–	–	–	
Wadi Tiwi	Tiwi	grave	950 graves; built on surface; chambers round or oval; sometimes built against other features or HTC; human bone visible	L:1.8-4.6m W: 0.8-2.5m; H: 1.0-1.7m	–	–	–	–	–	–	1.1-2.8m: length; 0.5-1.5m wide	Schrieber & Haser 2004
Wadi Tiwi	Tiwi	Hafit-type cairn	possibly tumuli; evidence of reuse	D: 2.0-8.0m; H: up to 1.5m	–	–	1 - 5	–	–	circular	1-1.5m	Schrieber & Haser 2004
Dhank	Bilt (locus 7)	circular tombs	n=2; larger is known locally as Husn al-Junuz	–	–	–	–	–	tabular stones, roughly cut/dressed	–	–	Costa 2006
Dhank	Locus 3	Pre-Islamic tombs	n=9; arranged in two rows	–	–	–	–	–		–	–	Costa 2006
Nizwa	eastern hills between Farq & Nizwa	Hafit/Beehive tomb	n= 50-60; no excavation or mapping	–	–	–	–	–	–	–	–	Schrieber 2007
Wilayat al-Qabil	Al Dulaji	Beehive Tomb	n=78	–	–	–	–	–	–	–	–	al-Belushi & ElMahi 2009
Wilayat al-Qabil	Al Fulayj	Beehive Tomb	n=58	–	–	–	–	–	–	–	–	al-Belushi & ElMahi 2009
Wilayat al-Qabil	Al Qufaysi	Beehive Tomb	n=42	–	–	–	–	–	–	–	–	al-Belushi & ElMahi 2009
Wilayat al-Qabil	Hamra Safra (ST12)	Beehive Tomb	unidentified bone fragments	–	–	–	–	–	–	–	–	al-Belushi & ElMahi 2009
Wilayat al-Qabil	Hamra Safra	Beehive Tomb	n=14	–	–	–	–	–	–	–	–	al-Belushi & ElMahi 2009
Wilayat al-Qabil	Sayh Al-Qattarh	Beehive Tomb	n=133	–	–	–	–	–	–	–	–	al-Belushi & ElMahi 2009
Wilayat al-Qabil	Sayhal-Qattarah (ST252)	Beehive Tomb	unidentified bone fragments; 2 copper arrowheads simple & IA stone vessel ---possible reuse during IA	–	–	–	–	–	–	–	–	al-Belushi & ElMahi 2009
Wadi Andam	CS.1	Hafit cairn	n=162	–	–	–	–	–	–	–	–	Al-Jahwari 2009
Wadi Andam	CS.2	Hafit cairn	n=167	–	–	–	–	–	–	–	–	Al-Jahwari 2009
Wadi Andam	CS.4	Hafit cairn	n=48	–	–	–	–	–	–	–	–	Al-Jahwari 2009
Wadi Andam	CS.5	Hafit cairns	n=135	–	–	–	–	–	–	–	–	Al-Jahwari 2009
Wadi Andam	CS.6	Hafit cairn	n=166	–	–	–	–	–	–	–	–	Al-Jahwari 2009

Location	Site	Tomb Type	Notes	External Dimensions	wall thickness	Roof	#Walls	Entrance	Materials	Tomb Shape	Chamber Diameter	Citations
Wadi Andam	CS.8	Hafit cairn	n=696	–	–	–	–	–	–	–	–	Al-Jahwari 2009
Wadi Andam	CS.10	Hafit cairns	n=283	–	–	–	–	–	–	–	–	Al-Jahwari 2009
Wadi Andam	CS.11	Hafit cairns	n=8	–	–	–	–	–	–	–	–	Al-Jahwari 2009
Wadi Andam	CS.12	Hafit cairns	n=44	–	–	–	–	–	–	–	–	Al-Jahwari 2009
Wadi Andam	CS.13	Hafit cairns	n=33	–	–	–	–	–	–	–	–	Al-Jahwari 2009
Wadi Andam	CS.14	Hafit cairns	n=170	–	–	–	–	–	–	–	–	Al-Jahwari 2009
Wadi Andam	CS.15	Hafit cairn	n=8	–	–	–	–	–	–	–	–	Al-Jahwari 2009
Wadi Andam	CS.16	Hafit cairns	n=6	–	–	–	–	–	–	–	–	Al-Jahwari 2009
Wadi Andam	CS.17	Hafit cairns	n=77	–	–	–	–	–	–	–	–	Al-Jahwari 2009
Wadi al 'Ayn	Bat	Beehive Tomb	–	–	–	–	–	–	–	–	–	Boehme 2010
Eastern Ja'alan	al-Ayn	Hafit-type cairn	<100 tombs	–	–	–	–	–	–	–	–	Giraud 2010
Eastern Ja'alan	al-Menkeb	Hafit-type cairn	100-150 tombs	–	–	–	–	–	–	–	–	Giraud 2010
Eastern Ja'alan	al-Menkeb north	Hafit-type cairn	<100 tombs	–	–	–	–	–	–	–	–	Giraud 2010
Eastern Ja'alan	as-Suwayh	Hafit-type cairn	<100 tombs	–	–	–	–	–	–	–	–	Giraud 2010
Eastern Ja'alan	Bu Fsheqa	Hafit-type cairn	100-150 tombs	–	–	–	–	–	–	–	–	Giraud 2010
Eastern Ja'alan	Bu Mdara	Hafit-type cairn	100-150 tombs	–	–	–	–	–	–	–	–	Giraud 2010
Eastern Ja'alan	el-Massawy	Hafit-type cairn	<100 tombs	–	–	–	–	–	–	–	–	Giraud 2010
Eastern Ja'alan	Haseed	Hafit-type cairn	<100 tombs	–	–	–	–	–	–	–	–	Giraud 2010
Eastern Ja'alan	Iref	Hafit-type cairn	12-30 tombs	–	–	–	–	–	–	–	–	Giraud 2010
Eastern Ja'alan	Jaltin	Hafit-type cairn	12-30 tombs	–	–	–	–	–	–	–	–	Giraud 2010
Eastern Ja'alan	Jli'a	Hafit-type cairn	<100 tombs	–	–	–	–	–	–	–	–	Giraud 2010
Eastern Ja'alan	Khatam	Hafit-type cairn	<100 tombs	–	–	–	–	–	–	–	–	Giraud 2010
Eastern Ja'alan	Kwar Jarama-Jsays	Hafit-type cairn	300-450 tombs	–	–	–	–	–	–	–	–	Giraud 2010
Eastern Ja'alan	Malahi	Hafit-type cairn	300-450 tombs	–	–	–	–	–	–	–	–	Giraud 2010
Eastern Ja'alan	Marafass	Hafit-type cairn	12-30 tombs	–	–	–	–	–	–	–	–	Giraud 2010
Eastern Ja'alan	Ras Al-Hadd	Hafit-type cairn	<100 tombs	–	–	–	–	–	–	–	–	Giraud 2010
Eastern Ja'alan	Ras Al-Jinz	Hafit-type cairn	300-450 tombs	–	–	–	–	–	–	–	–	Giraud 2010
Eastern Ja'alan	Roqum	Hafit-type cairn	12-30 tombs	–	–	–	–	–	–	–	–	Giraud 2010
Eastern Ja'alan	Shama	Hafit-type cairn	12-30 tombs	–	–	–	–	–	–	–	–	Giraud 2010
Eastern Ja'alan	Shiya	Hafit-type cairn	300-450 tombs	–	–	–	–	–	–	–	–	Giraud 2010
Eastern Ja'alan	Wadi Sa'I	Hafit-type cairn	<100 tombs	–	–	–	–	–	–	–	–	Giraud 2010
Adam	Jabal al-Qara	Hafit Period tomb	15km N Adam; well preserved; beads recovered from surface tombs: E235, E244, E250, E1152; human bone visible	some 2-3m tall,	–	–	–	trapezoidal	–	–	–	Giraud et al 2010
Adam	Jabal Moudmar	Hafit Period tomb	n=9; more of other types present on slope	–	–	–	–	–	–	–	–	Giraud et al 2010
Wadi al 'Ayn	Bat	Hafit tombs	3 isolated Hafit tombs near to stone quarry site	–	–	–	–	–	–	–	–	Boehme 2011

Location	Site	Tomb Type	Notes	External Dimensions	wall thickness	Roof	#Walls	Entrance	Materials	Tomb Shape	Chamber Diameter	Citations
Wadi al 'Ayn	Bat	Bat-type tombs	distribution of these tombs at Bat necropolis	–	–	–	–	–	–	–	–	Boehme 2011
Wadi Andam	CS.1.1	Beehive tomb	3km from main village; n=4; well preserved	D: ~5.0m; H:~3.0m	0.8-1.0m	corbelled	2	E; entrance 50cm tall, 40cm wide	yellow stone	–	–	Al Jahwari 2013
		Hafit cairn	3km from main village; n=8	D: 5.0-6.0m; H: 1.0-2.0m	–	–	–	–	brown & black wadi stones	–	–	
Wadi Andam	CS.1.3	Beehive Tomb	n=6; possibly collapsed	D: ~2.5m	0.80m	–	2	E	yellow stone	–	–	Al Jahwari 2013
Wadi Andam	CS.1.4	Beehive tomb	n~26; built on top of ridges and slopes of hills	D: 5.0-6.0m; H: 1.0-2.0m	0.8-1.0m	corbelled	2	–	yellow stone	–	1.0-1.5m	Al Jahwari 2013
		Hafit cairn	n~122; built on low hills and wadi gravel terrace	D: 4.0-8.0m; H: 0.6-1.1m	–	–	3-6	–	brown & black stones	–	–	
		cairn	many cairn tombs	D: 6.0-8.0m	~0.8m	–	variable, at least one had 3 walls	–	brown & black	–	–	
Wadi Andam	CS.1.4	Hafit cairn, cairn, creamy white soil	n=122	D: 4.0-8.0m; H: 0.6-1.1m	–	–	3-6	–	brown & black stones	–	–	Al Jahwari 2013
Upper Wadi Andam	CS.2.1	Hafit cairn	n=5	D: ~6.0m	–	–	3	–	brownish-black wadi stones	–	–	Al Jahwari 2013
Upper Wadi Andam	CS.2.2	cairn	n=8 on hills	–	–	–	–	–	–	–	–	Al Jahwari 2013
Upper Wadi Andam	CS.2.4	cairn, creamy white soil	n=1	–	–	–	4	–	brownish-black stones	–	–	Al Jahwari 2013
Upper Wadi Andam	CS.2.5	cairn, creamy white soil	n=5 on low hills in middle of wadi	–	–	–	–	–	–	–	–	Al Jahwari 2013
Upper Wadi Andam	CS.2.8	cairn, creamy white soil	n=4 on black gravel terrace	D: 6.0-8.0m	–	–	2-4	–	brown & black stones	circular	–	Al Jahwari 2013
Upper Wadi Andam	CS.2.15	cairn	n=3	D: ~6.0m: H: 1.5-2.0m	–	–	–	–	–	–	–	Al Jahwari 2013
Upper Wadi Andam	CS.2.16	cairn, possible collapsed Beehive tomb	n=2	D: 4.0-6.0m; H: 1.2m	–	–	–	–	yellowish-brown stones	–	–	Al Jahwari 2013
Upper Wadi Andam	CS.2.17	cairn	n=8 on black gravel terrace	D: 4.0-6.0m; H: ~1.5m	–	–	–	–	brown & black stones	–	–	Al Jahwari 2013
Upper Wadi Andam	CS.2.24	cairn, creamy white soil	n=1; evidence of reuse	D: ~8.0m; H: ~1.5m	–	–	6	–	brown & grey stones	circular	–	Al Jahwari 2013
Upper Wadi Andam	CS.2.33	cairn	n=2 on black rocky hill	D:4.0m	–	–	–	–	brown & black stones	–	–	Al Jahwari 2013

Location	Site	Tomb Type	Notes	External Dimensions	wall thickness	Roof	#Walls	Entrance	Materials	Tomb Shape	Chamber Diameter	Citations
Upper Wadi Andam	CS.2.42	Beehive tomb	n=35; IA material culture; evidence of reuse	D:3.0-6.0m	–	–	2	–	yellow & grey stones	–	–	Al Jahwari 2013
		Hafit cairn		D: 3.0-8.0m: H: 0.3-1.0m	–	–	–	–	brown, black, grey, yellow stones	–	–	
		cairn		–	–	–	–	–	–	–	–	
Upper Wadi Andam	CS.2.42	Hafit cairn		–	–	–	–	–	–	–	–	Al Jahwari 2013
Upper Wadi Andam	CS.2.42	cairn, creamy white soil		–	–	–	–	–	–	–	–	Al Jahwari 2013
Upper Wadi Andam	CS.2.47	Hafit cairn or collapsed Beehive tomb	n=1; additional tomb possibly attached on S side	D: ~8.0m	–	–	2	E	grey & yellow stoned	–	–	Al Jahwari 2013
Upper Wadi Andam	CS.2.50.3	cairn, creamy white soil	n=12; additional tombs possibly attached	D: 4.0-8.0m; H: 0.4-1.0+m	–	–	2-4	–	–	circular	–	Al Jahwari 2013
Upper Wadi Andam	CS.2.51.7	cairn	scattered cairns	–	–	–	–	–	–	–	–	Al Jahwari 2013
Upper Wadi Andam	CS.2.51.8	cairn	~13 cairns & honeycomb cairns	–	–	–	–	–	–	–	–	Al Jahwari 2013
Upper Wadi Andam	CS.2.51.8	cairn, creamy white soil	n=4 (noted as cairns/towers)	–	–	–	–	–	–	–	–	Al Jahwari 2013
Upper Wadi Andam	CS.2.52.4	cairn, creamy white soil	n=3	–	–	–	–	–	black travertine stones	–	–	Al Jahwari 2013
Upper Wadi Andam	CS.2.52.6	cairn	–	–	–	–	–	–	–	–	–	Al Jahwari 2013
Upper Wadi Andam	CS.2.56	cairn, creamy white soil	group of cairns; possibly reused	D: 4.0-10.0m; H: 0.4-1.0+m	–	–	2-6	–	magnesium carbonate stones	circular	–	Al Jahwari 2013
Upper Wadi Andam	CS.2.59	collapsed Beehive tomb	n~20; honeycomb attached tombs	D: 4.0-6.0m; H: 0.4-1.0m	0.8-1.0m (each wall)	–	1-2	–	yellowish-grey stones	circular	–	Al Jahwari 2013
Upper Wadi Andam	CS.2.63	cairn, creamy white soil	n=2	D: ~3.0-4.0m; H: ~0.6-0.8m	–	–	–	–	–	–	–	Al Jahwari 2013
Upper Wadi Andam	CS.2.64	Beehive tomb	n=7; honeycomb attached tombs	D: 4.0-6.0m; H: 1.0-2.5m	0.8-1.0m (each wall)	–	2 double skin walls	E	yellow stones	circular	–	Al Jahwari 2013
Upper Wadi Andam	CS.2.65	cairn, creamy white soil	n=1	D: ~5.0m; H: 0.5m	–	–	4	–	–	–	–	Al Jahwari 2013
Upper Wadi Andam	CS.2.68	cairn, creamy white soil	plus other possible cairns	–	–	–	–	–	–	–	–	Al Jahwari 2013
Upper Wadi Andam	CS.2.69.1	cairn, creamy white soil	group of cairns; some badly disturbed; attached honeycombs	D: 2.0-10.0m; H: 0.2-1.0m	–	–	2-5	–	black stones & white travertine stones	–	–	Al Jahwari 2013
Wadi Andam	CS.3.8	cairn, creamy white soil	n~30; IA ceramics suggest reuse, shells; human bone visible	D: 1.0-8.0m	–	–	2-6	–	black stones	–	–	Al Jahwari 2013
Wadi Andam	CS.4.2	Hafit cairn	n=4; on black rocky hill	D: 5.0-6.0m; H: 1.0-2.0m	–	–	–	–	brown & black stones	–	–	Al Jahwari 2013

Location	Site	Tomb Type	Notes	External Dimensions	wall thickness	Roof	#Walls	Entrance	Materials	Tomb Shape	Chamber Diameter	Citations
Wadi Andam	CS.4.4	possible cairn		D: 1.5-2.0m	–	–	–	–	–	–	–	Al Jahwari 2013
Wadi Andam	CS.4.5	cairn	n=1, badly disturbed; possible sub-divisions	D: ~10.0m	–	–	6	–	–	–	–	Al Jahwari 2013
Wadi Andam	CS.4.9	Hafit cairn	n=1; possibly 11 burial chambers; IA ceramics; evidence of reuse	D: ~12.0m; H: ~4.0m	–	–	–	–	brown & black stones	–	–	Al Jahwari 2013
Wadi Andam	CS.4.13	cairn	n=5; possible subdivisions; disturbed; IA material culture	D: 10.0-12.0m	–	–	4-6	–	brown & black stones	–	–	Al Jahwari 2013
Wadi Andam	CS.4.13	Beehive tomb	n=4; disturbed; IA material culture	W: ~2.0m	–	–	2	–	possible travertine	–	~1.0m	Al Jahwari 2013
Wadi Andam	CS.4.14	cairn, creamy white soil	n=8; possible sub-divisions; IA and Islamic ceramics collected; evidence of reuse	D: 8.0-10.0m	–	–	4-6	–	brown stones	–	–	Al Jahwari 2013
Wadi Andam	CS.4.15	Hafit cairn	n=10, near Kharma village	D: 3.0-5.0m; H: 0.8-1.0+m	–	–	–	–	black stone	–	–	Al Jahwari 2013
Wadi Andam	CS.4.16	cairn	n=8	D: ~8.0m; H: ~2.0-3.0m	–	–	–	–	white stones	–	–	Al Jahwari 2013
Wadi Andam	CS.4.17	cairn, creamy white soil	n=3	–	–	–	–	–	–	–	–	Al Jahwari 2013
Wadi Andam	CS.4.18	cairn, creamy white soil	n=1	–	–	–	–	–	–	–	–	Al Jahwari 2013
Wadi Andam	CS.4.19	Hafit cairn	n=2	D: 6.0-7.0m; L: 1.5m W: 1.0m; H: ~2.0m	–	–	–	–	black rocks	–	–	Al Jahwari 2013
Wadi Andam	CS.5.2.5	cairn	n=18	D: 8.0-12.0m	0.3-0.4m	–	2-4	–	yellow stone	–	–	Al Jahwari 2013
Wadi Andam	CS.5.3	cairn	n=12	D: 3.0-8.0m	–	–	3-6	–	yellow stone	–	–	Al Jahwari 2013
Wadi Andam	CS.5.4	cairn	n=12; some have possible chambers; similar to Tawi Silaim type; human bone visible	D: up to ~8.0m; H: up to ~2.0m	–	–	2+	–	yellow limestone slabs	circular	–	Al Jahwari 2013
Wadi Andam	CS.5.5	cairn	n=2; disturbed	–	–	–	possibly 2	–	small yellow and black stones	–	–	Al Jahwari 2013
Wadi Andam	CS.5.6	cairn	n=12	D: 8.0-12.0m	–	–	–	–	yellow & grey stones	–	–	Al Jahwari 2013
Wadi Andam	CS.5.8.3	cairn or Beehive tomb	n~50	D: 6.0-8.0m; H: 0.6-1.0m	–	–	–	–	yellow stones	–	–	Al Jahwari 2013
Wadi Andam	CS.5.8.3	Beehive tomb	n=23; roofing stone ot lintel	D: 5.0-6.0m; H: 1.0-2.0m	1.6m (0.8m each)	–	2	E	–	–	–	Al Jahwari 2013
Wadi Andam	CS.5.10	cairn, creamy white soil	n=39; IA and Islamic material culture; evidence of reuse	D: 6.0-10.0m; H: 1.0-3.0m	–	–	–	–	black & yellow stones	–	–	Al Jahwari 2013
Wadi Andam	CS.5.11	Beehive Tomb	n=12	D: 5.0-6.0m; H: ~2.0-3.0m	1.6m (0.8m each)	–	2	–	yellow stones	–	1.2m	Al Jahwari 2013
Wadi Andam	CS.5.11	cairn, creamy white soil	n=4	D: 6.0-8.0m; H: 1.0-2.5m	–	–	–	–	yellow stones	–	–	Al Jahwari 2013

Location	Site	Tomb Type	Notes	External Dimensions	wall thickness	Roof	#Walls	Entrance	Materials	Tomb Shape	Chamber Diameter	Citations
Wadi Andam	CS.5.12	cairn, creamy white soil	n=14 (n=7 one one hill, n=5 second hill; n=2 third hill)	D: up to ~8.0m	–	–	–	–	yellow & black stones	–	–	Al Jahwari 2013
Wadi Andam	CS.5.13	cairn, creamy white soil	n=11; IA material culture; evidence of reuse	D: 6.0-8.0m; H: 2.5m	–	–	–	–	yellow & black stones	–	–	Al Jahwari 2013
Wadi Andam	CS.5.14	cairn, creamy white soil	n=18; IA material culture & shell fragments	D: ~8.0m	–	–	–	–	yellow & black stones	–	–	Al Jahwari 2013
Wadi Andam	CS.5.15	cairn	n=36; IA material culture in one tomb	D: 6.0-8.0m	–	–	–	–	yellow & black stones	–	–	Al Jahwari 2013
Wadi Andam	CS.5.19	Beehive Tomb	n=48	D: 4.0-6.0m; H: 1.5-3.0m	–	–	–	–	yellow stones	–	–	Al Jahwari 2013
		Hafit cairn	cairns on low gravel hills and in wadi terraces	–	–	–	–	–	–	–	–	
Wadi Andam	CS7.2	cairn, creamy white soil	n=76; look like collapsed Beehive tombs	D: 6.0-8.0m; H: 0.8-2.0m	–	–	–	–	yellow & black stones	–	–	Al Jahwari 2013
Wadi Andam	CS7.4	cairn, creamy white soil	n=5	D: 4.0-6.0m; H: ~2.0m	–	–	–	–	brown & white travertine	circular	~1.0m	Al Jahwari 2013
	CS.9.3	burial cairn; cairn, white creamy soil	n=5	D: 4.0-8.0m	–	–	–	–	brown stones	–	–	Al Jahwari 2013
Dhank	Abu Silah	Hafit-type cairn	n>300	–	–	–	–	–	–	–	–	Williams & Gregoricka 2013
Dhank	Al Khubayb	Hafit-type cairn	n=316	–	–	–	–	–	–	–	–	Williams & Gregoricka 2013
Dhank	Aflaj	Hafit-type cairn	n=80	–	–	–	–	–	–	–	–	Williams & Gregoricka 2013
Dhank	Al Khutma	Hafit-type cairn	n>120	–	–	–	–	–	–	–	–	Williams & Gregoricka 2013
Wadi Samad	Al-Khashbah	Hafit tomb	n=205	–	–	–	–	–	–	–	–	Schmidt & Dopper 2017
Dhofar	–	High Circular Tower tombs (including possible HCT)	n=94	–	–	–	–	–	–	–	–	Harrower et al. 2014
Wadi Hijr	Wadi Hijr			–	–	–	–	–		–	–	Cable & Al-Jabri 2018
Wadi al-Fajj	QA22	Hafit-type cairn		–	–	–	–	–	–	–	–	Rutkowski 2018

Table A.2. Published excavated Early Bronze Age Cairns: Architecture Summary (does not include Jebel Hafit cairns)

		ARCHITECTURAL FEATURES							DIMENSIONS			OTHER	
Tomb/Grave	**Type**	**Materials**	**Roof**	**#Walls**	**Entrance**	**Tomb Shape**	**Chamber Shape**	**Floor?**	**External Diameter**	**Chamber Dimensions[a]**	**Standing Height**	**Citation(s)**	**Notes**
Site: Aflaj													
S020-001	tumulus	Unworked limestone	Unknown	1	Possibly top entry	oval	Oval	None	E-W: 7.80m; N-S: 5.06m	E-W:1.12m; N-S:2.41m; D:0.63m	–	Williams & Gregoricka 2020	2 hearths outside tumulus using northern & western walls
S020-002	tumulus	Unworked limestone	Unknown	4	Unknown	circular	Oval	None	E-W: 10.40m; N-S: 9.04m	E-W:1.75m; N-S:0.96m; D:1.79m	1.79m		1 hearth outside tumulus using western wall; walls created stepped exterior
Site: Abu Silah													
S021-001	tumulus	Unworked limestone	Capstones	4-5	South	circular	circular	None	7.91m	E-W:3.0m; N-S:2.30m	–	Williams & Gregoricka 2020	walls created stepped exterior
Site: Asimah													
As 6[b]	two-story grave mound	serpentinite; quartzite schist	corbelled	3	upper: possibly north; lower: top	circular	upper: oval; lower: rectangular	–	5.70m	upper: L: 2.50m, W: 2.25m; lower: L:1.65,W:0.95m	estimated: 1.30m	Vogt 1994; de Cardi 1985	Possibly cairn 14 (de Cardi 1985)
As 11[c]	cairn grave	serpentinite; quartzite schist; quartz	–	2	none	circular	oval	no	3.80-4.10m	chamber: L:1.70m, 1.05m, depth:0.90m; pit: L:>1.05m, W: 0.65m, depth:0.60m	~0.70m	Vogt 1994	Possible Hafit-type cairn; oval pit dug into chamber floor
As 17	disc grave	serpentinite; quartzite schist	corbelled walls, capstones	1	unclear	oval	rectangular	–	5.05m	L: 2.20m, W: 1.05m, D:0.95m	1.40m		–
Site: Bat													
603	Bat-type	white limestone	false dome	2	W, triangular	slightly oval	oval 1.6x2.4m	paved	5.3m - 5.7m (Oval)	1.6m x 2.4m	2.1m	Boehme 2011	Wadi Hijr; internal support wall; 0.4m bench found around the exterior of tomb; maybe (loam/gravel) binder
1137	Beehive grave	–	–	–	southwest	circular	oval/square	yes	~7.0m	~2.0m	~3.0m	Frifelt 1975b	Passage ~3.0m; plinth along outer wall and support wall in chamber
1138	Beehive grave	–	–	–	west	circular	c-shaped	yes	~6.0m	NE-SW :~3.0m; E-W: ~1.5	–	Frifelt 1975b; Yule & Weisgerber 1998	Passage ~2.5m L; ~0.5m W
Al Ayn Grave 6	Hafit-type tomb	roughly hewn stone	corbelled walls, false vault	2	southwest	round	round	no	5.75m	2.2m	4.0m	Dopper & Schmidt 2011; Schmidt & Dopper 2014	Passage L:1.67m; W: 0.39m
Al Ayn Grave 7	Hafit-type tomb	.	corbelled vault	1	south	round	round	no	3.90m		2.77m	Schmidt & Dopper 2014	well preserved; looters pit northeast wall
Site: Wadi Haluf													

		ARCHITECTURAL FEATURES							DIMENSIONS			OTHER	
Tomb/Grave	**Type**	**Materials**	**Roof**	**#Walls**	**Entrance**	**Tomb Shape**	**Chamber Shape**	**Floor?**	**External Diameter**	**Chamber Dimensions[a]**	**Standing Height**	**Citation(s)**	**Notes**
D013-001	high circular tower tomb	rough limestone	capstones	–	–	–	–	–	–	–	–	McCorriston et al. 2014	Robbed external façade;
D013-002	high circular tower tomb	rough limestone	–	–	–	–	–	–	–	–	–		Robbed external façade
D014-001	high circular tower tomb	rough limestone	–	–	–	–	–	–	–	–	–	McCorriston et al. 2014	Reused at later time and filled with rubble; Robbed external façade
D014-002	high circular tower tomb	rough limestone	capstones	–	–	–	–	–	–	–	–		Robbed external façade
Site: Hamra Safra													
ST12	Beehive tomb	–	–	–	–	–	–	–	–	–	–	Al-Belushi & ElMahi 2009	–
Site: Hanun													
D036-001	high circular tower tomb	rough limestone	–	–	–	–	–	–	–	–	–	McCorriston et al. 2014	lower courses of external facing remain;
D036-002	high circular tower tomb	rough limestone	–	–	–	–	–	–	–	–	–		–
D033-001	high circular tower tomb	rough limestone	–	–	–	–	–	–	–	–	–		–
Site: Jebel Buhais													
BHS 50	Hafit-type cairn	–	–	4	not found	circular	circular	–	1.6m	1.4m	0.5m	Jasim 2012	may be "tumulus"; reused
BHS 59	cairn	–	–	2-4	–	circular	oval	–	–	1.5m x 1.1m	0.75m		noted probably Hafit; may be "tumulus"; reused
BHS 62	Hafit-type cairn	–	–	multiple	–	circular	irregular shape	–	–	–	–		may be "tumulus"; reused
BHS 63	cairn	–	–	–	–	circular	–	–	2.0m	–	–		heavily destroyed; reused
BHS 64	Hafit-type cairn	coarse stones	–	–	–	circular	–	–	~7m	–	2.0m		structure altered for reuse event
BHS 76	Hafit-type cairn	massive stones	–	–	–	circular	semi circular	none	–	–	–		reused
BHS 88	cairn Grave (Hafit/UAN transition)	partially worked stone slabs	corbelled walls	–	western, rectangular	circular	H-shaped	stone pieces	5.5m	1.4m	0.9m		transitional cairn; wall 2.50m thick
BHS 89	Hafit-type cairn	unworked heavy stones	–	3	south	circular	1 chamber divided by wall	small flat stones	5.0m	–	1.2m		built against ridge, western wall only two rows; chamber divided in two with internal wall; wall ~1.5m thick
Site: Jebel al-Emalah													

		ARCHITECTURAL FEATURES							DIMENSIONS			OTHER	
Tomb/Grave	**Type**	**Materials**	**Roof**	**#Walls**	**Entrance**	**Tomb Shape**	**Chamber Shape**	**Floor?**	**External Diameter**	**Chamber Dimensions[a]**	**Standing Height**	**Citation(s)**	**Notes**
Tomb I	tomb	rough shaped stones	–	1	west	circular	H shaped	cobbles	6.5m	–	–	Benton & Potts 1994	Only NW chamber and central area of chamber paved
Tomb III	cairn	–	–	2	west	circular	–	cobbles	11.4m	8.2m	1.4m		doorway: exterior width 0.40-0.50m, interior width 0.40m; internal architecture: two parallel walls
Tomb IV	low stone cairn	large rectangular or oblong stones	corbelled walls, cap stones	1	–	circular	oval	packed earth floor	12.0m	not fully excavated	1.33m		smaller stones used as packing between larger stones
Site: Jebal Ibri, Site 59													
Grave 1141	cairn	local stones	n/a	n/a	n/a	circular	irregular	n/a	n/a	1.5m x 2.00m	0.5m	Frifelt 1975b; de Cardi et al. 1976	–
Site: Jibjat													
D002-001	high circular tower tomb	rough limestone	–	–	–	–	–	–	–	–	–	McCorriston et al. 2014	lower courses of external facing remain
Site: Kalba													
K2	cairn tomb	rounded wadi boulders	Corbelled	–	west	circular	2 chambers (c-shaped)	–	9.0m	–	–	Eddisford & Phillips 2009	Transitional between Hafit cairn and UAN tomb; Reused in late Pre-Islamic Period
Site: Al Khubayb													
S007-001	transitional cairn	Unworked limestone	Corbelled walls, false dome	2-3	unknown	circular	H-Shaped	no	–	7.0m	2.9m	Williams & Gregoricka 2013, 2019	Extensive deflation prevented accurate external diameter measurement
S007-003	transitional cairn	Unworked limestone	Corbelled walls, flat slabs	2	west	circular	round	no	–	3.6m	3.9m	Williams & Gregoricka 2013, 2019; Weber et al. 2019	Extensive deflation prevented accurate external diameter measurement
S007-011	transitional cairn	Unworked limestone	Corbelled walls, flat slabs	2	west	circular	round	no	–	3.3m	3.0m	Williams & Gregoricka 2019; Weber et al. 2019	Extensive deflation prevented accurate external diameter measurement
S007-012	transitional cairn	Unworked limestone	Corbelled walls, false dome	3	unknown	circular	H-Shaped	no	–	3.2m	2.8m	Williams & Gregoricka 2019; Weber et al. 2019	Extensive deflation prevented accurate external diameter measurement
S007-039	Hafit-type cairn	Unworked limestone	Corbelled walls	2	unknown	circular	round	no	–	1.5m	1.0m	Williams & Gregoricka 2013	–
S007-053	Hafit-type cairn	Unworked limestone	Corbelled walls	2	unknown	circular	round	no	–	1.2m	1.0m		–

		ARCHITECTURAL FEATURES							DIMENSIONS			OTHER	
Tomb/Grave	**Type**	**Materials**	**Roof**	**#Walls**	**Entrance**	**Tomb Shape**	**Chamber Shape**	**Floor?**	**External Diameter**	**Chamber Dimensions[a]**	**Standing Height**	**Citation(s)**	**Notes**
S007-057	transitional cairn	Unworked limestone	Corbelled walls, unknown roof	2	west	circular	oval	no	–	5.8m	4.5m	Williams & Gregoricka 2019; Weber et al. 2019	Extensive deflation prevented accurate external diameter measurement
S007-095	Hafit-type cairn	Unworked limestone	Corbelled walls, false dome	2	unknown	circular	oval	no	–	1.1m	2.1m	Williams & Gregoricka 2013	–
S007-100	Hafit-type cairn	Unworked limestone	Walls & roof eroded	1	unknown	circular	roughly round	no	~1.5m	~1.0m	~0.6m	Williams & Gregoricka 2020	–
S007-101	Hafit-type cairn	Unworked limestone	Walls & roof eroded	1	unknown	circular	roughly round	no	~1.75m	~1.25m	~0.75m		–
S007-167	tumulus	Unworked limestone	Likely capstones, walls not corbelled	3+	Possibly north	circular	circular	No	3.00m	–	1.60m	Weber et al. 2019; Williams & Gregoricka 2020	reused
S007-169	tumulus	Unworked limestone	Stepped exterior	4+	west	circular	C- shaped	No	6.00m	–	0.67m	Williams & Gregoricka 2020	–
Site: Al Khutma													
S002-001	Hafit-type cairn	Unworked limestone	Corbelled walls; too degraded to determine roof	2	Unknown	circular	circular	None	–	2.0m	1.1m	Williams & Gregoricka 2013	reused
Site: Khutum Malaha													
K1A	stone cairn	angular stones	–	–	–	–	–	–	–	–	–	Eddisford & Phillips 2009	–
K1B	stone cairn	angular stones	–	–	–	–	–	–	–	–	–		–
Site: Maysar													
Maysar 3, Tomb 17	cairn	–	–	–	–	circular	circular	–	–	–	0.6m	Weisgerber 1980	Bone splinters and carnelian beads in the rubble
Maysar 3, Tomb 18	cairn	–	–	–	–	circular	rectangular	–	–	–	–	Weisgerber 1980	MNI>1; flat clear bead; pearl; faunal material; 2 hearths outside of tomb
Maysar 3, Tomb 29	cairn	–	–	–	–	circular	–	–	–	–	–	Weisgerber 1980	Poorly preserved bones (possible reuse?); possible ocher; rock art on tomb – possibly more recent date

		ARCHITECTURAL FEATURES							DIMENSIONS			OTHER	
Tomb/Grave	**Type**	**Materials**	**Roof**	**#Walls**	**Entrance**	**Tomb Shape**	**Chamber Shape**	**Floor?**	**External Diameter**	**Chamber Dimensions[a]**	**Standing Height**	**Citation(s)**	**Notes**
Maysar 4, Tomb 1	cairn	–	Corbelled vault	–	–	circular	round	yes	5.40m	3.90m		Weisgerber 1980	Wall thickness: 0.75m; pseudo floor; elongated white beads, pottery sherds; MNI=3; long thin flat ax (parallels in Bahrain)
Maysar 8, Tomb 803	Hafit-type cairn	rough limestone boulders	–	3	n/a	circular	round	–	5.2m	n/a	n/a	Yule & Weisgerber 1988	–
Maysar 22, Tomb 1	cairn	–	–	–	–	circular	round	–	5.5m	1.60m	–	Weisgerber 1980	empty
Maysar 22, Tomb 4	Beehive grave	–	–	–	–	circular	round	–	0.60m	1.60m	–	Weisgerber 1980	
Maysar 22, Tomb 5	cairn	–	Corbelled vault	–	east	circular	round	–	4.0m	1.60m	–	Weisgerber 1980	Plinth, retaining wall; beads, Bones, two bronze needles
Maysar M317	Hafit tomb	–	–	–	south	circular	round	no	–	–	–	Yule & Weisgerber 1998	
Site: Mazyad													
Grave 1317	grave; mound	unfashioned stones	Corbelled walls, capstones	2	south	circular	round	yes	7.0m	2.0m	~2.0m	Frifelt 1975b	wall >2.0m; passage L:2.30m, H:1.05-1.20m
Grave 1318	Cairn-grave	–	roof slabs	–	east	circular	–	No	~6.0m	~2.0m	~3.0m	Frifelt 1975b	1.0m high supporting wall added on north and east sides
Grave 1319	grave	–	–	2	south	squarish	–	yes (see notes)	–	2.0m	3.0m		extra circular wall, ~1.5m tall' passage 1.3m tall, W:0.60m, L:2.5m; natural gravel floor and possibly layer of sand
Grave 1320	Grave, stone mound	–	corbelled walls; stone pile top	–	south	circular	–	no	6.0m	–	–		
Grave 1321	grave	–	–	–	–	circular	–	yes	6.0m	–	–		badly ruined
Site: Mudhai													
D001-001	high circular tower tomb	rough limestone	Corbelled walls, capstones	2	roof	round	round	no	~5.0m	D: 1.20m	–	McCorriston et al. 2014; Williams et al. 2014	–
Site: Ras Al-Hadd													
HD 10-3.1	cairn	small limestone boulders	stone cover and slabs	3	east	round	slightly oval	likely stone slabs	8.0m	–	1.5m	Salvatori 2001	southern portion excavated; entrance 0.60m wide
HD 10-3.2	cairn	–	slabs	2	–	round	slightly oval	–	–	–	–		–

		ARCHITECTURAL FEATURES							DIMENSIONS			OTHER	
Tomb/Grave	**Type**	**Materials**	**Roof**	**#Walls**	**Entrance**	**Tomb Shape**	**Chamber Shape**	**Floor?**	**External Diameter**	**Chamber Dimensions[a]**	**Standing Height**	**Citation(s)**	**Notes**
HD 10-4.1	cairn	small & medium sized stones	–	2	east	round	horse-shoe	Irregular limestone paving	–	–	–	Salvatori 2001	–
HD 10-4.2	cairn	–	–	–	east	round	horse-shoe	Irregular small limestone pebbles	–	–	–		disturbed and refilled with medium sized stones
HD 10-2.1	cairn	–	–	–	–	–	–	–	–	–	–		large tomb, reused/visited in antiquity
Site: Ras Al-Jinz 6													
cairn 1	cairn	–	–	–	–	circular	–	possibly	–	–	–	Cleuziou & Tosi 2000	–
cairn 6	cairn		–	–	–	circular	–	–	–	–	–		–
Site: Sayhal-Qattarah													
ST252	Beehive Tomb	–	–	–	–	–	–	–	–	–	–	Al-Belushi & ElMahi 2009	Wilayat al-Qabil; excavated, details not published
Site: Shenah													
Tomb ST2	Beehive Tomb	yellow-brown sandstone	corbelled walls, closed dome	1	no	circular	oval		11.2m	1.5m x 1.3m	1.3m	Al-Belushi & ElMahi 2009	Wilayat al-Qabil; partially preserved
Tomb ST103	Beehive Tomb	brown limestone	corbelled walls, opened at top	2 (no gap)	E	inverted paraboloid	–	bedrock	5.3m	–	2.6m		Wilayat al-Qabil; not well preserved
ST149	Pre-UAN burial structure	yellow-brown limestone	Not preserved	2	E	circular	circular	–	5m	2m	0.3m		Wilayat al-Qabil; located on low ridge; entrance measurements; wall thickness: 1.5 (inner: 0.95 & outer: 0.55)
ST151	Pre-UAN burial structure	yellow-brown limestone	–	3 concentric ring walls	E, rectangular, blocked	circular	circular	bedrock	6.6m	2.1m	–		Wilayat al-Qabil; Wall thickness: 2.6 (outer: 0.78; middle: 0.68; inner: 0.95)
Site: Shir													
Shi1	Tower tomb	Light grey-grey-brown (& scattered black) limestone	Conical vault	2	E	round	round	Yes, flat stones	6.07m	–	5.47m	Yule & Weisgerber 1998	Reused? (Lizq/Rumaylah sherds & pounding stone at entrance); 50 stone courses; façade stones have been shaped
Shi2	Tower tomb	Light colored limestone	Conical vault	2	SE	Round	Round	yes	7.34m	–	7.50m	Yule & Weisgerber 1998	Double corbelled vault; stone shims; EIA sherds & pound stones – reused?
Shi23	Tower tomb	Rough limestone	Corbelled walls	2	E	Round	Round	–	4.72-4.92m	–	0.90m	Yule & Weisgerber 1998	–

		ARCHITECTURAL FEATURES							DIMENSIONS			OTHER	
Tomb/Grave	**Type**	**Materials**	**Roof**	**#Walls**	**Entrance**	**Tomb Shape**	**Chamber Shape**	**Floor?**	**External Diameter**	**Chamber Dimensions[a]**	**Standing Height**	**Citation(s)**	**Notes**
Site: Tiwi Silaim (Jabal al Haura)													
cairn 1	Beehive tombs	Boulders and limestone	collapsed	3	E	circular	round	yes	9m	2.0m	2m	de Cardi et al. 1977	Wall thickness: A: 1.0m; B=1.0m; C=1.5m
cairn 2	cairn	rough limestone	corbelled walls	1?	east	circular	circular	yes	3.8m	.	0.40m	de Cardi et al. 1979	reused; entrance width: 0.60m
cairn 3	cairn	rough limestone	corbelled walls	1?	east	circular	circular	yes	3.6m	.	.	de Cardi et al. 1979	Entrance width: 0.60m
cairn 4	cairn	large flat slabs & rough limestone	corbelled walls	2	east	circular	elliptical	yes	.	2.6m x 1.0m	1.2m	de Cardi et al. 1979	robbed, but structure intact but roof stones; no skeletal material
Site: Umm an-Nar Island													
Tomb VI	Beehive or Pillbox	undressed stones	corbelled walls (no roof described)	2	east	circular	round with EW cross wall created 2 chambers	yes, large flag stones	5.5m	.	1.3m	Frifelt 1991; Al Tikriti 2011	published as "Cairn VI" and "Grave VI"; Registration # 1090; Grave 38 (Al Tikriti 2011)
Tomb VII	cairn	unfashioned stonesd	.	2	.	circular	circular	no	~3.0m	D:1.6m	.	Frifelt 1991; Al Tikriti 2011	published as "Cairn VII" and "Grave VII"; Registration # 1091; Grave 39 (Al Tikriti 2011)
Tomb VIII	cairn	unfashioned stones	.	1	.	circular	circular	no	~1.5m	.	.	Frifelt 1991; Al Tikriti 2011	Empty; published as "Cairn VIII" and "Grave VIII"; Registration # 1092; Grave 40 (Al Tikriti 2011)
Tomb XI	cairn	unshaped stones	not preserved	.	not preserved	circular/oval	circular/oval	.	.	.	.	Al-Tikriti 1981; Al Tikriti 2011	Grave 17 (Al-Tikriti 2011); Material culture and skeletal remains recoverede
Tomb XII	cairn	rough stones	not preserved	.	not preserved	circular	.	.	.	.	.	Al-Tikriti 1981	Grave 22 (Al-Tikriti 2011); Material culture and skeletal remains recoverede
Tomb XIII	cairn	.	not preserved	.	south	circular/oval	circular/oval	.	3.20 x 3.50m	1.70 x 2.00m	0.70m	Al Tikriti 2011	Grave 27 (Al-Tikriti 2011); empty

a. Diameter unless noted: D: Depth, L: Length, W: Width

b. This may not be an Early Bronze Age cairn. Vogt (1994: 26) discusses some elements of the architecture that is similar to both Beehive cairns (concentric walls) and Umm an-Nar (two story construction), but other aspects suggest a later date. It is included here because of the associated Umm an-Nar ceramics.

c. This tomb may have been a Hafit-type cairn that was reused (Vogt 1994: 36).

d. Wall contained one dressed block. This indicates that this tomb was built after the construction of tombs that used dressed blocks. It is included here because of it is primarily constructed of unworked stone and small size. This does not imply that it predates the Umm an-Nar communal tombs. This shows the diversity of tomb construction that did occur and the difficulty assessing period of use from the architecture of a tomb alone.

Table A.3. Published excavated Early Bronze Age Cairns: Interments

LOCATION/SITE INFORMATION		INTERMENTS					EVIDENCE OF DISTURBANCE		OTHER	
Tomb/Grave	Named Tomb Type	Total MNI[a]	Material Culture?	Evidence of Reuse?	Reuse MNI[a]	Material Culture from Reuse Event(s)	Interior Robbed?	Exterior Robbed?	Citation(s)	Notes
Site: Aflaj										
S020-001	tumulus	1	yes	no	–	–	no	no	Williams & Gregoricka 2020	Bone bioapatite and charcoal dates in Table 5.1
S020-002	tumulus	2	yes	yes	1	yes	no	no		
Site: Abu Silah										
S021-001	tumulus	6	yes	yes	5	yes	no	no	Williams & Gregoricka 2020	bone bioapatite dates in Table 5.1
Site: Asimah										
As 6[b]	two-story grave mound	0	yes	yes	0	yes	yes	yes	Vogt 1994; de Cardi 1985	.
As 11[c]	cairn grave	1	yes	yes	–	yes	.	.	Vogt 1994	contained bone fragments; chamber contained faunal bone & fragmentary human bones – may not be EBA
As 17	disc grave	1	yes	no	0	–	yes	.	Vogt 1994	fragmentary human bones
Site: Bat										
603	Bat-type	0	yes	maybe	–	–	yes	no	Boehme 2011	opened from top in antiquity; support wall; 0.4m bench found around the exterior of tomb; triangular entrance; white facing stones trimmed
1137	beehive shaped tomb	1	Yes	No	–	–	yes	–	Frifelt 1975a,b	–
1138	beehive shaped tomb	0	Yes	No	–	–	yes	–	Frifelt 1975a,b; Yule & Weisgerber 1998	–
Al Ayn Grave 6	Hafit tomb	0	Yes	No	–	–	yes	no	Dopper & Schmidt 2011; Schmidt & Dopper 2014	–
Al Ayn Grave 7	Hafit tomb	0	Yes	Yes	–	yes	yes	no	Schmidt & Dopper 2014	.
Site: Wadi Haluf										
D013-001	high circular tower tomb	1	yes	no	Possibly for faunal material	–	no	no	McCorriston et al. 2014	Perforated mother of pearl disc; **Calibrated date (bone bioapatite):** 3363-3029 BC
D013-002	high circular tower tomb	0	no	no	–	–	no	yes		**Calibrated date (charcoal)**: 4519-4354 BC (terminus post quem)
D014-001	high circular tower tomb	1	no	no	–	–	no	yes		.
D014-002	high circular tower tomb	1	no	no	–	–	no	yes		**Calibrated date (bone bioapatite):** 4676+/-58 BC (date may not be correct see McCorriston et al. 2014)
Site: Hamra Safra										
ST12	Beehive tomb	1	–	–	–	–	.	.	Al-Belushi & ElMahi 2009	excavated, details not published; bone fragments
Site: Hanun										
D036-001	high circular tower tomb	1	no	–	Possibly for faunal material	–	no	yes	McCorriston et al. 2014	human remains placed directly on bedrock and cranium rested on pillow of three black stones at the north-west side of the chamber; **Calibrated date (bone bioapatite)**: 2036 +/-69 BC
D036-002	high circular tower tomb	1	yes	possibly	possibly 1	–	no	no		**Calibrated date (bone bioapatite)**: 2036 +/-69 BC; Interment may be from a reuse event
D033-001	high circular tower tomb	0	no	no	Possibly for faunal material	–	no	no		Modern camel bone (but with date 4616+/-60 BC, see McCorriston et al. 2014: 129 for discussion)
Site: Jebel Buhais										
BHS 50	Hafit-type cairn	1	yes	yes	unknown	yes	.	.	Jasim 2012	Reused
BHS 59	cairn	1	yes	yes	unknown	yes	.	.		Reused
BHS 62	Hafit-type cairn	1	no	yes	unknown	no	.	.		Reused
BHS 63	cairn	1	yes	yes	unknown	yes	.	yes		Reused
BHS 64	Hafit-type cairn	1	yes	yes	1	yes	.	.		Reused
BHS 76	Hafit-type cairn	1	yes	yes	unknown	yes	.	.		Reused
BHS 88	cairn Grave (Hafit/UAN transition)	5	yes	yes	1	yes	.	.		Reused
BHS 89	Hafit-type cairn	24	yes	yes	unknown	yes	.	.		Reused
Site: Jebel al-Emalah										
Tomb I	tomb	6	yes	no	unknown	yes	.	.	Benton & Potts 1994	.
Tomb III	cairn	3	yes	no	unknown	yes	.	.		.
Tomb IV	low stone cairn	2	yes	yes	unknown	yes	.	.		.

LOCATION/SITE INFORMATION		INTERMENTS					EVIDENCE OF DISTURBANCE		OTHER	
Tomb/Grave	Named Tomb Type	Total MNI[a]	Material Culture?	Evidence of Reuse?	Reuse MNI[a]	Material Culture from Reuse Event(s)	Interior Robbed?	Exterior Robbed?	Citation(s)	Notes
Site: Jebal Ibri, Site 59										
Grave 1141	cairn	1	Yes	No	–	–	.	.	Frifelt 1975b; de Cardi et al. 1976	Foot of Jebel Fajj Raybah, opposite village of Hijar; bone fragments only
Site: Jibjat										
D002-001	high circular tower tomb	0	no	no	–	–	no	no	McCorriston et al. 2014	no human remains
Site: Kalba										
K2	cairn tomb	–	yes	yes	unknown	yes	.	.	David & Phillips 2008; Eddisford & Philips 2009	Reused; bone fragments
Site: Al Khubayb										
S007-001	transitional cairn	3[c]	yes	no	–	–	no	no	Williams & Gregoricka 2013, 2019	bone bioapatite and charcoal dates in Table 5.1
S007-002	Hafit-type cairn	0	no	no	–	–	yes	yes	Williams & Gregoricka 2013	.
S007-003	transitional cairn	5	yes	no	–	–	no	no	Williams & Gregoricka 2013, 2019	bone bioapatite and charcoal dates in Table 5.1
S007-011	transitional cairn	1	yes	no	–	–	no	no	Williams & Gregoricka 2019	.
S007-012	transitional cairn	1	yes	no	–	–	no	no		.
S007-039	Hafit-type cairn	1	yes	no	–	–	no	no	Williams & Gregoricka 2013	.
S007-053	Hafit-type cairn	0	no	no	–	–	Yes	Yes		.
S007-057	transitional cairn	5	yes	no	–	–	no	no	Williams & Gregoricka 2019	.
S007-095	Hafit-type cairn	1	Yes	no	–	–	no	no	Williams & Gregoricka 2013	.
S007-100	Hafit-type cairn	2	no	no	–	–	no	no	Williams & Gregoricka 2020	bone bioapatite dates in Table 5.1
S007-101	Hafit-type cairn	2	no	no	–	–	no	no		bone bioapatite dates in Table 5.1
S007-167	tumulus	2	yes	yes	1	yes	no	no		bone bioapatite and charcoal dates in Table 5.1; evidence of reuse & revisiting (Williams & Gregoricka 2020: 106)
S007-169	tumulus	1	yes	no			no	no		bone bioapatite dates in Table 5.1; no evidence of reuse, but evidence of revisiting (Williams & Gregoricka 2020: 109)
Site: Al Khutma										
S002-001	Hafit-type cairn	2	yes	yes	1	yes	no	no	Williams & Gregoricka 2013	bone bioapatite dates in Table 5.1
Site: Khutum Malaha										
K1A	stone cairn	1	no	no	–	–	.	.	Eddisford & Phillips 2009	Only few fragmentary bones
K1B	stone cairn	1	no	no	–	–	.	.		Only few fragmentary bones
Site: Maysar										
Maysar 3, Tomb 17	cairn	1	yes	–	–	–	.	.	Weisgerber 1980	.
Maysar 3, Tomb 18	cairn	>1	yes	–	–	–	.	.		.
Maysar 3, Tomb 29	cairn	1	yes	possibly	–	–	.	.		Anchor-like drawings on tomb stones – like post-date the destruction of the tomb; ocher-like substance on bones
Maysar 4, Tomb 1	cairn	1	yes	yes	unknown	yes	yes	.		Reused, floors ripped up and burial pit dug into floor
Maysar 8, Tomb 803	Hafit-type cairn	6	yes	–	–	–	no	no	Yule & Weisgerber 1988	cairn reused; used ring walls for subsequent burials
Maysar 22, Tomb 4	Beehive grave	1	yes	–	–	–	yes	.	Weisgerber 1980	
Maysar 22, Tomb 5	cairn	1	yes	–	–	–	yes	.		
Site: Mazyad										
Grave 1317	grave; mound	2	yes	no	–	–	no	no	Frifelt 1975b	Description of one flexed skeleton placed on left side and other bones (Frifelt 1975b: 61)
Grave 1318	cairn-grave	0	no	–	–	–	yes	yes		
Grave 1319	grave	0	yes	no	–	–	yes	yes		
Grave 1320	grave	3	yes	no	–	–	no	yes		one individual possibly facing east with legs toward south
Grave 1321	grave	0	Yes	no	–	–	.	yes		Author did not address presence/absence of bones (Frifelt 1975b: 66)
Site: Mudhai										
D001-001	high circular tower tomb	5	Yes	Yes	4	yes	no	no	McCorriston et al. 2014; Williams et al. 2014	bone bioapatite dates in Table 5.1

LOCATION/SITE INFORMATION		INTERMENTS					EVIDENCE OF DISTURBANCE		OTHER	
Tomb/Grave	Named Tomb Type	Total MNI[a]	Material Culture?	Evidence of Reuse?	Reuse MNI[a]	Material Culture from Reuse Event(s)	Interior Robbed?	Exterior Robbed?	Citation(s)	Notes
Site: Ras Al-Hadd										
HD 10-3.1	cairn	11	yes	yes	unclear	yes	yes	.	Salvatori 2001	earlier interments pushed aside for newer interments
HD 10-3.2	cairn	6	yes	yes	unclear	yes	.	yes		.
HD 10-4.1	cairn	22	yes	yes	unclear	yes	yes	yes		.
HD 10-4.2	cairn	22	yes	yes	unclear	yes	yes	yes		.
HD 10-2.1	cairn	1	yes	maybe	unclear	unclear	yes	.		.
Site: Sayhal-Qattarah										
ST252	Beehive tomb	1	yes	yes	–	–	.	.	Al-Belushi & ElMahi 2009	excavated, details not published; bone fragments
Site: Shenah										
Tomb ST2	Beehive tomb	–	–	–	–	–	yes	no	Al-Belushi & ElMahi 2009	partially preserved
Tomb ST103	Beehive tomb	–	no	–	–	–	yes	no	Al-Belushi & ElMahi 2009	not well preserved
ST149	pre-UAN burial structure	0	no	–	–	–	yes	no	Al-Belushi & ElMahi 2009	located on low ridge; well constructed; entrance measurements; no grave goods; roof not preserved
ST151	pre-UAN burial structure	0	yes	–	–	–	yes	no	Al-Belushi & ElMahi 2009	10m W of ST149; well-dressed interlocking rectangular stones; upright rectangular shape entrance blocked with stones
Site: Shir										
Shi1	Tower tomb	1	yes	–	–	–	yes	no	Yule & Weisgerber 1998	–
Shi2	Tower tomb	0	yes	yes	unknown	yes	yes	no		–
Shi23	Tower tomb	1	no	no	–	–	yes	no		Bone splinters in tomb at entrance
Site: Tiwi Silaim (Jabal al Haura)										
cairn 1	Beehive tombs	2	yes	yes	unknown	yes	yes	no	de Cardi et al. 1977	–
cairn 2	cairn	1	yes	yes	1	–	yes	yes	de Cardi et al. 1979	–
cairn 3	cairn	1	yes	no	n/a	n/a	no	no	de Cardi et al. 1979	–
cairn 4	cairn	1	yes	yes	1	yes	yes	yes	de Cardi et al. 1979	bones on the surface are interpreted as possible remains from the reuse event
Site: Umm an-Nar Island										
Tomb VI	Circular Tomb	5	yes	no	n/a	n/a	–	–	Thorvildsen 1962; Frifelt 1991; Kunter 1991; Al Tikriti 2011	Extramural burials on southern side of tomb
Tomb VII	Circular Tomb	3-4	yes	no	n/a	n/a	–	–	Frifelt 1991; Kunter 1991; Al Tikriti 2011	1-2 extramural burials on eastern & western sides of tomb
Tomb XI	Circular/oval tomb	1	Yes	No	–	n/a	Yes	Yes	Al-Tikriti 1981; Al Tikriti 2011	.

a. Total MNI refers to evidence of the total number of individuals in the tomb whereas Reuse MNI refers to the subset of the Total MNI that are evidence of reuse of the tomb. For example, a Total MNI of 5 and Reuse MNI of 4 means that 5 people were interred in the tomb over the entire period of use and 4 of those interred were events that occurred after the first interment. Reuse MNI does not include a measure of the period of disuse and could include reuse events that occurred soon after the initial interment event and reuse that occurred many years after the initial interment event. Where more evidence about the chronology of interments is known, this information is elaborated in subsequent footnotes.

b. This may not be an Early Bronze Age cairn. Vogt (1994: 26) discusses some elements of the architecture that is similar to both Beehive cairns (concentric walls) and Umm an-Nar (two story construction), but other aspects suggest a later date. It is included here because of the associated Umm an-Nar ceramics.

c. This tomb may have been a Hafit-type cairn that was reused (Vogt 1994: 36).

d. In this case, additional interment events are not considered "reuse events." Instead, these events happened close in time to one another and are interpreted as part of the initial use of the cairn. In other words, these transitional cairns are interpreted as mortuary monuments that were built to inter more than one person (with their own discrete space in the tomb) during the Early Bronze Age in contrast to other Early Bronze Age cairns that may have held more than one interment but where each new interment did not get their own discrete space and either displaced the either interment or were placed on top of the new interment.

Table A.4. Published excavated Early Bronze Age Cairns: Material Culture (does not include Jebel Hafit cairns)

		Ceramic(s)				Bead(s)			Copper/Bronze		Other	
Tomb/Grave	**Individual**	**shape**	**ware**	**paint/slip**	**notes**	**shape/color**	**material**	**dimensions/ description**	**object**	**dimensions/ description**	**Notes**	**Citation(s)**
Site: Aflaj												
S020-001	exterior (reuse or visit)	25+ Iron Age II drinking vessels (red fineware); sandy buff vessel	analyses needed for further identification	red fineware decorated with wavy black line near rim; sandy buff vessel had exterior black slip and inscribed palm motif on interior base	–	–			2 points; bronze rivets; bronze ring	–	–	Williams & Gregoricka 2020
S020-002	exterior (reuse or visit)	5 Iron Age II drinking vessels (red fineware)	analyses needed for further identification	decorated with wavy black line near rim		–			pin	–	–	
	A or B	–				20 beads	steatite, shell	–	rivets	–	found in fill, cannot be associated with specific individual due to rodent activity	
	B	a) orange ware suspension vessel; b) sandy buff vessel	analyses needed for further identification			–			–			
Site: Abu Silah												
S021-001	A (reuse event)	–				–			4 Iron Age points	–	–	Williams & Gregoricka 2020
	B-E	–				beads	–	–	–			
Site: Asimah												
As 6	–	fragments	UAN domestic	purple slip	may be from EBA use of tomb; found outside tomb	–			–		1 marine shell; glass fragment; silver coin (glass and coin from reuse)	Vogt 1994; de Cardi 1985
As 11	reuse event?	~15 body sherds	Gritty red Late Medieval	–	Found both in upper chamber and surface	–			–			Vogt 1994
As 17	–	2 body sherds	UAN domestic, reddish yellow	–	well fired	–			–			
		2 base fragments	UAN domestic, red	–	constantly fired	–			–			
		4 body sherds	UAN fine red ware	black	–	–			–			

		Ceramic(s)				Bead(s)			Copper/Bronze		Other	
Tomb/Grave	**Individual**	**shape**	**ware**	**paint/slip**	**notes**	**shape/color**	**material**	**dimensions/ description**	**object**	**dimensions/ description**	**Notes**	**Citation(s)**
Site: Bat												
Tomb 603	–	Sherds				carnelian			dagger	L:14.3cm maximum width: 3.3cm	point broken, hilt fixed with two rivets, slight concavity	Boehme 2011
									plate	–	–	
									plate with handle	L:8.5cm W:1.0cm thickness: 0.4cm	rectangular cross section, oval plate (12.5cm x 9cm, ~0.2cm)	
Grave 1137	–	fine buff ware jar with black bands				Biconical bead/ mottled black serpentine			–			Frifelt 1975a,b
Grave 1138	–	Rim sherd, everted flat rim, buff ware				–			–			Frifelt 1975a,b; Yule & Weisgerber 1998
Al Ayn Grave 6	–	Fragment of Jemdet Nasr vessel				–			Pin	L:8.6cm	–	Dopper & Schmidt 2011; Schmidt & Dopper 2014
Al Ayn Grave 7	–	Very coarse Iron Age pottery (reuse)				Stone beads			Open ring with two rounded ends	–	Sea shell	Schmidt & Dopper 2014
									Sheet fragment	–	–	
D013-001	–					mother of pearl disc pendant			–			McCorriston et al. 2014
Site: Hanun												
D036-001	–											McCorriston et al. 2014
D036-002	–	–				3 conus sp shell beads			–			
Site: Jebel Buhais												
BHS 50	–	wadi suq pottery sherds				–			–			Jasim 2012
BHS 59	–	pottery sherds				–			3 bronze/copper sheets; one point	–	softstone fragments	
BHS 63	–	–				–			arrow point, driven into lowest stone course, oriented East	–	Iron Age sofstone fragments	

		Ceramic(s)				Bead(s)			Copper/Bronze		Other	
Tomb/Grave	**Individual**	**shape**	**ware**	**paint/slip**	**notes**	**shape/color**	**material**	**dimensions/ description**	**object**	**dimensions/ description**	**Notes**	**Citation(s)**
BHS 64	–	–				–			12 Iron Age arrow points; 2 bronze rings	–	all material culture found in additional later chamber from reuse event	Jasim 2012
BHS 76	–	2 Mesopotamian sherds				cylindrical bead; shell bead			–	–	Iron Age Softstone fragments; white marble mace head; flint tool	
BHS 89	infant	–				–			bangle with tapering ends	–	rectangular softstone box (UAN)	
	commingled	Umm an-Nar pottery jars; Mesopotamian type jar				two necklaces made from shells, carnelian, stones			–			
Site: Jebal 'Ibri, site 59												
Grave 1141	–	Jemdet Nasr Bioconical jar	orange-brown fine ware, medium-fired	damaged	bevlled rim, flat base	–						Frifelt 1975; de Cardi et al. 1976
		Jemdet Nasr Bioconical jar	orange-brown sand-tempered micaceous ware	damaged	bevlled rim, flat base	–						
Site: Jebel al-Emalah												
Tomb I	commingled	Jemdet Nasr vessel JE515: small, bevelled rim, rounded carination in center of body;	soft, degraded fabric; high frequency of small voids; misfired; surface dark grey-medium pink	similarities to UAN and Hafit period ceramics		n=89; natural shell bead necklace	Conus catus shells pierced longitudinally; worked, pierced cone spiral centerpiece	–	7 rivets	L: 0.76-1.53cm; D: 2-3.9mm (all tombs)	feeding shell	Benton & Potts 1994
						n=33	fish vertebrae	–				
						3 microbeads	talcose steatite	L: c. 1-1.2mm; D:2-2.5mm (all tombs)				
	commingled	Jemdet Nasr vessel JE1108 (similar but no rim)	pale pink to buff fabric with small white inclusions	–		699 microbeads	talc	D: 2.5 -3mm; W:1.5-3mm (all tombs)	7 rivets	L: 0.76-1.53cm; D: 2-3.9mm (all tombs)	feeding shell	
						239 microbeads	softstone	D: 2.5 -3mm; W:1.2-2mm (all tombs)				
						n=10	carnelian	–				
						n=10	agate	–				
						n=3	silver/lead alloy					

		Ceramic(s)				Bead(s)			Copper/Bronze		Other	
Tomb/Grave	**Individual**	**shape**	**ware**	**paint/slip**	**notes**	**shape/color**	**material**	**dimensions/ description**	**object**	**dimensions/ description**	**Notes**	**Citation(s)**
Tomb I	reuse event	–				–			–		iron sword; fragment IA softstone bowl; whetstone	Benton & Potts 1994
Tomb III	commingled	Jemdet Nasr vessel JE256: rounded base, rounded carination at shoulder, bevelled rim	sandy, reddish pink with yellow to white inclusions	exfoliated; small preserved portion of cream slip	–	n=9; natural shell	2 Conus catus; 1 Conus; 6 fish vertebrae spacer beads	–	2 rivets	L: 0.76-1.53cm; D: 2-3.9mm (all tombs)	two beads in alignment - possible bead embroidered cloth; limestone prism (?), perforated longitudinally	Benton & Potts 1994
						573 white tubular beads	talcose steatite	L: c. 1-1.2mm; D:2-2.5mm (all tombs)				
						5 microbeads	talc	D: 2.5 -3mm; W:1.5-3mm (all tombs)				
						443 microbeads	softstone	D: 2.5 -3mm; W:1.2-2mm (all tombs)				
						n=3	silver/lead alloy	–				
						n=2	agate	–				
						n=9	carnelian	–				
	reuse event	–				–			2 bracelets	incised finials	Iron Age Reuse event	
Tomb IV	commingled	1 Jemdet Nasr vessel JE2886: narrow flat base, rounded carination, broad defined neck, bevelled rim	JE2886: sandy red ware (5YR6/4)	JE2886:exfoliated	–	n=27; natural shell	27 Conus catus; 2 Conus; 7 Oliva inflata; 20 dentalium; 1 cowrie; 4 fish vertebrae spacer beads	–	JE2530 Dagger blade	L: 24.5cm; W:3.4cm; diagonal rows of 5 rivet holes at hilt/tang	whetstone, northern exterior surface	Benton & Potts 1994
		UAN vessel JE2523: broad rounded body, cylindrical neck	JE2523:orange ware, few inclusions	JE2523: dark purplish-brown paint, geometric motif	–	1 tubular white	talcose steatite	L: c. 1-1.2mm; D:2-2.5mm (all tombs)	4 rivets	L: 0.76-1.53cm; D: 2-3.9mm (all tombs)	–	
						200 microbeads	talc	D: 2.5 -3mm; W:1.5-3mm (all tombs)				

		Ceramic(s)				Bead(s)			Copper/Bronze		Other	
Tomb/Grave	**Individual**	**shape**	**ware**	**paint/slip**	**notes**	**shape/color**	**material**	**dimensions/ description**	**object**	**dimensions/ description**	**Notes**	**Citation(s)**
Tomb IV	commingled	UAN vessel JE2519: flat base, rounded shoulder, long narrow everted neck/rim (bottle-like)	JE2519: orange, few inclusions	JE2519: red wash/slip, painted decoration	incised base	153 microbeads (105 red)	softstone	D: 2.5 -3mm; W:1.2-2mm (all tombs)	4 rivets	L: 0.76-1.53cm; D: 2-3.9mm (all tombs)	–	Benton & Potts 1994
						21 dark brown - pale buff / irregular ovoid shapes	possible jasper	D: 0.725- 1.29cm				
		UAN vessel JE1636: flat base, rounded body, flared rim	JE1636: orange, few inclusions	JE1636: painted zig zags, horizontal lines	–	n=3	carnelian	–				
Site: Kalba												
K2	–	Mesopotamian vessel, parallels EDII and EDIII periods				–					Imported Iranian softstone vessel, "figurative-style"	David & Phillips 2008; Eddisford & Philips 2009
Site: Al Khubayb												
S007-001	A	Jemdet Nasr biconical vessel with carinated shoulder	reddish-brown, coarse sand-tempered	none	badly exfoliated and broken	yes	2 steatite beads		–			Williams & Gregoricka 2013, 2019
S007-003	A	Jemdet Nasr biconical vessels with carinated shoulder	red sandy ware	none	thin, poorly fired	yes			pin			
	B	–				–					butchered ovi-caprid innominate	
S007-003	C	Jemdet Nasr biconical vessels with carinated shoulder	fine red/orange ware	red/black & white/ cream slip	finely made	–			dagger		–	Williams & Gregoricka 2013, 2019
	D	–				–			dagger			
S007-011	A	unidentfiable, very poorly preserved small sherds	red sandy ware	–	–	shell pendant			large bronze rivets (?)	n=9		Williams & Gregoricka 2019
S007-012	A	–				tubular/white	steatite	–	small bronze rivet	n=1		
S007-057	A	–				–			–		ovicaprid astragulus	
	C & D	–				–			–		bovid ribs, two bovid innominates	

		Ceramic(s)				Bead(s)			Copper/Bronze		Other	
Tomb/Grave	**Individual**	**shape**	**ware**	**paint/slip**	**notes**	**shape/color**	**material**	**dimensions/ description**	**object**	**dimensions/ description**	**Notes**	**Citation(s)**
S007-057	E	Jemdet Nasr biconical vessels with carinated shoulder	red sandy ware	none	–	–			–		–	Williams & Gregoricka 2019
S007-167	exterior walls	bridge spouted vessel	red sandy ware	none	–	–			–		fragmentary faunal material - likely not be part of mortuary ritual	Williams & Gregoricka 2020
	A	–				–			–		marine shell fragment - this interment was a reuse event	
	B	–				–			–		ovicaprid astragulus	Weber et al. 2019; Williams & Gregoricka 2020
	A or B	small fragments	red sandy ware	–	probably part of bridge spouted vessel	–			2 small rivets		found throughout fill due to rodent burrow	Williams & Gregoricka 2020
S007-169	exterior (reuse/ visit)	base of unidentified vessel	red coarse ware; analyses needed for further identification	–	broadly Iron Age; poorly fired	–			–		Conus sp. shell on exterior wall	Williams & Gregoricka 2020
	A	–				–			dagger; bronze rivets		dagger placed at waist	
Site: Al Khutma												
S002-001	A	–				18 beads	steatite, quartz, other stone	–	–		–	Williams & Gregoricka 2013
	B	Fragments of Jemdet Nasr ceramics				23 beads	steatite, quartz, other stone	–	–		–	
Site: Al Moyassar												
Maysar 3, Tomb 17	–	–				Carnelian beads			–			Weisgerber 1980
Maysar 3, Tomb 18	–	–				Flat rock crystal bead			–		Faunal bones	
Maysar 4, Tomb 1	–	Pottery sherds; gray ink-filled pot				Elongated white beads			long, dark flat axe (Dilmun)			
Maysar 8, Tomb 803	–	–				–			–			
Maysar 22, Tomb 5	–	sherd				Several beads			Two bronze needles			

		Ceramic(s)				Bead(s)			Copper/Bronze		Other	
Tomb/Grave	**Individual**	**shape**	**ware**	**paint/slip**	**notes**	**shape/color**	**material**	**dimensions/ description**	**object**	**dimensions/ description**	**Notes**	**Citation(s)**
Site: Mazyad												
Grave 1317	–	sherds red-brown micaceous carinated jar	cream slip	–	found outside on paving	3 segmented	green glazed	one bead measured: L:0.8cm W:0.4cm	4 rivets	1) flat-hammered ends, square section; L:5.0cm, W: 0.5cm 2) L:1.0cm, W:0.3cm (found on pavement outside)	–	Frifelt 1975b
						2 cylindrical	green glazed	L:0.4-0.5cm D: 0.4-0.5cm				
Grave 1319	–	–				–			pin (two pieces)	2 fragments flat-hammered; L: 5.0cm + L:7.8cm	–	
									rivet	circular cross-section, flat hammered heads; L: 4.5cm		
									pin	L:7.8cm		
Grave 1320	–	Jemdet Nasr biconical jar	red-brown micaceous ware	–	–	3 ring-shaped	carnelian	L:0.7-0.8cm D:0.3-0.4cm	–		–	Frifelt 1975b
						10 cylindrical	faience/green	L:0.2cm D:0.2cm				
						5 ring-shaped	quartz/colorless	L:1.0cm D:0.3cm				
						natural	shell/white and brown	–				
		Jemdet Nasr biconical jar	red-brown micaceous ware	plum-red paint	surface damaged	2 cylindrical	marble-like stone/ faintly pink	L:0.6cm D:0.5cm				
						36 cylindrical	faience/blue-green	–				
						3 cylindrical	stone	–				
						1 biconical	carnelian	L:1.0cm D:0.5cm				
Grave 1321	–	Jemdet Nasr biconical jar, low ridge on shoulder	finely levigated greenish clay	–	–	4 cylindrical	faience/green-glazed	L:0.3cm D:0.3cm	–		–	
		sherds	red-brown micaceous ware	–	–	–						
Site: Mudhai												
D001-001	–	–				3 Conus sp shell beads			–		–	McCorriston et al. 2014; Williams et al. 2014

		Ceramic(s)				Bead(s)			Copper/Bronze		Other	
Tomb/Grave	**Individual**	**shape**	**ware**	**paint/slip**	**notes**	**shape/color**	**material**	**dimensions/ description**	**object**	**dimensions/ description**	**Notes**	**Citation(s)**
Site: Ras Al-Hadd												
?	–	–				–			daggar	–	bone fragments from hilt survived	Salvatori 2001
HD 10-3.1	–	–				n=179	radiolarite	–	pin/awl	L: 13cm; D: 0.42cm	Stone hammer; Anadara sp. valve with ashy deposit inside; Pinctada sp. ring.	
HD 10-3.2	–	–				n=522	carnelian, shell, faience, radiolarite, chlorite, steatite, hematite, & rock crystal	disc-shaped, annular, biconic, cylindrical, and barrel-shaped	complete knife with rivets	–	bone fragments from hilt survived; found in chamber	
									small bronze bar	square section, end rounded and other end pointed	found in entrance	
									–		shark tooth with two holes on root	
HD 10-4.1	–	–				n >1,000	radiolarite, steatite, chlorite, faience, carnelian, agate, rock crystal, & shell	–	–		2 clamys sp. valves	
HD 10-4.2	–	–				n=259	radiolarite, steatite, chlorite, faience, carnelian, agate, bone, & shell	–	–		54 (steatite & radiolarite) of the 259 beads found as necklace; Conus sp. bracelet plate	
HD 10-2.1	–	–				n=49	radiolarite, steatite, chlorite, faience, carnelian, agate, rock crystal, & shell	–	–		–	
Site: Sayhal-Qattarh												
ST252	–	–				–			2 points	–	Iron Age Stone vessel	Al-Belushi & ElMahi 2009
Site: Shenah												

		Ceramic(s)				Bead(s)			Copper/Bronze		Other	
Tomb/Grave	**Individual**	**shape**	**ware**	**paint/slip**	**notes**	**shape/color**	**material**	**dimensions/ description**	**object**	**dimensions/ description**	**Notes**	**Citation(s)**
ST151	–	–				–			–		5 stone pebbles	Al-Belushi & ElMahi 2009
ST252	–	–				–			2 arrowheads	simple, tanged, two flat wings; no measurements; possibly Iron Age	fragment of Iron Age softstone vessel	
Site: Shir												
Shi1	–	IA pottery sherds 1.0m NE of entrance (exterior; DA 12721)				1 natural (DA12722)	mollusc	–	–		shell fragment; glass sherd; hammer stone (outside; DA 12726)	Yule & Weisgerber 1998
						3 natural (DA 12722)	cowry					
Shi2	–	Two Early Iron Age sherds				–			–		Roundish stones	
Site: Tiwi Silaim												
Cairn 1	–	sherds (nearly complete) high necked globular jar with everted rim, slight shoulder ridge, flat base; black chevrons, horizontal bands and sherd, very fine red-ware; rim				18 cylinder disc-shaped	carnelian	W: 2.0-5.0mm D: 6.0-9.0mm	–		rectangular 2-compartment, greyish-black softstone box; incised dot/ circle; lid; 9 terrestrial shells (5 Melanoides tuberculata, 4 Zootectus insularis) 1 marine bivalve (contained black substance)	de Cardi et al. 1977
						1 short oblate	carnelian	W: 4.0mm D: 7.0mm				
						1 long barrel	agate	W: 9.0mm D: 7.0mm				
						2 cylinder disc-shaped	chalcedony/ greyish	W: 3.0mm D: 7.0-8.0mm				
						1 truncated bicone	agate/pale grey with yellowish white band,tan veining	W: 10.0mm D: 6.0mm				
						1 barrel	agate	W: 11.0mm D: 7.0mm				

Table A.5. Summary of architectural features and interments at Jebel Hafit

Tomb	Elevation	Materials	Walls/Roof	Walls#	Entrance	Tomb Shape	Chamber Shape	Flooring	External Dimensions	Chamber Dimensions	MNI
/1[1] Cairn 1030[2] Tomb	300m-295	selected angular stone blocks and slabs	corbelled	2	SSE	oval	pear-shaped	(0.3m-0.2 up to) yes, slabs	5.4m (E-W); ;5.8m (N-S) 0.95m-0.75:H	2.0m :1.8m; L :W	0
/2[1] Cairn 1031[2] Tomb	300m~	rounded angular blocks	corbelled	5-4	SSE	oval	oval	(0.40m 0.25x up to) yes, slabs	1.3m-1.2 :6.0m; H:D	2.4m :2.2m; L :W	& 1 reuse 1
/3[1] Cairn 1032[2] Tomb	300m~	unworked stones of different sizes	corbelled	4	SSE	circular	circular	0.3x up to) yes, on western side (0.3m	0.75m :6.0m; H:D	2.0m-1.8	0
/4[1] Cairn 1033[2] Tomb	.	rounded-flat shaped stones	corbelled	2	SSE	circular	oval	no	1.5m :6.0m; H~:D	2.3m :1.9m; L :W	0
/5[1] Cairn 1034[2] Tomb	315m-300	medium to small unworked stones, some elongated blocks	unknown, but eastern wall nearly straight	1	S	circular	oval	no	6.0m: damaged and not~:D 1.4m:fully excavated; H	2.4m :2.2m; L :W	0
1035[2] Tomb	300m-295	up to) irregular flattish stones (0.5m long	disturbed	1	S	circular	slightly oval	no	2.0m~ :8.0m; H~:D	2.6m :2.2m; L :W	1
/7[1] Cairn 1036[2] Tomb	310m-300	large rounded blocks	disturbed	1	S	circular	round to pear shape	no	1.3m:7.0m; H>:D	2.0m :2.2m; L :W	1
/8[1] Cairn 1037[2] Tomb		up to) rounded stone blocks (0.5m-0.4	disturbed	1	S	circular	oval	no	1.3m:8.0m; H>:D	2.0m~ :1.8m; L :W	0
/9[1] Cairn 1038[2] Tomb	330m-320	medium stones of varied size & shape	corbelled	1	S	circular	oval to round	sandy fill on bedrock	1.0m :5.0m; H~:D	1.9m :1.8m; L :W	0
1039[2] Tomb	320m-310	irregular stone blocks	corbelled	1	S	circular	circular to oval	no	1.0m~ :6.0m; H~:D	1.8m :1.9m; L :W	0
/11[1] Cairn 1040[2] Tomb	340m-330	irregular stones	corbelled	1	S	circular	semi-circular	sandy fill on bedrock	0.7m :5.0m; H~ :D	1.2m :1.4m; L :W	1
/12[1] Cairn 1041[2] Tomb	320m-300	.	corbelled	1	SSE	circular	symmetrical pear shape	mixed sand on bedrock	1.22m :7.0m; H~:D	2.0m :2.2m; L :W	1
/13[1] Cairn 1042[2] Tomb	310m-300	larger elongated stone blocks	corbelled	1	S	circular	almost round	.	0.7m :H	2.0m :1.8m; L :W	1
/14[1] Cairn 1043[2] Tomb	330m-320	elongated irregular blocks	corbelled	1	S	circular	round	sandy fill on bedrock	1.1m :5.0m; H:D	2.0m :1.7m; L :W	1
1044[2] Tomb	330m-310	.	.	.	not located	circular	round	.	4.5m; H: one stone course:D	1.6m E-W ;1.5m N-S	0
/16[1] Cairn 1045[2] Tomb	.	.	.	1	not located	.	oval	sandy fill on bedrock	1.2m-1.1 :5.0m; H~:D	1.3m (damaged) 1.5m E-W ;N-S	1
/17 Cairn 1046[2] Tomb	310m-300	.	corbelled, Gothic Arch	1	S	circular	rounded pear shape	sandy fill on bedrock	2.0m-1.9 :7.0m: H~:D	1.8m:1.9m; L :W	1
1047 Tomb	290m-280	.	.	1	SSE	Circular	Elongated oval	Disturbed (sand & rubble)	0.8m-0.5 :4.0m; H~:D	1.4m:2.2m; L :W	1
/19[1] Cairn 1048[2] Tomb	290m-280	.	damaged, likely corbelled	1	S	circular	oval to pear shape	compact rubble & gravel fill	4.0m (damaged);-3.5 ;D 0.5m :H	1.2m:1.5m; L-1.4:W	0
/20[1] Cairn 1049 Tomb	290m-280	.	corbelled	1	S	circular	slightly oval	sandy gravelly fill	1.2m-1.1 :6.5m; H~:D	2.0m:2.2m; L :W	1 (reuse)

Tomb	Elevation	Materials	Walls/Roof	Walls#	Entrance	Tomb Shape	Chamber Shape	Flooring	External Dimensions	Chamber Dimensions	MNI
/21[1] Cairn 1050 Tomb	280m-270	.	corbelled	1	SW	circular	oval	coarse gravelly fill	0.7m-0.6:4.0m; H:D	2.0m~ :1.0m; L :W	0
/22[1] Cairn 1051[2] Tomb	280m-270	medium sized stones	likely corbelled	1	SE	circular	almost circular	flagstones	2.5m-2.0 :8.0m; H~ :D	2.6m:2.8m; L:W	1 (?reuse)
/23[1] Cairn 1052[2] Tomb	290m-280	0.4m irregular stones up to	corbelled	1	SSE	circular	oval, slightly asymmetrical	sand & gravel	5.5m~:D		1
1053[2] Tomb	280m~	0.4m-0.3 ,medium sized stones	corbelled	1	Not located	circular	oval to round	sand & gravel	1.0m~:7.0m; H-6.0 :D	:1.9m; L-1.6:W 2.2m~	0
1054[2] Tomb	290m~	0.4m elongated blocks up to	corbelled	1	S	circular	rounded rectangular	sand fill	0.6m-0.5 :6.0m; H~:D	1.8m~ :1.5m; L~:W	1
1300[2] Tomb	290m~	0.6m-0.5 elongated stones	likely corbelled	.	not located, possibly S	probably circular	oval	stone slab pavement (reuse); sand on bedrock	0.5m:4.0m: H~ :D	2.0m~ :1.6m; L :W	1
1302[2] Tomb	330m	.	corbelled	concentric rings	not located, likely S	circular	oval to pear shape	hand-sized irregular stones on a level sand layer	2.0m-1.8 :6.0m; H~:D	2.0m~:1.8m; L :W (NE-SW)	3
1303[2] Tomb	300m	medium elongated blocks up 0.4m to	corbelled	1	not identified, likely SE	circular	rounded rectangular	uneven bedrock	1.3m:6.0m; H~:D	2.8m :2.2m; L:W	1 and 1 reuse
1305[2] Tomb	295m	medium sized stones	corbelled	1	WSW	circular	oval to pear shape	small flagstones on levelled sand	0.8m :D: ; H	1.7m :1.4m; L:W	1
1306[2] Tomb	330m	elongated rocks, some up to 0.6m~	corbelled	1	S, not excavated	oval	triangular to pear shape	regular stone (1 :two floor levels ;(0.4m above bedrock-0.2) slabs sand & smaller rocks on (2 bedrock	1.3m :5.0m; H~ :D	:2.0m (N-S); L:W 2.2m (E-W)	1 & 2 reuse
1309[2,4] Tomb	300m-290	.	corbelled	1	SSE	circular	oval to pear shape	pavement (0.1m) small stone	1.8m :8.0m; H~ :D	2.6m :2.4m; L:W	6-5
1310[2] Tomb	295m-290	.	.	.	.	circular	.	(0.2m-0.1) flat stone pavement	.	.	1
1311[2] Tomb	295m-290	elongated or flat stone blocks	corbelled	1	S	asymmetrical, circular	almost round	irregular pavement of hand sized stones on subsoil	1.5m :8.0m; H~ :D (2.5m-2.2 probably)	2.4m:D	3
1312[2] Tomb	325m-320	.	corbelled	1	S, not excavated	asymmetrical, circular	rectangular	irregular bedrock	0.8m :6.0m; H~ :D	2.0m :1.6m; L:W	could) 1 be (reuse
1313[2] Tomb	300m~	0.5m-0.3 elongated stones	corbelled	1	S	circular	round to oval	5c, thick stone slabs irregular	1.6m :6.0m; H~ :D	2.0m :1.9m; L~:W	1
1314[2] Tomb	310m	selected increasingly large flat blocks	corbelled	1	SE	circular	almost round	;8cm thick-4) regular stone slabs arranged in round (0.4m long-0.1 1.5m wide platform	1.5m~ :6.5m; H-6.0 ;D	2.2m:D	3
1315[2,4] Tomb	330m	irregular elongated stone blocks	corbelled	1	S	asymmetrical, circular	pear-shaped	(0.2m-0.1) flagstones	1.5m-1.4:6.0m; H-5.5 :D	1.6m :1.4m; L:W	3
1316[2] Tomb	310m~	flat and elongated blocks; local subsoil used to fill gaps	corbelled	1	S	circular	rounded square	0.3m mixed sediment~	1.1m~:7.0m; H~ :D	1.9m:1.8m; L :W	1
[3,]1317[2] Tomb	352m~	large blocks in lower courses, smaller oblong stone blocks in higher courses	corbelled	2	SW	circular	almost circular	1.5m, floor pavement found bedrock	2.1m~ :8.0m; H-7.0 :D	2.5m~ :D	3
1318[2,3] Tomb	355m~	flat & elongated blocks	corbelled	2	S	circular	oval	no	2.7m::7.0m; H-6.0 :D	2.2m:1.9m; L :W	0

Tomb	Elevation	Materials	Walls/Roof	Walls#	Entrance	Tomb Shape	Chamber Shape	Flooring	External Dimensions	Chamber Dimensions	MNI
1319[2,3] Tomb	368m~	medium stone blocks (lower courses) and elongated irregular stones (upper courses)	corbelled	2	S	circular	pear-shaped	natural gravel surface	3.2m, :6.0m; H~:D 1.5m secondary wall	2.1m:2.0m; L:W	0
1320[2,3] Tomb	358m~	larger elongated blocks	corbelled	1	S	asymmetrical, circular	almost round	level bedrock	1.8m-1.6 :6.0m; H~:D	2.0m~:D	3
1321[2,3] Tomb	355m-353	badly ruined	corbelled	1	SE	circular	slightly irregular rounded rhomboid	stone slabs (disturbed)	1.0m~:6.0m; H~ :D	2.0m :1.8m; L :W	1

1. Frifelt K. 1971. Jemdet Nasr graves in the Oman. *Kuml* 1970: 355-383.
2. Madsen B. 2017. *The Early Bronze Age Tombs of Jebel Hafit*. Jutland Archaeological Society Publications. Volume 93.
3. Frifelt K. 1975
4. Littleton J, and Frifelt K. 2006. Trepanations from Oman: a case of diffusion? *Arabian Archaeology and Epigraphy* 17: 139-151.

Table A.6. Summary of interred material culture at Jebel Hafit

	Ceramic(s)				Bead(s)			Copper/Bronze		Other
Tomb	**shape**	**ware**	**paint/slip**	**notes**	**shape/color**	**material**	**dimensions**	**object**	**dimensions & description**	
Cairn 1[1]/ Tomb 1030[2]	Jemdet Nasr Biconical, carinated shoulder	yellow-brown sand-tempered	plum-red paint/cream slip	panels of black paint designs	1 shell bead	Cypraea Annulus (cowry)	–	1 pin	L: 10.8cm round cross section	found commingled in fill, cannot be associated with specific individual(s)
								1 pin/large needle	L: 24.1cm oval hole	
Cairn 2[1]/ Tomb 1031[2]	Jemdet Nasr biconical, carinated shoulder	grey-yellow sand-tempered	plum-red paint	vertical black bands on shoulder	–			–		(charcoal found close to pots)
	Jemdet Nasr ovoid jar with pointed base	reddish-brown, coarse sand-tempered	–	–						
Cairn 3[1]/ Tomb 1032[2]	–				1 barrel or ring-shaped	shell/white	L:3.4mm D: 4.9mm	–		
Tomb 1033[1,2]	–				–			–		Wadi Suq softstone bowl
Cairn 5[1]/ Tomb 1034[2]	fragmented vessel	red-buff sandy ware	black paint	UAN; thin walled; wavy hatched black bands	–			–		–
Cairn 7[1]/ Tomb 1036[2]	–				–			–		flint blade L: 10.9cm
Cairn 8[1]/ Tomb 1037[2]	Jemdet Nasr biconical vessel with carinated shoulder	yellow-brown sand tempered	red paint/creamy slip	black paint cross-hatch and plant motifs	1 spherical	glass/green	L:3.9mm D:4.1mm	–		–
Cairn 9[1]/ Tomb 1038[2]	Jemdet Nasr biconical vessel with carinated shoulder	reddish-brown sand-tempered ware	plum-red paint/greyish slip	black paint vertical bands on shoulder	1 oblong pendant	shell/white	L: 29.1mm W: 8.1 x 12mm	fragments of curved plate	–	–
					1 fragmented cylinder	stone/black with red spots	L:11.9mm D:16.1mm			
Cairn 11[1]/ Tomb 1040[2]	–				–			1 pin	L: 4.5cm	–
Cairn 12[1]/ Tomb 1041[2]	–				1 ring-shaped	carnelian/ red	L:~3mm D: ~7mm	–		–
Cairn 13[1]/ Tomb 1042[2]	rounded biconical vessel with faint marked shoulder, broad base	buff sand-tempered	–	–	1 cylindrical	softstone/ dark green	L:15mm D:6mm	1 pin	L: 8.5cm corroded	–
Cairn 14[1]/ Tomb 1043[2]	Jemdet Nasr biconical vessel with faint marked shoulder	brownish sand-tempered	plum-red paint	–	–			–		–
	rim sherd	red sand-tempered	–	from IA vessel, hand-made						
Cairn 16[1]/ Tomb 1045[2]	fragment of base	reddish coarse sand-tempered	–	handmade vessel	–			–		–
	Jemdet Nasr biconical vessel with carinated shoulder	reddish grey ware	red/black pattern, cream slip	black diamond pattern						
Cairn 19[1]/ Tomb 1048[2]	–				1 spherical	carnelian/ red	L: 10.6mm D: 11.6mm	–		–
Cairn 20[1]/ Tomb 1049	–				–			belt hook/buckle	incised hatched band	softstone bowl (light grey), flat base, everted rim
								bowl	flat base & spout	
								bowl	slightly thickened rim, flat base, central concavity	polished shell button (with three V-shaped drilled holes)
								sword	L: 41.7cm rim-flanged hilt	
Cairn 21[1]/ Tomb 1050	–				rounded biconical	carnelian/ red	L:4.4mm D: 5.5mm	–		–
					disc-shaped	carnelian/red	L:2.3mm D:5.6mm			

	Ceramic(s)				Bead(s)			Copper/Bronze		Other
Tomb	**shape**	**ware**	**paint/slip**	**notes**	**shape/color**	**material**	**dimensions**	**object**	**dimensions & description**	
Cairn 22[1]/ Tomb 1051[2]	Jemdet Nasr biconical vessel	fine orange ware	creamy slip	well-made, thin walled	240-255 cylindrical	faience/greenish	L: 2.2-6.5mm D: 2.5-5.1mm	1 point	tanged, leaf-shaped	cockle shell fragment
					6 double segmented cylindrical	faience/greenish	L: 6.0-10.3mm D: 4.2-4.9mm			
	Jemdet Nasr biconical vessel	buff sand-tempered	plum-red paint	partly discolored by fire	120 cylindrical	heated steatite	L: 2.0-4.1mm D: 2.5-3.7mm			
	Jemdet Nasr biconical vessel with marked grooved shoulder	reddish-brown sand-tempered	plum-red paint	–	7 biconical	heated steatite	L: 1.5-3.0mm D:2.2-3.8mm			
					2 ring-shaped	carnelian/red	L: 2.1-3.0mm D: 4.2-6.2mm			
Cairn 23[1]/ Tomb 1052[2]	Jemdet Nasr type vessel, globular body	reddish-brown sand-tempered	–	–	–			1 pin	square section L: 12.1cm	–
								1 pin	square section L: 11.4cm	
	Jemdet Nasr biconical vessel	fine beige ware	–	incised line on shoulder, probable flat base				1 blade	slight midrib, 2 rivet holes L: 21.7cm	
Tomb 1055.B[2]	Jemdet Nasr rounded biconical vessel	brown micaceous ware	greyish-yellow slip	–	–			–		–
Tomb 1055.D[2]	part of Jemdet Nasr rounded biconical vessel with carinated shoulder	brown micaceous ware	purple-red paint/ greyish-yellow slip	–	–			–		–
Tomb 1055.L[2]	–				3 cylindrical (2 double segmented)	faience/green glazed	L: 7.2-7.8mm D: 4mm	–		–
					5 square	heated steatite	6.0-6.6 x 6.1-6.5 x 2.3-3.6mm			
Tomb 1300[2]	part of Jemdet Nasr vessel tall body	reddish-brown micaceous ware	greyish-yellow slip	outside tomb	11 cylindrical	faience/green glazed	L: 2.8-3.9mm D:2.7-4.0mm	vessel (outside tomb)		shell fragments
					5 cylindrical	heated steatite	L: 3.2-4.3mm D: 3.0-3.3mm			charcoal sample
	rim sherd ceramic bowl	reddish-brown micaceous ware	greyish-yellow slip	outside tomb	1 cylindrical	stone (radiolarite?)/red	L: 1.8mm D: 2.6mm			softstone vessel sherd with fish ornament (outside tomb)
					2 disc-shaped	rock crystal/green translucent	L: 1.2-1.3mm D: 3mm			
Tomb 1303[2]	Jemdet Nasr biconical vessel with faint marked shoulder	brown micaceous sand-tempered	black paint/red slip	–	–			–		1 iron spear socket/ferrule (reuse) L: ~8.0cm D: ~3.5cm
Tomb 1305[2]	–				1 ring shaped	carnelian/red	L: 2.5mm D:5.1mm	1 pin (outside)	round section L:11.3cm	–
					1 spherical	carnelian/red	L: 7.0mm D:7.6mm			
					1 cylindrical	faience/green glazed	L:~3.0mm D:~2.0mm	1 rivet	flat heads (D:0.8cm) L: 4.0cm D:0.5cm	
Tomb 1309[2,4]	Jemdet Nasr ovoid jar with pointed base	brown ware	–		16 clylindrical	faience/green glazed	L: 3.6-5.6mm D: 3.5-4.5mm	–		charcoal sample
					1 segmented cylindrical	faience/green glazed	L: 6.8mm D: 4.2mm			
	Jemdet Nasr biconical vessel with faint marked shoulder	yellow-brown sand-tempered	red paint	–	3 cylindrical	faience/green glazed	L:~4.0mm D:~4.0mm			
					1 cylindrical	faience/green glazed	L: 5.4mm D: 3.9mm			

	Ceramic(s)				Bead(s)			Copper/Bronze		Other
Tomb	**shape**	**ware**	**paint/slip**	**notes**	**shape/color**	**material**	**dimensions**	**object**	**dimensions & description**	
Tomb 1310[2]	Jemdet Nasr biconical vessel with faint shoulder	brown micaceous sand-tempered	polychrome paint	–	32 cylindrical	faience/green glazed	L: 2.0-3.7mm D:3.0-4.4mm	–		rectangular mother of pearl plaque
					10 cylindrical	heated steatite	L: 2.4-4.1mm D:3.0-3.7mm			
					1 biconical	carnelian/red	L: 6.1mm D:6.1mm			
	Jemdet Nasr biconical vessel with faint marked shoulder	brown micaceous sand-tempered	red slip	–	2 natural	shell (Engina mendicaria)	–			
					30 square	heated steatite	5.8-7.5 x 5.8-7.3 x 2.3-3.4mm			
Tomb 1311[2]	Jemdet Nasr rounded biconical vessel	red-brown sand-tempered	–	11 holes around base of neck & 4 holes on neck	1 barrel-shaped	glass/brown	L: 6.9mm D: 7.0mm	nail	small flat head L:2.5cm W:0.3cm	charcoal samples
								bent rod	1.5 x 0.9cm	
Tomb 1312[2]	sherd	fine red ware			3 biconical (floor)	carnelian/red	L: 7.5-8.0mm D: 4.6-4.7mm	fragment copper sheet		UAN softstone vessel (floor level)
								ring	open; oval cross section, slightly pointed ends; outer diameter: 23mm	Jackknife clam (floor level)
								ring	Fragment; rhomboid cross section	softstone sherds (floor level & above)
								ring	open; oval cross section, outer diameter: 18mm	polished bivalve shell with green substance inside
	4 sherds			from different vessels	1 flat ovate (floor)	agate	L: 9.mm D: 4.3 x 8.8mm	ring	fragment; outer diameter: ~21mm	small sea shell
								rivet	both ends hammered; L: 1.0cm; W:0.35cm	
Tomb 1313[2]	Jemdet Nasr biconical vessel	yellow-brown ware with small white limestone inclusions	plum-red slip	dark painted ornament on shoulder	5 cylindrical	faience/green glazed	L: ~4.0mm D: ~3.0mm	–		–
					remains of chains of beads: 1 cylindrical	heated steatite	L:2.9mm D:3.4mm			
					remains of chains of beads: ~99 cylindrical	faience/green glazed	L: 2.0-4.6mm D: 2.7-4.0mm			
	Jemdet Nasr ovoid vessel	red-brown micaceous sand-tempered	yellow slip	conical body, flat base	remains of chains of beads: 1 triple segmented cylindrical	faience/green glazed	L:8.5mm			
					1 ring-shaped	carnelian/red	L:3.5mm D:7.0mm			
					1 natural	shell (Engina mendicaria)	–			
Tomb 1314[2]	Jemdet Nasr rounded biconical vessel	red-brown to grey-brown sand-tempered ware	greyish-yellow slip	11 drill holes	–			fragment of pointed rod	L: 0.8cm	–
								nail	L:2.5cm	
								nail	L:3.0cm	
								nail	L:3.0cm	
Tomb 1315[2,4]	–				1 ring-shaped	carnelian/red	L:4.9mm D:11.0mm	–		–
					1 natural	cowry shell	–			
					16 cylindrical	faience/green glazed	L: 3.0-4.4mm D:3.2-4.1mm			

	Ceramic(s)				Bead(s)			Copper/Bronze		Other
Tomb	**shape**	**ware**	**paint/slip**	**notes**	**shape/color**	**material**	**dimensions**	**object**	**dimensions & description**	
Tomb 1316[2]	sherds	UAN red fine ware	red slip		3 cylindrical	faience/green glazed	L:3.5-6.0mm D:3.6-3.8mm	pin	near hammered pointed end; L:~15.0cm W:1.0cm	–
Tomb 1317[2, 3]	sherds of Jemdet Nasr biconical vessel with faint marked shoulder	red sand tempered micaceous ware	greyish slip		1 double segmented cylindrical	faience/green glazed	L:8.2mm D:4.6mm	rivet	flat hammered ends L:~5.5cm D:~0.8cm	–
					2 cylindrical	faience/green glazed	L:3.6-4.7mm D:4.3-4.9mm	rivet	flat hammered ends L: ~4.8cm W: 0.6cm D: ~0.7cm	
					1 double segmented cylindrical	faince/greenish	L:10.1mm D:4.6mm	rivet	flat hammered ends L:~5.0cm D:~1.0cm	
								rivet	small	
Tomb 1319[2,3]	–				–			pin	round section, one end partly flat-hammered L:12.5cm	–
								rivet	both ends flat hammered L: ~4.5cm W:0.4cm	
Tomb 1320[2,3]	Jemdet Nasr rounded biconical vessel	red-brown micaceous, sand-tempered	traces of slip	–	1 ring shaped	carnelian/red	L:3.4mm D:7.8mm	–	–	–
					1 natural	shell (Engina mendicaria)	–			
					4 disc-shaped	rock crystal	L: 2.6-3.1mm D:6.6-9.8mm			
					2 cylindrical ring-shaped	unknown/pink	L:3.5-4.0mm D:7.8-9.2mm			
	Jemdet Nasr rounded biconical vessel	brown micaceous ware	–	–	2 barrel-shaped	unknown/pink	L:4.6mm D:5.8-6.1mm			
					39 cylindrical	faience/green glazed	L:2.9-3.5 D:2.8-3.7mm			
					3 biconical ring-shaped	carnelian/red	L:2.4-5.2mm D:7.0-10mm			
					7 cylindrical	faience/greenish	L:~3.0mm D:~3.0mm			
Tomb 1321[2,3]	Jemdet Nasr biconical vessel with ridged shoulder	thin, greenish ware	–	very thin walled	4 cylindrical	faience/green glazed	L:~3.0mm D:3.0mm	–	–	2 flint flakes
	ceramic sherds	red-buff micaceous ware	–	–	1 natural tubular	Dentalium/white	–			

1. Frifelt K. 1971. Jemdet Nasr graves in the Oman. *Kuml* 1970: 355-383.
2. Madsen B. 2017. *The Early Bronze Age Tombs of Jebel Hafit*. Jutland Archaeological Society Publications. Volume 93.
3. Frifelt K. 1975a. On prehistoric settlement and chronology of the Oman Peninsula. *East and West* 5: 359-424.
4. Littleton J, and Frifelt K. 2006. Trepanations from Oman: a case of diffusion? *Arabian Archaeology and Epigraphy* 17: 139-151.

Table A.7. Excavated Umm an-Nar tombs: Architecture Summary

ARCHITECTURAL FEATURES							DIMENSIONS				OTHER	
Tomb	# Chambers	Entrance	carved relief(s)?	Floor?	Subterranean chamber(s)?	Evidence of Second Story?	External Diameter	Internal Diameter	Depth of Subterranean chamber(s)	Standing Height	Citation(s)	Notes
Amlah												
Site 1	unknown	unknown	unknown	cobbles, river gravel	no	no	8.3m	unknown	n/a	0.2m	de Cardi 1975; de Cardi et al. 1976	tomb had been heavily damaged by stone robbers
Site 2a	possibly 2 (east & west)	unknown	unknown	yes, rough irregular stones	no	no	6.0m	unknown	n/a	–	de Cardi et al. 1976	circular tomb base; badly damaged by stone robbers; wall 1m thick; 6 white ashlar stones found in situ but not as façade; no bones mentioned
Site 5a	unknown	unknown	unknown	yes, slabs	no	no	8.5m	4.5m	n/a	1.0m		no plinth; tomb covered at some point by rubble
Asimah (see also As16 and As17 and As25 in Vogt 1994)												
As21	2	west (with 2 stepping stones)	unknown	no, gravel	pit, dug into floor - may be reuse event	no	5.20-5.55m	2.85-3.0m	burial pit: L:1.85m W:1.0m D:0.55m	0.75m	Vogt 1994	stone and interior robbed; major secondary modifications for reuse (supporting wall; intrusive subterranean pit); plinth; serpentinite boulders
As100	2	northeast	unknown	yes	no	no	5.50m	4.20m	n/a	0.20m		built on slope; no evidence of carefully finished façade; no plinth
Bat												
Tomb 153	2	west	no	yes, large flat stones	no	no	6.5m	.	n/a	0.72m	Schmidt & Döpper 2014	–
Tomb 154	2	–	no	–	no	no	8.8m	each chamber 2.4m	n/a	–	Bohme 2012; Döpper 2015	façade of white limestone
Tomb 155	2	west	no	yes, flat stones	no	no	6.5m	–	n/a	0.90m	Döpper & Schmidt 2014; Döpper 2015	façade of brownish stones, not white ashlars
Tomb 156	2	east & west	no	yes (partially preserved in Room B)	no	no	8.10m	each room L:5.40m, W:2.30m	n/a	2.80m	Schmidt & Döpper 2014; Döpper & Schmidt 2014; Döpper 2015	façade of brownish stones
401	2	.	no	yes, stone slabs	no	no	7.45m	5.75m	n/a	0.60m	Bohme & Al-Sabri 2011; Döpper 2015	estimate of original standing height: 2.1-2.4m; Iron Age reuse
Dahwa												
DH7-001	6	northwest & southeast	yes	no, but multiple clay or plaster layers	yes	possibly	8.46m	7.6mm	1.07m	0.1m	this volume, Williams et al. forthcoming	corridor allows communication between all chambers; multiple clay/plaster events

ARCHITECTURAL FEATURES							DIMENSIONS				OTHER	
Tomb	# Chambers	Entrance	carved relief(s)?	Floor?	Subterranean chamber(s)?	Evidence of Second Story?	External Diameter	Internal Diameter	Depth of Subterranean chamber(s)	Standing Height	Citation(s)	Notes
Hili												
1059	4	–	yes	–	–	–	12.0m	–	–	4.0m	Bibby 1965, 1966; Frifelt 1970, 1975a; Cleuziou & Vogt 1983; Gatto et al. 2003	heavily looted; no skeletal remains; also known as "Hili Grand Tomb"
Tomb A Hili North	4 (two non-communicating halves)	east & west	no	yes	yes	yes	10.5m	7.20m	1.5m	at least 2m based on number of facing stones	Al-Tikriti 1981; Cleuziou & Vogt 1983, 1985; McSweeney et al. 2008	2 halves that do not communicate, each divided into two chambers: access to lower story probably through eastern end of compartment 1
Tomb B	8	Possibly south & north	–	–	no	–	11.4m	–	n/a	–	Al-Tikriti 1981	fragmented bones
Tomb C	6	northwest & southeast	–	–	no	–	–	–	n/a	–	Al-Tikriti 1981	fragmented bones
Tomb D	–	–	–	yes, flat slabs	no	–	–	–	n/a	0.40m	Al-Tikriti 1981	badly disturbed
Tomb E	6	–	–	yes, flat slabs	no	.	9.25m	.	n/a	–	Al-Tikriti 1981; Mery et al. 2004	badly disturbed
Tomb F	–	–	–	yes, flat slabs	no	–	–	–	n/a	–	Al-Tikriti 1981	badly disturbed
Tomb G	–	–	–	yes, flat slabs	no	–	–	–	n/a	–	Al-Tikriti 1981	badly disturbed
Tomb H	4	north & south	–	yes, rough stones	no	–	–	–	n/a	–	Ur Rahman 1980; Al-Tikriti 1981	badly disturbed
Tomb J	6	unknown	–	yes, flat slabs	no	–	8.0m	–	n/a	–	Al-Tikriti 1981	badly disturbed
Tomb M	–	–	–	–	–	–	–	–	–	–	Al-Tikriti 1981	badly disturbed, plan unclear
Jebel Buhais												
BHS-51	1	possibly northeast	no	–	no	no	4.5m	–	n/a	–	Jasim 2012	No UAN skeletal remains; heavy looting; reused in Wadi Suq period (ceramic and softstone sherds); Two Iron Age reuse events (1) burial pit dug in floor, eastern side; MNI =1, flexed, facing S, 31 bronze arrowheads, bronze nail, possible whetstone, iron tool; 2) long chamber in northern end of UAN chamber, MNI=0, ceramic sherds)
BHS-57(a)	2	east	no	none present, maybe removed	no	no	6.5m	–	n/a	0.80m		ringwall=3 rings irregular shaped stones; entrance includes 1.2m passage

ARCHITECTURAL FEATURES							DIMENSIONS				OTHER	
Tomb	# Chambers	Entrance	carved relief(s)?	Floor?	Subterranean chamber(s)?	Evidence of Second Story?	External Diameter	Internal Diameter	Depth of Subterra-nean chamber(s)	Standing Height	Citation(s)	Notes
BHS-67	1	unknown	no	yes	no	no	9.3m	–	n/a	–	Jasim 2003, 2006, 2012	destruction of burial chamber due in part to Iron Age reuse; no skeletal remains in UAN chamber (few bone fragments and Iron Age ceramic and softstone sherds in 3-4 subsidiary graves in eastern wall of tomb)
BHS-69	1	unknown	no	yes	no	no	9.06m	–	n/a	–		–
BHS-69a	1	unknown	no	yes	no	no	~6.0m	–	n/a	–	Jasim 2003, 2012	empty
BHS-71	2	unknown	no	yes	no	no	8.04m	–	n/a	–	Jasim 2003, 2006, 2012	no skeletal remains; reused in Iron Age (2 reuse events on eastern side of tomb, softstone and ceramic sherds)
BHS-72	1	unknown	no	no	no	no	–	–	n/a	–		badly disturbed
BHS-73	1	unknown	no	yes	no	no	4.7m	–	n/a	–		significant destruction and looting; reused in Iron Age (subsidiary graves)
Maysar												
Maysar 4 Tomb 1	1	unknown	no	yes, large stone slabs	possibly	no	5.40m	3.90m	n/a	1.70m	Weisgerber 1980	–
Maysar 4 Tomb 3	1	unknown	no	–	no	no	5.10m	–	n/a	0.40m	Weisgerber 1981b	did not use white ashlar stones for façade; interior robbed and stone from walls robbed
Mleiha												
tomb	9	north	yes & possi-ble gutter	yes, blocks of different sizes and very large stone slabs on top	possibly	yes	13.85m	–	n/a	–	Blau 2001; Jasim 2003	corridor: 5m x 2m; tomb heavily looted; possible gutter stone
Mowaihat												
Tomb A	4 (may have been 8)	west & and maybe east	no	–	no	–	8.25m	6.5m	n/a	–	Al Tikriti 1989; Haerinck 1991	also published as Ajman Tomb A
Munay'i												
tomb	3	–	–	yes	–	–	9.0m	–	n/a	–	Phillips 1997	no skeletal remains published

ARCHITECTURAL FEATURES							DIMENSIONS				OTHER	
Tomb	# Chambers	Entrance	carved relief(s)?	Floor?	Subterranean chamber(s)?	Evidence of Second Story?	External Diameter	Internal Diameter	Depth of Subterranean chamber(s)	Standing Height	Citation(s)	Notes
Qumairah												
QA 1-1	4 (two non-communicating halves)	maybe north and south	–	yes; stone blocks of different sizes	no	no	10.8m	–	n/a	0.9m	Rutkowski 2017, 2020, 2021	northern and southern communication passages; facade stones (made from mudstone) appear grey but may have been lighter at time of construction
Ra's al-Jinz												
Tomb 1	8	–	no	yes	yes	yes	7.9m	~4.0m	0.4m	0.4m	Monchablon et al. 2003; Munoz & Cleuziou 2008; Munoz et al. 2012	–
Al Sufouh												
Tomb 1	6	northeast & southwest	no	yes	no	no	6.5m	–	–	–	Benton 1996	built with farush (beach rock)
Tell Abraq												
Tomb	2	south	no	yes	no	no	6.0m	–	n/a	1.0-1.5m	Potts 1990, 1993c; Blau 1996; Baustian & Martin 2010	terminus post quem 2190-2130 cal. BC (Potts 1993:120); constructed of beach rock (farush)
Umm an-Nar Island												
Tomb I	8	north & south	no	yes, flat stone slabs	no	yes	11.0m	–	n/a	1.50m	Frifelt 1991; Al Tikriti 2011	published as "Cairn I" and "Grave I" but listed as Tomb I here to reduce conflation with Early Bronze Age cairns; Registration # 1010; carved stone handle, door stone; Grave 45 (Al Tikriti 2011)
Tomb II	8	probably north & south	yes	some flat slabs; possibly layer of sand	no	yes	12.0m	–	n/a	2.25m	Frifelt 1991; Al Tikriti 2011	published as "Cairn II" and "Grave II" but listed as Tomb II here to reduce conflation with Early Bronze Age cairns; Registration # 1011; no communication between north and south halves; carved reliefs: camels, snakes, idol-like figure, gazelle/oryx, and bull; Grave 43 (Al Tikriti 2011)
Tomb IV	2	east & west	yes	no	no	no	8.5m	–	n/a	1.15m	Frifelt 1991; Al Tikriti 2011	published as "Cairn IV" and "Grave IV" but listed as Tomb II here to reduce conflation with Early Bronze Age cairns; Registration # 1088; walls made of unsmoothed quarried stone with some well worked blocks; one block has carved relief of gazelle/oryx; Grave 41 (Al Tikriti 2011)

ARCHITECTURAL FEATURES							DIMENSIONS				OTHER	
Tomb	# Chambers	Entrance	carved relief(s)?	Floor?	Subterranean chamber(s)?	Evidence of Second Story?	External Diameter	Internal Diameter	Depth of Subterra-nean chamber(s)	Standing Height	Citation(s)	Notes
Tomb V*	2	north & south	no	irregular flag stones	no	no	6.5m	–	n/a	0.80m	Frifelt 1991; Al Tikriti 2011	published as "Cairn V" and "Grave V" but listed as Tomb II here to reduce conflation with Early Bronze Age cairns; *Frifelt (1991) suggests that this may have been a "Beehive" or "Pill-Box" tomb. It is included here because of exterior façade stones and two entrances. Without the two entrances it may have been classified here as a "cairn."
Tomb IX	6	north & (likely) south	carved door handles	yes, flagstones	no	shelves are noted	12.0m	–	n/a	2.50m	Al Tikriti 1981; Al Tikriti 2011	dark brown layer of decomposed organic material; published as "Cairn XI"; Grave 42 (Al Tikriti 2011)
Tomb X	5	northwest & southeast	–	–	–	shelves are noted	8.75m	–	n/a	–	Al Tikriti 1981; Al Tikriti 2011	evidence of corbelled roofing; published as "Cairn X" ; Grave 44 (Al Tikriti 2011)
Unar												
Tomb 1	8	–	–	–	–	–	11.5m	–	–	–	Blau 2001	–
Tomb 2	12	see notes	yes	yes, cobbled floor	no	yes	14.3m	–	n/a	–	Blau 2001; Carter 2002	carved relief: human right foot; unlined pit found outside tomb (Carter 2002:5); entrances required: W, SE, & NE but no entrances confirmed due to stone robbing; unusual asymmetric design

Table A.8. Excavated Umm an-Nar bone pits

	DIMENSIONS								OTHER	
Site	Shape	Length	Width	Depth	Date(s)	Closest UAN tomb	Distance to UAN tomb	Evidence of Post-UAN Use	Citation(s)	Notes
Bat										
Burial Pit A Inst 0006	oval	4.0m	3.6m	0.74m	–	Tombs 154 & 155	–	no	Schmidt & Döpper 2011, 2014	–
Burial Pit A Inst 0025	roughly oval	3.7m	3.2m	0.60m	–	Tomb 156	0.80m to east	no		
Dahwa										
Bone Pit	roughly oval	4.9m	0.5m	0.6-0.9m	–	DH7-001	1.2m	no	this volume; Williams et al. forthcoming	may have been two pits that were combined or one that was extended at some point
Hili N										
Hili N	oval	7.0m	2.2m	2.5m	2200-2000BC	Tomb E	<1.0m on E side	Yes (Wadi Suq ceramics)	Haddu 1989; Al Tikriti & Méry 2000; Méry et al. 2004; Gatto et al. 2004; McSweeney et al. 2008;	total internal length 6.6m; subterranean, partially built; southern end is more shallow; covered by long flat slabs; support wall on N & W sides; incorporated ~12 ashlar blocks; oriented NNW-SSE
Mowaihat										
Tomb B	rectangular	3.9m	2.1m	0.85-0.95m	–	Tomb A	3m	no	Al Tikriti 1989; Haerinck 1991; Phillips 2007	built of rough limestone, floor paved; also published as Ajman Tomb B; damaged by trench digger
Ra's al-Jinz										
Pit 1	roughly oval	~5.0m	~1.4m	0.4-0.5m	2866-2503BC	Tomb 1	2m to south	no	Monchablon et al. 2003; Munoz & Cleuziou 2008; Munoz et al. 2012	black sediment - likely an organic bag/container that contained the remains from the tomb
Pit 2		~3.6m	~1.2m		2621-2467BC					
Pit 3		~3.0m	~1.0m		2879-2631BC					
Al Sufouh										
Tomb II	roughly oval	~2.0m	~1.0m	0.65m	–	Tomb 1	<0.5m south	no	Benton 1996	–
Tomb III		~2.0m	~1.0m	0.63m	–		~1.5m northwest	no		
Tomb IV		~0.5m	~1.0m	~0.10-0.20m	–		~9.0m southwest	no		
Unar 2										
mentioned in Blau 2001:560										–

Table A.9. Excavated Umm an-Nar communal tombs and bone pits: Interments

		INTERMENTS					OTHER	
Site/Tomb	Type	# bone fragments	MNI	Material Culture?	Evidence of burning?	Evidence of Disturbance	Notes	Citation(s)
Amlah								
Site 1	circular tomb	–	1	yes	no	yes	tomb had been heavily damaged by stone robbers	de Cardi 1975; de Cardi et al 1976
Site 5a	circular tomb	–	1	yes	no	yes	tomb had been heavily damaged by stone robbers	de Cardi et al 1976
Asimah								
As21	circular tomb	not reported; 1,515g	1	yes	no	yes	–	Vogt 1994
	pit burial (reuse)	not reported; 180g	1	yes	no	yes	at least two reuse events in Wadi Suq and Late Pre-Islamic periods	
As100	circular tomb	not reported; 3,200g	1	yes	no	yes	reused	
Bat								
Tomb 154	circular tomb	–	1	yes	no	–	–	Bohme 2012; Döpper 2015
Tomb 155	circular tomb	"few"	1	yes	no	yes	likely Samad Period reuse event: inside southern chamber	Döpper & Schmidt 2014; Döpper 2015
Tomb 156	circular tomb	–	1	yes	no	–	likely Samad Period reuse event: on top of collapsed exterior wall	Schmidt & Döpper 2014; Döpper 2015
Burial Pit A Inst 0006	oval	large number fragments	22	yes	no	no	–	Döpper 2015
Burial Pit A Inst 0025	oval	38,000	–	yes	no	no	–	Döpper 2015
Dahwa								
DH7-001	circular tomb	71,497	64	yes	no	no	–	this volume; Williams et al. forthcoming
Bone Pit	bone pit	88,180	108	yes	yes	no	–	
Hili								
Tomb A	circular	–	~300	yes	yes (estimated 50%)	yes	21 articulated skeletons in compartment 3; some articulated skeletons in compartment 1	McSweeney et al. 2008; McSweeney et al. 2010
Tomb N	oval bone pit	–	>700	yes	yes; 2 discrete areas; 20% of bones	no	some articulations; reused for primary interments most recent use; 2 discrete areas of burning	Al Tikriti & Méry 2000; Méry et al. 2001; Gatto et al. 2003; Méry et al 2004; Méry et al. 2008; McSweeney et al. 2008; Méry & Tengberg 2009; McSweeney et al. 2010

		INTERMENTS					OTHER	
Site/Tomb	Type	# bone fragments	MNI	Material Culture?	Evidence of burning?	Evidence of Disturbance	Notes	Citation(s)
Jebel Buhais								
BHS-57(a)	circular tomb	some fragmentary bones	1	yes	no	–	classified as UAN tomb but this is likely a transitional cairn (architecture and Jemdet Nasr ceramics) reused in UAN Period	Jasim 2012
BHS-69	circular tomb	few fragmentary remains	1	yes	no	yes	–	Jasim 2006, 2012
BHS-72	circular tomb	fragmentary remains	1	yes	no	yes	–	
BHS-73	circular tomb	fragmentary remains	1	yes	no	yes	unclear if these belong UAN or Iron Age use	
Maysar								
Maysar 4 Tomb 1	circular tomb	–	3	yes	no	yes	unclear from publication if individuals under the floor are from UAN period or a reuse event	Weisgerber 1980
Maysar 4 Tomb 3	circular tomb	–	1	yes	no	yes	significantly looted	Weisgerber 1981b
Mleiha								
tomb	circular tomb	–	6	yes	no	yes	heavily looted	Jasim 2003
Mowaihat								
Tomb A	circular tomb	–	1	yes	no	yes	heavily looted and damaged; Blau 2001a reports 3,307 fragments (57 crania; 40.31% of bones <25% complete) but it is not clear if this includes Tomb A and B or only one of the tombs; infant burial outside of tomb	Al Tikriti 1989; Haerinck 1991; Blau 2001a
Tomb B	bone pit	–	120	yes	yes	yes	–	Al Tikriti 1989; Haerinck 1991
Qumairah								
QA 1-1	circular tomb	many	25	yes	–	possibly	–	Rutkowski 2017, 2020, 2021; Rutkowski & Parol 2021
Ra's al-Jinz								

		INTERMENTS					OTHER	
Site/Tomb	Type	# bone fragments	MNI	Material Culture?	Evidence of burning?	Evidence of Disturbance	Notes	Citation(s)
Tomb 1	circular tomb	>18,600	74	yes	yes	filled with yellow clay	MNI considered for all structures combined	Monchablon et al. 2003; Munoz & Cleuziou 2008; Munoz et al. 2012
Pit 1	bone pit					eroded		
Pit 2	bone pit							
Pit 3	bone pit							
Al Sufouh								
Tomb I	circular tomb	–	13	yes	yes	yes	–	Benton 1996
Tomb II	bone pit	–	57	yes	yes	no	larger fragments in upper levels; skulls & intact bones on sides; burning may have happened elsewhere and relocated	
Tomb III	bone pit	–	48	yes	yes	no	larger fragments in upper levels; some articulations; fish skeletons at base of pit	
Tomb IV	bone pit	–	3	yes	yes	no	broken farush fragments	
Tell Abraq								
tomb	circular tomb	–	403	yes	yes	yes	276 adults; 127 subadults	Baustian & Martin 2010; Martin et al. 2019
Umm an-Nar Island								
Tomb I	circular tomb	–	21	yes	no	no	Adults: 9 males, 5 females, undetermined sex; 6 subadults	Frifelt 1991; Kunter 1991
Tomb II	circular tomb	–	34-48	yes	no	no	Adults: 20 males, 6 females, 4 undetermined sex; 4 subadults; dark brown layer of decomposed organic material	Frifelt 1991; Kunter 1991; Blau 1998
Tomb IV	circular tomb	–	1	yes	no	yes	bone fragments only	Frifelt 1991; Kunter 1991
Tomb V	circular tomb	–	37	yes	no	no	Adults: 12 males, 8 females, 10 undetermined sex; 7 subadults; walls were heavily eroded but author does not explicitly indicate other disturbance of the chamber; extramural burial on north side of tomb	Frifelt 1991; Kunter 1991
Tomb IX	circular tomb	–	1	yes	no	yes	dark brown layer of decomposed organic material; shelves	Al-Tikriti 2011
Tomb X	circular tomb	–	1	yes	no	yes	–	Al-Tikriti 2011
Unar								
Unar 1	circular tomb	–	438	–	–	–	–	Blau 2001 (after Blau 1998)
Unar 2	circular tomb	12,982	431	yes	yes	yes	–	Blau 2001

Table A.10. Excavated Umm an-Nar communal tombs and bone pits: Material Culture

								Copper/Bronze		Other		
Tomb	Ceramic(s)	Softstone	Alabaster	Shell	shape/color	material	dimensions/description	object	dimensions/ description	Other Material Culture	Notes	Citation(s)
Amlah												
Amlah Site 1	UAN red ware; incised grey ware (24 sherds, at least 4 vessels); black on grey ware (sherds from 3 vessels)	1 small incurved bowl; D: 11.20cm; grey chlorite	1 vase (flat base; D: 4.30cm; walls 12mm thick near base; white alabaster)	2 pieces	1 short truncated convex bicone	carnelian	D: 3mm; L: 4mm	fragment of thin sheet	23 x 22mm	none	tomb had been heavily damaged by stone robbers	de Cardi 1975; de Cardi et al. 1976
					1 short circular barrel	carnelian	D: 7mm; L: 4.mm					
					1 circular barrel	white stone	D: 9mm; L:2mm					
Amlah Site 2a	5 sherds of UAN red ware representing 4 vessels	rectangular compartmented box; buff clorite; base 44mm x 28 mm; top 39.4mm x 2 mm; H: 27-29mm	none	None	none			none		none	–	de Cardi et al. 1976
Amlah Site 5a	1 sherd: rim sandy tan jar	1 shallow, round-based bowl internally beveled rim; D: 9.80cm	none	none	1 short truncated convex bicone	carnelian	not reported	none		none	–	de Cardi et al. 1976
Asimah												
As21	4 UAN fine red ware sherds; 1 sherd UAN applique or fine redware (pale yellow); spouted UAN jar	none	none	none	1 spherical	carnelian	not reported	metal sheet	not reported	none	UAN interment(s)	Frifelt 1991
					2 barrel-shaped	carnelian	not reported					
					1 oblong	banded agate	not reported					
	1 possible Samad fragment (yellowish brown, well-fired, handmade, small black and brown minerals)	none	none	fragments; shell triangle with center perforation	none			none		iron dagger blade fragment	pit burial (reuse event(s))	
As100	UAN interment: fragments of 3-4 UAN red fine ware vessles	1 cylindrical beaker	none	none	beads			2 rings		none	UAN interment(s)	

								Copper/Bronze		Other		
Tomb	Ceramic(s)	Softstone	Alabaster	Shell	shape/color	material	dimensions/description	object	dimensions/ description	Other Material Culture	Notes	Citation(s)
As100	Reuse Event(s): at least 60 Late Wadi Suq/Early Iron Age vessels	up to 33 vessels	none	handle or cross-hilt, double perforation	1 natural	shell	pierced apex	2 incised arrowheads		none	Reuse event(s)	Frifelt 1991
					1 natural	fish vertebrae	perforated					
					1 barrel-shaped	shell	–					
					1 squat barrel-shaped	shell	–	ring				
					6 disc	shell	–					
					1 spherical	carnelian	–					
					1 squat barrel-shaped	carnelian	–	sheet/arrowhead fragment				
					1 barrel-shaped	carnelian	–					
					2 biconical	carnelian	–					
Bat												
Tomb 154	Typical UAN black-on-red	none	none	none	numerous	–	–	none		reuse events from Wadi Suq and Iron Age periods	–	Döpper & Schmidt 2011; Bohme 2012; Döpper 2015
Tomb 155	at least 4 Red-on-Black ware vessels; fragments incised grey ware	3 rectangular boxes, 2 rectangular lids, bowl, small closed vessel; undecorated spindle whorl	none	none	325 cylindrical/white	talcose steatite	–	2 fragments		Reuse event (likely Samad Period): 5 iron arrowheads, 2 bronze plates & 3 iron plates with two pins, steatite vessel fragments, handmade ceramic jar with incised wavy line (D: 8cm, H: 7cm)	complete skeleton from Iron Age reuse event	Döpper & Schmidt 2011, 2014; Döpper 2015
					1 lead bead							
					23 steatite beads							
					4 carnelian beads							
					30 flat cylindrical/ black, brown, or reddish-brown	stone	–					
					80 flat rectangular/ black, brown, or reddish-brown	stone	–					
					16 coiled wire	copper/bronze	.					
					1 biconical	carnelian	L: 7.6cm; D: 0.8cm					
Tomb 156	very coarse IA pottery (reuse event(s))	3 bowls, 1 lid, 1 rectangular box, 1 base; & 1 fragment with lug (see Döpper & Schmidt for detailed description & measurements)	–	28 sea & snail shells; some with turquoise substance	40 cylindrical	bone/horn	L:~ 13mm; D: 3mm	5 arrowheads 104 copper sheets & pins 3 copper rings 1 copper pin		Reuse event (likely Samad Period): 8 iron arrowheads, bronze plates connected with pins; 74 iron fragments; in front of eastern entrance: IA pottery and burned ovi-caprid remains; three grinding stones	much of the material culture may be from reuse events	Döpper & Schmidt 2011, 2014; Schmidt & Döpper 2014; Döpper 2015
					196 flat	reddish-brown sandstone	L:~ 2mm; D: 3mm					
					338 lenticular	bone	tiny					
					bead with figurative design	stone	–					

								Copper/Bronze		Other		
Tomb	Ceramic(s)	Softstone	Alabaster	Shell	shape/color	material	dimensions/description	object	dimensions/ description	Other Material Culture	Notes	Citation(s)
Burial Pit A Inst 0006	at least 12 ceramic vessels plus sherds (UAN black-on-red ware; incised grey ware)	yes	–	1 shell with black substance; 1 large sea snail shell	102 beads		L: 12mm; D:3mm	few copper/bronze items, heavily corroded		–	–	Döpper & Schmidt 2011; Schmidt & Döpper 2014; Döpper 2015
						ellipsoidal carnelian						
						diamond -shaped lapis lazuli						
						ellipsoidal bone						
						ellipsoidal black stone						
						flat-cylindrical reddish-brown sandstone						
Burial Pit A Inst 0025	13 archaeologically complete vessels (UAN Black-on-Red); incised grey ware	–	–	–	458 cylindrical-slightly conical/white	talcose steatite		–		ivory comb fragment	–	Schmidt & Döpper 2014; Döpper 2015
					79 flat cuboid-flat prism/reddish-brown	sandstone				cylinder seal L:20mm; D; 12mm; no perforation; agricultural scene		
					73 flat biconical or oval	carnelian						
					65 small biconical	talcose steatite						
					1 long biconical	carnelian						
					2 oval	carnelian	each with a bleached circle					
					rhomboid	sheet silver	L: 40mm; W:28mm; midrib string hole					
401	at least 142 vessels (UAN red fine ware; suspension vessels; yellow buff ware; domestic ware; plain grey ware; painted grey ware; incised grey ware; 1 sherd polychrome ware; eggshell ware; yellow-grey tempered ware;	fragment of bowl	rimsherd	2 Ficus subintermedia	117 tubular	burned softstone	L: 0.9-1.2cm or ~0.5cm	sword	rhomboid section, L: 38.6cm	two stone hammers; outside tomb two fragments of grinding stones	–	Bohme & Al-Sabri 2011; Döpper 2015
					3 Cylindrical/grey	Chlorite	L: 0.1-0.3cm; D: 0.24-0.5cm					
					11 square/black		H: 0.13-0.2cm; D: 0.2.5cm					
					square spacer		2 drillings					
					10 circular/light beige-light orange	carnelian	D: ~1cm					
					7 circular/medium orange		D: ~0.4-0.75cm					
					1 circular/intense orange		D: ~1.5cm					
					4 microbead/dark orange		H<0.1cm					
					1 cylindrical		wide drilled hole	7 rivets	round or square sections			
					2 barrel-shaped/dark		.					
					1 long biconical/red		L:3.3cm					
					1 cylindrical	etched carnelian	two encircled white lines					

								Copper/Bronze		Other		
Tomb	Ceramic(s)	Softstone	Alabaster	Shell	shape/color	material	dimensions/description	object	dimensions/ description	Other Material Culture	Notes	Citation(s)
					2 cylindrical/red	clay?	D: 0.3cm					
					apex of Architectonica perspectiva, natural hole?							
					disc pendant	mother of pearl						
					3 globular, slightly biconically facted	silver	one with engraved strokes					
Dahwa												
DH7-001	at least 74 vessels, including UAN red fine ware; 1 vessel UAN domestic, imported black on grey and incised grey wares; imported Indus red fine ware; Dasht red/buff ware	at least 15 vessels; 4 lids; imported and local	at least 4 vessels	34 shells, some with black & green substances	1 ring/discoid	silver	L:3.76mm; W/D: 1.42mm; hole D: 2.01mm	1 razor/spatula	L:80.59mm; W:43.02mm; T:2.36mm	at least 6 ivory hair combs; 4 sherds Indus fine red ware with partial characters/ inscription(s); three worked bone toggle buttons?	3 items from from later tomb built on top of chamber D (not intrusive): 1) copper/bronze chape (two plates with 2 intact rivets; plate 1: 27.57mm x 15.93mm x 1.11mm; plate 2: 27.57mm x 15.93mm x 0.77mm; rivet holes D:5.91mm and 5.77mm); 2) imported ceramic vessel with painted horse; 3) local ceramic vessel with single spout	This volume; Williams et al. forthcoming
					1 double barrel/ orange-red	carnelian	L:4.39mm; W/D: 3.56mm; hole D: 0.96mm	1 pin/awl	L:59.10mm, bent 12.70mm; square profile			
					1 natural/tan & white	shell	L:33.35mm; W/D: 17.38mm; hole D: 3.38mm	1 pin/nail	L: 48.35mm; Width ranges 5.41mm to 1.72 at bottom; thickness ranges 1.68mm-2.80mm; round profile	silver ring with rectangular stamp, Indus bull; D: 15.36mm; thickness: 1.58mm; rounded profile		
					1 barrel/orange-red	carnelian	L:4.81mm; W/D:4.61mm; hole D: 1.20mm	1 razor/spatula	too fragmentary to measure			
					1 double barrel/ orange-red	carnelian	L:3.70mm; W/D: 4.69mm; hole D: 1.82mm	1 pin/awl	L: 96.70mm; thickness ranges 1.74mm-3.19mm; square profile	silver ring, rounded profile; D: 15.12mm; thickness: 2.31mm		
					1 tubular	copper/bronze	L:14.01mm; W/D: 4.54mm; hole D: 2.90mm	1 pin/awl	L: 84.09mm; thickness ranges 1.03mm-2.97mm; square profile			
					1 tubular	softstone	L:30.82mm; W/D: 7.48mm; hole D: 4.15mm	1 pin/awl	L: 69.49mm; thickness ranges 1.71mm-3.67mm; very corroded			
					1 disc (pill-like)	softstone	L:4.83mm; W/D: 3.55mm; hole D: 1.76mm			silver ring, squeeze close, rounded profile; D: 15.26mm; thickness: 2.15mm		

								Copper/Bronze		Other		
Tomb	Ceramic(s)	Softstone	Alabaster	Shell	shape/color	material	dimensions/description	object	dimensions/ description	Other Material Culture	Notes	Citation(s)
					1 cylinder disc	silver	L:3.94mm; W/D: 5.86mm; hole D: 1.24mm	1 pin/awl	too fragmentary & corroded to measure			
					1 barrel/tan	possibly shell	L:9.72mm; W/D: 3.89mm; hole D: 1.61mm					
					1 unknown		L:3.30mm; W/D: 5.74mm; hole D: 1.33mm	1 pin/awl	L: 79.55mm; thickness ranges 2.17mm-4.61mm; corroded	silver ring, squeeze close, flattened profile; (floral?) design on front; warped & corroded; thickness: 1.41mm		
					1 bead spacer, 12 holes	silver	L:35.38mm; W/D:2.08mm; hole D: 0.93mm					
					1 round/blue	lapis lazuli	L:5.30mm; W/D:4.53mm; hole D: 1.54mm	1 spiral ring bead?	W: 13.93mm; thickness: 1.48mm			
					1 diamond shaped	lapis lazuli	L:3.30mm; W/D:6.06mm; hole D: 1.16mm			silver ring, squeeze close, flattened profile; corroded; D: 19.76mm; thickness: 1.65mm		
					1 ring/discoid	silver	L:1.20mm; W/D:3.73mm; hole D: 1.93mm	1 bronze ring	squeeze close; flat profile; warped; thickness: 2.06mm			
					1ring/discoid	silver	L:3.68mm; W/D:5.41mm; hole D: 1.58mm					
					1 bead fragment/pale grey-blue, ribbed	softstone	L 24.70	1 bronze ring	squeeze close, rounded profile; D: 17.08mm; thickness: 3.22mm	silver ring, thin, round profile, twisted 3 times; D: 13.97mm; thickness: 1.27mm		
DH7-001 Bone Pit	at least 61 vessels, including UAN red fine ware; 1 vessel UAN domestic, imported black on grey and incised grey wares; imported Indus red fine ware; Dasht red/buff ware	at least 12 vessels; 3 lids	none	15 shells	1 double barrel	silver	L:18.78mm; W/D: 9.04mm; hole D: 2.37mm	1 bronze ring	toe ring? Flat profile; D: 6.22mm; thickness: 1.30mm	at least 2 ivory hair combs	–	This volume; Williams et al. forthcoming
					1 double barrel/ orange	carnelian	L:8.45mm; W/D: 7.80mm; hole D: 1.85mm					
					1 broken tubular	heated steatite	L:4.85mm; W/D: 4.03mm; hole D: 1.27mm					
					1 cylinder disc/orange	carnelian	L:3.48mm; W/D: 4.56mm; hole D: 1.74mm	1 bronze ring	flat profile; D: 21.67mm; thickness: 2.08mm	1 silver ring, squeeze close,two forks one end & 1 fork other end; flat profile; D: 13.55mm; thickness: 1.40mm	–	
					1 tubular-double barrel/ dark grey & red with white stripes	agate	L:18.89mm; W/D: 7.38mm; hole D: 2.64mm					
					1 natural/tan&white	shell	L:14.84mm; W/D: 3.75mm; natural hole: 2.60mm					

								Copper/Bronze		Other		
Tomb	Ceramic(s)	Softstone	Alabaster	Shell	shape/color	material	dimensions/description	object	dimensions/ description	Other Material Culture	Notes	Citation(s)
					1 barrel/orange-red	carnelian	L:5.96mm; W/D: 4.92mm; hole D: 2.10mm	1 bronze ring	flat profile; D: 17.52mm; thickness: 2.07mm			
					1 microbead/orange-red	carnelian	L:2.32mm; W/D: 3.26mm; hole D: 1.26mm					
					1 barrel/orange-red & opague	carnelian	L:5.18mm; W/D: 3.06mm; hole D: 1.49mm					
Hili												
Tomb 1059	several hundred clay vessels (Black-on-Red; painted grey ware; incised grey ware; suspension vessel)	vessels, including a polislhed black steatite vessel & multi-compartmented vessel	none	–	biconical carnelian bead			2 daggers (Benton 1996); sword L: 43cm (Bibby 1966); sword with 3 rivets, L: 35cm (Bibby 1967)		–	–	Bibby 1966, 1967; Frifelt 1970; Benton 1996
Tomb A, Hili North	662 vessels (65%Sandy red ware; 19% UAN fine red ware; 5% Iranian grey ware; 4% fine red Indus ware; 1% Iranian fine red ware; 1 Mesopotamian vessel;6% undetermined; suspension vessels)	82 vessels (10% imports - mostly Iranian): 45 hemispherical bowls; 6 rectangular boxes; 7 beakers;	–	–	carnelian			2 razors, rings & pins	–	–	–	Cleuziou & Vogt 1985; Méry 1997; David 2002; McSweeney et al. 2008
					etched carnelian							
					small silver							
					paste							
					glazed paste							
					large silver							
Tomb N	Sandy red ware; UAN fine red ware; fine red Indus ware; fine red & grey Dasht wares; incised grey ware; black-on-grey ware	37 vessels (David 2002, excavation not complete): 23 hemispherical bowls; 8 rectangular boxes; 4 beakers;	yes	yes, Ficus subintermedia	barrel, rhombic, flat, cylindrical, rectangular, conical, spherical	carnelian		rings; pins/awls	–	square softstone seal with 4 petals & 5 dots; Carbonized Dates	Wadi Suq type ceramics documented in Haddu 1989	Haddu 1989; Bondioli et al. 1996; McSweeney et al. 2008
						etched carnelian						
						silver						
						paste						
						glazed paste						
						lapis lazuli		razor	handle, L:4cm			
						bird bone						
						shell						

								Copper/Bronze		Other		
Tomb	Ceramic(s)	Softstone	Alabaster	Shell	shape/color	material	dimensions/description	object	dimensions/ description	Other Material Culture	Notes	Citation(s)
Jebel Buhais												
BHS-57(a)	Jemdet Nasr jar, exfoliated surface; UAN globular vessel	–		–	–	–	–	bronze knife/dagger	–	–	associated with interment	Jasim 2012
								4 rivets	–			
								nail, bent at tip	–		–	
								2 arrowheads (Iron Age?)	small; one is 2cm		Iron Age reuse?	
								blade with T-shaped handle	.			
BHS-67	none	none		none	none			needle/awl	.	–	–	Jasim 2006; 2012
								2 blade axes/bar celts	trapezoidal, straight sides, curved edges			
BHS-69	rim sherd, Early Dynastic reddish-brown ware jar	none		none	cylindrical carnelian beads			dagger/knife	L:25cm; W: 3.7cm; three rivet holes each side	–	–	Jasim 2006; 2012
	rim sherd, redware with buff slip				grey-brown/pinkish tubular	steatite talcose	L:1.1cm; D:2-2.2cm					
BHS-71	UAN vessel, reddish-orange, thin walls, four humped oxen/ bulls and parallel lines	none		none	reddish-brown discoid	stone	small	2 daggers/knives	1) L:27cm, W:3cm, 3 rivet holes each sidel 2) L:26cm, W:3.7cmm 2 rivet holes each side	–	–	Jasim 2006; 2012
								needle/awl	.			
BHS-72	small carinated brownish-buff vessel, H:9cm	none		plano-convex shell disc	2 beads	stone	small	none		Iron Age ceramics: open bowl with ridged walls & open mouthed vessel with tapered sides	–	Jasim 2006; 2012
BHS-73	none	none		none	1 black	steatite	.	none		–	–	Jasim 2006; 2012

								Copper/Bronze		Other		
Tomb	Ceramic(s)	Softstone	Alabaster	Shell	shape/color	material	dimensions/description	object	dimensions/ description	Other Material Culture	Notes	Citation(s)
Maysar												
Maysar 4Tomb 1	shards of pottery; greyware pot	none	none	none	" countless" tiny white beads			long thin ax (metal not indicated)		–	–	Weisgerber 1980
Maysar 4Tomb 3	none				numerous beads			adze		–	–	Weisgerber 1981b
Mleiha												
tomb	Black-on-Red fineware; painted, incised, and plain Grey ware	rectangular box	–	feeding shells	necklace of beads	shell	–	knife	three small holes with rivets on each side	flint tools	–	Jasim 2003
					tubular	talcose	–					
Mowaihat												
Tomb A	few sherds, mostly Black-on-Red	–	–	–	few beads, red (kidney, cylindrical, barrel, semi-globular, & disc shapes)	carnelian	–	finger ring	round section	1cm wide finger ring of silver/lead alloy	–	Al Tikriti 1989; Haerinck 1991
					2 lozenge shaped beads	silver/lead						
Tomb B	34 vessels (mostly Black--on-Red); Grey ware sherds	5 bowls, 3 compartmented rectangular boxes; 1 beaker	–	some shells; 2 shell rings	323 beads (globular, disc, barrel, & cylindrical), light red - deep blood color	carnelian	two beads are etched	copper awls, finger rings, tools	–	1 cylindrical seal	L: 2.2cm; D: 1.7cm; perforated lengthwise; partly erased dot and lines -no pattern	Al Tikriti 1989; Haerinck 1991
					2,856 beads (mostly disc, some globular & elongated), white or cream color	frit or fired steatite	light brown, maybe stained by soil; ~3mm					
					beads, dark grey disc or square shape	stone	2-3mm					
					1 globular	stone	large					
					1 cylindrical	stone	large					
					2 clear white	stone (quartz?)	–					
					2 disc-shaped green	stone	tiny					
					7 black biconical	clay	–			round seal, knob on top	pattern of lines	
					2 black round, fluted	clay	–					
					10 beads	bone	tiny					
					81 dark biconical	silver	50 fused together					

								Copper/Bronze		Other		
Tomb	Ceramic(s)	Softstone	Alabaster	Shell	shape/color	material	dimensions/description	object	dimensions/ description	Other Material Culture	Notes	Citation(s)
					few unusual shaped beads	silver	–					
					2 date-shaped	agate	–					
					1 double conical	agate	–					
					25 elongated tubular	fired steatite	–					
					1 barrel-shaped, light bluish	frit	–					
					3 blackish ribbed	–	–					
					1 barrel-shaped	copper	–					
					3 double conoid	silver/lead	heavy					
Munay'i												
tomb	Umm an-Nar ceramics; Mesopotamian import; Dilmun jar; one sherd incised grey ware	softstone vessels	–	–	–			1 dagger; 1 ring		–	heavily robbed	Benton 1996; Phillips 1997
Qumairah												
QA 1-1	incised grey ware sherd & plain metallic ware jar rim sherd; 300 diagnostic sherds (common UAN assemblage); 1 miniature vase	up to 67 vessels	–	4 marine bivalve shells	70 microbeads and 14 others	stone, shell, vitreous material	not reported	3 items	2 fragments of weapon handle & rivets; 1 arrowhead	riveted scraps of metal likely from Iron Age reuse of tomb	broken spherical bead of vitreous material (eye bead) indicates post-UAN use of tomb; few examples of transitional UAN-WS softstone vessels	Rutkowski 2017, 2020, 2021
Ra's al-Jinz												
Tomb 1	sherds (300+) and near complete vessels	1 small vessel	none	none	n= 2,506 (1,911 microbeads)	mostly chorite		several rings and pins	–	–	Material Culture not fully published	Monchablon et al. 2003; Munoz & Cleuziou 2008; Munoz et al. 2012
Pit 1					n=636 (430 microbeads)			–	–	–		
Pit 2					–	–	–	–	–	–		
Pit 3					–	–	–	–	–	–		

								Copper/Bronze		Other		
Tomb	Ceramic(s)	Softstone	Alabaster	Shell	shape/color	material	dimensions/description	object	dimensions/ description	Other Material Culture	Notes	Citation(s)
Al Sufouh												
Tomb I	20 Black-on-Red ware vessels; 2 domestic vessels; 2 painted grey ware vessels; 3 suspension vessels	one bowl	none	4 shell rings	4 square-rectangular	serpentite/talcose steatite	see Benton 1996 for dimensions and more detailed descriptions	dagger (DM4)	L: 37.8cm; W: 3.2cm; T: 0.8cm	lapis lazuli frog amulet (L:1.16cm; W: 0.95cm; T:0.41cm dark softstone fly amulet tin/silver spiral	see Benton 1996 for very detailed inventory of the ceramics	Benton 1996
					328 cylindrical			dagger (DM2)	L: 34.7cm; W: 3.5cm; T: 0.62cm			
					20 barrel-shaped cylindrical			dagger (DM3)	L: 33.6cm; W:4.9cm; T: 0.9cm			
					89 large squat beads, biconical and barrel-shaped			dagger (DM7)	L:31.9cm; W:3.6cm; T: 0.4cm			
								dagger (DM25)	L:22.2cm; W:3.4cm; T: 1.01cm			
					4,139 microbeads, various sizes			dagger (DM40)	L:21.0cm; W:3.0cm; T: 0.4cm			
								dagger (DM1)	L:14.3cm; W:3.3cm; T: 0.25cm			
								dagger (DM46)	L:15.0cm; W:2.54cm; T: 0.4cm			
				2 Ficus subintermedia	53 untyped			dagger (DM11)	L:17.7cm; W:3.4cm; T: 0.22cm			
								blade-axe (DM5)	L:21.4cm; W:3.2cm; T: 0.5cm			
					652 microbeads, various sizes	softstone		pins/awl (DM42)	L: 9.8cm; D:0.45cm			
								pins/awl (DM38)	L: 9.6cm; D:0.38cm			
					133	carnelian		pins/awl (DM10)	L:8.5cm; D:0.4cm			
					82	paste		pins/awl (DM45)	L:6.1cm; D:0.4cm			

								Copper/Bronze		Other		
Tomb	Ceramic(s)	Softstone	Alabaster	Shell	shape/color	material	dimensions/description	object	dimensions/ description	Other Material Culture	Notes	Citation(s)
					59	fishbone		ring (DM44)	D:2.7cm; T:0.55cm			
					28	shell		ring (DM23)	D:2.63cm; T:0.42cm			
					18	unidentified stone		ring (DM26)	D:2.58cm; T:0.36cm			
								ring (DM27)	D:2.47cm; T:0.24cm			
					4	rock crystal		ring (DM52)	D:2.4cm; T:0.40cm			
					1	agate		ring (DM43)	D:2.5cm; T:0.24cm			
Tomb II	11 Black-on-Red ware vessels; 1 painted grey ware and 1 incised grey ware vessel; 2 miniature; 1 bottle				1 square-rectangular	serpentite/talcose steatite	see Benton 1996 for dimensions and more detailed descriptions	dagger (AS3755)	L: 16.8cm; W: 2.95cm; T: 0.70cm	lapis lazuli frog amulet (L:1.22cm; W: 1.02cm; T:0.40cm	see Benton 1996 for very detailed inventory of the ceramics	
					10 cylindrical	–						
					16 barrel-shaped cylindrical	–						
					5 large squat beads, biconical and barrel-shaped	–		dagger (AS979)	L: 14.9cm; W: 3.4cm; T: 0.30m			
					5,061 microbeads, various sizes							
					2 untyped	–						
					8 including: circular, red; perforated inverted V-shape; dark color	softstone	large;L: 1.43cm; W: 1.0cm; thickness: 0.39cm					
					81	carnelian	–	ring (AS2872)	D:2.25cm; T:0.37cm			
					17	paste	–					
					3	fishbone	–					
					1	shell	–	ring (AS11217)	D:2.46cm; T:0.77cm			
					4	unident stone	–					
					2	rock crystal	–					
					4	agate	–	ring (AS12049)	–			
					2	lapis	–					

								Copper/Bronze		Other		
Tomb	Ceramic(s)	Softstone	Alabaster	Shell	shape/color	material	dimensions/description	object	dimensions/ description	Other Material Culture	Notes	Citation(s)
Tomb III	18 Black-on-Red ware vessels 2 cordon vessels				1 square-rectangular	serpentite/talcose steatite	see Benton 1996 for dimensions and more detailed descriptions	dagger (AS6980)	L: 13.0cm; W: 2.95cm; T: 0.70cm	–	see Benton 1996 for very detailed inventory of the ceramics	
					48 cylindrical							
					20 barrel-shaped cylindrical			dagger (AS7843)	L: 13.4cm; W: 2.77cm; T: 0.20cm			
					15 large squat beads, biconical and barrel-shaped							
					2,047 microbeads, various sizes			dagger fragment (AS7844)	L:9.77cm; W:3.62cm; T: 0.89cm			
					9 untyped							
					1	softstone		dagger fragment (AS9910)	L:8.3cm; W:3.1cm; T:1.0cm			
					82	carnelian						
					15	paste		ring (AS3286)	D:2.05cm; T:0.46cm			
					21	fishbone						
					4	shell		ring (AS9011)	D:2.40cm; T:0.43cm			
					6	unident stone						
					1	rock crystal						
Tomb IV	2 Black-on-Red ware vessels				2 large squat beads, biconical and barrel-shaped	serpentite/talcose steatite	see Benton 1996 for dimensions and more detailed descriptions	–		Small, flat rounded pendant, dark grey stone	see Benton 1996 for very detailed inventory of the ceramics	
					41 microbeads, various sizes							
					4 untyped							
					3	carnelian						
					1	unident stone						
Tell Abraq												
Tell Abraq tomb	late UAN (black-on-orange) jars; transitional UAN-Wadi Suq ceramics	softstone vessels	–	17 Ficus subintermedia shells	mainly agate & carnelian beads			including rings & two spearheads		ostrich egg shell; decorated ivory; bone/ivory comb	–	Potts 1993a,c

								Copper/Bronze		Other		
Tomb	Ceramic(s)	Softstone	Alabaster	Shell	shape/color	material	dimensions/description	object	dimensions/ description	Other Material Culture	Notes	Citation(s)
Umm an-Nar Island												
Tomb I	33-40 vessels (17-20 Black-on-Red; 8-9 painted Grey; 5 pear-shaped jars; small blackened beaker)	cylindrical polished dark green softstone vessel	1 bowl & 1 disc (base of another bowl?)	none	~70 tubular	talcose steatite	–	1 fishhook		small grinding slab inside tomb	–	Frifelt 1991
					~600 ring-shaped	talcose steatite	small					
					~100 ring-shaped	steatite	small					
					21	carnelian	–					
					1	faience/frit	–					
Tomb II	55-60 vessels (39-45 Black-on-Red; 3 painted Grey; 3 incised Grey; 3-4 pear-shaped jars; 1-2 storage vessels; 5-6 small jars)	none	none	none	~200 tubular	talcose steatite	–	3 blades	two blades with midrib (one spearhead?); 1 blade with 2 hafting rivets	7 small white pebbles	tiny fragments of charred material also found in tomb	Frifelt 1991
										3 small grinding slabs		
					~5,150 ring-shaped		small			small whetstone		
										hammerstone		
					30	carnelian	includes 1 etched			front part of premaxilla of garfish		
					1 ring-shaped, green	stone	small			bitumen plug		
					1	faience/frit	–			2 stone net sinkers found in rubble of tomb		
Tomb IV	2 large jars (1 Black-on-Red; 1 red-brown micaceous ware w/bluff slip	none	none	none	none			none		–	–	Frifelt 1991; Al Tikriti 2011
Tomb V	56-65 vessels (40-45 Black-on-Red jars; 4 painted Grey; 3-4 large sand-tempered storage jars; 10 small sand-tempered vessels)	none	alabaster disk	none	~4,300 tubular	talcose steatite	–	3 leaf-shaped blades	–	spindle whorl (bone, Bos domesticus)	–	Frifelt 1991
					~200 ring-shaped	talcose steatite	small					
					~1,250 ring-shaped	steatite	small					
					3	carnelian	–					
					15 red-brown	stone	–					
					25 grey-brown or black	stone	–					
					1 grey-blue	possible lapis lazuli	–	1 fishhook	–	2 grinding slabs found outside of tomb		
					10	clay	–					
					47 natural	shell, conus catus	–					

								Copper/Bronze		Other		
Tomb	Ceramic(s)	Softstone	Alabaster	Shell	shape/color	material	dimensions/description	object	dimensions/ description	Other Material Culture	Notes	Citation(s)
Tomb IX	5 Black-on-Red ceramic vessels; fragment of grey ware; fragment of large storage jar	3 sherds of one vessel (imported)	1 vessel	4 fiscus linneaus shells	–			1 pin & 1 ring	–	sling ball & three crushing/rubbing stones	–	Al Tikriti 2011
Tomb X	1 Black-on-Red vessel; 3 painted grey ware vessels	none	1 vessel	.	necklace of beads: cylindrical carnelian, black stone, white stone, and shell; 4 bone pendants & 2 stone pendants			3 spearheads	L: 0.23-0.35m	gold hair band, L: 10.5cm	–	
Unar												
Unar 2	84% black-on-red; 15% imported (Black-on-Grey 10%, Barbar 1.5%, Incised Grey 0.5%, Kaftari 0.8%, Bampur 0.2%, Mesopotamian 0.2%)	bowls	–	–	thousands of beads			rings, pins, rivets		–	instrusive Wadi Suq, Iron Age II, and Sasanian/Early Islamic ceramics	Blau 2001; Carter 2002

Index

Abu Silah (Oman), 15, 24, 108, 109, 112, 120, 135, 137, 147, 194, 202, 208
Adam (Oman), 62, 190
Ad-Dakhiliyah Governorate (Oman), 98
Ad-Dhahirah Governorate (Oman), 98
Ajman (UAE), 71-73, 230, 233
alabaster, 69, 237, 249
Al-Ain (UAE), 49, 73, 176
Al-Ayn (Oman), xvi, 40- 42, 46, 62, 89, 90, 114, 115, 177, 178
Al-Batinah Governorate (Oman), 80, 82, 152
Al-Buhais (UAE), 33
Al-Hajar Mountains, 25, 49, 94, 109
Al-Khubayb (Oman), 10-13, 22, 49-53, 91, 92, 101, 102, 106-109, 112, 115, 137, 146
Al-Khutma (Oman), 112, 117, 137
Al-Qabil (Oman), 94
Al-Sufouh (United Arab Amirates), 76-79, 128, 129, 130, 150
Amlah (Oman), 40, 228, 234, 237
antemortem tooth loss, 69, 125, 134
anthropomorphic, 59
ashlar, 57, 69, 70, 83, 84, 96, 101, 128, 136, 152, 228, 230, 233
Ash-Sharqiyah Governorate (Oman), 18, 24, 26, 34, 47, 75
Asimah (UAE), 86, 92, 98, 138, 195, 202, 208, 228, 234, 237
astragali, 106
awl, 13, 93, 215, 240, 241, 243, 246

Baluchistan, 67, 69
Bat (Oman), 14, 40, 42, 47, 49, 55, 61-64, 89, 90, 91, 98, 101, 109, 110, 114, 115, 128-131, 137, 176-178, 183, 190, 191, 195, 202, 209, 228, 233, 234, 238
beehive tomb, 21, 86, 176, 178, 181-183, 189-193, 196, 202, 206
bioapatite, 16-19, 35, 53, 86, 93, 101, 111, 112, 146, 203, 205
bioarchaeology, 1, 7, 124,
bone pit, 63, 67-73, 76, 77, 78, 82, 84, 130, 134, 140, 147-151, 234-236
bronze, 11-14, 25, 29, 41, 47, 54, 61, 62, 66-74, 77, 80-84, 93, 101, 107, 111, 113, 117, 124, 127, 131, 144, 146, 199, 208-210, 212, 213, 215, 229, 238-243
Al-Buraimi Governorate (Oman), 11, 24, 25, 49
burned bone, 150, 152

carnelian, 11, 38, 71, 107, 111, 137, 198, 209-216, 221, 223, 225, 227, 237-250
carved relief, 70, 80, 128, 152, 228, 231, 232
children, 28, 33, 37, 63, 106, 108, 117, 125, 133, 134
copper, 11, 14, 18, 25, 28, 31, 38-41, 47, 54, 61-63, 66-77, 81-84, 93, 101, 107, 111, 127, 131, 144, 146, 183, 189, 209, 225, 238, 239, 240, 244, 245
corridor, 62, 70, 82, 83, 90, 129, 138, 228, 230
cranial porosities, 109, 132, 134
cranial trepanation, 125
cultural continuity, 56

dagger, 13, 113, 209, 212, 213, 237, 243-248
Dahwa (Oman), 58, 60, 82, 128-131, 138, 148-152, 228, 233, 234, 240
degenerative joint disease, 109, 132
dental calculus, 125, 134
dental caries, 109, 125
dental health, 125, 134, 152
Dhank (Oman), xviii, 10, 15, 24, 49-52, 57, 92, 101, 108-111, 117-120, 135-139, 145-147, 176, 189, 194
Dhofar Governorate (Oman), 16, 17, 21, 22, 42-45, 54, 56, 110, 111, 113, 116, 117, 120, 122, 124, 128, 142, 143, 184, 194
discrete space, 127
disuse, 130
DNA (Deoxyribonucleic Acid), 106, 107

erosion, 21, 48, 49, 57, 82, 109, 115, 144

farush, 77, 80, 150, 231, 236
fire, 19, 37, 67, 148, 150, 151, 222
flexed, 16, 18, 31, 37, 47, 66, 68, 84, 107, 117-122, 136, 138, 205, 229
fracture, 118, 122
funeral pyre, 77, 78, 130

grey ware, 63, 65, 66, 68, 71, 74, 76, 77, 220, 237-239, 242, 245-247, 250
gutter, 70, 230

Hadramawt (Yemen), 14, 43, 44
Hafit-type tomb, 13, 18, 20, 21, 24, 26, 31, 41, 42, 45, 49-53, 55, 61, 85-92, 96, 101, 110, 112, 137, 188-190, 194-204, 207
Halban (Oman), 109
Haluf tomb, 113
high circular tower tomb (HCT), 21, 43, 110, 194
Ras Al-Hadd HD-7 (Oman), 28, 34, 35, 36, 39
Ras Al-Hadd HD-10 (Oman), 28, 29, 34, 122
Hili (UAE), 42, 61, 63-71, 76, 98, 128, 129-131, 134, 137, 148, 150, 229, 233, 234, 242
Hili Tomb A (UAE), 68, 129, 134
Hili Tomb N (UAE), 63, 67, 129, 134

Ibra (Oman), 176, 178
Ibri (Oman), 24, 47, 49, 109, 176, 178, 183, 197, 204, 210
Indus Valley / Civilization, 11, 66-71, 73, 76, 80-83, 131, 240-242
Iron Age, 14, 18, 24, 25, 31, 37, 41, 42, 45, 48, 49, 57, 58, 61, 63, 74, 117, 126, 137-140, 143, 208-216, 228-230, 235, 238, 243, 245, 250
ivory, 65, 80, 82, 83, 127, 151, 239, 240, 241, 248

Ja'alan (Oman), xviii, 18, 40, 42, 55, 190
Jebel Buhais (UAE), 91, 137-140, 196, 202, 209, 229, 235, 243
Jebel Emalah (UAE), 90-92
Jebel Hafit (UAE), 11, 14, 24, 25, 40, 45, 47-49, 86, 125, 137, 175, 176, 195, 208, 217, 219, 220, 227
Jemdet Nasr (Iraq), 11-14, 24, 25, 41, 45-48, 54, 89, 90, 93, 101, 107, 111, 117, 124, 146, 183, 209, 210-214, 219, 220, 222, 224-227, 235, 243
Joint Hadd Project, 26, 28, 30, 34, 40, 74

Khor Jarama KJ1 (Oman), 15, 18, 19

lapis lazuli, 77, 239, 241, 242, 246-249
lead, 4, 15, 43, 71, 72, 115, 125, 143, 144, 146, 147, 210, 211, 238, 244, 245

Makran, 67, 69
marine shell, 208, 213
Mesopotamia, 14, 80, 81
Mleiha (UAE), 70, 136, 230, 235, 244
Minimum Number of Individuals (MNI), 66, 67, 70-81, 122, 133, 134, 183, 198, 199, 206, 217, 229, 234, 236
Mowaihat (UAE), 63, 71-73, 128-32, 230, 233, 235, 244
Mudhai (Oman), 15, 16, 43, 112, 113, 120, 122, 199, 204, 214

Neolithic Period, xviii, 15-18, 29, 33, 40, 43, 54, 109, 111, 125, 143
New Archaeology movement, 4, 7
Nizwa (Oman), 171, 189

organic bag, 133, 233
ovicaprid, 63, 106, 146, 212, 213

pendant, 13, 31, 77, 101, 209, 212, 221, 240, 248
pin, 18, 93, 146, 208, 212, 214, 215, 221, 223, 227, 238, 240, 241, 250
pins/awls, 111, 127, 242
primary interment, 63, 76, 127, 128, 129, 130, 137

Qumairah (Oman), 71, 74, 135, 231, 235, 245

radiocarbon, 1, 19, 28, 32, 34, 35, 37, 50, 69, 81, 86, 89, 92, 93, 101, 107, 110-112, 134, 138,
Ras Al-Hadd (Oman), 28, 29, 32-35, 39, 40, 42, 122, 182, 183, 190, 199, 206, 215
Ras Al-Jinz (Oman), 26-29, 36, 40, 42, 69, 74-76, 125, 129-133, 148, 150, 188, 190, 200
Roots of Agriculture in Southern Arabia (RASA) Project, 22, 44, 113
razor, 38, 39, 240, 242
reuse, 1, 17, 25, 41, 42, 45-49, 57, 61, 63, 74, 82-86, 89, 90, 106, 110, 113, 117, 120, 124, 126, 130, 136-145, 182, 184, 189-198, 203, 205-213, 217, 218, 223, 228-230, 234-238, 243, 245
ring, 19, 28, 59, 68, 71, 72, 77, 92, 102, 107, 127, 200, 205, 208, 209, 214, 215, 221, 223, 225, 227, 238, 240-245, 247-250
rivet, 101, 211-214, 223-227, 240, 243
Ras Al-Jinz RJ-1, 26, 27, 63, 69, 74-76, 148, 168
Ras Al-Jinz RJ-6, 26-29, 36, 125

Samad Al-Shan (Oman), 40, 63, 102, 176, 178, 180, 182, 184, 194, 234, 237, 238
seal, 48, 65, 71, 73, 77, 239, 242, 244
secondary interment, 120, 122, 137
Shenah (Oman), 49, 94, 95, 200, 206, 215
Shir (Oman), 92, 93, 109, 184-188, 200, 206, 216
Shiya (Oman), 42, 86, 110, 182, 190
Shokur (Oman), 57
silver, 71, 77, 127, 208, 210, 211, 239-246
softstone, 11, 38, 41, 61-63, 66-71, 73-77, 80, 82, 84, 127, 129, 131, 137, 138, 209-212, 216, 221, 223, 225, 229, 230, 239-249
spatula, 38, 39, 240
steatite, 38, 93, 101, 107, 111, 208, 210-215, 223, 225, 238-249
subadult, 70, 117-120, 122, 125, 134, 146
Sultan Qaboos University, 42, 49, 94, 95
suspension vessel, 208, 242

Tawi Silaim (Oman), 47, 48, 86, 137, 138, 178, 181, 193
Tell Abraq (UAE), 71, 80, 81, 128-133, 150, 231, 236, 248
transitional cairn, 52-54, 86, 89, 90, 92, 101, 146, 196-198, 204, 235
trauma, 1, 69, 120, 122, 125, 132, 134, 136, 144
tumuli, 21, 34, 43, 49, 50, 54, 86, 92, 110, 116, 137, 143, 189
tumulus, xi, 31, 52, 145, 195, 196, 198, 202, 204

Umm an-Nar Island (UAE), 11, 21, 24, 45, 58, 59, 61, 65, 68, 128, 130, 201, 206, 231, 236, 249
Umm an-Nar period, 14, 19, 25, 37, 42, 45, 56-58, 62, 63, 67, 69, 75, 76, 80, 84, 85-89, 92, 93, 102, 103, 126-140, 149, 152
Umm an-Nar-type tomb, 14, 55, 58, 60, 63, 70, 71, 76, 80, 84, 86, 90, 92, 110, 128, 131, 136, 144
Unar (UAE), 79, 80, 84, 130, 134, 136, 149, 150, 232, 233, 236, 250

Wadi Jizzi/Suq (Oman), 24, 176
Wadi Suq period, 25, 92, 128, 131, 132, 137, 138, 152, 229
whetstone, 63, 211, 229, 249

Zukayt (Oman), 11, 22, 85, 115, 176, 177

OmanMHT

OmanMHT

OmanMHT

OmanMHT

This book provides a comprehensive and detailed review of the evidence for Early Bronze Age mortuary rituals on the Oman Peninsula, describing the research conducted, synthesizing the resulting data, and presenting a complete view of the state of knowledge on the topic. The author demonstrates that the construction, use, and location of mortuary cairns in the ancient landscape is no simple question in the Early Bronze Age archaeology of the region. This book explores the characteristics of ancient funerary monuments and rituals, demonstrating variations in these practices, as well as evidence for continued cairn use during this period and how some communities elaborated mortuary rituals. This book will serve as an invaluable reference volume for scholars working in the region, as an introduction for students to mortuary archaeology and to models that can be used to explore this aspect of prehistoric life on the Oman Peninsula, and as a valuable repository of currently available data. The book features extensive demonstrative illustrations and appendices summarizing the architecture, interments, and material culture found in all published Early Bronze Age mortuary monuments in the region.

Kimberly D. Williams is Associate Professor and Chair in the Department of Anthropology at Temple University, Philadelphia (USA). Dr. Williams received her PhD from The Ohio State University in 2005 and conducted postdoctoral research in genetic epidemiology at Wright State University. Her reseach span the fields of genetics, human biology, bioarchaeology, and mortuary archaeology. In 2015-2017 she joined the Sultan Qaboos University with a Fulbright award. Dr. Williams has been conducting research in the Sultanate of Oman since 2008, excavating funerary monuments in Dhofar, Al-Dhahirah and Al-Batinah.

Archaeopress Archaeology
www.archaeopress.com