**Archaeobiology 3** 

# ARCHAEOZOOLOGY OF SOUTHWEST ASIA AND ADJACENT AREAS XIII



Proceedings of the Thirteenth International Symposium, University of Cyprus, Nicosia, Cyprus, June 7–10, 2017

edited by

Julie Daujat, Angelos Hadjikoumis, Rémi Berthon, Jwana Chahoud, Vasiliki Kassianidou, and Jean-Denis Vigne

# ARCHAEOZOOLOGY OF SOUTHWEST ASIA AND ADJACENT AREAS XIII

Proceedings of the Thirteenth International Symposium, University of Cyprus, Nicosia, Cyprus, June 7–10, 2017

#### Archaeobiology

Series Editors

Sarah Whitcher Kansa Justin Lev-Tov

#### Number 3

## ARCHAEOZOOLOGY OF SOUTHWEST ASIA AND ADJACENT AREAS XIII

Proceedings of the Thirteenth International Symposium, University of Cyprus, Nicosia, Cyprus, June 7–10, 2017

# ARCHAEOZOOLOGY OF SOUTHWEST ASIA AND ADJACENT AREAS XIII

Proceedings of the Thirteenth International Symposium, University of Cyprus, Nicosia, Cyprus, June 7–10, 2017

#### Edited by

Julie Daujat, Angelos Hadjikoumis, Rémi Berthon, Jwana Chahoud, Vasiliki Kassianidou, and Jean-Denis Vigne



#### ARCHAEOZOOLOGY OF SOUTHWEST ASIA AND ADJACENT AREAS XIII

Proceedings of the Thirteenth International Symposium, University of Cyprus, Nicosia, Cyprus, June 7–10, 2017

#### Copyright © 2021 by Lockwood Press

All rights reserved. No part of this work may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or by means of any information storage or retrieval system, except as may be expressly permitted by the 1976 Copyright Act or in writing from the publisher. Requests for permission should be addressed in writing to Lockwood Press, PO Box 133289, Atlanta, GA 30333 USA.

ISBN: 978-1-948488-29-7 Cover design by Susanne Wilhelm Cover art by Helena A. Kansa

Library of Congress Cataloging-in-Publication Data

Names: International Symposium on the Archaeozoology of Southwest Asia and Adjacent Areas (13th : 2017 : Nicosia, Cyprus), author. | Daujat, Julie, editor. | Hadjikoumis, Angelos, editor. | Berthon, Rémi, editor. | Chahoud, Jwana, editor. | Kassianidou, Vasiliki, editor. | Vigne, Jean-Denis, editor.

Title: Archaeozoology of Southwest Asia and adjacent areas XIII : proceedings of the Thirteenth International Symposium, University of Cyprus, Nicosia, Cyprus, June 7-10, 2017 / edited by Julie Daujat, Angelos Hadjikoumis, Rémi Berthon, Jwana Chahoud, Vasiliki Kassianidou, and Jean-Denis Vigne.

Identifiers: LCCN 2021049118 (print) | LCCN 2021049119 (ebook) | ISBN 9781948488297 (hardcover) | ISBN 9781957454009 (pdf)

Subjects: LCSH: Animal remains (Archaeology)--Middle East--Congresses. | Domestication--Middle East--History--Congresses. | Human-animal relationships--Middle East--History--Congresses. | Middle East--Antiquities--Congresses.

Classification: LCC CC79.5.A5 I58 2017 (print) | LCC CC79.5.A5 (ebook) | DDC 930.1/0285--dc23/eng/20211108

LC record available at https://lccn.loc.gov/2021049118

LC ebook record available at https://lccn.loc.gov/2021049119



This book is subject to a CC-BY-NC license. To view a copy of this license, visit https://cre-ativecommons.org/licenses/by-nc/4.0/. Other than as provided by these licenses, no part of this book may be reproduced, transmitted, or displayed by any electronic or mechanical means without permission from the publisher or as permitted by law.

Printed in the United States of America on acid-free paper.

# Group photo of the 13th ASWA[AA] meeting June 8th 2017 in the hall of the University-House Anastasios G. Leventis of the University of Cyprus.



#### First row (from left to right):

Maayan Lev, Nehora Schneller-Pels, Meir Orbach, Sarieh Amiri, Yasha Hourani, Haskel Greenfield, Vasiliki Kassianidou, Jwana Chahoud, Jean-Denis Vigne, Julie Daujat, Marjan Maskour, László Bartosiewicz, Annie Brown, Britt Starkovich, Laura Harutyunova, Salima Ikram, Margarit Marjanyan, Joris Peeters.

#### Second row (from right to left):

Noushig Zarikian, Raija Heikkilä, Jana Eger, Mary Metzger, Saiji Arai, Hitomi Hongo, Max Price, Kamilla Pawłowska, Angelos Hadjikoumis, Mary Stiner, Emmanuelle Vila, Katerina Papayiannis, Zohar Turgeman-Yaffe, Rachel Blevis.

#### Third row (from left to right):

Maria Saña Seguí, Francesca Slim, Franciscus Koolstra, Lee Perry Gal, Ursula Mutze, Michaela Zimmermann, Stephanie Emra, Alfred Galik, Selena Vitezović, Pernille Bangsgaard, Lisa Yeomans.

#### Fourth row (from right to left):

Robert Pocklington, Katryn Pocklington, Reuven Yeshurun, Eleonora Serrone, Antonio Curci, Elena Maini, Roger Alcàntara Fors, Nadja Pöllath, David Meiggs, Bea De Cupere, Laura Strolin, Scott Rufolo, Guy Bar-Oz, Nimrod Marom.

#### Last row (from left to right):

Terry O'Connor, Sonia O'Connor, Mark Beech, Benjamin Arbuckle, Cheryl Makarewicz, Sebastian Walter, Ram Bouchnik.

#### *Not in the photograph* (in alphabetic order):

Jeremy Beller, Herbert Böhm, Douglas Campana, Pam Crabtree, Thomas Cucchi, Hossein Davoudi, Mario Di Stasi, Tal Fried, Nasia Makarouna, Günther Karl Kunst, Roya Khazaeli, Inbar Ktalav, Safoora Komijani, Sina Lehnig, Abra Spiciarich, Jacqueline Studer, Wim Van Neer.

#### **CONTENTS**

	eword iliki Kassianidou	IX	
Juli	Editors' Preface Julie Daujat, Angelos Hadjikoumis, Rémi Berthon, Jwana Chahoud, Vasiliki Kassianidou, and Jean-Denis Vigne		
	t 1: Methodological Approaches to Faunal Analysis in the Archaeozoology Southwest Asia and Adjacent Areas		
1.1.	Assessing Changes in Animal Mobility and Activity Patterns during Early Stages of Domestication and Husbandry of Capra: Tell Halula as a Case Study (Euphrates Valley, Syria) Roger Alcàntara Fors, Josep Fortuny, Miquel Molist Montaña, Carlos Tornero, and Maria Saña Seguí	3	
1.2.	Pigs in Between: Pig Husbandry in the Late Neolithic in Northern Mesopotamia  Max Price	23	
1.3.	Stable Isotope Evidence for Animal-Husbandry Practices at Prehistoric Monjukli Depe, Southern Turkmenistan  Jana Eger, Corina Knipper, and Norbert Benecke	41	
1.4.	The Butchered Faunal Remains from Nahal Tillah, an Early Bronze Age I Egypto-Levantine Settlement in the Southern Levant Jeremy A. Beller, Haskel J. Greenfield, and Thomas E. Levy	61	
1.5.	Sweating the Small Stuff: Microdebris Analysis at Tell eṣ-Ṣâfi/Gath, Israel Annie Brown, Haskel J. Greenfield, and Aren M. Maeir	81	
1.6.	Bad Contexts, Nice Bones—And Vice Versa?  Günther Karl Kunst, Herbert Böhm, and Rainer Maria Czichon	93	
1.7.	Animal Exploitation and Community Behavior at a Middle Bronze Village on Cyprus Mary C. Metzger, Elizabeth Ridder, Suzanne E. Pilaar Birch, Steven E. Falconer, and Patricia L. Fall	113	
1.8.	Old Dentitions and Young Post-crania: Sheep Burials in the Ptolemaic–Early Roman Animal Necropolis at Syene/Upper Egypt Ursula R. Mutze, Wolfgang Müller, Mariola Hepa, and Joris Peters	129	
1.9.	Osseous Artifacts from the Late Iron Age Site of Kale-Krševica (Southern Serbia): Seasons 2013–2016 Selena Vitezović and Ivan Vranić	141	

## Part 2: Subsistence Economies of Early and Late Complex Societies in Southwest Asia and Adjacent Areas

2.1.	Exploring Ubaid-Period Agriculture in Northern Mesopotamia: The Fifth-Millennium BC Animal Remains from Tell Ziyadeh, Syria Scott J. Rufolo	153
2.2.	Animal Bones from the 2009–2012 Excavations at the Early Bronze Age Site of Shengavit, Yerevan, Armenia: A First Look  Pam J. Crabtree and Jennifer Piro	179
2.3.	Animal Economy at Karkemish from the Late Bronze to the Iron Age: A Preliminary Assessment Elena Maini and Antonio Curci	187
2.4.	The Subsistence Economy of a Highland Settlement in the Zagros during the Bronze and Iron Ages: The Case of Gūnespān (Hamadan, Iran)  Sarieh Amiri, Marjan Mashkour, Azadeh F. Mohaseb, and Reza Naseri	199
2.5.	Animal Exploitation in the Samarkand Oasis (Uzbekistan) at the Time of the Arab Conquest: Zooarchaeological Evidence from the Excavations at Kafir Kala Eleonora Serrone, Elena Maini, Antonio Curci, Simone Mantellini, and Amriddin E. Berdimuradov	221
	t 3: Beyond Subsistence: Animals in the Symbolic World of Southwest Asia Adjacent Areas	
3.1.	Emerging Bees: Identification and Possible Meanings of Insect Figures at Göbekli Tepe Sebastian Walter and Norbert Benecke	233
3.2.	The Cult of Horus and Thoth: A Study of Egyptian Animal Cults in Theban Tombs 11, 12, and -399- Salima Ikram and Megan Spitzer	245
3.3.	Animals and Ceremonies: New Results from Iron Age Husn Salut (Sultanate of Oman)  Laura Strolin, Jacqueline Studer, and Michele Degli Esposti	255
3.4.	Ornithological Interpretation of the Sixth-Century AD Byzantine Mosaics from Tall Bīʿa, Syria <i>Gábor Kalla and László Bartosiewicz</i>	269
Subj	ject Index	283

#### **FOREWORD**

The 13th ASWA conference was hosted by the University of Cyprus, one of the youngest of Europe's universities. In 2019, it was only thirty years since its foundation. Nevertheless, this is a thriving academic institution, which currently consists of eight faculties, twenty-two departments, and eleven research units.

In 1991, and just two years after the university's foundation, the Archaeological Research Unit (ARU) was founded by decree from the Government of the Republic of Cyprus, following the issuance of the dependent legislation by the House of Representatives. The decision to establish the ARU was based on the recommendation of the Interim Steering Committee of the University of Cyprus, which stated the following:

- Cyprus is offered for primary research in the field of archaeology thanks to its distinctive cultural signature and history, as well as due to the fact that Cypriot archaeology and archaeological research on the island already has a distinguished tradition and international reputation;
- 2. The subsequent international recognition of the importance of archaeological research in Cyprus should comprise one of the first incentives for choosing the University of Cyprus as a center for postgraduate studies, and will pave the way for the exchange of students and academics between the University of Cyprus and academic institutions overseas.

The faculty members of the ARU, who are also part of the Department of History and Archaeology academic staff, have contributed immensely over the past 28 years to the achievement of the aforementioned objectives for the study and promotion of Cypriot cultural heritage through their research, their teaching, and the practical training they have been providing to students at undergraduate and postgraduate levels. The active study of other regions of the Mediterranean world have not been overlooked either, as members of the ARU academic staff have been carrying out excavations and research projects in Greece, Turkey, and France.

The members of the ARU are actively carrying out research in Pre- and Protohistoric Archaeology, Classical and Byzantine Archaeology but also Archaeometry and Environmental Archaeology, Maritime Archaeology, and Western Art. In the course of the past 28 years, the ARU has laid very stable foundations in all aforementioned specialisations of the archaeological discipline, none of which existed at academic level in Cyprus before the unit's establishment. Through their teaching at undergraduate and postgraduate levels, all members of the ARU academic staff have been contributing to the formation of a new generation of Cypriot archaeologists, equipped with all the necessary knowledge and practical experience needed to excel in this scientific field.

Over the years, the ARU has been very active in organizing international conferences and workshops. The ARU has organized over 50 international conferences, while members of the academic staff have published the proceedings of over 20 scientific meetings held at the ARU.

Thus, when Jean-Denis Vigne came to my office several years ago with the suggestion to co-organize the 13th Archaeozoology of Southwest Asia and Adjacent Areas conference I gladly accepted. The meeting in Nicosia brought together colleagues from all over the world and offered a venue where new results from the field or the laboratory could be presented and discussed. The publication of the conference proceedings enables colleagues who were unable to attend the conference to read about the latest developments in the archaeozoology of this culturally important region.

I would like to close by thanking all the members of the 13th ASWA organizing committee for all the work they have put into bringing so many scholars to Cyprus, many of them for the first time. I would also like to thank the co-editors of this volume for all the work they have put into the publication of the proceedings.

Professor Vasiliki Kassianidou Director of the Archaeological Research Unit, University of Cyprus Nicosia, August 2019

#### **EDITORS' PREFACE**

Due to their location at the meeting point of the three Old World's continents-Africa, Asia, and Europe-Southwest Asia and its adjacent areas played a pivotal role in the history of humanity. They received successive waves of our species-Homo sapiens—out of Africa. Different processes in several areas of this large region brought about the transition to the Neolithic, and later on the urban revolution, the emergence of empires bringing with them important subsequent religious, cultural, social, and political consequences. Southwest Asia also played a major role in the interactions between East (Asia) and West (Europe) during the last two millennia. The unique importance of Southwest Asia in the history of humanity is strengthened by the, also related to its location, fact that this area is a hotspot of biodiversity, especially in mammals, which were-as everywhere in the world-tightly associated to the history of civilizations in a diversity of roles: game, providers of meat and milk, traded raw material, symbol of prestige and wealth, pets, etc.

Everywhere in the world, the biological and cultural interactions between humans and animals often remain under-evaluated in their heuristic value for understanding complex social and biological interactions and trajectories. This is why, almost half a century ago, archaeologists who were carrying out research and reflecting on such themes founded a very active nonprofit world organization named the International Council for Archaeozoology (ICAZ). This is also why the ICAZ working group "Archaeozoology of Southwest Asia and Adjacent Areas" (ASWA[AA]) was one of the first ones created within ICAZ, constituting one of the largest and most active of ICAZ's working groups.

The ASWA[AA] was formed during the 1990 ICAZ International Conference in Washington, D.C. Its purpose is to promote communication between researchers working on archaeological faunal remains from sites in western Asia and adjacent areas (e.g., Northeast Africa, Eastern Europe, Central Asia, and South Asia). It carries out its mandate mainly through the sponsoring of biennial international conferences. Since 1998, these meetings have alternated in being hosted in Europe or in Southwest

Asia: Paris (1998), Amman (2000), London (2002), Ankara (2004), Lyon (2006), Al Ain (2008), Brussels (2011), Haifa (2013), Groningen (2015).

Ongoing armed conflicts and political tensions in several countries of Southwest Asia made it difficult to locate a safe and convenient place that would enable the organizing the 13th ASWA[AA] meeting in within that region. Although Cyprus is currently a member of the European Union, in (pre-)history Cyprus was embedded in the eastern Mediterranean "world." Because of its location, Cyprus was indeed at the confluence of African, Levantine, Anatolian, and Greek cultural streams and, as is common for islands, recombined them in different but always original ways all along its history. Archaeozoology recently provided one of the most convincing illustrations of the tight connection between Cyprus and Southwest Asia, demonstrating that the earliest domesticated mammals, especially cats, pigs, cattle, sheep, and goats, were introduced to the island very shortly after their first incipient domestication on the near continent, that is, during the ninth millennium BC. For all these reasons, Cyprus represented an ideal place to host the 13th ASWA[AA] conference.

Despite the illegal military occupation of part of its territory by a foreign country, the option of hosting the meeting in Cyprus was enthusiastically embraced by all members of the working group, especially because it is open to all nationalities and maintains good diplomatic relationships with a large majority of countries in Southwest Asia. These facts contributed towards the 13th ASWA[AA] meeting in Cyprus (June 7–9, 2017) becoming one of the best-attended ASWA[AA] meetings. It brought together 80 scientists coming from 25 different countries: from Southwest Asia (6 countries), Europe (14 countries), North America (2 countries), and Japan.

They presented their results in 36 oral and 32 poster presentations. They debated the long-term interactions between humans and biodiversity, about the beginning of animal domestication and husbandry, the strategies of animal exploitation from the Paleolithic to modern times, and the symbolic and funeral use of animals through time. They also greatly enjoyed the numerous social events organized, in-

cluding a fantastic Cypriot mezze dinner, enhanced by a local folk-music band, and a nice excursion to the archaeological sites of Amathous, Kourion, and Khirokitia, and to the museums of Nicosia and Larnaca, which provided ample opportunities for scientific exchanges in a friendly atmosphere.

The hosting of the conference at the new campus of the University of Cyprus was another major reason to the meeting's success. This campus was a convenient and pleasant venue for such a conference, and the strong support of the University of Cyprus, as well as its valuable experience for the organization of such meetings were deeply appreciated by both the scientific organizers and the delegates. Several other partners contributed to the organization: the French archaeological mission "Neolithisation—Klimonas," which is itself strongly supported by the French School at Athens, the Cyprus Department

of Antiquities, the French Institute of Cyprus, the French National Center for Scientific Research (Centre National de la Recherche Scientifique [CNRS]), and the French National Museum of Natural History (Muséum national d'Histoire naturelle [MNHN]).

The present volume brings together the texts of 18 of the 68 presentations of the meeting in Nicosia. The editorial board collected the papers and organized their review and editing. We are very grateful to Sarah Kansa (and Open Context), Justin Lev Tov, and Lockwood Press for their constant support in bringing this volume to fruition.

Julie Daujat Angelos Hadjikoumis Rémi Berthon, Jwana Chahoud Vasiliki Kassianidou Jean-Denis Vigne

### Subject Index

acropolis, 141–142, 189, 190 Aeneolithic, 41, 43–46, 52, 55 Turkmenistan, 41, 43–46, 52, 55 age-at-death (general), 74, 120, 195. See also culling; kill-off patterns; mortality; slaughter(ing); survivorship; and under individual species agriculture, 23, 24, 26, 32–34, 42, 52–53, 61,113–115, 117, 132, 155–159, 163, 169, 181, 207, 252, 256. See also cultivation; crop(s) anatomical representation, 66, 78, 93, 96, 103–110, 119. See also carcass(es)	body size, 7, 14, 30, 73, 120, 204, 225, 227, 238, 263. See also individual species bone, worked, 65, 70, 72–74, 146–147. See also astragali; tools awls, 87, 141, 143 game pieces, 65, 70, 87, 143–144, 195, 226–227 needles, 143, 206 ornaments, 145, 228. See also jewelry pendant(s), 227 point(s), 65, 72, 143 tokens, 65, 227
Armenia, 179	breeding, 5, 16, 26, 56, 133–135, 208, 251–253
artifacts	Bronze Age, 94–96, 109, 110, 183
awl, stone, 87	Anatolia, 93–96, 99, 101–102, 104, 109–110
coins, 223	Armenia, 179, 180, 183
flint(s), 83, 86-87, 180. See also chipped stone	Cyprus, 113-114, 121-122, 159, 168, 180
loom weights, 119, 123, 141, 143-145	Early, 61-74, 81-89, 94, 121, 159, 168, 179-184,
needle, bronze, 206	199, 201, 218, 273
ornaments, 86, 142, 208. See also jewelry	Iran, 183, 199–200, 204, 202, 206–208
pottery, 24–26, 31, 62, 82–83, 86–87, 94–97, 99,	Israel, 61–66, 69, 73–74, 81–82, 84, 89, 110
101–102, 104, 109–110, 113–117, 119, 123, 131,	Late, 93–94, 122, 187–190, 195–196
142, 155, 157, 159n5, 159–160, 180, 184, 187, 223,	Mesopotamia, 159, 168
256, 258, 261, 264. See also ceramics	Middle, 94, 113–123, 180, 188, 201
seal, sealings, 157, 223, 223n1	Syria, 273
spindle whorls, 26, 119, 123, 206	Turkey, 93–94, 187–90, 193, 195
tokens, 157	bronze (metal), 142, 206, 208, 256, 264
tools, 83, 86–87, 116, 119, 142, 189, 208	burial(s), 46, 129, 130–131, 142, 157, 234, 235, 247. See
astragali, 30, 64–65, 67, 68, 70, 72, 78, 119, 143–145,	also individual species
195, 227, 228. See also individual species	butchery, butchering. See also individual species
aurochs (Bos primigenius), 161–162, 181, 202, 206, 233	incidences, 63–64, 68, 70–73
avifauna, 248, 252, 273, 278. See also individual spe-	marks, 61, 63–65, 68–70, 72–74, 119, 146, 158n4,
cies	194, 200, 225, 227, 261, 263, 26
	pattern(s), 61–64, 69–70, 72–74
banquet. See ritual	practices, 105, 119, 122–123, 167, 265
bee, 233–241	technology, 61, 63, 74
Bī'a, Tall, 270–281	waste, 106–7, 110, 167
biometrics, 6, 24, 27, 29, 32, 200, 202	Byzantine period, 269–281
bird(s). See avifauna; and under individual species	1/0 1 ) 101 105 555
boar, wild (Sus scrofa), 24, 29–33, 142, 181, 200, 204,	camel (Camelus), 191–195, 223–227, 234, 236, 260,
206, 223, 227	263

```
carnivore(s), 200, 227, 263, 280
                                                            diet/dietary, 23
caprine(s), 26, 42, 66-67, 69, 71-73, 78-80, 121, 181,
                                                            frequencies, 5, 26, 44, 66–67, 73, 102–105, 117–118,
     201, 264. See also sheep and goat
                                                              123, 162-163, 166, 180-181, 183-184, 189-190,
   age-at-death/ageing, 42, 55, 67, 73-74, 116,
                                                              192-195, 200, 223-226, 258, 262, 263n6
     120-121, 158, 164-167, 181-182, 189-190, 195,
                                                            herding/husbandry, 26, 33, 123, 207-208
     224n3, 224-227, 259, 261-264
                                                            identification/distinction, 190n4
   astragali, 195, 227
                                                            manufacture, 69, 70, 146
   biometry, 120
                                                            meat/consumption, 5, 23, 73, 166, 169, 181, 195,
                                                              207, 229
   butchery, 72-73, 105-107, 123, 227, 261-262. See
     also butchery (general)
                                                            pathologies, 207
   culling/slaughter(ing), 11, 26, 54-55, 165-166,
                                                            raw material, 143
     181, 192, 224, 226, 261, 264. See also kill-off
                                                            secondary products (milk, skin/hides/leather), 70,
   diet/dietary, 42, 52-53, 55
                                                              73
   frequencies, 11, 26, 43, 66-67, 102-106, 117-118,
                                                            sex ratio(s)/sexing, 262
     122-123, 158, 165, 181, 183-84, 189, 193, 196,
                                                            size, variations/changes, 181, 202, 204, 206. See
                                                              also Log-Size Index (LSI)
     200, 223, 225, 258-259, 262-265
   herding/husbandry, 42, 45, 56, 120, 123, 158, 162,
                                                            skeletal representation, 106, 169, 224
     166, 168, 182, 208, 228, 262, 264-265
                                                            teeth, 206, 224n4
   identification/distinction, 46, 52, 165-166, 181,
                                                         Caucasus, 155, 183
     189-190, 192-195, 200, 223, 225
                                                         ceramics, 24-26, 31, 82, 83, 86, 87, 94, 99, 101, 102,
  Log-Size Index (LSI), 202. See also size in goat(s)
                                                              113-117, 119, 123, 131, 142, 155, 159, 160, 180,
     and sheep
                                                              184, 258, 264
   manufacture, 72, 146
                                                         ceremony. See ritual
   meat/consumption, 5, 42, 67, 73, 110, 115, 117,
                                                         Chalcolithic
     119-120, 122-123, 158, 165-166, 181, 195-196,
                                                            Anatolia, 93
     206-207, 229, 261-262, 265. See also meat in
                                                            Cyprus, 113-114, 120-121
     goat(s) and sheep
                                                            Iran, 183, 204, 218
   raw material, 143-144
                                                            Israel, 62
   ritual, 265
                                                            Mesopotamia, 153-169
   secondary products (milk, wool/hair, skin/hides/
                                                            Turkmenistan, 42
     leather), 42, 73, 113, 120, 123, 157-158, 165-167,
                                                         chicken (Gallus gallus), 200-201, 206, 208, 212, 217,
     182, 195-196, 207, 229
                                                              270, 274, 276
   sex ratio(s)/sexing, 42, 262
                                                         chipped stone, 83, 87
   skeletal representation, 55, 105-106, 109, 115,
                                                         climate, 26, 44-45, 82, 93, 256. See also microclimate
     119-120, 122, 261
                                                         computed tomography (CT), 5-6, 16-17
   teeth, 42, 46, 50-52, 54-55, 116, 132, 181-182, 224n3
                                                         consumption, 26, 44, 73, 74, 108, 133, 195-196, 200
carcass(es)
                                                            goals, 26
   distribution, 119-120, 194
                                                            of exotic taxa, 168
   processing, 54, 61, 74, 115, 119-120, 122-123, 165,
                                                            of meat, 64, 117, 122, 184, 228, 265
     227, 261, 263, 265
                                                            of pigs, 33
cat, 161-162, 200, 227
                                                            of plants, 46, 55
catacomb, 245, 251
                                                            of sheep and goats, 5, 123, 261
cattle (Bos taurus), 4, 66, 131
                                                            of wine, 123
   age-at-death/ageing, 67, 194-195, 224, 224n4, 226,
                                                         copper, 62, 113-114, 116, 119, 264
     262-263
                                                         crops, 26, 33, 42, 52-53, 55, 252. See also agriculture;
   astragali, 143-44
                                                              cultivation
   biometry, 202, 204, 206, 226
                                                         culling (general), 61, 67, 73, 120, 131, 165. See also
   burial, 131
                                                              age-at-death; demographic data; kill-off pat-
                                                              terns; mortality; slaughter(ing); survivorship;
   butchery, 70, 227, 261, 263. See also butchery (gen-
     eral)
                                                              and under individual species
```

cult, cultic deposits, 95, 96, 100-105, 109, 187, 234, enamel (tooth), 24, 27, 29, 42, 44, 50, 133, 262. See also 245, 252, 258, 264, 265. See also ritual isotopes; and under individual species cultivation, 42-43, 56, 117, 252. See also agriculture; environment(s), 28, 33, 42, 52-53, 55, 82, 86-87, 136, 155, 159, 166, 169, 206, 208, 228, 238, 265, 278, crops Cyprus, 24, 113-124 280-281. See also landscapes; vegetation desert(s), 42, 45, 55, 132. See also Karakum (Turkdebris, 82, 95, 101, 258 menistan) floodplain, 155, 221 botanical, 52, 238 macrodebris (remains), 82-84, 88-89 foothills, 28, 42-43, 61, 114, 207 forest(s), 26, 93, 159, 169, 238 manufacture, 116, 142, 146 microdebris, 82-89 grasslands, 26, 28, 169 highland(s), 41, 55, 204, 206, 208, 273 occupation, 86, 88, 103 deer (Cervidae), 66-67, 70-71, 73, 78-80, 115, 118lagoons, 275 lowland(s), 41-42, 45-46, 54, 56 123, 201 fallow, 117, 120, 123, 190, 195, 200, 273, 279 mountain(s), 28, 41-42, 46, 53-56, 114, 141, 221, Mesopotamian (Dama mesopotamica), 117, 256, 264 120, 122-123 pasture(s)/pasturelands, 41-42, 46, 53-56, 165-Persian (Dama dama mesopotamica), 200, 206 167, 208 red, 142, 143, 147, 180-181, 183, 195, 200, 206, 223, piedmont(s), 42, 206, 256 225 river deltas, 275 reindeer, 4 steppe(s), 28, 46, 55, 159, 166–168, 183, 204, 206, roe, 142, 143, 180-181, 223, 225 demographic data, 26, 108, 120, 132, 133. See also ageterrace(s) (natural and human made), 61–62, 114– at-death; culling; kill-off patterns; mortality; 115, 117, 158, 256 slaughter(ing); survivorship; and under individupland, 45, 53-54, 56 ual species valley(s), 207 depictions. See iconography wet, 251-52 desert, 132 woodland(s), 117, 238 Karakum, 42-56 environmental conditions, 52-53, 55, 87, 120, 136, Negev, 61 206, 208 diet equid(s)/equidae (Equus), 208. See also individual speanimal, 42, 45-46, 133. See also individual species human, 61, 73, 166, 261, 265, 277. See also meat; age-at-death/ageing, 67, 224, 226 biometry, 200, 202 consumption; and under individual species disarticulation, 69-74, 261-265 butchery, 227. See also butchery (general) disposal, 105, 107, 119, 122, 123, 227. See also waste frequencies, 165, 181, 183, 190, 192-195, 200, 202, DNA, 252 207, 223-226, 263 dog (Canis familiaris), 66-67, 70, 142, 146, 162, 180hunting, 26, 163, 204 181, 190, 192, 200, 237, 263 hybrid(s) (hinnies/mules), 202 domestication, 3-5, 11, 16-17, 23, 27, 32, 206, 275. See identification, 142, 162, 183, 190, 190n4, 192-195, also individual species 200, 202, 224, 226, 263 donkey (Equus asinus), 66-67, 70, 74, 142, 180-181, manufacture, 70 183, 190, 192-195, 202, 204, 208, 224, 226, 263 meat/consumption, 184 dove (Streptopelia), 260, 263, 272-274, 277-280 size, body, 202-204 duck (Anatidae), 200, 270, 274-276, 279, 280 skeletal representation, 169 dung, 52, 129, 133 Euphrates, 3, 5, 157, 168, 196, 234, 269, 273, 278 exotic economy, 3, 26, 42, 74, 113, 147, 155, 156, 158, 160, animal, 194, 273, 277 165-169, 181, 187-196, 199-219, 228, 245, 265taxa, 163, 168, 278, 280

Egypt, 26, 61–62, 74, 129–130, 132, 241, 245, 252–253

```
feast(s), feasting, 24, 26, 28, 34, 47, 118–119, 122–123,
                                                             secondary products (milk, hair, leather), 16, 262
     157, 167-168, 183, 265. See also ritual
                                                             sex ratio(s), 262-263
filleting, 69–74, 261–265
                                                             size, variations/changes, 5, 7-8, 10-11, 13-16,
floor(s), 5, 81-89, 95, 101-102, 104, 108-109, 192, 234,
                                                               204-205, 207, 259, 262
                                                             teeth, 47-49, 181
     258, 275–276
   beaten, 5, 223
                                                             wild (Capra aegagrus), 6-9, 13-16, 181, 200, 202,
   pebble, 190
                                                               204, 206
   mosaic. See mosaic(s)
                                                          Göbekli Tepe, 233–242
flotation, 82-84, 86, 116
                                                          god/goddess, 94, 241, 245, 247, 251, 253, 277
                                                          Godin Tepe, 183, 199-208, 212
fodder, 42, 46, 52-53, 55, 133, 136. See also stockpiling
food(s). See also meat; consumption; and under indi-
                                                          graves. See burials
                                                          Guinea fowl, 270, 275, 277, 278, 280
     vidual species
   animal, 24, 32-33, 42, 44-46, 53, 55, 117, 132, 136,
                                                          Gūnespān, 200
     240, 251
                                                          Halula, Tell, 3-16
  human, 5, 25–26, 67, 73, 82–83, 87, 95, 107, 122–
     123, 189, 194–195, 227, 229, 251–252, 263, 265
                                                          hand collection, 82, 247, 258-259
fortifications, 95, 141, 168
                                                          hare (Leporidae, Lepus europaeus), 66-67, 71-73, 78-
fowl (Galliformes), 190, 274, 276-277
                                                               80, 162, 166, 181, 190, 193, 200
fox (Vulpes vulpes), 44, 180-181 223, 225, 228, 263
                                                          hearth(s), 83-84, 88, 180, 182, 262
funerary areas/practices, 113, 187, 241, 264n7, 265,
                                                          heavy fraction, 82-83, 86
                                                          Hellenistic period
     270, 279
                                                             Anatolia, 94, 278
                                                             Egypt, 129
game pieces, 123, 143, 144, 195
game (wild animal), 117, 120, 162, 166-167, 169, 240
                                                             Serbia, 141–142, 145, 147
gazelle (Gazella), 11, 55, 66-67, 70, 73, 142, 165, 181,
                                                          hemione. See onager
     190, 190n4, 193, 195, 200, 225, 258, 261
                                                          hen. See chicken
   Gazella gazella, 66-67, 70
                                                          herbivore(s), 42, 44, 200, 206, 280
   Gazella subgutturosa, 181, 200
                                                          herders/herding, 16, 41-42, 45, 53, 67,196, 261. See
   hunting, 26, 44, 163, 166-167, 240, 263
                                                               also husbandry; and under individual species
gnaw marks, 64, 227, 263
                                                          heron (Ardea), 200, 272, 274, 275
goat (Capra), 5, 15-16, 66-67, 73, 204. See also cap-
                                                          hides, 69, 144. See also leather; pelts; secondary prod-
     rines; sheep and goat
                                                               ucts; skin(s); and under individual species
   age-at-death/ageing, 181, 206, 208, 259, 262-263
                                                          horse (Equus caballus), 142, 180, 183, 190, 192-195,
   biomechanics, 4-5, 16
                                                               202, 204, 208, 224, 226
   biometry, 204, 259, 262
                                                          household(s), 28, 33, 53, 81, 88, 101, 108, 116, 119, 123,
   butchery, 261. See also butchery (general)
                                                               157, 163
   culling/slaughter, 206, 261
                                                          hunter-gatherers, 233, 240
   diet/dietary, 23, 42
                                                          hunting, 26, 42, 120, 122–123, 158, 160, 162–163n6,
   domestic (Capra hircus), 4, 6-8, 11, 16, 42, 66-67,
                                                               167-168, 180, 184, 228, 240. See also individual
     72-74, 117, 180, 196, 200, 204, 259
                                                               species
   domestication, 10, 201
                                                          husbandry, 3-4, 23, 26, 33, 34, 42-43, 53, 87, 120, 180,
   frequencies, 43, 52, 162, 181, 189, 207, 224-225,
                                                               256, 275. See also herders/herding; and under in-
     258, 262-265
                                                               dividual species
   herding/husbandry, 5, 11, 13-14, 16, 67, 208, 262,
                                                          Husn Salut, 255-265
     265
   hunting, 204
                                                          ibis, 245, 248, 251-253, 274, 275
   identification/distinction, 180, 224-225, 262, 264
                                                          iconography, 123, 160, 208, 234-235, 238, 240-241,
   manufacture/toolmaking, 72
                                                               270, 272, 275, 277, 279–280. See also representa-
   meat/consumption, 5, 23, 67, 261
                                                               tions (visual)
   pathologies, 261-262, 265
                                                          identity, 61, 123, 157, 167-169
```

imagery. See iconography images, 233, 236, 242, 270-274, 276, 280. See also motifs insects, 24 representations, 233-241 Iran, 41, 44-45, 107, 155, 183, 199-200, 207 Iranian Plateau, 202, 204, 206-207 Iraq, 154-156, 158, 168, 204. See also Mesopotamia Iron Age (IA), 94, 260, 273, 275 Iran, 181, 183, 199–200, 202, 204, 206–208, 212, 218 Oman, 255–256, 260 Serbia, 141-147 Turkey, 187, 190-196 Islamic period Iran, 199 Oman, 256, 265 Turkey, 188 Uzbekistan, 222-229 isotope(s), 42, 44-46, 49, 54, 56 carbon ( $\delta^{13}$ C), 42, 44–50, 52–53, 55–56 nitrogen, 56 oxygen ( $\delta^{18}$ O), 42, 44–50, 52–55 strontium, 56 jewelry, 86, 142, 145, 228 Kafir Kala, 222-229 Kale-Krševica, 141-147 Karakum, 42, 45-46, 55-56 Karkemish, 187-196 Khabur Basin, 154-169 River, 28 kill-off patterns (general), 26, 206. See also age-atdeath; culling; demographic data; mortality; slaughter(ing); survivorship; and under individual species knucklebones. See astragali Kopet Dag, 42, 45 Körtik Tepe, 233-241 Kura-Araxes, 179-184 landscape(s), 16, 42, 54-55, 113, 115, 117, 157, 206, 238, 256, 262. See also environments leather, 144, 195, 228. See also hides; pelts; secondary products; skins; and under individual species Levant, 61-62, 64, 74

linear enamel hypoplasia, 24, 27, 31-33, 262. See also

Log-Size Index (LSI), 29-30, 202, 204, 218

individual species

material; bone, worked; and under individual species antler, 146 bone, 142–143, 146–147 ceramic, 160 debris, 146 metallurgical, 116 textile, 143. See also textile production tool, 83, 147 meat, 23, 64, 69, 72-74, 115, 120, 122-123, 166, 169, 184, 227-229, 263, 265 Mediterranean, 24, 61, 141, 145-147, 278 eastern, 114, 129, 239 Mesopotamia, 23-26, 32, 153-155, 155n1, 155n2, 156-157, 157n3, 158-160, 166-169, 183, 208, 233, 236, 241 metallurgy, 116, 119, 147, 258 midden(s), 47, 83, 162-163, 165, 167-169 Middle Zeravshan Valley, 222 milk production, 16, 26, 42, 120, 123, 157-158, 165-166, 195, 229, 262 mobility (geographic), 3-4, 16, 41-42, 53, 55-56, 168, 208. See also agropastoralism; movements (human/herd); nomadism; pastoralism mollusk shells, 142-143, 147, 162 mortality (general), 10, 120. See also age-at-death; culling; demographic data; kill-off patterns; slaughter(ing); survivorship; and under individual species mosaic(s), 269-270, 272-273, 275-281. motif(s), 155, 234, 237, 241, 270, 276–277, 280. See also images movements (human/herd), 42, 44, 52, 54-56, 62, 155-156, 169. See also agropastoralism; mobility (geographic); nomad(s), nomadism; pastoralism body movements, 3-5, 7, 13-17, 167 mud brick(s), 43, 83-84, 87, 88, 95, 101, 108, 141, 223 mummies, mummification, 131, 132, 245, 247-248, 251-253. Nahal Tillah, 61-74 necropolis (animal), 129-137, 145, 251 Neolithic, 3, 5, 10-17, 23-34, 41, 43, 107, 120, 122, 143, 154, 204, 218, 233, 238-241 nomad(s), nomadism, 41, 44, 55-56, 61, 73, 182. See also agropastoralism; mobility (geographic); movements (human/herd); pastoralism Nush-i Jan, 199-200, 207, 208

manufacturing, 86, 142-143, 146-147. See also raw

offering(s), 33, 245, 247, 264-265. See also votive PPNA, 29-30, 233-41, 273 onager (Equus hemionus), 26, 44, 55, 163, 165-167, PPNB, 5, 11, 24, 25, 28-30 181, 183-184, 193, 200, 202, 204, 206 Persian onager, 202, 204 rainwater. See precipitation Turkmen kulan, 202 raptors, 245, 248-253, 278-281 osseous industry, 141-147 raw material, 63, 69, 83, 86, 142-143, 146-147, 228. Ovicaprines. See caprines See also manufacture; bones, worked; and under Ovis/Capra. See caprines individual species Oymaağaç, 93-110 representations (visual), 233, 236-238, 240-241, 256, 264, 269-270, 273, 277, 280. See also iconograpalace(s), 96, 109, 188, 190, 193-195, 276, 280 phy parrot (Psittaciformes), 278-279 residue(s), milk, 26, 158 pastoralism, 16, 41, 52, 157-158, 165-169, 181-182, ritual, 24, 33, 95–96, 101, 103–104, 106, 123, 157, 180, 195-196, 229. See also agropastoralism; mobil-182-183, 192, 234, 256, 258, 261-262, 264-265. ity (geographic); movements (human/herd); See also cult nomad(s), nomadism Roman period pathology(ies), 27, 192, 248, 251. See also in caprines, Anatolia, 94 goat(s), pig(s), cattle, sheep Egypt, 94, 129, 136, 143, 146, 195, 245, 273, 275, 280 pelts, 228. See also hides; leather; secondary prodrooster. See chicken ucts; skin(s); and under individual species pendant, 145, 227 sacrifice(s), 101, 109, 245, 258, 264-265 phytolith(s), 53, 132-133 Sâfi/Gath, Tell es-, 81-89 pig(s) (Sus) 24, 26-27, 32 Samarkand, 222-229 age-at-death, 24-26, 29-33, 67, 190, 192, 224-226 secondary products, 73, 113, 120, 158, 166, 182, 195, biometry, 24, 26-27, 29, 181 196, 262. See also hides; leather; pelts; skins; and butchery, 73, 263see also butchery (general) under individual species culling/slaughter(ing), 26, 30-31, 33, 195, 224 sedentarism, 3, 24, 41, 61, 73, 74, 167-169, 233 diet/dietary, 23-24, 27, 32-33 sheep (Ovis), 67, 133, 142, 204, 262. See also caprines; domestic (Sus domesticus), 23, 66-67, 180 sheep and goat domestication, 23-24, 28, 30-33 age-at-death/ageing, 131-137, 181, 259, 262 frequencies, 5, 26, 34, 66, 102-104, 117-118, 123, biometry, 181, 204, 259, 262 142, 181, 183-184, 189-190, 192-193, 195-196, burials, 131 200, 207, 223-226, 263 butchery, 72. See also butchery (general) herding/husbandry, 23-33, 123, 163, 166 diet/dietary, 23, 55, 132 hunting, 24, 31, 204 domestic (Ovis aries), 42, 66-67, 72-73, 117, 180, husbandry, 23-34 200, 259 hybrids, 29-30, 33 frequencies, 43, 52, 181, 189, 207, 224-225, 262, identification/distinction, 180-181 linear enamel hypoplasia (LEH), 27, 29, 31-33 herding/husbandry, 5, 131, 136, 208, 258, 262 hunting, 204, 240 manufacture, 143 identification/distinction, 180, 224-225 meat/consumption, 24, 33, 73, 163, 166, 195-196, 229, 265 introduction, 11 Karakul, 129, 133-137 penning, 24, 32-34 raw material, 143 meat/consumption, 23, 261-262 sex ratio(s)/sexing, 224, 226 pathologies, 131, 133, 261, 265 size, variations/changes, 24, 29-30, 32 secondary products (milk, wool, skin/hides/leathpigeon (Columbiformes), 274, 277-279 er), 133, 141 Politiko-Troullia, 113-124 sex ratio(s)/sexing, 132, 259, 262-263 precipitation, 44-45, 54-55 size, variations/changes, 204-207, 262. See also Pre-Pottery Neolithic Log-Size Index (LSI)

teeth, 46-49, 132-137, 181 temple, 93-97, 99, 101-107, 109-110, 129, 192, 251, wild (Ovis orientalis), 44, 181, 200, 202, 206, 240 269 sheep and goat, 5, 26, 42, 44, 46-55, 66, 67, 73, 74, tesserae. See mosaic(s) 102, 105, 115-123, 132, 143, 146, 158, 161, 162, textile production, 87, 123, 142-144, 147. See also ar-165-167, 181, 182, 189-196, 200, 202, 206, 223, tifacts: loom weights; bone, worked: astragali 225, 227, 228, 258-262, 264. See also caprines tomb(s), 245, 247, 251, 265 consumption, 5 tools, toolmaking, 65, 69-74, 83, 86-87, 116, 119, Shengavit, 179-184 142-143, 147, 189, 208 sherds. See ceramics tooth wear. See age-at-death; and under individual shrews, 245 species sieving, 82, 108, 187, 188n2, 206, 272, 280 tortoise, 200 trade, 86, 114, 147, 155, 157, 166, 168, 182, 208, 263, Silk Road, 221 silo(s), 62, 93-94, 96, 99, 101-109, 180 Simpson's ratio, 202 Turkey, 28, 83, 93, 156, 168, 187, 195, 204, 233, 241, size. See body size 269, 273, 278. See also Byzantine period skeletal representation. See anatomical representa-Achaemenid, 187, 190, 193-195 tion; carcass(es): distribution; and under indi-Assyrian, 193 vidual species Hittite, 93-96, 99, 101-102, 187, 192, 193 skin(s), 69, 228. See also hides; leather; pelts; second-Turkmenistan, 41, 44-46, 55 ary products; and under individual species slaughter(ing) (general), 69-70, 72-74, 134, 166, 195. Ubaid period, 153–169 See also age-at-death; culling; demographic urban/urbanism, 24, 62, 83, 88, 94-95, 113, 120, 122 data; kill-off patterns; mortality; survivorship; 153-157, 168-169, 187 Uruk period, 154-155, 168, 204 and under individual species snake(s), 234, 250, 251, 258-259, 264, 280 Uzbekistan, 45, 133, 222-229 cult, 256, 258, 264 decoration, 259, 264, 280 vegetation, 42, 52, 55, 93, 159, 238, 256. See also environments; landscapes social organization, 3, 156, 157 votive(s), 102, 245, 247, 251, 264. See also offering(s) sow. See pig(s) spider, 236 stockpiling, 53, 56. See also fodder waste. See also disposal subsistence, 61, 73, 86-87, 118, 122, 264 agricultural, 52-53 activities, 108, 256 butchery, 106-110, 167, 200 household, 28, 33, 47, 83, 227 economy, 42, 74, 155, 160, 167, 169, 200, 206–208 strategy(ies), 43, 113, 155, 158, 165–166, 195, 258, manufacturing, 146 weaponry, 142, 208 survivorship (general), 27, 116, 120. See also age-atwear, bone, 143-144, 146 weaving. See textile production death; culling, demographic data; kill-off patterns; mortality; slaughter(ing); and under indiwild ass. See onager vidual species wool production, 120, 123, 142, 157, 158, 165-167, Syene, 130-137 182, 195, 229, 262 Syria, 5, 28, 154, 156, 158, 168, 196, 204, 269, 275, 278, worked bone. See bone, worked 280 workshop(s), 115-116, 118, 122-123, 142, 146 Zagros, 28, 199, 204, 208 taphonomy, 4, 61, 64-65, 67, 82, 96, 102, 104-110, 120, 146, 194, 196, 206, 227, 272 Ziyadeh, Tell, 153-169 fragmentation, 64-65, 72-73, 102-106, 119-120

preservation, 7, 64, 104, 107, 116, 131, 146, 187,

189-190, 200, 261

weathering, 64, 73, 82, 87, 116