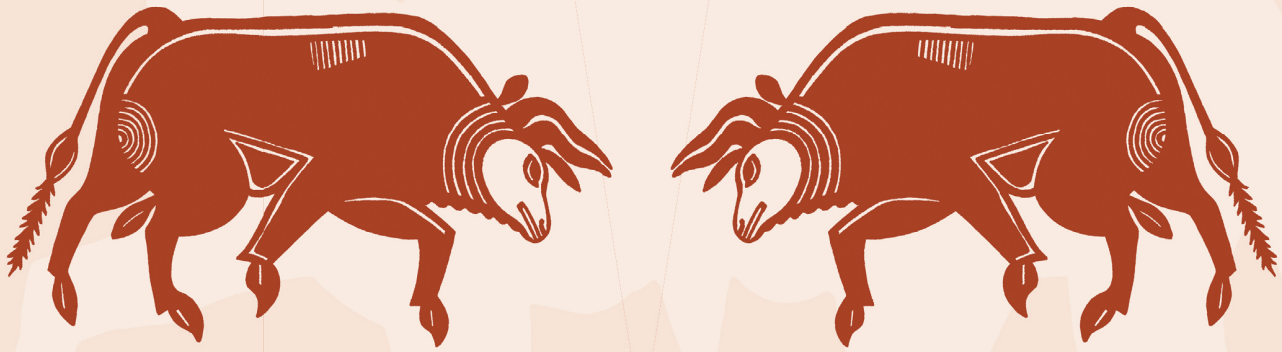
Archaeobiology 3

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

LOCKWOOD PRESS
Atlanta • 2021

ARCHAEOZOOLOGY OF SOUTHWEST ASIA AND ADJACENT AREAS XIII

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

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 9781948488983 (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

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

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

Part 3: Beyond Subsistence: Animals in the Symbolic World of Southwest Asia and Adjacent Areas

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:

1. 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

2.1 | Exploring Ubaid-Period Agriculture in Northern Mesopotamia

The Fifth-Millennium BC Animal Remains from Tell Ziyadeh, Syria

Scott J. Rufolo*

Abstract

Excavations at the Syrian site of Tell Ziyadeh in the 1990s yielded a considerable body of archaeological evidence documenting life at a fifth-millennium BC settlement in northern Mesopotamia. The findings paint a picture of a pioneer community founded around 4800 BC, and a site subsequently occupied for several hundred years, thus spanning the later Northern Ubaid and initial Late Chalcolithic periods of the region. Providing one of the largest zooarchaeological datasets from the Khabur Basin for this temporal range, the Ziyadeh faunal material is described here as part of an examination of the animal-based economy of a rural site during a critical phase of sociocultural transition in northern Mesopotamia. The closing centuries of the fifth millennium are noted for cultural shifts preceding the emergence of urban life over the course of the fourth and third millennia; therefore, the societies of the Ubaid and immediate post-Ubaid periods are commonly viewed as forming a bridge between the Neolithic Revolution and the Urban Revolution. Recent archaeological work supports the notion that an indigenous trajectory toward urbanization was established in northern Mesopotamia by the end of the fifth millennium, but it also indicates that sociocultural evolution in the north did not mirror the pattern of urbanization documented for the south during the Uruk period. The animal remains from Tell Ziyadeh offer a window into the early stages of the North's distinct path as it unfolded among a cluster of small hinterland settlements, recording their evolution from localized agricultural practices into a more integrated, regional economic network connecting neighboring pioneer settlements. This transformation is in line with a trend toward greater sedentarization and expanding social networks already recognized by other archaeological analyses concerning fifth-millennium BC northern Mesopotamia.

Keywords

Khabur Basin, Late Chalcolithic, Middle Khabur sites, northern Mesopotamia, Northern Ubaid, Post-Ubaid society, Tell Ziyadeh faunal assemblage, Ubaid expansion

Introduction

From a broad archaeological perspective, Southwest Asia as a region appears to be standing on the threshold leading into the realm of urban life and text-based history by the end of the fifth millennium BC. The subsequent centuries of the fourth millennium would witness the rise of the world's first cities and their accompanying bureaucratic structures in the Sumerian heartland of southern Mesopotamia, eventually giving birth to—among many other things—the written record (Mieroop 2015:21–43). As an academic subject, this "Urban Revolution" has traditionally commanded much attention (Smith 2009), although significant archaeological effort in recent decades has sought to better understand the developments of the immediately preceding periods (Carter and Philip, eds. 2010; Stein and Özbal 2007). In the chronology of prehistoric Mesopotamia (Figure 2.1.1), the precursors to the earliest urban phases are contained in the Ubaid and Late Chalcolithic (LC) periods, a broad span of time that, as archaeology has begun to show, harbored a range of cultures more diverse and sophisticated than once thought (Carter and Philip 2010; Frangipane 2001; Marro, ed. 2012; McMahon and Crawford 2014; Pittman 2001).

* *Palaeobiology Section, Canadian Museum of Nature, PO Box 3443, Station D, Ottawa, ON K1P 6P4, Canada ([srufolo@nature.ca], corresponding author)*

DOI: http://dx.doi.org/10.5913/aswaxiii.0130201

Old World Chronology	Dates (cal BC)	Regional Periodization (Northern Mesopotamia)	Cultural Period (Jazireh Region)	Ziyadeh Stratigraphy
Chalcolithic	4400–4200	Late Chalcolithic 1	Post-Ubaid/ Kuranian	South Side: *Levels VI–VIII (4762-4241 cal BC)* East Side: *Levels XII–XXIV (4762-4241 cal BC)*
	5200–4400	Northern Ubaid	Ubaid	South Side: *Levels I–V (4987-4661 cal BC)* East Side: *Levels I–XI (4901-4586 cal BC)*
Neolithic	5400–5200	Halaf–Ubaid Transitional	Halaf–Ubaid Transitional	N/A
	5900–5400	Halaf	Halaf	N/A

Figure 2.1.1. Comparison of chronological terms for northern Mesopotamia covering the period of time discussed in this work. General dating and regional terminology follow Akkermans and Schwartz (2003) and Rothman (ed. 2001); cultural periods for the Jazireh—traditional appellation for the region in which the Khabur Basin is located, roughly equivalent to the core of northern Mesopotamia—and specific radiocarbon dates for Ziyadeh are derived from Tonoike and Hole (2016).

To continue the metaphor employed at the beginning of this paragraph, it is becoming more and more evident that Southwest Asia not only approached the threshold of urbanism in the fifth millennium BC, but likely also experienced the first societal reconfigurations resulting in some communities in the region crossing over.

One of the most important general observations that has emerged from archaeological explorations of later prehistoric Mesopotamia is the fact that the northern and southern areas of the region followed distinct paths toward urbanization (Oates et al. 2007; Ur 2014; Wilkinson 2009). The early Sumerian city-states formed during the Uruk Period of southern Mesopotamia, emerging to become the world's first societies of undisputed urban character as the fourth millennium BC unfolded in what is now central and southern Iraq (Foster and Foster 2009:15–34; Nissen 2001). On the northern periphery of the Sumerian world, in what today is eastern Syria and northern Iraq, cities, which were organized in a similar fashion to those of the Iraqi alluvium along the Persian Gulf, made a later appearance, emerging during the mid-third millennium (Ur 2010). The evolution of urban society in both regions, however, was marked by variable and complex sociocultural processes (Algaze 2008; Lawrence and Wilkinson 2015; Pollock 2001) that unfolded over the course of centuries. Also of increasing interest to scholars is the fact that the roots of urbanism in northern Mesopotamia appear to ultimately stretch back into the fifth millennium, where proto-urban settlement configurations have been identified for several sites (Brustolon and Rova 2008; Ur et al. 2007; Ur, Karsgaard, and Oates 2011; Ur, Khalidi, and Al-Quntar 2011).

Northern Mesopotamia during the first half of the fifth millennium BC was part of the Ubaid phenomenon (Becker 2013), a seemingly progressive expansion of cultural elements with origins in southern Mesopotamia into adjacent territories of Southwest

Asia.[1] These elements first crystallize around 6500 BC in the southern Iraqi flood plain and include certain characteristic components of material culture—common domestic architectural plans, shared ceramic technology and repertoire of decorative motifs and forms, the presence of baked clay nails and mullers, etc. (Carter and Philip 2010:4)—as well as particular social and economic practices such as increasing use of communal cemeteries (Hole 1989), headshaping (Lorentz 2010), and participation in long-distance obsidian trade networks of a complex but not yet fully understood nature (Breniquet 1989:327; Healey 2010:188–193; Khalidi et al. 2016). This cultural "package" eventually spread outwards, being adopted to varying degrees in areas as diverse as northern Mesopotamia, Anatolia, the Levant, the Arabian Peninsula, and even Iran and the Caucasus. During the sixth and fifth millennia it formed what is regarded by many archaeologists as the first large-scale cultural interaction sphere (Carter and Philip, eds. 2010; Henrickson and Thuesen, eds. 1989). As a chronological entity, the Ubaid is also often viewed as a period of transition between agrarian-based subsistence economies and urban-centered economic networks (Henrickson and Thuesen 1989), a span of time during which increased social complexity developed in numerous ways (Iamoni 2016; Rothman 2004). Counted among the signals of this greater complexity is the higher number of permanent settlements, which in some areas exhibit hierarchical relationships in terms of size and location as well as indications of economic stratification (Ur 2010:393–401). However, the extent of political ranking and the level to which a social elite emerged during the Ubaid remains contested (Akkermans and Schwartz 2003:178–179). Complicating matters, the basic subsistence strategies and agricultural economy of the Ubaid are poorly known, as archaeobiological studies for this period are few (Grossman and Hinman 2014:203; Stein 2010:28).

Nonetheless, the archaeological data that do exist for the fifth millennium BC demonstrate that the Ubaid phenomenon coincides with a patchwork of proto-urban developments and incipient forms of social stratification in Mesopotamia. These varied forms of greater social complexity likely shifted within a set of diverse patterns over time, advancing and retreating in some areas, solidifying into a permanent change in others. Summed over the region, however, those societal changes with longevity established a foundation for future urban emergence distinctive to northern Mesopotamia (Lawrence and Wilkinson 2015; Ur 2010). It is also increasingly clear that the expansion of Ubaid cultural currency to form an archaeological horizon was the result of a diverse set of regional sociocultural processes rather than a coordinated and monolithic act of conquest, colonization, or economic imperialism (Baldi 2016; Stein 2010). Geographic areas entered the Ubaid sphere in a variety of ways and with differing degrees of interconnection, often without uniform adoption of the complete range of Ubaid cultural signals. Similarly, the closing centuries of the fifth millennium—for northern Mesopotamia broadly treated as the Post-Ubaid[2] phases that preceded the Uruk Expansion—also seem to have been characterized by multifaceted and dynamic social processes that played out in both directions between the north and the south (Marro 2012). In neither the Ubaid nor immediate post-Ubaid periods, however, does the interplay between the two Mesopotamian regions—nor, for that matter, that between Mesopotamia and its neighbors—appear to have involved large-scale migration and displacement of populations (Breniquet 1996; Carter and Philip 2010:7). Smaller-scale movements of people certainly did occur (Frangipane 2012:42n2; Oates 2004), however, and archaeological investigations in the Khabur Basin of northeastern

1 Most scholars discuss the distinctive cultural features of the Ubaid as having first evolved in southern Mesopotamia, subsequently spreading outward and moving mostly in a northerly direction. It should be noted, however, that there is some evidence that this might not have been the case—at least regarding certain components of Ubaid material culture—and some researchers question the direction of movement (e.g., Campbell and Fletcher 2010; Karsgaard 2010). Certain elements of the "Ubaid package" may actually have appeared first in the north and then made their way southward.

2 The term "Post-Ubaid" is employed in this paper as a chronological entity encompassing the first few centuries following the general disappearance of the distinctive Ubaid cultural styles and forms in northern Mesopotamia and surrounding regions where this disappearance occurs around the mid-fifth millennium BC. It is not formally recognized as such in most of the literature, although the term frequently occurs, but it is often eschewed as a proper designation in favor of local chronological terminology. The capitalized form is used here in opposition to "post-Ubaid", which may be understood as any and all periods following the Ubaid in any region.

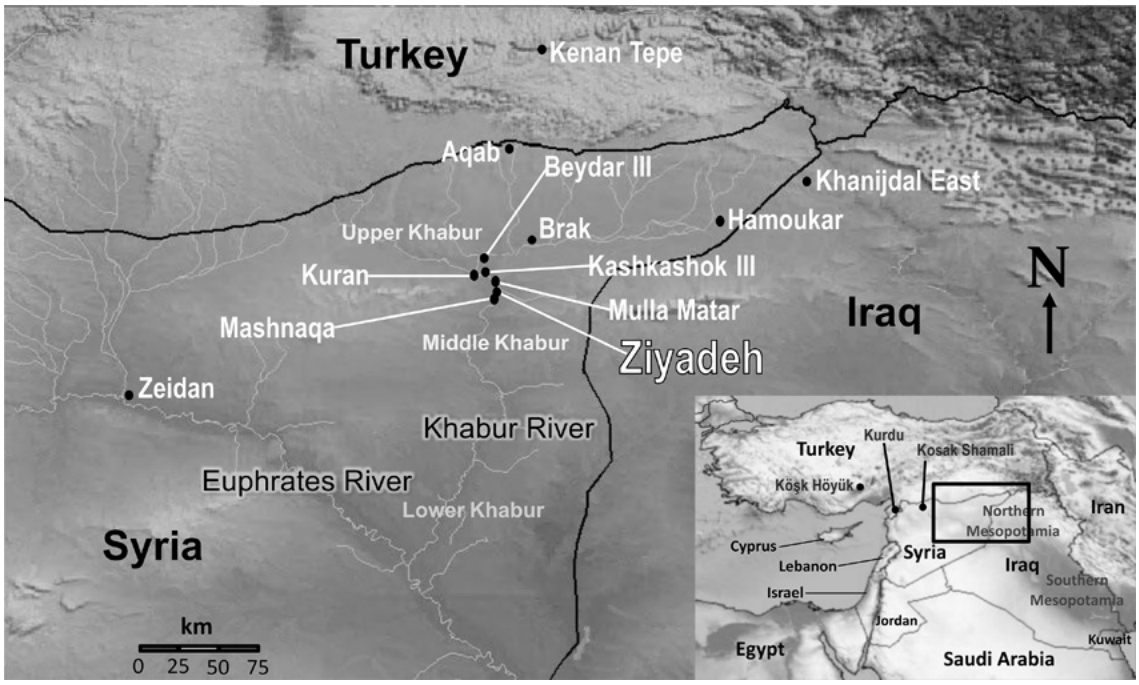


Figure 2.1.2. Map of the Khabur Basin region of northeastern Syria indicating the location of sites mentioned in the text, with inset situating the area within the broader setting of Southwest Asia. The locations of three sites—Kosak Shamali, Köşk Höyük, and Tell Kurdu—are shown on the inset map.

Syria provide evidence of such movements in northern Mesopotamia.

The site of Tell Mashnaqa, located on the middle stretch of the Khabur River (Figure 2.1.2), has been interpreted as containing the remains of a settlement established by a small group of migrants during the Ubaid (Thuesen 2000), assumed by its excavator to have traveled northward along the river from the southern Mesopotamian zone.

The nearby sites of Tell Ziyadeh and Mulla Matar also hosted communities founded during the Ubaid, part of a broader episode of new settlement within the Khabur Basin, along with small agricultural installations established further north at sites such as Kashkashok III, Beydar III, and Tell Kuran (Hole and Tonoike 2016d:391–397). The essentially simultaneous appearance of these sites on either virgin ground or territory long abandoned strongly suggests that their establishment was due to immigration, and the artifacts recovered at Tell Ziyadeh in particular have been interpreted as recording the foundation and evolution of a small homestead by an enterprising group of pioneers (Hole 2016). Possessing one of the largest fifth-millennium BC archaeological datasets for a small rural community of northern Mesopotamia, Ziyadeh provides an example of how the Ubaid phenomenon was expressed in a localized fashion as its associated cultural hallmarks spread into northern Mesopotamia, evolving over time through various stages of sociocultural transmission and transformation. The Chalcolithic faunal assemblage from Tell Ziyadeh is described here in order to highlight those aspects of the animal-based economy that reflect the pioneer origins of the ancient community, followed by a brief discussion of how the zooarchaeological data contribute to a broader understanding of the sociocultural dynamics underlying the Ubaid phenomenon and its relationship with subsequent developments in urban social organization.

The Ubaid Phenomenon in Northern Mesopotamia

Before profiling Tell Ziyadeh as an archaeological site, a brief exploration of the Ubaid as it was expressed in northern Mesopotamia—today the Jazireh of northeastern Syria and northwestern Iraq along with the area of southeastern Turkey bordering its northern edge—is in order so that the data from Ziyadeh may be understood within their broader regional context. Stein (2012) provides a detailed assessment of northern Mesopotamia during the Ubaid

and subsequent LC phases, and what follows here is largely a summary of the most important points of this work. The periods under consideration with reference to Tell Ziyadeh (Figure 2.1.1) are the Northern Ubaid (ca. 5200–4400 BC), corresponding to the Ubaid 3 and Ubaid 4 phases of the southern Mesopotamia chronology (Lebeau 2011), and the LC1 designation (ca. 4400–4200 BC) of the LC chronology erected for northern Mesopotamia (Rothman 2001), which overlaps with the Terminal Ubaid/Ubaid 5 phase of the southern alluvium (Forest 1996:387).

During the first half of the fifth millennium BC, northern Mesopotamia witnessed the spread of the Ubaid material-culture complex, which commingled with the waning native cultural traditions of the preceding Halaf period of the sixth millennium (Özbal 2010). These became integrated into an overarching, Ubaid-derived set of cultural expressions and modes of social organization, thereby creating a new identity centered in participation within a broad interaction sphere that united northern Mesopotamia economically and symbolically with surrounding regions (Breniquet 1989, 1996). Such changes were also accompanied by the emergence of greater economic differentiation and disparities in social status. The archaeological correlates of this include site distributions of greater complexity that exhibit a more densely settled landscape, with distinct two-tiered settlement hierarchies in areas such as the Balikh drainage basin (Trentin 2010) and large regional centers in the Upper Khabur and Hamrin plains of the Jazireh (Ball 1990; Brustolon and Rova 2008; Wilkinson et al. 2003); indications in both the artifacts and faunal remains that some communities intensified their involvement in pastoralism to heighten the extraction of milk and wool (Grossman and Hinman 2014; Sudo 2010); the procurement of luxury goods through long-distance trade networks (Forster and Grave 2012; Oates 1993; Tobler 1950) and the possible use of painted pottery in feasting rituals to signify social status (Helwing 2003); and the presence of administrative devices such as seals, sealings, and clay tokens (Pittman 2001; Rothman 2007). Overall, however, disparities in social status appear to have been minimal, and the Ubaid period in northern Mesopotamia seems to have been characterized by nascent economic ranking and the gradual development of limited forms of social stratification. This incipient socioeconomic complexity is generally viewed as the result of a process of social replication in which northern communities shifted their political structures so that small corporate groups within villages and settlement clusters—perhaps even accompanied by the emergence of headmen or chiefs—gained limited control of the collection and distribution of agricultural goods, initially generated by and subsequently enabling the maintenance of their status through mutual trade and social exchanges with staple finance-based chiefdoms of the south (Nissen 2001; Stein 1994).

Unfortunately, the subsequent Post-Ubaid or LC1 phase of northern Mesopotamia is poorly documented due to a relative lack of archaeological data for this time period (Stein 2012:132). The information that is available indicates that the trends toward socioeconomic differentiation and the emergence of a social elite continued from the Ubaid, and may even have accelerated (Marro 2012).[3] Some continuities in material culture are present as well, with the retention of certain Ubaid forms and styles, but these display alterations characteristic of the Post-Ubaid, and most components of the Ubaid cultural assemblage disappear over the course of the second half of the fifth millennium BC. Evidence of far-ranging, centralized political control—such as a consistent pattern of large public buildings or a formal organization of settlements into urbanized arrangements (Ur and Wilkinson 2008; Wilkinson and Tucker 1995)—or strongly hierarchical social status in the form of segregated household activities and economic production (Gurdil 2010) or differential burial practices (Akkermans and Schwartz 2003:175–178), remains lacking.

The number of zooarchaeological studies whose subject are Ubaid or Post-Ubaid period assemblages from northern Mesopotamian sites is small. Grossman and Hinman (2014:212–213) tally eight sites with published zooarchaeological analyses, including only those with assemblages containing one hundred or more specimens identified to taxonomically useful categories and that also have a secure stratigraphic association. To these may be added the site of Tell Aqab (Bartosiewicz 2016), which possesses a very early Northern Ubaid assemblage—dating to around 5300–5100 BC. Of these, five are located outside of the Khabur Basin—Tell Kurdu on the Amuq Plain, Tell Zeidan on the Balikh River, Kosak Shamali in the Upper Euphrates Valley, Khanijdal East in

3 However, see Kennedy (2015) for an opposing view that posits a levelling of social differentiation in northern Mesopotamia during the LC1.

the Iraqi Jazireh, and Kenan Tepe in the Upper Tigris region. The remaining four are situated within the Khabur Basin: three on the banks of the Khabur River itself—Tell Kuran in the northwestern portion of the basin and Tell Mashnaqa and Tell Ziyadeh[4] on the middle course of the Khabur—and one in the far north of the basin within the Wadi Dara drainage system—Tell Aqab. A survey of the basic zooarchaeological profiles for these nine sites reveals that an array of subsistence strategies was employed during the Ubaid, with four of the assemblages characterized by a variable but overall high percentage of wild species (ranging from 27% to 57%), and the others exhibiting very high proportions of domesticated species (87% or greater). Moreover, the presence of a large number of remains from wild taxa does not correlate well with site location or size, so a reliance upon hunted resources does not appear to have been more common in marginal areas of settlement with little rainfall to support extensive agricultural production. Sites with a significant domestic component reveal a concentration on sheep and goat, although detailed analyses of herding-management practices are not yet available for Kenan Tepe (Parker et al. 2008:114–122) or Tell Kurdu (Özbal et al. 2004:64–68; Yener et al. 2000:78–80). At Zeidan, caprines were managed primarily to maximize meat yield, although the age-at-death profiles indicate that milk was also likely extracted to a small but significant extent (Grossman and Hinman 2014:209). Although chemical analyses have shown that dairy was an important component of pastoral practice in Southwest Asia as early as the seventh millennium BC (Evershed et al. 2008), and there is residue evidence for dairy products such as butter during the Chalcolithic (Sauter et al. 2003), the progress of the "Secondary Products Revolution" in the region was likely a gradual one (Grigson 2000), so it is not surprising that coordinated pastoral endeavors and centers for milk and wool production are not in evidence for Ubaid northern Mesopotamia.

As for the Ubaid, very few faunal studies have been published for the Post-Ubaid period of northern Mesopotamia. Some data do exist for Khabur Basin sites, however. The sites of Mashnaqa and Kuran continued to host small populations into the Post-Ubaid period, and their zooarchaeological assemblages reveal a similar pattern to that of the Ubaid (Zeder 1998b). At Mashnaqa there was little change, with domesticates continuing to dominate the animal-based economy, whereas for Kuran wild resources are predominant in the faunal assemblage, a shift from the Ubaid profile in which caprines were most abundant. However, with only 53 identifiable specimens in a total of 357 recovered bones, the Post-Ubaid Kuran assemblage is small and so must be interpreted with caution. Faunal material from large sites and their satellite communities in the northern Khabur Basin, such as Tell Brak and Tell Majnuna (Dobney et al. 2003; Weber 2007), dates to LC2 and later, therefore it is not comparable in age to the assemblages from Kuran, Mashnaqa, and Ziyadeh. The latest fifth-millennium BC remains at such sites, however, suggest that intensification of wool production may have begun in the Upper Khabur region as early as the LC2 (ca. 4200–3850 BC) and later became a small but significant part of the economy by the mid-fourth millennium.

Archaeological Investigation at Tell Ziyadeh

Located in northeastern Syria, Tell Ziyadeh is located upon the right bank of the Khabur River, originally sitting on an east-west running bend of the river but now at a point where the waters flow into the northern edge of the reservoir of the middle Khabur dam (Figure 2.1.2). The present form of the site is a mound measuring approximately 120 m long by 90 m wide (Figure 2.1.3), and rising 8 m above the surrounding river terrace (Hole 2000), although it has been periodically partially surrounded by the reservoir lake since the creation of the dam (Hole and Tonoike 2016e:2).

During its occupation, the site likely never achieved a size greater than one hectare (Hole and

4 The Ziyadeh data presented in Grossman and Hinman (2014) are derived from earlier studies by Zeder (1995, 1998a, 1998b). Zeder's work presents the results of an initial sorting and identification of the Ziyadeh material that sought only to assign preliminary taxonomic identifications and obtain counts and weights by species. The Ziyadeh data presented in this work represent a second, more detailed analysis (Rufolo 2016) in which material was carefully selected according to secure stratigraphic contexts and subjected to a greater range of data extraction—identifications were refined where necessary, information concerning fragmentation was collected, measurements were performed, butchery marks were recorded, and more.

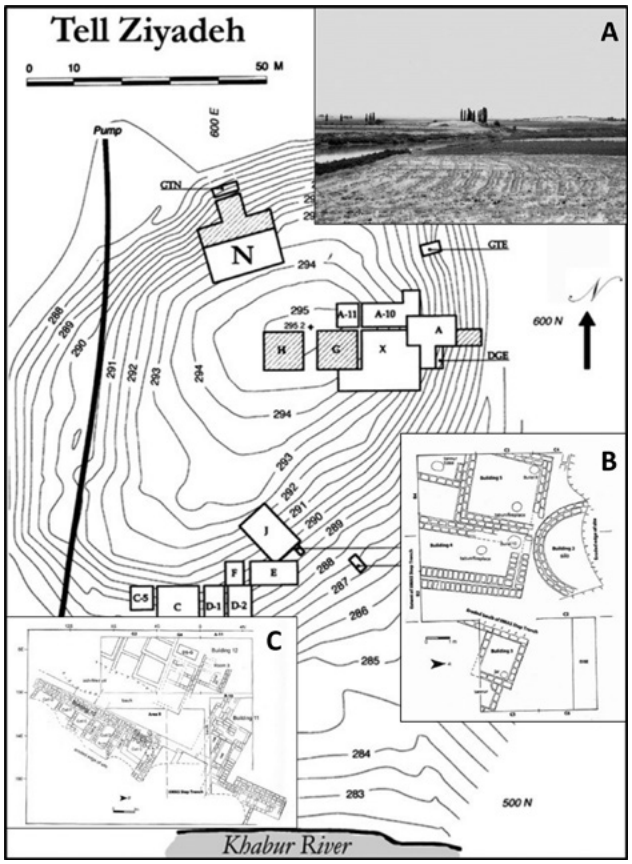


Figure 2.1.3. Plan of Tell Ziyadeh depicting the main excavation units, based on map by Stephen Hughey as provided in Hole (1999), with details presented in insets: A. Photograph of Tell Ziyadeh (Photograph courtesy of F. Hole); B. Plan of Ubaid domestic architecture and associated rounded storage building exposed in excavation area A, reproduced from Hole and Tonoike (2016a:Figure 5.7); C. Plan of Kuranian/Post-Ubaid architectural remains exposed in excavation area X, reproduced from Hole and Tonoike (2016a:Figure 5.27), including domestic units—upper portion of plan—and the remains of a large, complex structure that may have housed storerooms—lower portion.

Tonoike 2016b:51), and the areal extent of the inhabited areas at any one time was probably considerably less. Preliminary archaeological investigations at Tell Ziyadeh were conducted in 1988–1990 by the International Institute of Mesopotamian Archaeology (Buccellati et al. 1991), with more extensive excavations undertaken by the Yale University Khabur Basin Project in 1996 and 1997 (Hole and Arzt 1998). Both excavation projects were initiated in response to an appeal made to the international archaeological community in 1984 for foreign participation in salvage operations to document archaeological sites that would become threatened with flooding upon completion of a new irrigation and hydroelectric development project within the Khabur Basin (Bahnassi 1984; Bounni 1990).

Tell Ziyadeh is a multiperiod site, with earliest occupation probably dating to the sixth millennium BC. Little remains of this Halaf period settlement,[5] however, with most of it either lost to flooding, destroyed by subsequent construction, or buried beneath the extensive overlying remains of the Late Ubaid settlement of the early fifth millennium (Hole and Tonoike 2016e:2). The ceramics, architecture, and general artifact inventory clearly demonstrate that Ziyadeh was part of the Ubaid sphere in terms of material culture, exhibiting numerous features characteristic of Ubaid affiliation, such as painted pottery, tripartite buildings, and labrets. Smaller remnants of a Post-Ubaid and an Early Bronze Age occupation were also uncovered, although these have both suffered greatly from erosion. The Post-Ubaid layers are present only along the southern and eastern slopes of the central mound. Radiocarbon dating places the Late Ubaid occupation around 4800–4600 BC and the immediately succeeding post-Ubaid inhabitation—referred to as the Kuranian, a local expression of the LC1—around 4600–4300 BC (Hole 2001).

Today, the middle stretch of the Khabur River is surrounded by arid steppe and is not well suited to rain-fed agriculture; however, in the fifth millennium BC, northern Mesopotamia likely experienced an overall stable environment (Wilkinson 2003). This resulted in a richer vegetation in the Khabur Basin along the river banks including stretches of riparian forest and an environmental regime that fostered a greater agricultural potential (Hole and Tonoike 2016c). The site is estimated to have hosted a small village of forty to sixty inhabitants during both the Late Ubaid and Kuranian/LC1 (Hole and Tonoike 2016f:407). Remains of domestic architecture and storage structures were uncovered, although no single domestic unit was excavated in its entirety for either period. The community likely consisted of no more than five or six residential compounds at any one time during its Ubaid and Post-Ubaid incarnations.

5 A few Halaf-period ceramics worked into later deposits are the only evidence of a possible sixth-millennium occupation at Ziyadeh. As the Halaf settlement documented at the nearby site of Umm Qseir predates the Ubaid remains at Ziyadeh by nearly one thousand years, Ziyadeh's excavator regards the Ubaid settlement as essentially an establishment made on virgin soil.

Table 2.1.1. General assemblage data for the fifth millennium BC Tell Ziyadeh faunal remains, presented by broad stratigraphic categories—Ubaid-period depositional units, Post-Ubaid depositional units, and the large Post-Ubaid midden. Counts and weights are reported for the identifiable material—specimens that could be identified to meaningful taxonomic units, generally family level or lower—versus the unidentifiable material—fragmentary remains that could only be assigned to broad categories such as medium-sized mammal. NISP: Number of Identified Specimens; NUSP: Number of Unidentified Specimens.

	# Analyzed Specimens	# Identified Specimens (NISP)	Weight (Identified)	# Unidentified Specimens (NUSP)	Weight (Unidentified)
Post-Ubaid	21,710	2,687	25.87 kg	19,023	28.55 kg
EXV Midden	5,261	754	6.14 kg	4,507	9.26 kg
Ubaid	26,023	3,473	31.00 kg	22,549	32.31 kg

The material culture of Tell Ziyadeh suggests that the fifth-millennium BC occupation was initiated by migrants from southern Mesopotamia who established homesteads in clusters along the middle and upper stretches of the Khabur River (Hole 2016). The ceramic inventory of the site—fabrics indicate that nearly all of the vessels were manufactured locally and not imported (Tonoike 2016; Všianský and Gregerová 2016)—includes decorated bell-shaped vessels whose form and painted imagery has exact parallels in the Ubaid-period finds from Eridu in southern Mesopotamia. A similar pattern is seen in the material culture of the nearby Ubaid settlements: excavations at Kashkashok II and Mashnaqa also yielded pottery, boat models, and bent clay nails identical in appearance to finds at southern sites. Ziyadeh's inhabitants appear to have brought their Ubaid-period styles and practices with them. Through societal processes of immigration, adaptation, and the emergence of new traditions they gradually attenuated and evolved over the centuries into the distinctive cultural features of the Kuranian.

The Tell Ziyadeh Faunal Assemblage

In light of the story told by the artifacts and architecture of Tell Ziyadeh, certain aspects of the fifth-millennium zooarchaeological data are presented here to explore the animal-based economic activities of the site's inhabitants from their initial settlement along the Khabur River around 4800 BC until the community's abandonment around 4300 BC. The select set of information provided here is intended to permit a reconstruction of the basic hunting and animal-management practices of the pioneer settlement during its founding period, with a focus on detecting any signals in the data that might indicate changes in the subsistence economy that evolved between the Ubaid and Post-Ubaid phases. The full suite of zooarchaeological data that were collected is contained in Rufolo (2016), along with a more detailed analysis.

The fifth-millennium BC levels of Tell Ziyadeh provided a faunal assemblage numbering over 51,000 specimens, making it one of the largest yet recovered from a northern Mesopotamian site for the later Chalcolithic period. Although numerous depositional units were recognized during excavation, these could not be reliably correlated across the site due to the distances between excavation units (Hole and Tonoike 2016b). Therefore the faunal assemblage is analyzed using the two broad stratigraphic groupings of Ubaid and Kuranian—Post-Ubaid—levels. Within excavation areas, dividing the recovered faunal material into the recognized depositional units resulted in subassemblages that were too small to permit a rigorous chronological analysis, so it is not possible to consider changes over time within the Ubaid or Post-Ubaid levels. Comparisons between these two periods of time, however, are robust, as both the Ubaid and Kuranian strata are represented by large total sample sizes (Table 2.1.1) with similar fragmentation profiles (Rufolo 2016:Figure 12.6). Ubaid material was largely recovered from the southern side of the mound (Figure 2.1.3; excavation areas C, D, E, F, and J), whereas the majority of the Kuranian/Post-Ubaid finds were uncovered on the mound center and eastern slope (Figure 2.1.3; excavation areas A,

Table 2.1.2. Taxonomic identifications for the fifth-millennium BC Tell Ziyadeh faunal assemblage. The data presented here represent the identifiable material and are categorized by taxon and period/stratum. Certain taxonomic categories, such as cervid, rodent, reptile, contain material positively identified to species; see Rufolo (2016) for a list of the species collapsed here into these broad categories. It should be noted that for the Ubaid-period domestic remains, the three cat specimens come from the same individual, and 89 of the 145 dog bones belong to one animal.

	Ubaid			EXV Midden			Post-Ubaid		
	NISP	%	Weight (g)	NISP	%	Weight (g)	NISP	%	Weight (g)
Sheep *Ovis orientalis* f. dom. a*ries*	109	3.14	505.1	7	0.93	54.6	78	2.90	440.5
Goat *Capra aegagrus* f. dom. *hircus*	38	1.09	165.3	2	0.27	6.1	40	1.49	223.0
Sheep/goat	1,063	30.61	4,521.5	67	8.89	287.4	641	23.86	2,734.4
Caprine (Total)	1,210	34.84	5,191.9	76	10.08	348.1	759	28.25	3,397.9
Pig *Sus scrofa* f. dom. *domesticus*	76	2.19	421.8	8	1.06	41.9	54	2.01	488.4
Cattle *Bos primigenius* f. dom. *taurus*	243	7.00	4,679.2	20	2.65	303.5	203	7.55	5,359.5
Dog *Canis lupus* f. dom. *familiaris*	145	4.18	369.9	12	1.59	58.8	54	2.01	251.9
***Canis* sp.**	10	0.29	22.5	-	-	-	8	0.30	18.1
Small Canid	1	0.03	0.3	-	-	-	-	-	-
Small Carnivore	-	-	-	-	-	-	1	0.04	0.1
Cat *Felis silvestris* f. dom. *catus*	3	0.09	2.5	-	-	-	-	-	-
***Felis* sp.**	1	0.03	1.0	-	-	-	-	-	-
***Gazella* sp.**	631	18.17	1,975.4	208	27.59	497.3	509	18.95	1,508.6
Cervid	23	0.66	127.6	2	0.27	0.9	8	4.26	10.5
Aurochs *Bos primigenius*	20	0.58	1,116.2	4	0.53	376.3	6	0.22	442.0
***Equus* sp.**	829	23.87	15,881.5	273	36.21	4,023.6	713	26.54	13,175.2
Wolf *Canis lupus*	1	0.03	1.0	1	0.13	2.2	3	0.11	26.4
Fox *Vulpes* sp.	24	0.69	20.7	4	0.53	2.2	24	0.9	19.1
Caracal *Caracal caracal*	1	0.03	0.9	1	0.13	1.2	1	0.04	1.3

Table 2.1.2. (cont.) Taxonomic identifications for the fifth-millennium BC Tell Ziyadeh faunal assemblage.

	Ubaid			EXV Midden			Post-Ubaid		
	NISP	%	Weight (g)	NISP	%	Weight (g)	NISP	%	Weight (g)
Lion *Panthera leo*	-	-	-	2	0.27	13.4	5	0.19	26.8
Hare *Lepus capensis*	8	0.23	3.0	1	0.13	0.3	10	0.37	5.7
Mustelid	2	0.06	0.08	-	-	-	4	0.15	0.8
Rodent	9	0.27	10.7	5	0.67	0.3	18	0.67	2.3
Hedgehog	1	0.03	0.5	-	-	-	1	0.04	0.2
Mongoose	-	-	-	1	0.13	0.3	3	0.11	0.6
Bird	24	0.69	27.5	7	0.93	14.9	21	0.78	24.5
Reptile	65	1.88	167.7	90	11.92	157.0	112	4.17	189.5
Fish	10	0.30	2.4	4	0.53	0.4	21	0.78	6.9
Crab	1	0.03	0.1	-	-	-	-	-	-
Mollusk	135	3.88	976.6	35	4.64	294.6	149	5.54	917

G, and X), although area J in the south also exposed a considerable depth of Kuranian-age strata.

The taxonomic composition of the Ubaid and Kuranian zooarchaeological assemblages are summarized in Table 2.1.2 and shown graphically in Figure 2.1.4. In the upper portion of Figure 2.1.4, the Post-Ubaid assemblage is shown in two forms: the first pie chart includes data from the entire range of specimens recovered from Post-Ubaid strata, while the second chart excludes data from the animal bones recovered from a large midden dating to this period—originally designated as locus X–030 by the excavators, comprising Stratum EXV of Area X.

The depth and extent of this refuse accumulation indicate that it does not represent a single event but was rather used over a period of time. But since no other areas of the site contained a large midden deposit of similar nature—and it may contain refuse from periodic events (discussed further below)—it has been excluded from the analysis of very broad categories such as wild versus domestic taxa. It can readily be seen from the taxonomic profiles that the representation of species, both wild and domestic, in the Ubaid and Kuranian assemblages appear to be rather similar. Pearson's chi-squared tests indicate that there actually is a statistically significant difference in the taxonomic proportions between the two periods for both the domestic—counting the associated dog and cat remains as one specimen each within the *Other* category ($\chi^2 = 17.82$ for $df = 5$, significant at a p value of 0.005)—and wild ($\chi^2 = 28.71$ for $df = 3$, significant at a p value of 0.001) spectra, but the association between taxon counts and period is very weak in both cases: for the domestic taxa ($\phi^2 = 0.007$) and for the wild ($\phi^2 = 0.008$); a ϕ^2 value of 0 indicates no correlation between variables, a value of 1 returned for a perfect association. There is a slightly greater representation of cattle and goat during the Kuranian as well as a reduced presence of aurochs and a broader emphasis on more diverse, small-sized game, but the difference is so small as to be negligible.

Throughout the fifth millennium BC, occupants of Tell Ziyadeh balanced domestic and wild resources, supplementing a small-scale livestock production focused primarily on sheep and goat with a broad array of wild game.[6] Cattle were maintained in small

6 These results differ from those obtained by Zeder (Zeder 1995, 1998a, 1998b) during her first stage analysis of the Ziyadeh faunal assemblage. The preliminary analysis indicated a strong emphasis on hunting during the Ubaid,

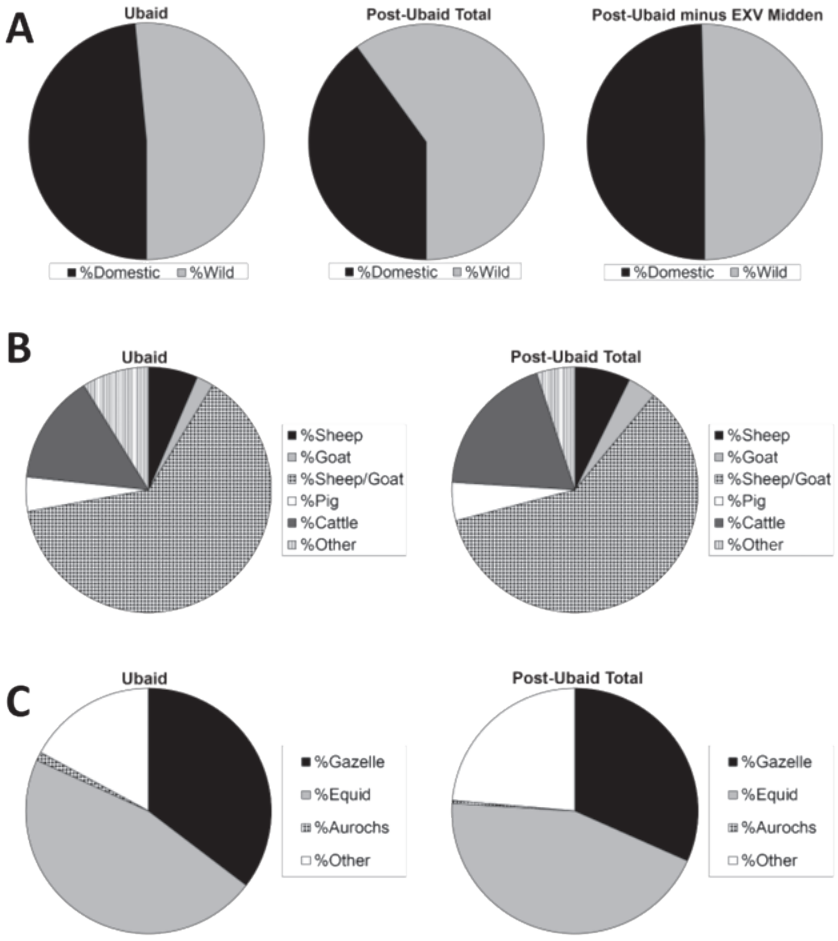


Figure 2.1.4. Charts depicting the basic taxonomic breakdown of the Tell Ziyadeh faunal assemblage. A. Domesticated *versus* wild taxa. Sample sizes: Ubaid N = 3,462, Post-Ubaid Total N = 2,687, Post-Ubaid minus EXV midden N = 754—note that these counts exclude material identified as *Canis* sp., *Felis* sp., small canid, and small carnivore because these categories may represent domesticated or wild species; B. Proportions of domesticated taxa. Sample sizes: Ubaid N = 1,677, Post-Ubaid Total N = 1,070; C. Proportions of wild taxa. Sample sizes: Ubaid N = 1,784, Post-Ubaid Total N = 1,608.

numbers, likely kept primarily as a source of traction for use in working nearby agricultural plots, as were swine, a household-level husbanding of pigs ensuring a ready supply of meat as security during leaner seasons of the year. Equids, most likely the onager or wild half ass, and gazelles were the most important wild species hunted throughout the fifth millennium.

The large Kuranian/Post-Ubaid midden found in Area X deserves some separate consideration. Although not detailed here, the zooarchaeological profile of this deposit does exhibit some noteworthy characteristics (Rufolo 2016:298–305, 319–320). The midden overall preserves a greater proportion of remains from wild taxa compared to both the Ubaid and Post-Ubaid assemblages (Figure 2.1.4), although the overall composition of the domestic and wild components mirror those of the surrounding Kuranian deposits: for domesticates (χ^2 = 7.64 for df = 5) and for wild taxa (χ^2 = 1.06 for df = 3). Neither therefore is significant at a p value of 0.18 or less. The midden material does include examples of some rare, exotic taxa, however, such as the caracal and steppe lion, and also exhibits a different fragmentation pattern compared to remains from Ubaid deposits. The midden material—indeed the Kuranian assemblage in general—contains a greater percentage of unidentified to identified large-mammal remains, meaning that the Post-Ubaid large-mammal material is more

with around 70% of the recovered remains representing wild species, followed by a dramatic change in the Kuranian, whose assemblage features over 65% domesticated forms. The discrepancy with the results presented here is likely due to criteria for inclusion: for Zeder's work, all specimens thought at the time to have been recovered from Ubaid and Post-Ubaid contexts were included in the study. For the present analysis, only material from secure contexts as determined from examination of the field notes and more recent assessments of the stratigraphy by the excavators was selected (Rufolo 2016:290–291). The preliminary analysis thus likely included a small but still significant amount of material from mixed and incorrectly assigned contexts.

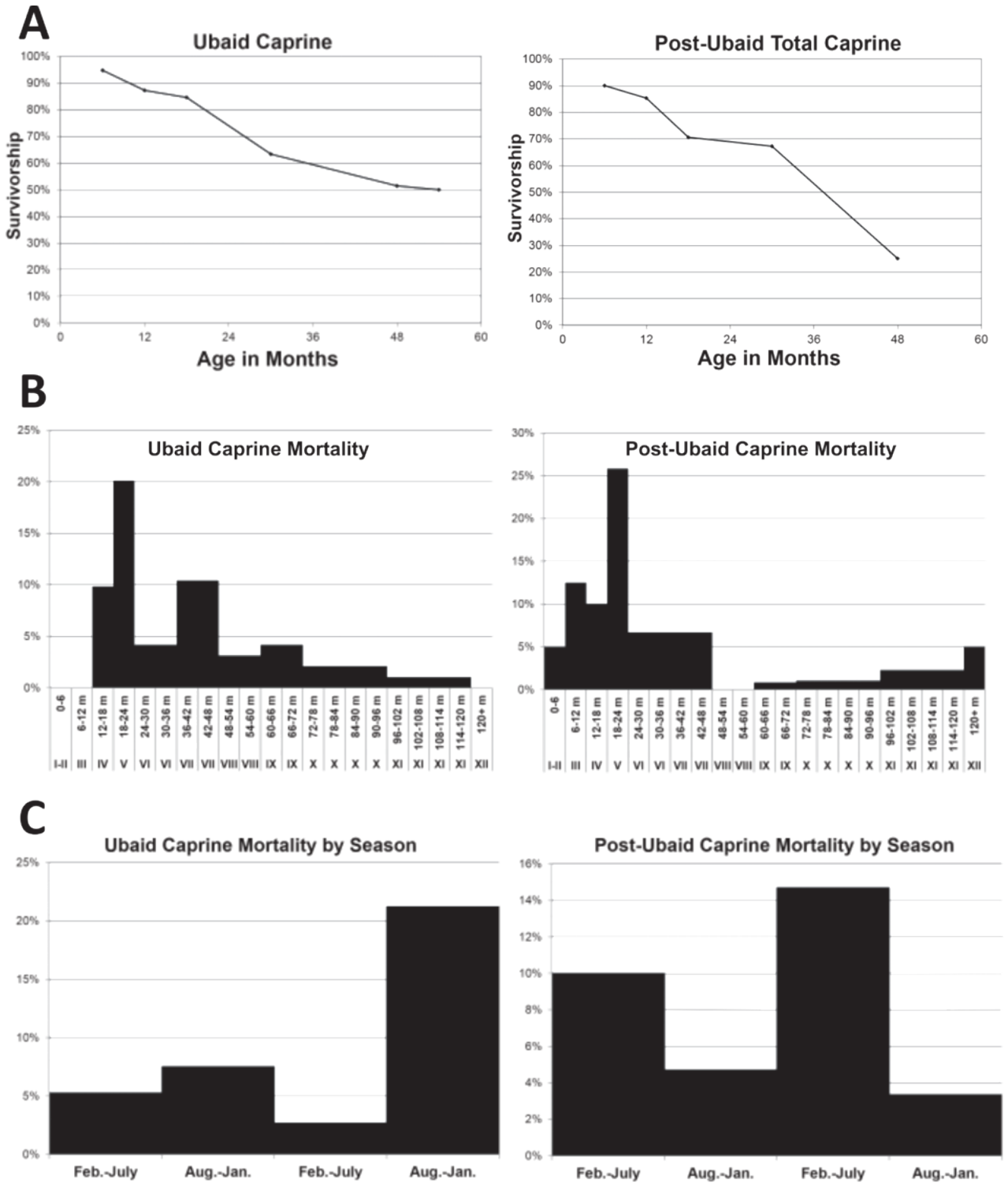


Figure 2.1.5. Charts presenting the survivorship data for caprine material of the Tell Ziyadeh faunal assemblage. A. Caprine survivorship curves based on long-bone fusion. Sample sizes: Ubaid N = 187, Post-Ubaid Total N = 150; B. Caprine mortality profiles based on dental wear. Sample sizes: Ubaid N = 24 mandibles, Post-Ubaid Total N = 20 mandibles; C. Caprine mortality over the first two years of age calibrated to season. Sample sizes: Ubaid N = 151, Post-Ubaid Total N = 124.

highly fragmented. This may signal that large animal carcasses, likely those of the onager, were being processed differently during the Kuranian. Additionally, a significant proportion of equid, gazelle, and soft-shelled turtle remains in the midden are blackened, much higher percentages of burnt bones being present for these taxa than in other contexts.

Caprine Culling Profiles

The culling profiles for caprines (sheep and goat) are shown in Figure 2.1.5. As there was an insufficient number of elements positively identified to the genus level, the caprine data must be considered in aggregate—combining information from specimens that were identified as being either sheep, goat, or sheep/goat.

The ratio of sheep to goat in the differentiated caprine material ranges from 2.0:1.0 to 2.9:1.0 for the fifth-millennium strata, therefore the combined caprine dataset likely contains similar proportions of the two species. The fusion-based survivorship curves derived from long bones, presented at the top of Figure 2.1.5, and the mortality histograms based on dental eruption and wear, comprising the central band of the figure and based on the method developed by Zeder (2006). Both sets of data serve as a means of detecting pastoral management strategies as they plot the attrition of individuals in a hypothetical herd composed of all the caprines found for the period in question. The data derived from long-bone fusion track this attrition as the cumulative percentage of individuals who survive over the course of four years following birth. Data from caprine dentition record the percentage of animals from the original herd that die within a particular age range. They are thus the inverse of the survivorship data but are capable of tracking changes up to eight years.

The caprine culling profiles for Tell Ziyadeh indicate that there was a strong interest in slaughtering animals in the 12–48 month age range during both the Ubaid and Kuranian, with a particular preference for culling animals in the 12–24 month interval. In both periods, over 30% of individuals were culled by the age of two and a half years. Additionally, there is a particularly strong peak at the 18–24 month interval in the dentition-based mortality data for the Kuranian/Post-Ubaid. Caprines obtain their prime muscle mass during the second year of life, so residents of Ziyadeh throughout the fifth millennium managed their flocks primarily for meat yield, with a distinct concentration during the Post-Ubaid on animals likely to provide the most meat. At the older end of the age spectrum, over 10% of the reconstructed herd survives beyond six years of age in both periods, signaling that dairy production of a scale sufficient to meet the immediate needs of the community was likely also part of the subsistence strategy. The older remains would therefore be those of females that were kept alive longer in order to provide milk, likely also affording a reliable source of wool for the homestead's residents.

Interestingly, seasonality profiles for the slaughter of caprines (shown in the lower portion of Figure 2.1.5) detect a shift in the timing of primary culling episodes between the Ubaid and Kuranian periods. These graphs present the dentition-based mortality data for the age range 0–24 months as calibrated to the months of the year based on the birthing seasons of sheep and goat populations maintained in the environments of southwestern Asia (Zeder 1994), thereby serving to indicate the intensity of animal kill-off during certain parts of the year. Assuming a lambing and kidding season that runs from February to March as is typical for the region today, the caprine mortality data reveal a distinct difference in the timing of kill-offs between the Ubaid and Post-Ubaid periods at Ziyadeh. During the Ubaid, culling peaks in the late summer through early winter when members of the herd were approaching two years of age. The Kuranian assemblage yielded data that reveal a change in strategy, with slaughter intensifying during the spring and focusing on younger animals—one to one and a half years old. This new pattern probably reflects the activities of transhumant pastoralists who exploited summer and autumn pastures further to the north, moving south along the Middle Khabur during the late winter and early spring for better forage there during the rainy season. The Ubaid pattern thus likely indicates that residents of Ziyadeh during the earlier fifth millennium were largely managing their own flocks in lands nearby without moving animals great distances throughout the year.

Interpreting the Subsistence Economy at Tell Ziyadeh

Even though only a limited set of data is presented here, the basic zooarchaeological profile construct-

ed from this information nonetheless documents important general trends that characterized the fifth-millennium BC animal-based economy at Tell Ziyadeh. The animal-bone assemblage recovered from the earliest phases of occupation dating to the Northern Ubaid clearly represents a general subsistence strategy balancing domestic and wild fauna in a manner that would support the primary dietary needs of the community. Nearly half of the identified assemblage is composed of the remains of domesticated species, largely sheep and goat, and the wild component is dominated by onager and gazelle. As it is assumed that the Ubaid-period inhabitants of Ziyadeh most likely represent migrants from southern Mesopotamia, it might be expected that the domestic suite would exhibit a stronger emphasis on cattle and pigs, since these taxa are dominant—generally representing over 50% of the domestic remains—in the data presented by the few available zooarchaeological analyses for southern communities of the early fifth millennium (Desse 1985–1986, 1996; Flannery and Wright 1966). This does not appear to be the case, however. The earliest Ubaid levels excavated at Ziyadeh were exposed along the base of the southern slope of the tell, yielding 573 bones from domestic animals, of which cattle represented 11% and pig only 1% of the total. Cattle never reach more than 28% of the domesticate remains in any Ubaid level with a sample size of 100 faunal specimens or more, pigs never exceed 5%. Rather than speak against the southern origins of the settlers, however, whose material culture exhibits strong ties with that of southern Mesopotamia as mentioned previously, the faunal profile for the Ubaid is likely an indication of the demands of the local environment. The drier northern plains with extensive steppe were simply better suited to a focus on caprine husbandry.

The community's staple supply of meat was provided in large part by pastoralists based at Tell Ziyadeh who did not range far for much of the year. The principal culling of sheep and goat occurred during the hot summer months and the opening weeks of the rainy season, with animals approaching two years of age preferentially targeted. The heightened culling activity coincides with the driest span of the year during which local plant growth is minimal, and resident pastoralists are likely responsible for furnishing the main meat supply during the annual period of greatest environmental stress. Following the winter rainy season, as the surrounding land became comparatively richer in forage, the flocks could be moved out into the steppe. Wild game, now roaming the steppe in greater numbers to take advantage of the new growth, could be hunted with greater ease and frequency. Meat from gazelle and onager probably greatly supplemented the diet at this time, reducing the need to slaughter domesticates during the winter and spring months. Small numbers of pigs and cattle could be used to round out the diet throughout the year, with smaller wild taxa such as birds, fish, and hare also likely serving in this role. There are no indications of a highly specialized pastoralism; caprines were maintained principally for their meat and secondarily as a source of milk and likely also wool for domestic use.

During the Kuranian/Post-Ubaid, residents of Tell Ziyadeh appear to have changed their general subsistence strategy little, maintaining an animal-based economy largely similar to that of the earlier phases of occupation. Domesticated animals as well as wild species contributed nearly equally to the diet, and sheep and goat continue in their role as the dominant component of the livestock. There is no significant change in the basic pastoral management, the zooarchaeological data for the Post-Ubaid continue to signal a herding strategy focused on obtaining a steady supply of meat. The small increase in the numbers of animals surviving to older age classes seen in the Post-Ubaid caprine mortality profile (Figure 2.1.5 B) may evidence a shift in culling patterns indicative of a growing economic interest in yield increase of secondary products, although meat procurement remains the dominant focus. There is some indication, however, of a growing set of more complex and extensive economic relationships. The seasonal culling pattern for sheep and goat during the Post-Ubaid assemblage is the opposite of that for the Ubaid material, exhibiting spikes in the kill-off intensity for the late winter and into the spring months. This pattern likely indicates that caprines are being managed further out in the steppe, and probably by largely nonresident transhumant pastoralists, who would have been returning to the region from summer and autumn pastures further to the north so that the flock could graze on the steppes surrounding the Khabur River over the rainy season (Zeder 1994:108). In this scenario, sheep and goat would have most often been obtained on the hoof through trade with these pastoral groups moving along the middle region of the Khabur Basin or

perhaps through a mobile sector of the population of Ziyadeh that spent much of the year off-site involved in pastoral activities. Isotopic studies of the caprine remains should be able to detect such a shift in the source of animals; such work is currently being planned as a means of potentially providing additional evidence for this scenario.

The distinctive nature of the Area X midden documents intensified hunting practices and provides a signal of more complex social interactions. In terms of the procurement of wild game, the midden material may be a sign of a more developed corporate strategy for hunting. In the early fourth millennium BC, the occupants of Tell Kuran engaged in the mass hunting of gazelles (Bar-Oz et al. 2011; Zeder et al. 2013), likely with the use of kites to funnel the movements of the animals to make capturing and killing them easier. Excavations at Tell Kuran revealed a large midden containing large quantities of gazelle bone, with few specimens of other species being present. Unlike the Kuran gazelle assemblage, however, the Area X midden is characterized by a multi-species profile rich in remains from two larger taxa—gazelle and onager—as well as a variety of smaller wild forms. Nor does the Ziyadeh midden exhibit a body-part profile dominated by a concentration of foot elements or other expected butchery waste, as is the case for the Kuran midden. As previously mentioned, though, the Ziyadeh midden assemblage is notable for its high percentage of burned bones. It therefore likely does not represent a single event but, considering its contents as well as its depth and size, more likely preserves the remains of several large, successive meals over time. These meals might have followed a communal hunting foray, perhaps as an associated special feast, the midden therefore capturing the occurrence of what was likely an event of community-wide participation and significance.

Discussion and Conclusion

The data derived from the animal-bone remains paint a picture that is consistent with the interpretation of Ziyadeh as having been a homestead community founded in an uninhabited region by a small group of pioneers. Throughout the site's occupation across the fifth millennium BC, the general subsistence economy involving animals and animal-derived products was organized at a scale intended primarily to meet the daily needs of the settlement and maintain the self-sufficiency of its inhabitants to the greatest extent possible. Specialized pastoral pursuits designed to capitalize on a newly emerging market for wool or dairy products that may have been developing elsewhere in Mesopotamia never fully matured at Ziyadeh. With game animals and other wild resources readily available on the steppes and along the river banks, residents of the site could support their community through combining hunting and the rearing of livestock without having to invest in an agropastoral system more focused on connecting them economically into a broader regional economy. However, all the homesteads newly established within the Khabur Basin during the Northern Ubaid, Ziyadeh included, undoubtedly had to rely on social and economic interactions with one another to a certain degree from the moment of their founding (Hole and Tonoike 2016f:407–408). Changes in the zooarchaeological profile for the site as derived from the later fifth-millennium BC faunal assemblage indicate that such intercommunity ties may have intensified during the Post-Ubaid period.

The Kuranian/Post-Ubaid data detect a minor socioeconomic shift in the procurement of meat from caprine species. The culling profiles for this period indicate a change in the seasonal pattern of slaughter for sheep and goats, with the majority of prime-aged animals being killed during the spring and early summer. This is probably due to a change in animal management strategy, the community no longer maintaining its herds largely nearby and shepherded by members who resided at Ziyadeh much of the year. Instead, groups of transhumant pastoralists—either mobile residents of the surrounding steppe land who were not affiliated with the settled community or perhaps members of the homestead who now spent much of the year off-site—supplied caprine-derived goods to Ziyadeh and nearby settlements as they moved southward along the Khabur River to summer pastures. Ziyadeh, therefore, may have become one node in a localized economic system involving a more integrated, mutual dependence between mobile pastoral groups and the more sedentary communities stationed along the river. The remains found in the Area X midden may also be a result of this new relationship: they evidence the occurrence of communal activities meant to reinforce corporate identity at Ziyadeh, forge and strengthen

relationships with other homesteads, and maintain amicable interactions with pastoralists.

The mid- to late fifth millennium BC is the period during which the internal socioeconomic differentiation of communities and societies began to heighten in Mesopotamia, with a concomitant development of nascent forms of social inequality built on an emerging elite status and the control of goods and symbols associated with prestige (Algaze 2001, 2008; Wengrow 2010:54–65). In Syria, the Late Ubaid and immediate post-Ubaid phases seem to have been characterized by a diverse assemblage of overlapping social networks that formed in response to certain sectors of the population adopting an increasingly more sedentary lifestyle while mobility throughout Mesopotamia was being deemphasized overall (Akkermans and Schwartz 2003:158). The patterns in the zooarchaeological data seen for the Post-Ubaid strata at Ziyadeh may reflect this general trend, because the development of larger settlements and proto-urban social structures in northern Mesopotamia forced economic restructuring within the Khabur Basin. The homesteads strengthened local ties with each other in order to maintain their independence. But they also established a socioeconomic connection with more mobile pastoralist groups that were beginning to specialize in servicing the growing larger centers of permanent settlement.

The middle reaches of the Khabur Basin were situated within a largely marginal area that bordered the territories of several newly expanding settlements. Tell Brak, a large site in the northern Khabur Basin well known for its urban configuration in the third millennium BC (Early Bronze Age), was already showing signs of complex, centralized economic activities by the late fifth millennium (Oates et al. 2007). The site of Khirbat al-Fakhar, located in the eastern periphery of the Upper Khabur region close to another Early Bronze Age urban center (Tell Hamoukar), also displays proto-urban proportions during the LC1/Post-Ubaid time span (Ur, Khalidi, and Al-Quntar 2011). In the Iraqi Jazireh, evidence for social stratification and a differentiated local economy with connections to regional trade networks is found at Grai Resh (Kepinski 2011), a large settlement that featured defensive fortifications by the end of the fifth millennium. It has also been noted that the Khabur Basin may have begun to function as a gateway region during the immediate post-Ubaid centuries (Stein 2010:34), the Khabur River serving as a conduit for regional trade between larger settlements in the north, such as Brak, and communities to the south of the Khabur's confluence with the Euphrates. By the final decades of its occupation, Ziyadeh may have been more like a small hamlet whose inhabitants made their living by interacting with the traffic moving upon the river. Ziyadeh and nearby communities likely also served as an interface with the mobile polities of the hinterland, funneling goods into and from the steppe. Such arrangements have been described for the LC of the southern Levant (Hermon 2008), where settlement clusters occur in particular geographic regions that permitted groups of interrelated communities to act as an independent unit, primarily exploiting local resources and supplementing their economy by tapping into broader trade networks for certain goods only.

Social mechanisms for developing a stronger corporate identity among the homestead communities, as well as for encouraging and maintaining new relationships with pastoralists or merchants, may well have included communal meals between the residents of the small Khabur Basin settlements and perhaps even cooperative mass hunts. Smaller-scale community events, such as those interpreted here to have been responsible for the Ziyadeh stratum EXV midden, may represent the foundations for later, larger-scale events intended to generate greater social cohesion as proto-urban forms of living were originating in northern Mesopotamia. In the fourth millennium BC, feasting and communal meals are thought to have played an important role in the development of centralized authority at Tell Brak (Weber, in press), where the consumption of exotic taxa such as lion and bear appears to have served as a signal of prestige (Weber 2014). The site of Arslantepe in Turkey also preserves evidence of the importance of feasts during the Uruk Period (D'Anna and Guarino 2010). Earlier Anatolian sites contain examples of communal dining activities, indicating that such events had a long evolution over the course of the Chalcolithic. At Early Chalcolithic Köşk Höyük, whose occupation dates to 6200–5400 BC (equivalent to the Halaf in northern Mesopotamia), numerous roasting pits have been found that contain significant quantities of animal bone, including higher proportions of wild species than other middens and refuse deposits on the site (Arbuckle 2012). The body-part representation in the pit deposits also differs from that of faunal assemblages recovered from

other areas, being weighted toward meaty portions of the hind- and forelimbs and displaying a pattern that suggests that cattle and equid cuts were apportioned according to a particular socially prescribed logic. Such a pattern is not present in the EXV midden, whose body-part representations do not differ from other deposits of the site, supporting the notion that Ziyadeh hosted a homestead community with little social differentiation in terms of status.

The information obtained from the Tell Ziyadeh faunal remains certainly provides a valuable addition to the archaeological record for fifth-millennium BC northern Mesopotamia, enlarging our understanding of the variability in subsistence economy and animal management strategies during the Ubaid and Post-Ubaid periods. As with the Ubaid sites of Mashnaqa (Zeder 1998b) and Kosak Shamali (Gourichon and Helmer 2003), the faunal assemblage from Ziyadeh exhibits a large component of remains from wild taxa, but standing at over 50% for both the Ubaid and Post-Ubaid phases, it is noticeably greater than the proportion of wild species represented in the Mashnaqa (31%) and Kosak Shamali (39%) assemblages. All three stand in contrast to the only other Ubaid-period assemblages documented in the archaeological literature with relatively large sample sizes—Kenan Tepe (Parker et al. 2008), Khanijdal East (Wilkinson and Tucker 1995:42), Tell Aqab (Bartosiewicz 2016), Tell Kurdu (Özbal et al. 2004), and Tell Zeidan (Grossman and Hinman 2014)—whose faunal remains are dominated by domesticated species. Such diversity in agropastoral systems among fifth-millennium BC settlements in Southwest Asia has also been noted for other areas of the Levant, such as modern-day Israel (Price et al. 2013) and Jordan (Müller-Neuhoff 2014), where the Chalcolithic subsistence economy evolved to include a greater interconnectedness between sedentary and mobile sectors of the population. This dynamic between settlements and pastoralists may even have played some role in the spread of Ubaid material culture and ideology.

Sites such as Tell Ziyadeh demonstrate that one avenue for the Ubaid phenomenon to progress was through the movement of small pioneer groups. In the Khabur Basin, the Ubaid period is marked by the establishment of a network of homesteads founded by immigrants from the south. As with the material culture, they brought certain agricultural practices and strategies with them, which they employed and adapted as needed to suit their new environment. The zooarchaeological data support an interpretation of a self-sufficient subsistence economy at Tell Ziyadeh during the Ubaid that equally integrated both locally managed domesticated herd animals and ample wild game from the nearby gallery forests and grasslands. As these homesteaders transitioned into a distinct regional entity culturally, the animal-based economy likely evolved in service of this process: it further integrated the clusters of post-Ubaid communities through the development of new economic relationships, such as transhumant pastoralism on a regional scale within the Khabur Basin. The developments in the animal-based economy during the Kuranian may have been part of a strategy to maintain independence and a separate ethnic identity from the larger settlements growing in the northern Khabur Basin and on its periphery. Banning (2011) has documented the various ways that communities in the southern Levant attempted to establish cultural independence while at the same time supporting economic stability and fostering social prestige during the Chalcolithic. Ziyadeh and its fellow homesteads are likely another case of this process in action during the fifth millennium BC, one example of the diverse ways in which northern Mesopotamian communities responded to the fluctuating network of socioeconomic changes associated with eventual urban emergence in the region.

Acknowledgments

I would like to thank Frank Hole, director of excavations at Tell Ziyadeh, for the financial support he provided to enable me to spend one season working at the site as well as for his encouragement and patience throughout the lengthy process of analyzing the Ziyadeh faunal data. This work benefitted from the insightful and thoughtful consideration of two reviewers, Rémi Berthon and the other anonymous. I extend my gratitude to them for taking the time to thoroughly dissect the information and arguments presented here, and for providing very useful feedback.

References Cited

Akkermans, P. M. M. G., and G. M. Schwartz
2003 *The Archaeology of Syria: From Complex Hunter-Gatherers to Early Urban Societies (ca. 16,000–300 BC).* Cambridge University Press, Cambridge.

Algaze, G.
2001 Initial Social Complexity in Southwestern Asia: The Mesopotamian Advantage. *Current Anthropology* 42:199–233.
2008 *Ancient Mesopotamia at the Dawn of Civilization: The Evolution of an Urban Landscape*. University of Chicago Press, Chicago.

Arbuckle, B. S.
2012 Animals and Inequality in Chalcolithic Central Anatolia. *Journal of Anthropological Archaeology* 31:302–313.

Bahnassi, A.
1984 Appel international pour la sauvegarde des antiquités du Moyen Khabour. *Lettres d'information d'archéologie orientale* 6:127–129.

Baldi, J. S.
2016 Regionalized Patterns and Paths to "Complexity": Reflections about Ceramic Provinces and Organizational Modalities in the 6th–4th Millennia Northern Mesopotamia. In *Trajectories of Complexity: Socio-Economic Dynamics in Upper Mesopotamia in the Neolithic and Chalcolithic Periods*, edited by M. Iamoni, pp. 117–138. Harrassowitz, Wiesbaden.

Ball, W.
1990 Tell al-Hawa and the Development of Urbanisation in the Jazira. *Al-Rāfidān* 11:1–28.

Banning, E. B.
2011 Houses, Households, and Changing Society in the Late Neolithic and Chalcolithic of the Southern Levant. *Paléorient* 36(1):49–87.

Bar-Oz, G., M. A. Zeder, and F. A. Hole
2011 Role of Mass-Kill Hunting Strategies in the Extirpation of Persian Gazelle (*Gazella subgutturosa*) in the Northern Levant. *Proceedings of the National Academy of Sciences* 108:7345–7350.

Bartosiewicz, L.
2016 Halaf Period Animal Remains from Tell Aqab, Northeastern Syria. In *Bones and Identity: Zooarchaeological Approaches to Reconstructing Social and Cultural Landscapes in Southwest Asia; Proceedings of the 11th International Symposium on the Archaeozoology of Southwestern Asia and Adjacent Areas*, edited by R. Yeshurun, L. Weissbrod, N. Marom, and G. Bar-Oz, pp. 125–156. Oxbow Books, Oxford.

Becker, J.
2013 Northern Syria in the Ubaid Period, ca. 5300–4200 BC. In *Archéologie et Histoire de la Syrie I : La Syrie de l'époque néolithique à l'âge du fer*, edited by W. Orthmann, P. Matthiae, and M. al-Maqdissi, pp. 33–42. Harrassowitz, Wiesbaden.

Bounni, A.
1990 The Khabur and the Hasseke Dam Projects and the Protection of Threatened Antiquities in the Region (A Preliminary Report). In *Tall al-Hamidiya 2, Symposion: Recent Excavations in the Upper Khabur Region; Berne, December 9–11, 1986; Vorbericht 1985–1987*, edited by S. Eichler, M. Wäfler, and D. A. Warburton, pp. 19–29. Orbis Biblicus et Orientalis Series Archaeologica Vol. 6. Universitätsverlag Freiburg/Schweiz; Vandenhoeck & Ruprecht, Göttingen.

Breniquet, C.
1989 Les origines de la culture d'Obeid en Mésopotamie du nord. In *Upon This Foundation: The 'Ubaid Reconsidered*, edited by E. F. Henrickson and I. Thuesen, pp. 325–338. Museum Tusculanum Press, Copenhagen.
1996 *La disparition de la culture de Halaf: Les origines de la culture d'Obeid dans le nord de la Mésopotamie*. CNRS/Éditions Recherches sur les Civilisations, Paris.

Brustolon, A., and E. Rova
2008 The Late Chalcolithic Settlement in the Leilan Region of Northeastern Syria: A Preliminary Assessment. In *Proceedings of the 5th International Congress on the Archaeology of the Ancient Near East, Madrid, April 3–8 2006*, Vol. I, edited by J. M. Córdoba, M. Molist Montaña, M. C. Pérez, I. Rubio, and S. Martínez, pp. 357–382. Centro Superior de Estudios sobre el Oriente Próximo y Egipto, Universidad Autónoma de Madrid, Madrid.

Buccellati, G., D. Buia, and S. Reimer
1991 Tell Ziyade: The First Three Seasons of Excavation (1988–1990). *Bulletin of the Canadian Society for Mesopotamian Studies* 21:31–61.

Campbell, S., and A. Fletcher
2010 Questioning the Halaf-Ubaid Transition. In *Beyond the Ubaid: Transformation and Integration in the Late Prehistoric Societies of the Middle East*, edited by R. A. Carter and G.

Philip, pp. 69–84. Studies in Ancient Oriental Civilization Vol. 63. The Oriental Institute of the University of Chicago, Chicago.

Carter, R. A., and G. Philip
2010 Deconstructing the Ubaid. In *Beyond the Ubaid: Transformation and Integration in the Late Prehistoric Societies of the Middle East*, edited by R. A. Carter and G. Philip, pp. 1–22. Studies in Ancient Oriental Civilization Vol. 63. The Oriental Institute of the University of Chicago, Chicago.

Carter, R. A., and G. Philip (editors)
2010 *Beyond the Ubaid: Transformation and Integration in the Late Prehistoric Societies of the Middle East*. Studies in Ancient Oriental Civilization Vol. 63. The Oriental Institute of the University of Chicago, Chicago.

D'Anna, M. B., and P. Guarino
2010 Continuity and Changes in the Elite Food Management during the 4th Millennium BC: Arslantepe Period VII and VI A—A Comparison. In *Economic Centralisation in Formative States: The Archaeological Reconstruction of the Economic System in 4th Millennium Arslantepe*, edited by M. Frangipane, pp. 193–204. Dipartimento di Scienze Storiche Archeologiche e Antropologiche dell'Antichità, Università degli Studi di Roma "La Sapienza," Rome.

Desse, J.
1985–1986 Analysis of Bones from Tell el-Oueili, Lower Levels (Obeid 0, 1, 2, 3), 1983 Campaign. *Sumer* 44:123–125.
1996 Les ossements animaux des campagnes de 1987 et 1989 à Oueili. In *Oueili: Travaux de 1987 et 1989*, edited by J.-L. Huot, pp. 307–310. Éditions Recherche sur les Civilisations, Paris.

Dobney, K., D. Jacques, and W. van Neer
2003 Diet, Economy and Status: Evidence from the Animal Bones. In *Excavations at Tell Brak, Vol. 4: Exploring an Upper Mesopotamian Regional Centre, 1994–1996*, edited by R. J. Matthews, pp. 417–434. McDonald Institute for Archaeological Research/British School of Archaeology in Iraq, Cambridge.

Evershed, R. P., S. Payne, A. G. Sherratt, M. S. Copley, J. Coolidge, D. Urem-Kotsu, K. Kotsakis, M. Özdoğan, A. E. Özdoğan, O. P. Nieuwenhuyse, P. M. M. G. Akkermans, D. Bailey, R.-R. Andeescu, S. Campbell, S. Farid, I. Hodder, N. Yalman, M. Özbaşaran, E. Bıçakcı, Y. Garfinkel, T. E. Levy, and M. M. Burton
2008 Earliest Date for Milk Use in the Near East and Southeastern Europe Linked to Cattle Herding. *Nature* 455(7212):528–531.

Flannery, K. V., and H. T. Wright
1966 Faunal Remains from the "Hut Sounding" at Eridu. *Sumer* 22:61–63.

Forest, J.-D.
1996 Éléments de chronologie. In *Oueili: Travaux de 1987 et 1989*, edited by J.-L. Huot, pp. 385–390. Éditions Recherches sur les Civilisations, Paris.

Forster, N., and P. Grave
2012 Non-Destructive PXRF Analysis of Museum Curated Obsidian from the Near East. *Journal of Archaeological Science* 39:728–736.

Foster, B. R., and K. P. Foster
2009 *Civilizations of Ancient Iraq*. Princeton University Press, Princeton, New Jersey.

Frangipane, M.
2001 Centralization Processes in Greater Mesopotamia: Uruk "Expansion" as the Climax of Systemic Interactions among Areas of the Greater Mesopotamian Region. In *Uruk Mesopotamia and Its Neighbors: Cross-Cultural Interactions in the Era of State Formation*, edited by M. S. Rothman, pp. 307–347. School of American Research Press, Santa Fe, New Mexico.
2012 "Transitions" as an Archaeological Concept: Interpreting the Final Ubaid–Late Chalcolithic Transition in the Northern Periphery of Mesopotamia. In *After the Ubaid: Interpreting Change from the Caucasus to Mesopotamia at the Dawn of Civilization (4500–3500 BC); Papers from The Post-Ubaid Horizon in the Fertile Crescent and Beyond; International Workshop Held at Fosseuse, 29th June–1st July 2009*, edited by C. Marro, pp. 39–63. Varia Anatolica Vol. 27. Institut français d'études anatoliennes, Istanbul; George Dumézil/de Boccard, Paris.

Gourichon, L., and D. Helmer
2003 Preliminary Analysis of the Faunal Remains from Tell Kosak Shamali (Syria): Squares AD5, AE5, AF5, BD6 and BE6. In *Tell Kosak Shamali—The Archaeological Investigations*

on the Upper Euphrates, Syria. Vol. II: *Chalcolithic Technology and Subsistence*, edited by Y. Nishiaki and T. Matsutani, pp. 273–282. Oxbow Books, Oxford.

Grigson, C.
2000 The Secondary Products Revolution? Changes in Animal Management from the Fourth to the Fifth Millennium, at Arjoune, Syria. In *Archaeozoology of the Near East IV: B. Proceedings of the 4th International Symposium on the Archaeozoology of Southwestern Asia and Adjacent Regions*, edited by M. Mashkour, A. M. Choyke, H. Buitenhuis, and F. Poplin, pp. 124–138. ARC, Groningen.

Grossman, K., and M. Hinman
2014 Rethinking Halaf and Ubaid Animal Economies: Hunting and Herding at Tell Zeidan (Syria). *Paléorient* 39(2):201–219.

Gurdil, B.
2010 Exploring Social Organizational Aspects of the Ubaid Communities: A Case Study of Değirmentepe in Eastern Turkey. In *Beyond the Ubaid: Transformation and Integration in the Late Prehistoric Societies of the Middle East*, edited by R. A. Carter and G. Philip, pp. 361–376. Studies in Ancient Oriental Civilization Vol. 63. The Oriental Institute of the University of Chicago, Chicago.

Healey, E.
2010 Ubaid Lithics Revisited: Their Significance for the Interpretation of Ubaid Society. In *Beyond the Ubaid: Transformation and Integration in the Late Prehistoric Societies of the Middle East*, edited by R. A. Carter and G. Philip, pp. 181–200. Studies in Ancient Oriental Civilization Vol. 63. The Oriental Institute of the University of Chicago, Chicago.

Helwing, B.
2003 Feasts as a Social Dynamic in Prehistoric Western Asia: Three Case Studies from Syria and Anatolia. *Paléorient* 29(2):63–85.

Henrickson, E. F., and I. Thuesen
1989 The Importance of the ʿUbaid: Transition between Revolutions. In *Upon This Foundation: The ʿUbaid Reconsidered*, edited by E. F. Henrickson and I. Thuesen, pp. 11–15. Carsten Niebuhr Institute of Ancient Near Eastern Studies Publications Vol. 10. Museum Tusculanum Press, Copenhagen.

Henrickson, E. F., and I. Thuesen (editors)
1989 *Upon This Foundation: The ʿUbaid Reconsidered*. Carsten Niebuhr Institute of Ancient Near Eastern Studies Publications Vol. 10. Museum Tusculanum Press, Copenhagen.

Hermon, S.
2008 *Socio-Economic Aspects of Chalcolithic (4500–3500 BC) Societies in the Southern Levant: A Lithic Perspective*. BAR International Series Vol. 1744. British Archaeological Reports, Oxford.

Hole, F. A.
1989 Patterns of Burial in the Fifth Millennium. In *Upon This Foundation: The ʿUbaid Reconsidered*, edited by E. F. Henrickson and I. Thuesen, pp. 149–180. Carsten Niebuhr Institute of Ancient Near Eastern Studies Publications Vol. 10. Museum Tusculanum Press, Copenhagen.
1999 Economic Implications of Possible Storage Structures at Tell Ziyadeh, NE Syria. *Journal of Field Archaeology* 26:267–283.
2000 Tell Ziyadeh on the Middle Khabur, Syria. In *Proceedings of the 1st International Congress on the Archaeology of the Ancient Near East, Rome, May 18th–23rd, 1998*, Vol. I, edited by P. Matthiae, A. Enea, L. Peyronel, and F. Pinnock, pp. 609–619. Dipartimento di scienze storiche, archeologiche e antropologiche dell'antichità, Università degli Studi di Roma "La Sapienza," Rome.
2001 A Radiocarbon Chronology for the Middle Khabur, Syria. *Iraq* 63:67–98.
2016 Historical Processes on the Middle Khabur River, Syria, during the Late Ubaid: Intrusion, Attenuation and Divergence. In *Proceedings of the 9th International Congress on the Archaeology of the Ancient Near East, June 9–13, 2014, University of Basel: 3. Reports*, edited by R. A. Stucke, O. Kaelin, and H.-P. Mathys, pp. 231–242. Harrassowitz, Wiesbaden.

Hole, F. A., and J. M. Arzt
1998 Excavations at Tell Ziyadeh, 1996–97. *Orient–Express* 1998(3):64–66.

Hole, F. A., and Y. Tonoike
2016a East Side Excavations. In *Homesteads on the Khabur: Tell Ziyadeh and Other Settlements*, edited by F. A. Hole and Y. Tonoike, pp. 77–

108. BAR International Series Vol. 2827. British Archaeological Reports, Oxford.

2016b Excavations and Test Trenches. In *Homesteads on the Khabur: Tell Ziyadeh and Other Settlements*, edited by F. A. Hole and Y. Tonoike, pp. 39–51. BAR International Series Vol. 2827. British Archaeological Reports, Oxford.

2016c Geography and Environment of the Khabur Basin. In *Homesteads on the Khabur: Tell Ziyadeh and Other Settlements*, edited by F. A. Hole and Y. Tonoike, pp. 13–37. BAR International Series Vol. 2827. British Archaeological Reports, Oxford.

2016d Immigration and Change. In *Homesteads on the Khabur: Tell Ziyadeh and Other Settlements*, edited by F. A. Hole and Y. Tonoike, pp. 391–401. BAR International Series Vol. 2827. British Archaeological Reports, Oxford.

2016e The Khabur Basin Project. In *Homesteads on the Khabur: Tell Ziyadeh and Other Settlements*, edited by F. A. Hole and Y. Tonoike, pp. 1. BAR International Series Vol. 2827. British Archaeological Reports, Oxford.

2016f Living at Ziyadeh. In *Homesteads on the Khabur: Tell Ziyadeh and Other Settlements*, edited by F. A. Hole and Y. Tonoike, pp. 403–425. BAR International Series Vol. 2827. British Archaeological Reports, Oxford.

Iamoni, M. (editor)

2016 *Trajectories of Complexity: Socio-Economic Dynamics in Upper Mesopotamia in the Neolithic and Chalcolithic Periods*. Studia Chaburensia Vol. 6. Harrassowitz, Wiesbaden.

Karsgaard, P.

2010 The Halaf-Ubaid Transition: A Transformation without a Center? In *Beyond the Ubaid: Transformation and Integration in the Late Prehistoric Societies of the Middle East*, edited by R. A. Carter and G. Philip, pp. 51–68. Studies in Ancient Oriental Civilization Vol. 63. The Oriental Institute of the University of Chicago, Chicago.

Kennedy, J. R.

2015 Commensality and Labor in Terminal Ubaid Northern Mesopotamia. In *Between Feasts and Daily Meals: Towards an Archaeology of Commensal Spaces*, edited by S. Pollock, pp. 143–179. Topoi, Berlin.

Kepinski, C.

2011 New Evidence from Grai Resh, Northern Iraq—The 2001 and 2002 Seasons: A Pre-Uruk Expansion Site from the Late Chalcolithic Period. *Zeitschrift für Orient-Archäologie* 4:26–81.

Khalidi, L., B. Gratuze, G. J. Stein, A. McMahon, S. al-Quntar, R. Carter, R. Cuttler, P. Drechsler, E. Healey, M.-L. Inizan, D. Mouralis, E. Pernicka, and A.-K. Robin

2016 The Growth of Early Social Networks: New Geochemical Results of Obsidian from the Ubaid to Chalcolithic Period in Syria, Iraq and the Gulf. *Journal of Archaeological Science: Reports* 9:743–757.

Lawrence, D., and T. J. Wilkinson

2015 Hubs and Upstarts: Pathways to Urbanism in the Northern Fertile Crescent. *Antiquity* 89:328–344.

Lebeau, M. (editor)

2011 *Associated Regional Chronologies for the Ancient Near East and the Eastern Mediterranean: 1. Jezirah*. ARCANE Vol. 1. Brepols, Turnhout.

Lorentz, K. O.

2010 Ubaid Headshaping: Negotiations of Identity through Physical Appearance? In *Beyond the Ubaid: Transformation and Integration in the Late Prehistoric Societies of the Middle East*, edited by R. A. Carter and G. Philip, pp. 125–148. Studies in Ancient Oriental Civilization Vol. 63. The Oriental Institute of the University of Chicago, Chicago.

Marro, C.

2012 Is There a Post-Ubaid Culture? Reflections on the Transition from the Ubaid to the Uruk Periods along the Fertile Crescent and Beyond. In *After the Ubaid: Interpreting Change from the Caucasus to Mesopotamia at the Dawn of Civilization (4500–3500 BC); Papers from The Post-Ubaid Horizon in the Fertile Crescent and Beyond; International Workshop Held at Fosseuse, 29th June–1st July 2009*, edited by C. Marro, pp. 13–38. Varia Anatolica Vol. 27. Institut français d'études anatoliennes, Istanbul; George Dumézil/de Boccard, Paris.

Marro, C. (editor)

2012 *After the Ubaid: Interpreting Change from the Caucasus to Mesopotamia at the Dawn of*

Civilization (4500–3500 BC); Papers from The Post-Ubaid Horizon in the Fertile Crescent and Beyond International Workshop Held at Fosseuse, 29th June–1st July 2009. Varia Anatolica 27. Institut français d'études anatoliennes, Istanbul; George Dumézil/de Boccard, Paris.

McMahon, A., and H. E. W. Crawford (editors)
2014 *Preludes to Urbanism: The Late Chalcolithic of Mesopotamia; Studies in Honour of Joan Oates*. McDonald Institute for Archaeological Research, Cambridge.

Mieroop, M. van de
2015 *A History of the Ancient Near East ca. 3000–323 BC*. 3rd ed. Wiley-Blackwell, Oxford.

Müller-Neuhoff, B.
2014 A "Marginal" Region with Many Options: The Diversity of Chalcolithic/Early Bronze Age Socio-Economic Activities in the Hinterland of Jawa. *Levant* 46:230–248.

Nissen, H. J.
2001 Cultural and Political Networks in the Ancient Near East during the Fourth and Third Millennia B.C. In *Uruk Mesopotamia and Its Neighbors: Cross-Cultural Interactions in the Era of State Formation*, edited by M. S. Rothman, pp. 149–179. School of American Research Press, Santa Fe, New Mexico.

Oates, J.
1993 Trade and Power in the Fifth and Fourth Millennia BC: New Evidence from Northern Mesopotamia. *World Archaeology* 24:403–422.
2004 Ubaid Mesopotamia Revisited. In *From Handaxe to Khan: Essays Presented to Peder Mortensen on the Occasion of His 70th Birthday*, edited by K. von Folasch, H. Thrane, and I. Thuesen, pp. 87–104. Aarhus University Press, Aarhus.

Oates, J., A. McMahon, P. Karsgaard, S. al-Quntar, and J. A. Ur
2007 Early Mesopotamian Urbanism: A New View from the North. *Antiquity* 81:585–600.

Özbal, R.
2010 A Comparative Look at the Halaf and Ubaid Period: Social Complexity and the Tell Kurdu Case. *Tüba-Ar* 13:39–59.

Özbal, R., F. A. Gerritsen, B. Diebold, E. Healey, N. Aydın, M. A. Loyet, F. Nardulli, D. S. Reese, H. Ekstrom, S. Sholts, N. Mekel-Bobrov, and B. Lahn
2004 Tell Kurdu Excavations 2001. *Anatolica* 30:37–107.

Parker, B. J., C. P. Foster, J. Heneck, M. Hopwood, D. E. Hopwood, A. Creekmore, A. Demirergi, and M. Eppihimer
2008 Preliminary Report from the 2005–2006 Field Seasons at Kenan Tepe. *Anatolica* 34:103–176.

Pittman, H.
2001 Mesopotamian Intraregional Relations Reflected through Glyptic Evidence in the Late Chalcolithic 1–5 Periods. In *Uruk Mesopotamia and Its Neighbors: Cross-Cultural Interactions in the Era of State Formation*, edited by M. S. Rothman, pp. 403–443. School of American Research Press, Santa Fe, New Mexico.

Pollock, S.
2001 The Uruk Period in Southern Mesopotamia. In *Uruk Mesopotamia and Its Neighbors: Cross-Cultural Interactions in the Era of State Formation*, edited by M. S. Rothman, pp. 181–231. School of American Research Press, Santa Fe, New Mexico.

Price, M. D., M. Buckley, M. M. Kersel, and Y. M. Rowan
2013 Animal Management Strategies during the Chalcolithic in the Lower Galilee: New Data from Marj Rabba (Israel). *Paléorient* 39(2):183–200.

Rothman, M. S.
2001 The Local and the Regional: An Introduction. In *Uruk Mesopotamia and Its Neighbors: Cross-Cultural Interactions in the Era of State Formation*, edited by M. S. Rothman, pp. 3–26. School of American Research Press, Santa Fe, New Mexico.
2004 Studying the Development of Complex Society: Mesopotamia in the Late Fifth and Fourth Millennia BC. *Journal of Archaeological Research* 12:75–119.
2007 The Archaeology of Early Administrative Systems in Mesopotamia. In *Settlement and Society: Essays Dedicated to Robert McCormick Adams*, edited by E. C. Stone, pp. 235–254. Cotsen Institute of Archaeology, Los Angeles.

Rothman, M. S. (editor)
2001 *Uruk Mesopotamia and Its Neighbors: Cross-Cultural Interactions in the Era of State Formation.* School of American Research Press, Santa Fe, New Mexico.

Rufolo, S. J.
2016 Analysis and Interpretation of the Tell Ziyadeh Faunal Assemblages. In *Homesteads on the Khabur: Tell Ziyadeh and Other Settlements*, edited by F. A. Hole and Y. Tonoike, pp. 287–349. BAR International Series Vol. 2827. British Archaeological Reports, Oxford.

Sauter, F., L. Puchinger, and U.-D. Schoop
2003 Studies in Organic Archaeometry, VI: Fat Analysis Sheds Light on Everyday Life in Prehistoric Anatolia—Traces of Lipids Identified in Chalcolithic Potsherds Excavated Near Boğazkale, Central Turkey. *Arkivoc* 15:15–21.

Smith, M. E.
2009 V. Gordon Childe and the Urban Revolution: A Historical Perspective on a Revolution in Urban Studies. *Town Planning Review* 80:3–29.

Stein, G. J.
1994 Economy, Ritual, and Power in 'Ubaid Mesopotamia. In *Chiefdoms and Early States in the Near East: The Organizational Dynamics of Complexity*, edited by G. J. Stein and M. Rothman, pp. 35–46. Prehistory Press, Madison, Wisconsin.
2010 Local Identities and Interaction Spheres: Modeling Regional Variation in the Ubaid Horizon. In *Beyond the Ubaid: Transformation and Integration in the Late Prehistoric Societies of the Middle East*, edited by R. A. Carter and G. Philip, pp. 23–34. The Oriental Institute of the University of Chicago, Chicago.
2012 The Development of Indigenous Social Complexity in Late Chalcolithic Upper Mesopotamia in the 5th–4th Millennia BC—An Initial Assessment. *Origini* 34: 125–151.

Stein, G. J., and R. Özbal
2007 A Tale of Two *Oikumenai*: Variation in the Expansionary Dynamics of Ubaid and Uruk Mesopotamia. In *Settlement and Society: Essays Dedicated to Robert McCormick Adams*, edited by E. C. Stone, pp. 356–370. Cotsen Institute of Archaeology, Los Angeles.

Sudo, H.
2010 The Development of Wool Exploitation in Ubaid-Period Settlements of North Mesopotamia. In *Beyond the Ubaid: Transformation and Integration in the Late Prehistoric Societies of the Middle East*, edited by R. A. Carter and G. Philip, pp. 169–180. Studies in Ancient Oriental Civilization Vol. 63. The Oriental Institute of the University of Chicago, Chicago.

Thuesen, I.
2000 Ubaid Expansion in the Khabur—New Evidence from Tell Mashnaqa. In *La Djéziré et l'Euphrate syriens de la protohistoire à la fin du second millénaire av. J.-C.: Tendances dans l'interprétation historique des données nouvelles*, edited by O. Rouault and M. Wäfler, pp. 71–79. Brepols, Turnhout.

Tobler, A. J.
1950 *Excavations at Tepe Gawra: II. Levels IX–XX.* University of Pennsylvania Press, Philadelphia.

Tonoike, Y.
2016 Petrographic Analysis of Select Fifth-Millennium Ceramics at Tell Ziyadeh. In *Homesteads on the Khabur: Tell Ziyadeh and Other Settlements*, edited by F. A. Hole and Y. Tonoike, pp. 427–434. BAR International Series Vol. 2827. British Archaeological Reports, Oxford.

Tonoike, Y., and F. A. Hole
2016 Radiocarbon Dates and Relative Chronologies. In *Homesteads on the Khabur: Tell Ziyadeh and Other Settlements*, edited by F. A. Hole and Y. Tonoike, pp. 455–461. BAR International Series Vol. 2827. British Archaeological Reports, Oxford.

Trentin, M. G.
2010 The Ubaid in the Balikh Valley, Northern Syria: Balikh Periods IV–V. In *Beyond the Ubaid: Transformation and Integration in the Late Prehistoric Societies of the Middle East*, edited by R. A. Carter and G. Philip, pp. 329–338. Studies in Ancient Oriental Civilization Vol. 63. The Oriental Institute of the University of Chicago, Chicago.

Ur, J. A.
2010 Cycles of Civilization in Northern Mesopotamia, 4400–2000 BC. *Journal of Archaeological Research* 18:387–431.
2014 Urban Form at Tell Brak across Three Millennia. In *Preludes to Urbanism: The Late Chalcolithic of Mesopotamia; Studies in Honour of Joan Oates*, edited by A. McMahon and H. E. W. Crawford, pp. 49–62. McDonald Institute for Archaeological Research, Cambridge.

Ur, J. A., Philip Karsgaard, and J. Oates
2007 Early Urban Development in the Near East. *Science* 317:1188.
2011 The Spatial Dimensions of Early Mesopotamian Urbanism: The Tell Brak Suburban Survey, 2003–2006. *Iraq* 73:1–20.

Ur, J. A., L. Khalidi, and S. al-Quntar
2011 Proto-Urbanism in the Late 5th Millennium BC: Survey and Excavations at Khirbat al-Fakhar (Hamoukar), Northeast Syria. *Paléorient* 37(2):151–175.

Ur, J. A., and T. J. Wilkinson
2008 Settlement and Economic Landscapes of Tell Beydar and Its Hinterland. In *Beydar Studies I*, edited by M. Lebeau and A. Suleiman, pp. 305–327. Brepols, Turnhout.

Všianský, D., and M. Gregerová
2016 Technical Analyses of Red Ware Sherds and Clay Sources. In *Homesteads on the Khabur: Tell Ziyadeh and Other Settlements*, edited by F. A. Hole and Y. Tonoike, pp. 435–440. BAR International Series Vol. 2827. British Archaeological Reports, Oxford.

Weber, J. A.
2007 Community and Household: A Preliminary Report on the Animal Remains from the Excavations at Tell Brak, 2007. *Iraq* 69:167–170.
2014 Exotic Animal Consumption at Tell Brak in the Mid-Fourth Millennium BC. In *Preludes to Urbanism: The Late Chalcolithic of Mesopotamia; Studies in Honour of Joan Oates*, edited by A. McMahon and H. E. W. Crawford, pp. 127–134. McDonald Institute for Archaeological Research, Cambridge.
in press Patterns of Animal Production and Harvesting, and Communal Consumption Activities from the Fourth- to the Late-Third Millennium BC at Tell Brak, Syria. In *Excavations at Tell Brak. Vol. 3: The Uruk and Ubaid Periods*, edited by H. McDonald, D. Oates, and J. Oates. McDonald Institute for Archaeological Research/British School of Archaeology in Iraq, Cambridge.

Wengrow, D.
2010 *What Makes Civilization? The Ancient Near East and the Future of the West*. Oxford University Press, Oxford.

Wilkinson, T. J.
2003 Archaeological Survey and Long-Term Population Trends in Upper Mesopotamia and Iran. In *Yeki Bud, Yeki Nabud: Essays on the Archaeology of Iran in Honor of William M. Sumner*, edited by N. F. Miller and K. Abdi, pp. 39–51. Cotsen Institute of Archaeology, Los Angeles.
2009 Political Landscapes and States in Upper Mesopotamia and the Levant. In *Polities and Power: Archaeological Perspectives on the Landscapes of Early States*, edited by S. E. Falconer and C. L. Redman, pp. 152–162. University of Arizona Press, Tucson.

Wilkinson, T. J., and D. J. Tucker
1995 *Settlement Development in the North Jazira, Iraq: A Study of the Archaeological Landscape*. Iraq Archaeological Reports 3. Aris & Phillips, Warminster.

Wilkinson, T. J., J. A. Ur, and J. Casana
2003 From Nucleation to Dispersal: Trends in Settlement Pattern in the Northern Fertile Crescent. In *Side-by-Side Survey: Comparative Regional Studies in the Mediterranean World*, edited by J. F. Cherry and S. E. Alcock, pp. 198–205. Oxbow Books, Oxford.

Yener, K. A., C. Edens, J. Casana, B. Diebold, H. Ekstrom, M. A. Loyet, and R. Özbal
2000 Tell Kurdu Excavations: Preliminary Report, 1999. *Anatolica* 26:31–117.

Zeder, M. A.
1994 After the Revolution: Post-Neolithic Subsistence in North Mesopotamia. *American Anthropologist* 96:97–126.
1995 The Archaeobiology of the Khabur Basin. *Bulletin of the Canadian Society for Mesopotamian Studies* 29:21–32.
1998a Environment, Economy, and Subsistence on the Threshold of Urban Emergence in Northern Mesopotamia. *Bulletin of the Canadian Society for Mesopotamian Studies* 33:55–67.

1998b Regional Patterns of Animal Exploitation in the Khabur Basin, 7000 to 1500 BC. In *Man and the Animal World: Studies in Archaeozoology, Archaeology, Anthropology, and Palaeolinguistics in memoriam Sándor Bökönyi*, edited by P. Anreiter, L. Bartosiewicz, E. Jerem, and W. Meid, pp. 569–582. Archaeolingua, Budapest.

2006 Reconciling Rates of Long Bone Fusion and Tooth Eruption and Wear in Sheep (*Ovis*) and Goat (*Capra*). In *Recent Advances in Ageing and Sexing Animal Bones: Proceedings of the 9th Conference of the International Council of Archaeozoology*, edited by D. Ruscillo, pp. 87–118. Oxbow Books, Oxford.

Zeder, M. A., G. Bar-Oz, S. J. Rufolo, and F. A. Hole

2013 New Perspectives on the Use of Kites in Mass-Kills of Levantine Gazelle: A View from Northeastern Syria. *Quaternary International* 297:110–125.