The Cultures of Ancient Xinjiang, Western China: Crossroads of the Silk Roads

Edited by

Alison V.G. Betts, Marika Vicziany, Peter Jia and Angelo Andrea Di Castro

Archaeopress Archaeology

Archaeopress Publishing Ltd
Summertown Pavilion
18-24 Middle Way
Summertown
Oxford OX2 7LG

www.archaeopress.com

ISBN 978-1-78969-406-2
ISBN 978-1-78969-407-9 (e-Pdf)

Cover images come from the following chapters in this book: Chapter 3, Figure 79. Xiaohe Cemetery: Painted wooden face (photo Xinjiang Institute of Archaeology); Chapter 4, Figure 5. Adunqiaolu: House Site F1 (photo Chinese Academy of Social Sciences); Chapter 7, Figure 5. Berel (Altay, Kazakhstan): horse tack ornament in gilded wood in the shape of griffin and mountain sheep with curling mane of Achaemenid inspiration (photo Mission Archéologique Française en Asie centrale – MAFAC).

Printed in England by Severn, Gloucester

This book is available direct from Archaeopress or from our website www.archaeopress.com

Contents

List of Figures

Chapter 4

D. Cong: **Tianshan as a Bridge: New Studies of Bronze Age Archaeology in the Western Tianshan, Xinjiang, China**

Chapter 5

X. Liu: **A Report on Archaeological Findings in the Upper Yili Valley**

Chapter 6

N. Boroffka and L. Sverchkov: **Painted Pottery of the Late Bronze Age – Early Iron Age in Central Asia: New Data from Southern Uzbekistan**

Chapter 7

H.-P. Francfort: **Shifting Exchange Patterns During the Bronze and Iron Ages Between China and the West in Eurasia**

Chapter 8

M. Vicziany and A.A. Di Castro: **The Kashgar Oasis: Reassessing the Historical Record**

Chapter 9

A.A. Di Castro, M. Vicziany and X. Zhu: **The Kashgar Oasis in Buddhist and Pre Buddhist Times: the Archaeological and Environmental Record**

Chapter 10

J. Dodson, P. Atahan and X. Li: **Unravelling Farming and Metallurgy in Ancient China with Nuclear Science**

Chapter 11

P. Jia and F. Chau: **Early Wheat Cultivation and Plant Use in Xinjiang Prehistory: New Evidence Based on Starch Analysis**

Preface

This book had its origins in a collaborative project between the University of Sydney and the Archaeological Institute of the Chinese Academy of Social Sciences in Beijing. In 2006 Alison Betts and Peter Jia began, with Chinese colleagues from CASS, a study of the impact of the cultures of the Eurasian steppe on the rise of the state in central China through exploration of the prehistory of Xinjiang. In 2014 the team was enhanced by additional collaborators from Monash University, Marika Vicziany and Angelo Andrea Di Castro, as well as John Dodson, then Head of the Institute for Environmental Research, Australian Nuclear Science and Technology Organisation (ANSTO). Funding for collaborative fieldwork from the Australian side has been provided by the Australian Research Council through two major Discovery grants, *East meets West: an archaeological study of early contact between China and Eurasia* (DP0770997: 2007-2010) and *The Silk Roads in the Bronze Age: critical links between Eurasia and China* (DP150100121: 2015-2018). Additional funding with smaller grants was provided by The University of Sydney (through the China Studies Centre and the Bridging Grants Scheme), Monash University's School of Philosophical, Historical and International Studies (Faculty of Arts) and ANSTO.

The papers included in this volume are based on a selection of lectures presented at a workshop, *East and West: Past and Future,* sponsored by the China Studies Centre at the University of Sydney in May 2012. The volume presents a fresh framework for the prehistory and early history of Xinjiang that will be of value and interest to all readers concerned with the role of Inner Asia in world history. In addition to thanking our European and Australian collaborators for their unique contributions, we are grateful to our Chinese colleagues for generously sharing with us their ground-breaking original chapters about new discoveries based on recent fieldwork in Xinjiang.

The editors are grateful to the Chinese Academy of Social Sciences (Beijing), the China Studies Centre at Sydney University and the Arts Faculty at Monash University for their continued support of research on the early history and cultures of Xinjiang. We are also grateful to Dr Uri Gilad for his support in preparing the 16 figures showing the location of the archaeological sites referred to in this volume. Funding for Dr Gilad's work came from the ARC project on *The Silk Roads in the Bronze Age* (DP150100121: 2015-2018). And finally, we thank the editorial team at Archaeopress for their assistance in preparing these papers for publication. We are especially grateful for the support and patience showed by Dr David Davison.

Alison Betts, Marika Vicziany, Peter Jia,
Angelo Andrea Di Castro

Contributors

Yidilisi **Abuduresule** is the former Director of the Xinjiang Bureau of Relics and Director of Excavations at the world famous Bronze Age cemetery of Xiaohe in the Taklamakan Desert.

Pia **Atahan** has a PhD in environmental change from the University of Western Australia and until recently worked as a scientist at the Australian Nuclear Science and Technology Organisation in Sydney. Her research focused on early agriculture in China and the use of isotopes for unravelling animal and human diets from skeletal remains in China.

Alison **Betts** is Professor of Silk Road Studies at the University of Sydney. She has been working on the archaeology of Central Asia for more than two decades. Over the past decade she has been working with Jia on a collaborative field programme with the Institute of Archaeology, Chinese Academy of Social Sciences to study the Bronze Age of Xinjiang and the influence of the Eurasian Bronze Age on early Chinese cultural development.

Nikolaus G.O. **Boroffka** is a senior member of the Eurasia-Department, German Archaeological Institute/ Deutsches Archäologisches Institut in Berlin. He has undertaken extensive archaeological fieldwork across Central Asia and Eastern Europe. He has a wide range of research interests including mining, metallurgy and environment-human interactions.

Florence **Chau** studied a Bachelor of Science and Bachelor of Arts (Honours) at the University of Sydney, majoring in Botany, Archaeology and English Literature. She is currently working at the University of Sydney and the Australian National Maritime Museum.

Dexin **Cong** is the Director of the Frontier Archaeological Department, Archaeological Institute, Chinese Academy of Social Sciences and co-Director of the Adunqiaolu Project at Bortala Valley, a major long-term study of late prehistoric archaeology in Xinjiang, China.

Angelo Andrea **Di Castro** is Adjunct Research Fellow of the Centre for Ancient Cultures of Monash University. He has worked extensively on archaeological sites in Italy, Nepal, Australia and China and published various books and academic papers. His recent research projects include the cultural exchanges along the Silk Road, the archaeology of the Kashgar oasis and the goddess cults of Gandhara.

John **Dodson** is the former head of Environmental Sciences at the Australian Nuclear Science and Technology Organisation (ANSTO). He has undertaken extensive environmental field research in China and is currently based in Xian as a research professor with the Institute of Earth Environment, CAS.

Henri-Paul **Francfort** is a Member of the Institute of the Académie des Inscriptions et Belles-Lettres. He is Emeritus Director of Research for the CNRS – UMR 7041 'ArScAn', The Archaeology of Central Asia. He has had a long and distinguished career in the archaeology of Central Asia, particularly Afghanistan and more recently Tadjikistan.

Xingjun **Hu** is a Professor at the Xinjiang Institute of Cultural Relics and Archaeology. As a Director of Fieldwork, he has worked in Xinjiang for many years. Most recently he has directed the excavation of a cemetery with Afanasievo burial features.

Peter Weiming **Jia** is a Senior ARC Research Fellow at the University of Sydney. He has worked on starch residue analysis and other archaeobotanical studies in Xinjiang. He has been involved in archaeological fieldwork on the Bronze Age in Xinjiang for more than a decade.

Wenying **Li** is Professor and the Director of Xinjiang Institute of Cultural Relics and Archaeology. She has worked extensively on Xinjiang's late prehistoric archaeology. Amongst her other work she has been involved in the excavation of the Xiaohe cemetery and is the only female archaeologist on the expedition team.

Xiaoqiang **Li** is the Deputy Director of the Key Laboratory of Vertebrate Evolution and Human Origins, Institute of Vertebrate Palaeontology and Palaeoanthropology of Chinese Academy of Science. He is also a Professor at the Graduate University of Chinese Academy of Science. He has worked in the field of palaeo-environmental and environmental archaeology in China for many years. One of his teams is working on the Xinjiang and Central Asia area.

Xuetang **Liu** is Professor and the Head of the School of Ethnology and Sociology, Xinjiang Normal University. He was the Director of a large scale archaeological excavation in the Yili River Valley at the Xinjiang Institute of Cultural relics and Archaeology before moving to the university.

Leonid M. **Sverchkov** is a senior member of the Fine Arts Scientific Research Institute of the Academy of Sciences of Uzbekistan/San'atshunoslik Ilmiy-Tadqiqot Instituti, O'zbekistan Badiiy Akademiyasi in Tashkent/ Toshkent. He has undertaken extensive archaeological fieldwork in Central Asia. His many publications range from the history of the Neolithic to the Early Middle Ages.

Marika **Vicziany** is Professor Emerita and Director of the National Centre for South Asian Studies (Monash Asia Initiative) in the Arts Faculty at Monash University and a specialist on long term economic development in Asia. In addition to her work on South Asia, Vicziany has worked on Xinjiang since a consultancy with the Asian Development Bank and the State Council of China in 2000. Her two major projects have been about the Buddhist culture and monuments of Kashgar and the Bronze Age in the Bortala Valley. In 2008 she published a monograph with George Michell, Yen Hu Tsui and John Gollings: *Kashgar-Oasis City on China's Old Silk Road* (London: Frances Lincoln).

Xuan **Zhu** is a Senior Lecturer in the School of Earth, Atmosphere and Environment at Monash University and specialises in environmental decision analysis and modelling, geographical information systems and remote sensing.

Chapter 1

Ancient Xinjiang at the International Crossroads

Marika Vicziany

This book unveils the ancient secrets of Xinjiang, western China, one of the least known but culturally rich and complex regions of the heart of Asia. Xinjiang is perhaps most famous for its lethal desert, the Taklamakan (Figure 1), its name in the local Uyghur language translating as 'You can go in, but you will never come out'. For those who have a good grasp of geography it may also be known as the core part of the routes along the ancient Silk Roads, hazardous paths from one small patch of green oasis to another, days apart across perilous sandy wastes. In recent years Xinjiang has also become known for its so-called 'mummies', remarkably preserved bodies protected from decay by heat and saline sands.

Some two decades have passed since news of the remarkable Tarim Basin mummies was first publicised outside China (Barber 1999; Mallory and Mair 2000), but as the world was introduced to this extraordinary Bronze Age marvel, the lack of further archaeological information on Xinjiang and surrounding lands meant that the mummies stood as an isolated phenomenon, lacking a broader context to explain their culture's unique features. In the intervening years, many studies on specific aspects of the mummies have been published. We now know that their DNA makeup signalled their largely Eurasian ancestry (Li *et al.* 2010, 2015) rather than the earlier view that the mummies were of European origins (Romgard 2008: 21, 36). Moreover, in the Li 2010 study, the mixing of Asian and European features has been traced to southern Siberia. DNA analysis, in other words, suggests far longer migration routes and not only in one direction. The foods of the mummies have also been studied (Yang 2014; Yang *et al.* 2014), as have their cattle (see Chapter 3 in this volume; Mai *et al.* 2016), showing that their domesticated antecedents came from both Western Asia and China. So far, however, core data on the archaeology of key sites such as Xiaohe have not been published and without this the other studies are essentially disembodied specialist

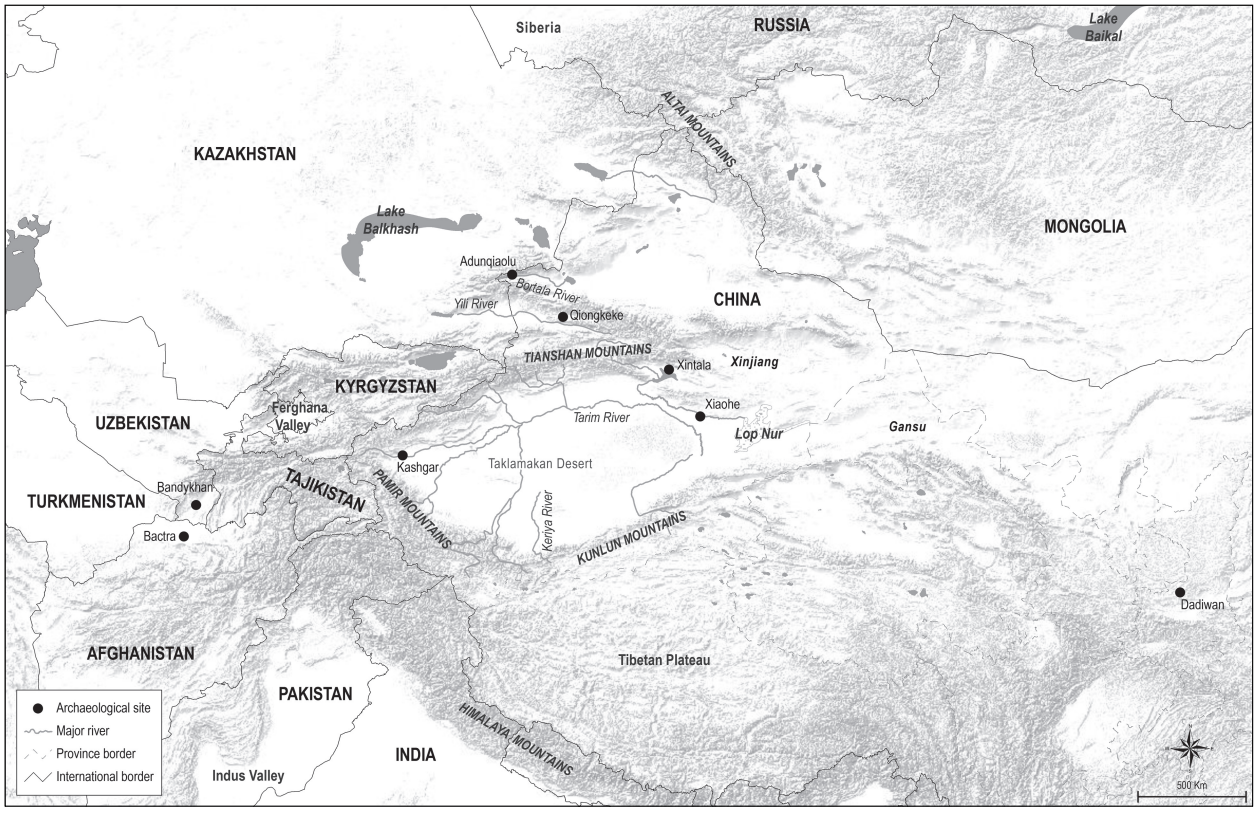

Figure 1. Diagram showing some of the key archaeological sites and locations referred to in this chapter.

volume contains the long awaited first authoritative review of the archaeological framework for Xiaohe and related sites that constitute the Xiaohe culture, by its chief scholars Yidilis Abuduresule, Wenying Li and Xingjun Hu. The importance of Xiaohe lies in its age, for together with Qiemu'erqieke and Tianshanbeilu it is one of the three earliest Bronze Age cultures of Xinjiang (see next chapter by Betts).

Chapter 3 reveals the unexpected geographical spread of the Xiaohe culture in the eastern and southern parts of the Taklamakan desert, a culture which despite its many common features also incorporated unique characteristics at particular sites such as the Northern Cemetery in the lower Keriya River area. The Xiaohe culture in its various iterations remains a puzzle for Abduduresule and his colleagues, as explained to us during his first visit to Australia in 2008. He was attracted to the indigenous Australian collections at the Museum of Victoria because he hoped to solve the problem of why the houses and other buildings used by the Xiaohe people have not survived, even in ruined form. The Xiaohe culture is understood entirely from coffins, the mummies and their grave goods, although recently work has also been undertaken to study the changing environment of the region (Li *et al.* 2013). Until his visit to Melbourne, Abduduresule did not know that research on Australian indigenous cultures had in recent years moved away from notions about nomadic, wandering Australian Aborigines and paid greater attention to permanent structures including the fish dams and basalt stone houses used by indigenous Gunditjmara people in the Condah Lake areas of southwestern Victoria (McNiven 2015; Mirtschin 2013). As a result of new research, indigenous Australian subsistence economies have increasingly come to be defined as societies of 'hunter-gatherer-cultivators' (Keen 2004: 95-96). Recognition of the ingenuity of Aboriginal engineering and environmental management has accelerated since the earliest eel dams of Lake Condah were dated back to some 6,600 years (Hinchliffe 2018; McNiven 2015).

The lack of any comparable discoveries about the nature and patterns of human settlements in the Xiaohe culture has only served to increase the puzzles about the lives of the Bronze Age peoples of the Taklamakan desert. The largest structure found so far in the case of the Xiaohe sites is a sizeable wooden 'hut'. In 2008, Abduduresule at a public lecture in Melbourne speculated that this 'mysterious cabin' might have been constructed for the use of a local shaman who may have officiated at the Xiaohe burials (Abduduresule 2008: slides 94, 95, 96, 98). The illustration, however, describes this large cabin as a 'special tomb,' although no human remains were found in it. Given the history of looting in the area, together with physical degradation caused by sand storms, the structure might well have been a tomb when it was first built. One can suggest that the presence of dozens of goat and oxen horns and dried snakes and eagles around the cabin/tomb (Abduduresule 2008: slides 97 and 101) points to a totemic culture involving a person of power (Abduduresule 2008: slide 98 showing an 'Unearthed Marble-head of a Staff of Authority').

Abduresule's hypothesis assumed that Australian indigenous people lived only in temporary grass-wooden shelters, a view that was encouraged by other similarities he observed between Aboriginal and Xiaohe peoples in their animal skin clothing and weapons. If the Xiaohe people lived in temporary dwellings, it was hardly surprising that no evidence of this remained. On the other hand, if Hedin's account of living conditions in Lop Country are to be believed, the dwellings might have been substantial and permanent, but made of materials that have not survived into the present day. When the Swedish explorer Hedin mapped the Tarim River at the turn of the 20th century he reported on the reeds used by the local people ('Lopniks') along the river banks of Lop country as construction material and fibre for clothing. These reed structures were substantial and towered over the local residents. Hedin's photographs do not suggest that these were temporary structures.[1] Perhaps reeds were also the primary building materials used by the people of the Xiaohe culture at a time when the water resources of the Xiaohe areas were plentiful?

Thanks to new research reported in the present collection, we know that the Bronze Age people used a variety of construction materials determined by the nature of locally available materials. In Chapter 4 by Cong, we have documentation about the enormous size of the Andronovo-type houses which were built by the Bronze Age residents of Adunquiaolu. These houses used the plentiful supply of rocks in the upper Bortala Valley, in contrast to the environmental conditions of the Taklamakan desert-based sites of Xiaohe. Irrespective of the size of houses or the building materials used, the permanence of such habitations does not mean that the Bronze Age peoples resided there all year around.

Chapter 3 by Abuduresule *et al.* leads us into the first part of this collection which includes the work of other Chinese archaeologists in Chapters 4 and 5. These three chapters are based on excavation reports that have never before been published in English except in summary form for a few international conferences. Publication of

[1] Hedin's report of his journey down the Tarim River into Lop Country speaks of the extensive use of the river reeds which were so high and prolific that on at least one occasion his crew had to burn off a considerable area in order to clear a channel through the waterways. His account is accompanied by numerous photographs of his workmen and the local villagers standing in front of their substantial reed huts towering over the heads of the residents (Hedin 1903: 321, 325, 420-423, 437,439, 443, 449).

this work in this volume was a time consuming process and had to await, in the first instance, completion of the individual reports to the Chinese Bureau of Cultural Relics. Once that had happened, the difficult task of translation, checking and cross checking began in order to ensure that these unique chapters are as accurate as possible and unambiguous in their statements. It was essential to do this because other non-Chinese writings have sometimes misunderstood and then misrepresented the nature of the evidence. Chapter 3, therefore, represents the first, much awaited, full official summary of the excavations and cultural context of the sites by the primary excavators involved in elucidating the evidence thrown up by the remarkable excavations of the Bronze Age cemeteries of the Xiaohe culture with their extraordinary levels of organic preservation. The arduous task of collecting and analysing the scattered evidence has taken more than 30 years. The people of Xiaohe emerge from this analysis as remarkable humans whose daily habits, judging by their grave goods, bear an uncanny resemblance to modern day living. Their animal skin boots, as protection against the extreme cold of the winters, are little different from modern day ugg boots, while the ephedra twigs carried in their grass-woven pouches remind us of the medicinal properties of the same plant which remains an essential component of the modern nasal and sinus decongestant called Sudafed. Even the name Sudafed is based on the word ephedra, a herb that has many properties including the ability to act as a dramatic stimulant. Perhaps the Xiaohe peoples followed a form of shamanism in which ephedera's medicinal properties helped them to achieve heightened levels of awareness?

The next two chapters by Cong and Liu shift our attention away from the eastern, desert regions of Xinjiang to the even less studied western, river valleys defined by the glacier-covered Tianshan Mountains that separate China from Kazakhstan. Cong focuses on one of the most important new archaeological excavations in western China, namely the site of Adunqiaolu, some 17 kms from the border of China and Kazakhstan, in the Bortala River Valley.[2] He provides the first properly documented, absolute dates for the Bronze Age in this part of Xinjiang. The characteristics of the excavated mounds, houses and cemeteries bear a strong relationship to excavated sites further to the west, beyond the borders of China rather than to the eastern parts of Xinjiang, specifically with those of the Andronovo cultural style (see also Ruan 2013). The huge houses and the width of the walls suggest strong relationships between the protection provided in the deep winters to the settlers and the care of their valuable animal herds in this shared accommodation.

Liu's chapter complements that by Cong in focussing away from the Bortala River Valley to archaeological sites in the upper Yili River Valley. Together, the broadening perspective provided by Liu and Cong are dramatically enhancing our knowledge of the prehistory of the western Chinese regions in going beyond the previous focus of research on the desert areas of Xinjiang. Not only are these scholars providing geographical and topographical benchmarks for documenting the Bronze Age, they are also starting to map out the unique connection of these settlement sites, graves and rock paintings to the western, southern and northern regions beyond China – a theme also elaborated by Francfort in his contribution to this volume. More specifically, Liu presents a broad chronology for the known sites of the Bronze and Iron Ages based on excavations at Qiongkeke. Qiongkeke, he suggests, provides a base reference point by which to assess other archaeological sites in the Yili Valley that appear to be interrelated. It is significant that in these first ever investigations into the pre-history of the far western part of Xinjiang both Cong and Liu provide not only detailed reports about their findings but also benchmarks for human settlement patterns stretching beyond China into eastern Kazakhstan. This painstaking, comparative documentation is helping us to understand how the Bortala and Yili river valleys served as gateways from Eurasia into western Xinjiang and to the far east. Exactly when and how these Bronze Age settlements spread across such a wide area is still, however, to be revealed by new research. Chapter 2 by Betts in this collection addresses some of this by providing an overview of the important cultural connections that linked up the human settlements of the vast spaces of Xinjiang during the Bronze Age.

Bronze Age settlers, it seems, protected their precious animals and other assets not only from the weather as described by Cong but also other threats to their security. A paper published by Jia *et al.* in 2018 describes the ruins of three fortified hills found only a few years ago in the Bortala River Valley, dating from the Late Bronze Age. They are located at strategic positions that provide a look-out over expansive, green fields, one of the 'richest areas of seasonal pastures in the upper Bortala Valley' (Jia 2018: 70). The authors suggest that the inhabitants of these fortified hill stations were defending their interests against competitor pastoral groups. The question yet to be answered, however, is 'who was being protected from whom'? These fortifications also reinforce the nature of Cong's findings in the Bortala Valley, for they indicate that the large houses built by Bronze Age people were not the only construction projects of that period. Again, this new evidence for the far western Bronze Age sites at

[2] In 2015-2018 the editors of this book were involved in an Australian Research Council funded project, DP150100121, that collaborated with Professor Cong and his team in analysing the evidence uncovered by the excavations in Adunqiaolu and bringing the findings to international attention.

the foot of the Tianshan Mountains underscores the puzzle that remains with the lack of any settlement data for the Xiaohe culture described in Chapter 3.

Liu's account of the Iron Age in the Yili Valley is complemented by the chapter by Boroffka and Sverchkov. Their study helps us to understand the transition between the Bronze and Iron Ages through an analysis of the painted pottery that spanned both eras in southern Uzbekistan. Their unique German-Uzbek collaborative excavations of Bandykhan, especially the site of Maydatepa, began in 2005 and continue to challenge the idea that distinctive cultural forms emerged in particular regions and reflected self-contained technological and artistic formations. Instead they point to the convergence of cultural styles from southern Uzbekistan to the Ferghana Valley and Xinjiang. Even the unfired bricks of the Xintala site in Xinjiang closely resemble those of Maydatepa, not to mention the overlapping chronologies and the shared characteristics of the painted pottery. This evidence reflects not only close cultural contacts between such dispersed sites but also, possibly, influences transferred by human migrations. The authors plead for the notion of human migrations to be taken seriously, and draw on information about changing climates to propose that the settlers from Xintala moved to the upper Bandykhansay delta in response to the desertification of north-western Xinjiang. This is an important hypothesis because, in contrast to the majority of scholars working on the cultural links between Eurasia and Xinjiang, Boroffka and Sverchkov propose the movement of people and ideas from Xinjiang into the Eurasian regions to the west of the Tianshan Mountains rather than from the west to the east. A similar east-west movement of ideas and technologies is documented by Dodson, Atahan and Xiaoqiang in their chapter.

In searching for explanations about the cultural affinities between Xinjiang and southern Afghanistan Boroffka and Sverchkov make an observation that needs to be taken seriously:

> It seems that the separation of regions with highly similar archaeological complexes is due rather to the history of research, caused by the order in which phenomena were studied by different research teams located within different contemporary administrative borders.

Francfort's chapter develops this point further by drawing on an even wider canvas for interregional comparisons ranging from the Mediterranean to the eastern part of Xinjiang and from South Asia to the Altai Mountains and Russia. While acknowledging that a critical feature of the transition from the Late Bronze Age to the Iron Age in Eurasia 'was the emergence of horse harnessing and mounted pastoral nomadism', he argues that the limited focus of previous research on west to east exchanges needs to be expanded and take into account the exchanges between Central Asia and South-Afghanistan and the Indus-Baluchistan regions. The need for this extended perspective agrees with arguments put by other authors in this collection (see the two chapters on Kashgar). The special features of the Late Bronze Age and Iron Age emerge from the enormous diversity and complexity of the goods and artefacts that Francfort has studied over such a wide region. He suggests this reflects the growing elaboration of the technologies, social structures and religions that supported such production and exchange. Moreover, the exchange of goods and ideas accelerated. Both production and trade appeared to feed a greatly expanded demand by diverse regional elites for more raw materials, especially metal, stone and clay/plaster casting. The value of speedy communications has, for millennia, been recognized by scholars to be important in the survival of societies. But carefully documented cases such as those by Francfort are not easy to find. In his chapter, horsemanship replaced Bronze Age elite chariots and played a transformative role in 'permitting ....speed of movement in long distance treks and raids, and speed in delivering showers of arrows by noblemen or laymen riding their horses'. Francfort argues that the nomadic populations thrived in mountainous and semi-desert areas, without having to invest the laborious effort required by the sophisticated but fragile agrarian empires of the Greeks and others. But when nomadic armies did successfully conquer the oases of South and Central Asia and Xinjiang, they acculturated and adopted the lifestyles of the agrarian centres like Bactra. Such cultural adoptions form a long running theme in the history of the regions mapped out by Francfort. His unique contribution is to give equal weight to the exchanges that occurred along the north-south axis (i.e. between the steppes of central Asia and the southern Bactrian-Hindukush regions) and the west-east exchange routes which are more typically discussed by other scholars of the Silk Road.

Francfort's knowledge of this extensive terrain and time scale is based on in-depth excavations that he has been involved with for many decades – for example, the Sarazm site in the upper Zaravshan river valley of modern day Tadjikistan has been studied since 1984. The artefacts found on this site alone speak to long distance trade and the exchange of ideas with Iran, Baluchistan, the Indus Valley and the Siberian steppes. The images on the petroglyphs of the Karakoram-Himalayan regions correspond to designs on engraved wood and woven textiles in the sandy parts of Xinjiang that lack stone, while in the Bortala and Upper Yili River Valleys the rock art corresponds to designs found on the rocks of the Altai Mountains (see Cong and Liu in this book). In contrast to Boroffka and Sverchkov,

Francfort places less importance on human migrations to explain the appearance of parallel artefacts, designs and raw materials across a vast expanse. Human migrations assume 'too many migrations from too many places to too many other places'. International trade networks seem to hold the key but there remain many gaps in the evidential record for complete certainty. The third period discussed by Francfort begins *c.* 250 BC and the cultural influences of the Greeks. Whether the Hellenistic styled artefacts discussed by Francfort came from Greece or were fashioned by local artists in the Grecian tradition remains unknown but both cases testify to the long distance trade and cultural links between northern Xinjiang and the Mediterranean, mainly as a result of the demands by elite nomadic societies. Elite tastes, it seems, were not restricted to goods of military value but also a wide variety of personal items. The Chinese chronicles portrayed the nomadic tribes of Eurasia as 'barbarians' but the archaeological record speaks to their cultural sophistication, much of it based on adopting and adapting technologies, ideas and styles from agrarian empires.

The importance of preserving the archaeological record of Xinjiang is taken up in the next two chapters about the Buddhist monuments in the oasis town of Kashgar which sits at the meeting point between the Tianshan and Pamir mountains. These chapters go well beyond the Bronze and Iron Ages into the period *c.* 200 CE up to the Islamic era starting in *c.* 1000 CE. In Chapter 8, Vicziany and Di Castro argue that in contrast to imperial narratives that focus on the rise and fall of kings and warriors, the history of Kashgar needs to be understood as an integral part of international trade routes that benefited the local populations, irrespective of the identity of the overlords. In this sense, this chapter speaks to the themes raised by Francfort's chapter. By reviewing examples of the literature in Chinese, Persian and European sources, Vicziany and Di Castro suggest that the rise of Kashgar as a centre for Buddhist culture was only possible, in the first instance, because of the location of the Kashgar oasis on crossroads flowing not only west-east but also south-north. The authors also question the usefulness of writing the history of western China by being overly dependent on the Chinese chronicles which focus on imperial histories. Drawing on the new scholarship about Indian empires such as the Mughals, for example, they argue that the fall of empires does not typically disadvantage the local elites or people because the rise of smaller successor states kept the fabric of society together in a familiar way, without ordinary people having to bear the burdens of an exploitative imperial superstructure. Small states were less demanding of the economic surplus than larger political formations with the result that local people benefitted from the end of empires.

Unlike the other chapters in this collection that draw on evidence from many excavation sites, Kashgar's archaeological record has suffered from long term neglect. In Chapter 9, Di Castro, Vicziany and Zhu argue for the urgent need to conserve and study the ancient monuments of Kashgar for they are rapidly disappearing as a result of the combined pressures of agricultural and urban development. Using photographs taken since 2005, observations from on-site visits, satellite images and interviews with local curators such as Mr. Qadir (the former Director of the Kashgar Museum) they suggest that some of the Buddhist sites might be amongst the earliest in western China. In particular, they have identified eight key archaeological sites (Mori Tim, Topa Tim, Khan-oi, Yawaluk, the Three Immortal Buddha Caves, Upal, Ancient Shule and Eskishahar). The Mori Tim site also appears to have the remnants of an ancient irrigation system – but its date and the corresponding dates for the stupas is yet to be determined. Their arguments for new research on Buddhist Kashgar are based on their study of the Buddhist economies of Sanchi in India, Anuradhapura in Sri Lanka and Angkor Wat in Cambodia. Not only were these three great centres of Buddhist learning and practice but they were also outstanding examples of how Buddhist monasteries managed the land and water systems that sustained these cultures. In contrast to Kashgar, where the absence of comprehensive excavations means that we have no dates for any of the eight sites, in these other centres the parameters of knowledge are constantly expanding thanks to the application of new technologies such as Lidar. For this reason, the authors have identified a range of methodologies that are needed for the study of Kashgar's Buddhist heritage and fragile oasis environment, if the cultural achievements of this significant Buddhist centre are to be recognised.

Dodson, Atahan and Li are also concerned with demonstrating the value of particular technologies in documenting the history of Xinjiang. Using nuclear techniques they have provided absolute dates and, therefore, unique insights into the mineral and agricultural industries of the Bronze Age in the Hexi Corridor of Gansu. Their hypothesis is that the Corridor was an important conduit for the transfer of ideas from Mongolia into the Hexi region and further on. The excavated mineral remains show that bronze making in Gansu is at least some 4000 years old. While not as old as bronze manufacture in Mesopotamia, the mineral richness of the area is demonstrated by the continued mining for copper over the very long run.

In this as in the other chapters, a research priority has been to establish reliable dates for the archaeological sites and the material evidence that they have revealed. In addition to providing absolute dates for the manufacture of alloys they have also estimated reliable dates for the presence of wheat in Gansu. The

earliest wheat seeds in this area were collected from sediments at Xishanping (Dadiwan) near the Xi River. The wheat and barley seeds are dated from about 4650 cal. years B.P. The sediment section shows that millet and rice cultivation are even older – some 5100 years. The presence and dates for wheat are especially important, given the role that wheat has played in diversifying the agricultural base of the emerging Chinese empires. Dodson *et al.* maintain (see Figure 7 and related discussion in Chapter 10) that robust AMS radiocarbon dating shows that wheat entered Gansu and further north-west some 4000 years ago and from there moved to the central, southern and western parts of China including Xinjiang. For many scholars, the role of Mongolia as a transition zone remains controversial (Spengler *et al.* 2016; Stevens *et al.* 2016). Without engaging in this debate, the importance of this chapter is that it compels us to reassess the relationship between Xinjiang, Gansu and Mongolia – something that has not attracted much attention until now.

The last case study offered by Dodson *et al.* uses nuclear isotopes to analyse bone collagen from humans and animals found at sites in the Hexi Corridor. Their analysis shows that, despite the presence of some wheat in the palaeobotanical remains, millet was the main component of the diet of local Bronze Age people in the period from the late 3rd millennium to the early 2nd millennium cal. BC. By contrast, they did not find much evidence for the consumption of protein in the diet of the Bronze Age settlers. They do not suggest that this 'intriguing' diet was typical of Xinjiang or Gansu but it certainly justifies their call for further analysis of bone collagen from other sites.

In the final chapter Jia and Chau also analyse the consumption habits of the Bronze Age peoples of Xinjiang, but this time their focus is on four archaeological sites in the far west of Xinjiang, near the Tianshan Mountains. Their methodology involves an analysis of the ancient starch granules found on eight grinding stones. This is the first work for Xinjiang using the identification of ancient starches to study the plants used by Bronze Age peoples who lived here *c.* 2300-1000 BC. The starches found by Jia and Chau came from cultivated and wild plants and food and non-food plants, including medicinal species. In showing the multiple character of the starches found on grinding stones, we can conclude that some mixed farming was practiced at that time but that the grinding stones by themselves do not prove that farming dominated. This supports the work of other scholars showing that wild plants were also processed (Liu *et al.* 2010; Liu *et al.* 2013; Liu *et al.* 2011; Yang *et al.* 2012). Moreover, cereals were also traded as noted by Francfort in this volume and Frachetti (2004: 206-207, 242-243, 368) in the case of eastern Kazakhstan and southern Russia. Most significantly, this chapter addresses the controversies about the nature of prehistoric pastoralism. The authors show that Bronze Age people did not depend on their animal herds alone. This evidence agrees with the latest insights we have into the lifestyles and diets of the people of the Xiaohe culture. Using human hair/dentin and animal bones Qu and colleagues concluded that while the 'initial settlers of the Xiaohe culture primarily engaged in animal husbandry' their diets became more complex over time and included, in some cases, surprisingly large quantities of wheat (Qu *et al.* 2018: 2010-2012).

Conclusion

The main conclusions of this collection can be summarised as follows. First, this monograph brings to public attention the first detailed and systematic account by Chinese archaeologists of the new, recently discovered Bronze Age sites of Xinjiang stretching from the Tianshan Mountains to the far eastern part of the Taklamakan desert. This contrasts with the previous literature that was focussed on the eastern desert region. Three chapters in this volume provide an important corrective to previous understandings of the Bronze Age by assessing the recent archaeological findings in the mountains bordering China and Kazakhstan. This refocus draws attention to western China's river valleys and mountain passes as conduits for the transmission of cultures, technologies and peoples from further west, in Central Asia, to western China and eastwards. None of this diminishes the importance of Chapter 3 by Abuduresule *et al.*, for this is the most comprehensive published discussion in English about the complexities of the Xiaohe culture located in the Taklamakan desert. Chapter 3 is critical for providing the essential context for ongoing work by this team and their colleagues in addressing the ever growing puzzles about the Xiaohe culture whether it is about its desert-based oasis environment (Li *et al.* 2013) or the world's oldest glue (Rao *et al.* 2015) and paint brushes made of cattle heart muscle (Mai *et al.* 2016) identified amongst the grave goods of the mummies.

Secondly, our findings stress the powerful and enduring cultural links between western China and the regions to the west, north and south. There were many Silk Roads along many routes, not only those along a west-east direction. Moreover, the direction in which innovative cultural and technical ideas flowed remains complex and multi-layered. The archaeological history of Xinjiang is still too young and scattered to allow us to resolve debates about which entry points mattered more than others. Rather we prefer to consider multiple entry points for the same or similar ideas and technologies. The porous nature of Xinjiang's borders then and now, together with the incomplete archaeological record, makes it hard to assume that one particular corridor was more important than another.

Thirdly, our understanding of pastoralism in the Bronze Age has been expanded by these chapters demonstrating that Bronze Age herders, like their east Kazakhstan counterparts, were brilliant environmental managers and multi-skilled in combining herding with farming, artisanal, trading and security-oriented activities as a way of minimising the risks of living in difficult, extremely cold, semi-arid and desert environments. Fragile ecologies needed special management skills for survival.

Fourthly, different chapters have emphasised different mechanisms of cultural-technological transfers. We feel that instead of focussing on the debate about whether trade was more important than human migration, we need to recognise that both were possible and could serve as substitutes for each other depending on what was opportune at particular points in time.

Fifthly, many chapters emphasised the need to solve the remaining puzzles of Xinjiang's long historical connections with bordering regions by expanding the research technologies that investigators use. Archaeological findings have made major contributions to increasing the parameters of our understanding of the processes of long-term interchanges of people, goods, technologies and ideas but they need to go hand in hand with a re-examination of documents which can now be approached with fresh eyes. The case of Kashgar, however, is exceptional, for here we urgently need systematic archaeological investigations before the pre-Islamic heritage is lost for ever.

In summary, while the role of Xinjiang as a transition zone has long been appreciated, at this stage, we simply do not yet know enough to assert that any one route or mechanism was more important than another. We cannot even generate a chronology suggesting which routes preceded others, for the archaeological and historical records remain imprecise or unknown. Nor can we yet reconstruct the sequences by which these transmissions happened once they had crossed into western China. What this collection has drawn attention to is the misleading view that transmissions along the Silk Road occurred mainly from west to east. This needs to be revised by reinstating the notion of many 'Silk Roads' and zones of transmission from south to north and also from east to west, involving not only the mountainous-valley-steppe routes from Kazakhstan, Russia and Central Asia but also paths via Afghanistan, Pakistan, India, Mongolia and Central China. And it may well be that all of these routes were equally significant. What we can say on the basis of Chapter 3 is that if the Xiaohe culture replicated itself across a 'gap' of some 600 kms, distances were no obstacle to the spread of Bronze Age or other cultures. The surprising mobility of the Bronze Age peoples contributed to the growing complexity of these cultures over time as successive waves of new migrants arrived bringing with them wheat from the west and millet from the east (Qu *et al.* 2018: 2012). The next chapter by Betts takes up some of these themes by mapping the range of pre-historic cultural sites in Xinjiang and identifying features that relate to other parts of Eurasia and China.

References

Abuduresule, Y. 2008. Treasures in the Tarim Basin, Xinjiang, China: Looking for the Ancient Civilisations. Public Lecture for the Monash Asia Institute and the National Gallery of Victoria. Melbourne: NGV, May.

Barber, E. 1999. *The Mummies of Ürümchi.* London: Pan Books.

Fletcher, R. 2011. Low-Density, Agrarian-based Urbanism: Scale, Power and Ecology in Michael E. Smith (ed.) *The Comparative Archaeology of Complex Societies.* Cambridge: Cambridge University Press: 289-381.

Frachetti, M. 2004. Bronze Age Pastoral Landscapes of Eurasia and the Nature of Social Interaction in the Mountain Steppe Zone of Eastern Kazakhstan. Unpublished PhD dissertation, University of Pennsylvania.

Hedin, S. 1903. *Central Asia and Tibet: Towards the Holy City of Lassa*, Vol. 1. London: Hurst and Blackett.

Hinchliffe, J. 2018. How smoked eel is at the heart of Australia's next World Heritage bid. *The Age*, 9 December, viewed on 8 March 2019, <https://www.theage.com.au/national/victoria/how-smoked-eel-is-at-the-heart-of-australia-s-next-world-heritage-bid-20181208-p50100.html>.

Keen, I. 2004. *Aboriginal Economy and Society: Australia at the Threshold of Colonisation.* South Melbourne: Oxford University Press.

Li, C. *et al.* 2015. Analysis of ancient human mitochondrial DNA from the Xiaohe cemetery: insights into prehistoric population movements in the Tarim Basin, China. *BMC Genetics* 16:78, viewed on 29 April 2019, <https://doi.org/10.1186/s12863-015-0237-5>.

Li, J. *et al.* 2013. Buried in Sands: Environmental Analysis at the Archaeological Site of Xiaohe Cemetery, Xinjiang, China. *PLoS ONE* 8: 7, July 22. https://doi.org/10.1371/journal.pone.0068957.

Li, C. *et al.* 2010. Evidence that a West-East admixed population lived in the Tarim Basin as early as the early Bronze Age. *BMC Biology* 8: 15, viewed on 29 April 2019, <http://www.biomedcentral.com/1741-7007/8/15>.

Liu, X. 2001. Migration and Settlement of the Yuezhi-Kushan: Interaction and Interdependence of Nomadic and Sedentary Societies. *Journal of World History* 12: 262-292.

Mai, H. *et al.* 2016. Characterization of cosmetic sticks at Xiaohe Cemetery in early Bronze Age Xinjiang,

China. *Nature Scientific Reports* 6:18939. DOI: 10.1038/srep18939.

Mallory, J.P. and V.H. Mair 2000. *The Tarim Mummies: ancient China and the mystery of the earliest peoples from the West*. London: Thames & Hudson.

McNiven, I. *et al.* 2015. Phased redevelopment of an ancient Gunditjmara fish trap over the past 800 years: Muldoons trap complex, Lake Condah, southwestern Victoria. *Australian Archaeology* 81: 44-58.

Mirtschin, A. 2013. The Aboriginal Stone Huts of Lake Condah. YouTube video, 16 Dec, viewed on 8 February 2019, <https://www.youtube.com/watch?v=DOA8VIYAVGU>.

Qu, Y. *et al.* 2018 Diverse lifestyles and populations in the Xiaohe culture of the Lop Nur region, Xinjiang, China. *Archaeological and Anthropological Science*. 10: 2005-2014. DOI 10.1007/s12520-017-0520-7.

Rao, H *et al.* 2015. Proteomic identification of adhesive on a bone sculpture-inlaid wooden artifact from the Xiaohe Cemetery, Xinjiang, China. *Journal of Archaeological Science* 53: 148-155. http://dx.doi.org/10.1016/j.jas.2014.10.010.

Romgard, J. 2008. Ancient Human Settlements in Xinjiang and the Early Silk Road Trade. *Sino-Platonic Papers* 185: 1-126.

Ruan, Q. 2013. Studies on the discoveries of Andronovo affiliation found in Xinjiang, China. *Western Archaeology* 7: 125-154 [阮秋荣:《新疆发现的安德罗诺沃文化遗存研究》，《*西部考古*》2013年，7期, 125-154页]

Spengler, R. *et al.* 2016. The spread of agriculture into northern Central Asia: Timing, pathways, and environmental feedbacks. *The Holocene* 26/10: 1527-1540. DOI: 10.1177/0959683616641739.

Stevens, C. *et al.* 2016. Between China and South Asia: A Middle Asian corridor of crop dispersal and agricultural innovation in the Bronze Age. *The Holocene* 26/10: 1541-1555. DOI:10.1177/0959683616650268.

Yang, R. *et al.* 2014. Investigation of cereal remains at the Xiaohe Cemetery in Xinjiang, China. *Journal of Archaeological Science* 49: 42-47.

Yang, Y. 2014. Proteomics evidence for kefir dairy in Early Bronze Age China. *Journal of Archaeological Science* 45:178-186.