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Shifting Memories: Burial Practices and Cultural Interaction in Bronze Age China

A study of the Xiaohe-Gumugou cemeteries in the Tarim Basin

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Abstract

Yang, Y. 2019. *Shifting Memories: Burial Practices and Cultural Interaction in Bronze Age China. A study of the Xiaohe-Gumugou cemeteries in the Tarim Basin*.

This study focuses on the burial practices in the Bronze Age Xiaohe-Gumugou cemeteries, north-west China, in order to understand how people constructed their social identities and delivered the social cognitions through generations. The Xiaohe-Gumugou cemeteries, as the main sites of the Xiaohe cultural horizon, have central roles for the understanding of the formation of the Bronze Age cultural groups and the cultural interactions between the west and the east in the Tarim Basin. However, current research is lacking in-depth examinations of the material culture of the cemeteries, and the contexts of the surrounding archaeological cultures in a timespan from Bronze Age to Iron Age. Through detailed comparisons of the construction of coffins and monuments, the dress of the dead, and the burial goods assemblages, this study provides an overview of the social structural development, from the Gumugou group's heterogenous condition to the Xiaohe group's homogeneous and mature state. Also, through relating to the results of biological and osteological analyses, and applying geographical analyses to the material, this study suggests that the early settlers in the Tarim Basin, the Xiaohe-Gumugou people have created their own social identities. Although the Xiaohe-Gumugou people might have migrated from southern Siberia or Central Asia, the archaeological material shows indications of their own typical features. When newcomers joined the society, the local burial customs were accepted and applied in a new cultural setting.

Keywords: *Burial practice, mortuary rituals, social identities, ancestral memories, the Xiaohe-Gumugou cemeteries, Bronze Age, the Tarim Basin*

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Abstrakt

Yang, Y. 2019. *Skiftande minnen: Gravskick och kulturell interaktion i bronsålderns Kina. En studie av Xiaohe och Gumugou gravfälten i Tarimbäckenet.*

Denna studie fokuserar på gravskick på gravfälten Xiaohe och Gumugou i nordvästra Kina, för att förstå hur människor konstruerade social identitet och överförde kulturella föreställningar mellan generationer. Xiaohe-Gumugou-gravfälten, som de viktigaste platserna i Xiaohe-kulturhorisonten, är centrala för förståelsen av bildandet av bronsålderns kulturgrupper och de kulturella växelverkningarna mellan väst och öst i Tarimbäckenet. Tidigare forskning saknar fördjupade undersökningar av gravfältens materiella kultur samt den historiska kontexten med de omgivande arkeologiska kulturerna under tidsperioden från bronsålder till järnålder. Genom detaljerade jämförelser av konstruktionen av kistor och monument samt de dödas klädsel och gravgåvor, ger denna studie en översikt över utvecklingen av sociala strukturer, från Gumugou-gruppens heterogena situation till Xiaohe-gruppens homogena och mogna tillstånd. Genom att relatera till resultaten från biologiska och osteologiska analyser och tillämpa geografiska analyser på materialet, tyder den här studien på att de tidiga bosättarna i Tarimbäckenet, Xiaohe-Gumugou-folket, har utvecklat egna sociala identiteter. Trots att Xiaohe-Gumugou-folket kan ha migrerat från södra Sibirien eller Centralasien visar det arkeologiska materialet indikationer på egna typiska egenskaper. När nykomlingar anslöt till samhället accepterades de lokala begravningssederna och tillämpades i ett nytt kulturellt sammanhang.

Nyckelord: *Begravningsseder, gravritualer, social identitet, släktminnen, Xiaohe-Gumugou gravfälten, bronsåldern, Tarimbäckenet*

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The two-year study in Uppsala University has been a different and fantastic experience for me. Although I have struggled a lot at the beginning for the unfamiliar education system, society, culture and also my language barriers, I am glad to say that I managed to acquire knowledge and develop my research with the help of a lot of people, my teachers, colleagues and families.

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This is not the ending. I am still on my way pursuing my academic life. Thanks Uppsala University, for the trip so far!

Yunyun Yang
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1. Introduction

The Xiaohe-Gumugou site is situated along the ancient Silk Road, in the Xinjiang province, northwest China (see *Fig. 1*). Dating to the Bronze Age, the site contains time span from 2000-1450 BCE. It is an important site for studying burial practices and social life in the Bronze Age societies, which are believed to be the earliest occupants in the Tarim Basin. It is commonly defined that Xinjiang entered in Bronze Age around 2000-1000 BCE, and in Iron Age around 1000-200 BCE (Xinjiang 2012a). The time period varies in different areas.

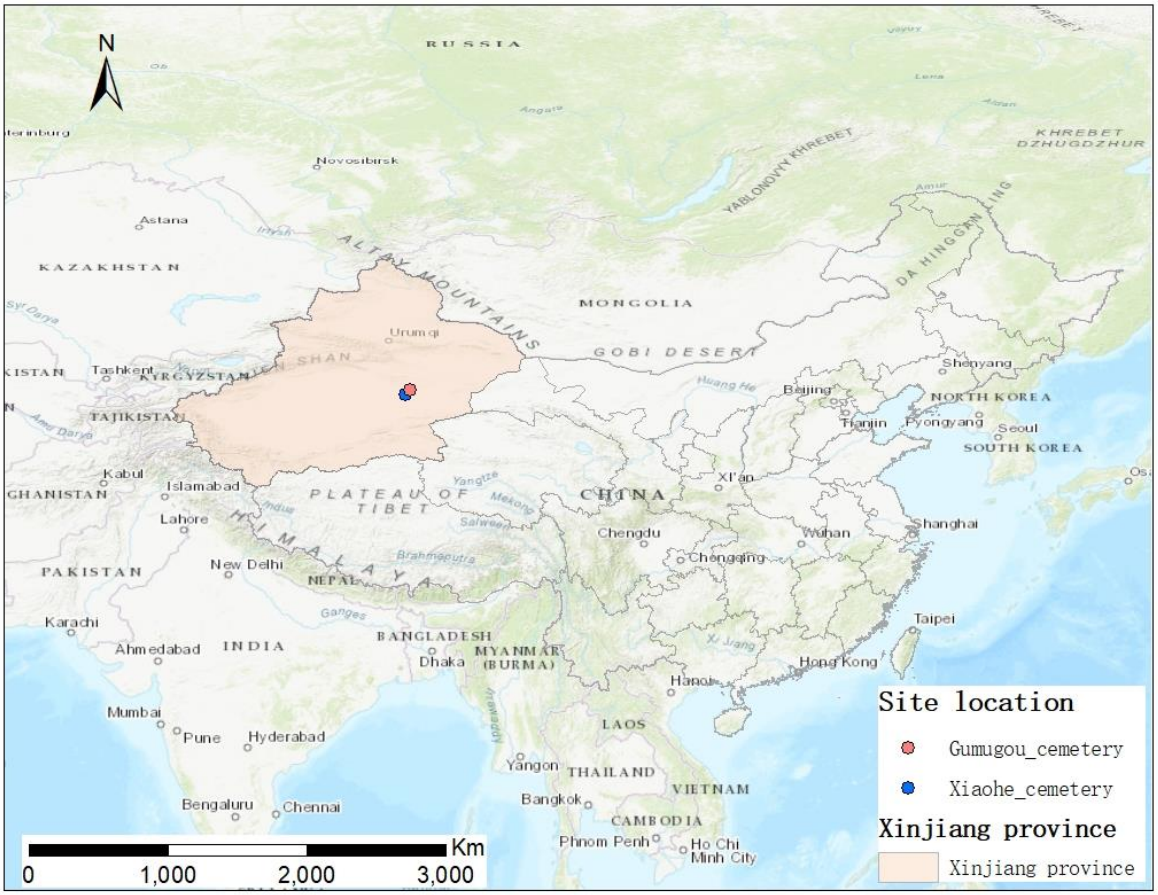


Figure 1 An overview map of the research location

The Xiaohe-Gumugou site complex is represented by both the Xiaohe cemetery, the Gumugou cemetery, and some scattered graves mainly along the Peacock River. The Tarim Basin itself is constituted mainly by the Taklamakan Desert, but with many perennial river branches spreading over the desert. Most graves of the Xiaohe-Gumugou complex have been found in the desert not far from the banks of the Peacock River. The surface layers of the cemeteries and graves have been destroyed by strong winds or plundered by people, while the deeper layers have been well preserved in the dry desert environment, with mummified dead bodies, textiles, and organic materials remaining inside the wooden coffins.

The principal element of a burial is commonly the dead person, but from analyses of the physical remains of the dead, we can gain several important insights into the life and lifeways of the individual. In addition, by studying the body display, dress, associated assemblages and burial constructions – e.g. all the material remains of the mortuary rituals that accompanied the dead – we can gain insights into associated burial practices and the social norms that accompanied them. Viewed together, burials may contain huge amounts of information, which can help in addressing issues concerned with social identities, community life, ecology, economy, and technology etc. It is, however, difficult to gain a full appreciation of the burials, rituals, and their roles for the contemporary society without contextual information on the surrounding landscape, cultural groups and social life as deduced from other archaeological data.

The main objective of this thesis is to analyze similarities and differences of burial practices in the Bronze Age burial sites of the Xiaohe cultural horizon (2000-1200 BCE) of the Tarim Basin. Burial practices will be discussed against the background of population and archaeological cultures in the Tarim Basin, known to have been part of the Silk Road connecting the west and the east since Han Dynasty (206 BCE-220 CE). The study will therefore also review archaeological and biological (e.g. DNA and osteology) information of the Bronze Age in the Tarim Basin and its surroundings and possible population movements and interactions, mainly including Afanasievo and Andronovo burials.

The rising interest in social memories, burial practice and ritualization theories in recent years (see chapter 2) has provided us new research angles to prehistoric burial materials. However, these research perspectives have so far not been applied and tested in the research of the Bronze Age Xiaohe-Gumugou cemeteries yet. Studies of the Xiaohe or the Gumugou cemeteries from its beginnings have mainly focused on ethnicities associated with osteological features, languages, or genetic information (Keith 1929; Han 1986, 1994; Lin 2003; Thornton *et al*. 2004; Li *et al*. 2010; Liu 2010; Zhang *et al*. 2013; Li *et al*. 2015). More recently there has also been a focus on diets and health (Liang *et al*. 2012; He *et al*. 2014), plants and agriculture (Li *et al*. 2011; Yu 2012; Xie *et al*. 2013; R. Yang *et al*. 2014; Chen 2016; Zhang *et al*. 2017). The wooden human sculptures (Liu 2008; Wu 2013) and the special use of livestock (Rao *et al*. 2015; Mai *et al*. 2016) have also received focus. From these studies, we have prior understanding of the possible European ancestry lineages of the people from the Xiaohe-Gumugou site. We also have some knowledge about their main husbandry lifeways in the oasis environment of the Peacock River. But we still lack understanding about how the people constructed their social identities through burying their dead in the Xiaohe-Gumugou site, and delivered these social cognitions through generations.

The structure of the thesis is arranged in a traditional way, chapter 1 introductions, chapter 2 theory and method, chapter 3 detailed material information, chapter 4 analyses and comparisons, chapter 5 discussions, and chapter 6 conclusions. In the end, there are four appendixes. Appendix 1 is a name difference list, in order to let readers recognize the same locations but with different spelling in Chinese Pinyin inscription, in English-Chinese, in Simplified Chinese. Commonly I chose Chinese Pinyin inscription to indicate the names, but also used a few names created and applied since the early twentieth century, considering their common sense in academic field. Appendix 2 are some intact grave examples with detailed descriptions, in order to show individual cases, and also make some of the grave information from Chinese reports available to English readers. The whole analyses and comparisons were based on all the graves that I had access to, and summarized in Appendix 4. Appendix 3 is about radiocarbon dating information.

1.1. Background

The Xiaohe-Gumugou site is located near the lower part of the Peacock River closed to the dried Lop Nur lake in the Tarim Basin, Xinjiang, northwest China. The Tarim Basin is mostly occupied by Taklamakan Desert, but with many perennial river branches spreading over the desert. And the Tarim Basin is surrounded by Tian Shan (mountains) in the north and Kunlun Mountains in the south. Tian Shan (mountains) spread from west to east and divide Xinjiang into two main parts with the Tarim Basin in the south and the Dzungaria Basin in the north (see *Fig. 2*). Xinjiang is a frontier area adjacent to Central Asia, southern Siberia, Mongolia and connected to the inland of China through the Hexi Corridor along the Qilian mountains.

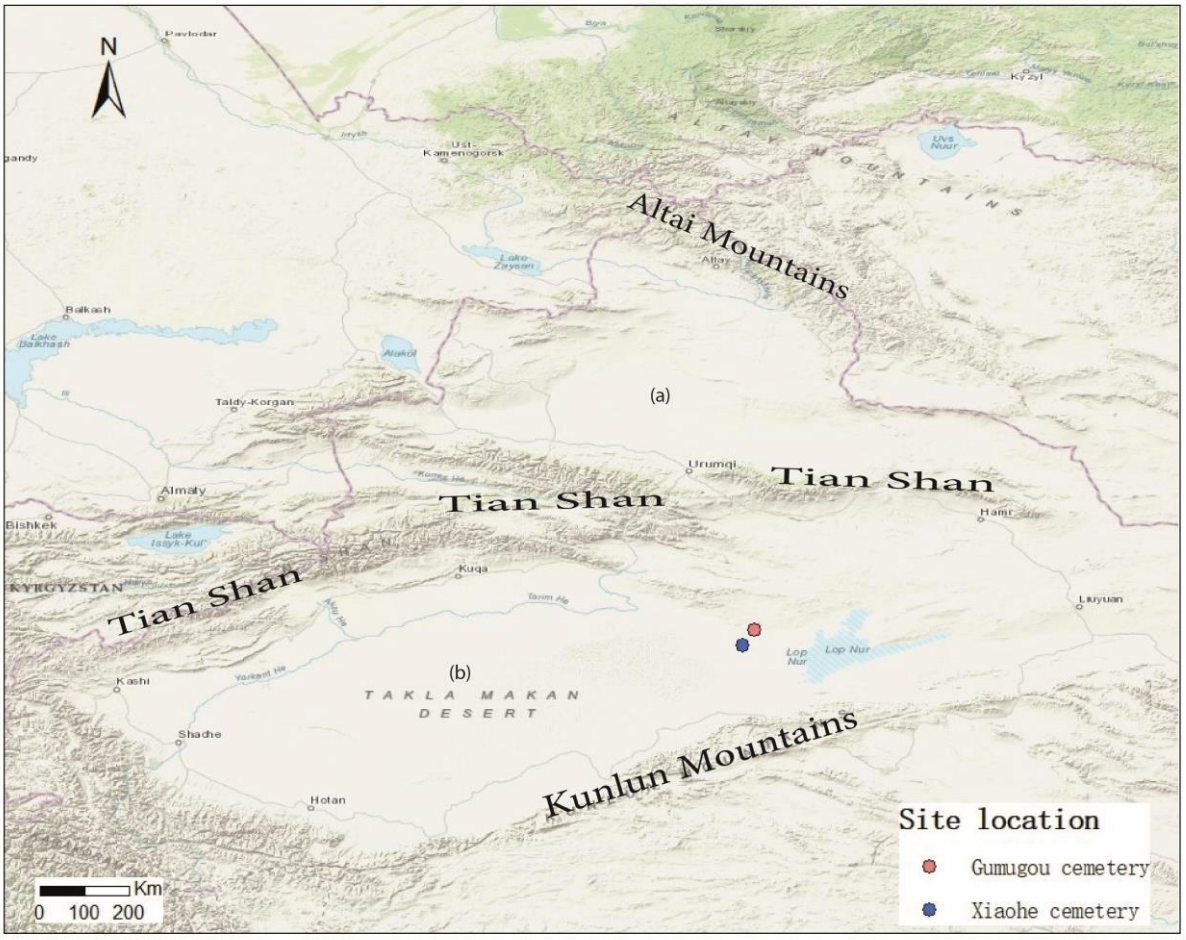


Figure 2 The topographic view of the Tarim Basin and its surroundings

(The Altai Mountains and the Tian Shan together surround (a). the Dzungaria Basin; the Tian Shan and the Kunlun Mountains surround (b). the Tarim Basin.)

The Lop Nur area is located in an extremely flat plain (Huntington 1907) in the eastern end of the Tarim Basin. Because of the low elevation of the Lop Nur area, the Peacock River flew into this area and formed the salted Lop Nur lake in the past. In the Lop Nur area, the climate is extremely arid with the average annual rainfall only around 26 mg (B. Wang 2014: 2). During spring and summer time, strong wind often blows from northeast. The mean annual temperature is 11.5 ℃ (Hao *et al*. 2012), and in winter the Lop Nur area is dry and cold. Wild plants like Ephedra as a marker of arid environment (Zhang *et al*. 2017) and tamarisks found in the Xiaohe cemetery indicate the arid environment during Bronze Age time. Reeds growing in wetland environment and cereals of bread wheat (Li *et al*. 2011) imply the Lop Nur area has been oases during the time period. Although the living condition has been hard, the rich river branches have probably created oases living environment.

There were different cultural elements around the Tarim Basin during the Bronze Age. At that time, burials in different areas had obvious typical geographical features in the southern edge of the Altai Mountains area, the Hami Basin-the Balikun Grassland area, the Turpan Basin-the middle part of Tian Shan area, and the Tarim Basin (see *Fig. 7*). The Xiaohe-Gumugou people were early Bronze Age occupants of the Tarim Basin. The arid and cold desert environment of the Tarim Basin contributed to the mummification of the bodies and the excellent preservation of the dead bodies and the organic matter in the burial assemblages. The Xiaohe-Gumugou site complex, also called the Xiaohe horizon (Xinjiang 2011: 1–15; Xinjiang 2012a: 1–12; Mallory 2015), is mainly represented by the Xiaohe cemetery, the Gumugou cemetery, and some scattered graves including Grave 36, Grave 37, LF, LQ, LS, LT, Ruoqiang 09LE50, Ruoqiang 09LE4, and Keliyahe northern cemetery mainly along the Peacock River, in the Lop Nur area and along the Keliya River. The Xiaohe cemetery was rather well preserved and contained five (stratigraphic) layers of burials. Its typical features are boat-shaped wooden coffins with wooden posts erected at one end of the coffins. The Gumugou cemetery contained two types of burials, one similar to the Xiaohe burials and another with sun-shape burial format (see *Fig. 6*) on the ground. The detailed descriptions of graves will be presented in chapter 3.

In Xinjiang province, more than 500 mummies have been found in the past hundred years (Mallory *et al*. 2008: 179f). The brownish hair, deep eyes, and high noses of the mummies imply that they might be Europeans rather than Asians. The mummies have been considered (to be related to) the proto-Tocharian speakers of Indo-European languages (Wang 1998; Wang 2001; Lin 2003; Xu 2005; Mallory *et al*. 2008). The Tocharian manuscripts have been found in the northeast of the Tarim Basin (in Kucha and Turpan etc.), and dated to Iron Age 400-1000 CE (Adams 2006). However, this hypothesis has always been challenged since there has no any texts/scripts in the Bronze Age burials (e.g. the Xiaohe cemetery and the Gumugou cemetery) of the Tarim Basin and not enough burial links to fill in the huge time gap from Bronze Age to Iron Age (Wang 2014; Mallory 2015; Shui 2017).

Apart from the Tocharian hypothesis, Bronze Age Afanasievo and Andronovo cultures in southern Siberia and Central Asia have also been taken into consideration. One assumption (the so-called steppe hypothesis) is that Afanasievo cultural groups migrated southward to the Tarim Basin and developed to the (Xiaohe-)Gumugou groups (Lin 2003; Kuz'mina *et al*. 2008). Recent DNA research on the Xiaohe people (Li *et al*. 2010; Li *et al*. 2015) support the steppe hypothesis, suggesting that the first occupants in the Tarim Basin came from the Afanasievo cultural groups, then were followed/or replaced by Andronovo cultural groups. But this conclusion is questioned is by Hollard's (2018) study that there were no Y-chromosome lineage proofs of the Afanasievo people found in the Tarim Basin. Although people in the Xiaohe horizon, Afanasievo culture, Andronovo culture shared morphological similarities with their European appearance (Han 1986, 1994), it does not necessarily mean these people shared ancestral lineages or were from same ethnic groups. Furthermore, the archaeological cultures of the Xiaohe horizon are thought to be quite different from the Afanasievo cultures (Wang *et al*. 2017).

The previous research indicates a crucial role of the Xiaohe horizon in understanding the formation of the Bronze Age cultural groups and cultural interactions in Xinjiang and its surroundings, and suggests possible connections with the Indo-European languages and interlanguages. Considering the admixture of the west and the east populations in the Tarim Basin, and the background of the eastward migrations of Europeans in Bronze Age in the Eurasian Steppe, there needs more understanding the societies/communities of the Xiaohe horizon, before we can move to a complete comparison of the related Bronze Age burials between the Eurasian Steppe and the Tarim Basin, the whole Xinjiang area. Since there are no related settlement sites of the Xiaohe horizon have been ever found yet, the examination has to be based on the burial sites.

Figure 3 The geographic connections between the Eurasian Steppe and the Asian Grassland, and possible cultural influence

(a). The Eurasian Steppe is widely spread from the west to the east, and is connected to the Asian Grassland hence also to provide some easy access from the north to the south; the Silk Road route shows connection between the west and the east during historical time. (b). The assumed possible access from the Eurasian Steppe to China, considering the geographic convenience of the steppes.

Here it also needs to be highlighted the importance of the geographical suitability of the Altai-Tian Shan-Kunlun Mountains area. As the central part of the Silk Road and with the geographical connections to the Eurasian Steppe through the Asian grasslands (see *Fig. 3*), it was unavoidable for the Xinjiang area to be influenced by the Eurasian Steppe and form cultural complex during the Bronze Age. The Eurasian Steppe has played an important role in the development of horse transport and wheeled vehicles in the Bronze Age (Anthony 2007; Kuz'mina *et al*. 2008). And it has been argued that the spread of the Bronze Age cultures in the Eurasian Steppe contributed to the formation of the Silk Road (Kuz'mina *et al*. 2008). However, the interesting thing is that there were no wheels or horses in the Xiaohe-Gumugou cemeteries. In order to understand this archaeological phenomenon, it is important to draw attention to the geographical convenience and the Bronze cultural groups distributions in the area too.

1.2. Aims and research questions

To sum up, I want to address questions as below by bringing biological line into the research of the Xiaohe-Gumugou burial practices, and classifying Bronze Age archaeological cultures based on the geographical convenience from the surrounding areas of the Tarim Basin:

1. What is the concept of the Xiaohe horizon or what sites does the Xiaohe horizon include?
2. What features did the Bronze Age burials in the surrounding areas of the Tarim Basin have or what possible burial connections were there between the Tarim Basin and its surrounding areas?
3. How did the Gumugou people and the Xiaohe people bury their dead, including the coffin structures, manipulation of the dead, assembled burial goods and accompanied burial behaviour/burial action?
4. Were there changes in each cemetery from the early time to the late time? And what were the differences between the Gumugou cemetery and the Xiaohe cemetery?
5. How did the Gumugou society and the Xiaohe society construct their social identities in burials, and what possible relations did the two societies have?

The project centers on death, social identities, rituals, and burial practices under the Bronze Age culture complex in northwestern of China. It aims to explore how the Xiaohe-Gumugou societies or communities constructed their social identities and what possible relations had between the Gumugou and the Xiaohe communities. So that we gain a better understanding about the construction of social identities in a stable society through burials, and construct a foundation to develop further research on the Bronze Age cemeteries between the Tarim Basin and the Eurasian Steppe.

2. Theory and method

2.1. Theory

In burials, even though as stated in the introduction the principal factor is the dead, it is hard to retrieve any relevant social information without also thinking about the cultural surroundings around the burial. What we can see from a burial are usually the dead, displayed in a certain way, dressed specific costumes, and accompanied by burial goods assemblage. What we cannot see directly are the processes of preparation, rituals and feasts, the annual or periodic commemoration by the living, and the ideology behind the burials, etc. Burials potentially contain huge amount of information on ecology, social economy, technology, and social identities related to the cemetery. What I am interested in here are the transformation of the social memories from life to death, from individuals to groups, and the construction of social identities in burials.

Based on a biological definition, memory is the means that information is stored in the brain (Hine *et al*. 2015b). It contains two important processes, one to store information and another to retrieve information. The philosophic function of memory stresses humans' individual identities and ties to other people (Michaelian *et al*. 2017). During the time without written texts, people had to rely on oral narratives like myths, tales, legends, epic poems, and so on to deliver memories, when people were alive. However, when people died, the living constructed and transformed memories of the dead through ritual practices to achieve their social identities in the community.

Mortuary rituals transformed the dead to a new state of existence in relation to the living (Ekengren 2013). The deceased would enter in another world from the secular world after the funerals, while the bereaved would keep the deceased in their memories. The transition from life to death is a process of selecting to remember and/or to forget by the living (Williams 2013). The living gave a new position for the dead through mortuary rituals of commemoration and hence created a new social relationship between the dead and the living (Ekengren 2013). We can imagine that over a few generations the dead would become part of the living's ancestors, and commemorated by descendants periodically in certain locations, possibly in the burial places, and through certain ways such as with special rituals for the ancestors. In such contexts, it becomes so understandable that the living assembled main life goods, important tools to their dead for afterlife.

Social identity is originally defined as a person's self-concept based on a membership in a group or a society (Turner *et al*. 1986). This concept stresses on interpersonal and intergroup relations instead of individuals, which means how to identify a person in relation to others in the same group or society. From this perspective, the transformation in the communal cemetery is not only from living to death, but also from individuals to groups. When a group member died, the living constructed and confirmed his or her former social identities by following certain rules, which normally we understand as burial customs or burial behaviours. Such conformation of social identities of the dead in burials was based on the social bond between the dead and the living. The social bond existed before and still need to be maintained even people died. Sextual identity is part of social identity, and can be shown/expressed in burials from how to dress the dead, and what burial goods to assemble, etc. As we commonly admitted, graves mostly show relationship between the living and the dead. When the mourners

acted the mortuary ritual to bury their deceased, sexual identity would be possibly reflected in graves based on their contemporary social cognition.

Ritual practice theory provides us possibilities to trace rituals from material remains, by abandoning the idea of seeing rituals as preserving or enacting religious beliefs, and giving an emphasis on ritual as human actions (Fogelin 2007). Bell (2009) has examined two structural patterns, where ritual is either simply thoughtless action or ritual is considered a synthetic mechanism of action and belief, which stresses its performative attribute of involving doing things. In this sense, the performance of rituals is acted by people and follow in certain principles admitted by the performers and audiences. On one hand, performance creates meaning by bringing symbols and contexts together (Ekengren 2013); on the other hand, the meaning (or belief) of the ritual might be projected to related symbolic objects during the performance. It is hard to explore what kind of beliefs were projected in the past to the objects of rituals. There could have been different narratives not only in the past amongst different participants, but also in the present depending on what interpreters want to project on the objects of rituals. However, the material record provides a chance to understand the meaning by seeing how actions and objects have been combined or changed over time. It is the actions and objects that will be reconstructed here, and thus will allow me to attempt to reconstruct meaning in terms of social roles, changing practices, context and possible influences.

From an archaeological point of view, there is the question if cemeteries can be generally seen as the material results of mortuary rituals. From a practice perspective, a ritual is a form of human actions designed and ruled by a set of common principles; a ritual is a process of performance and practice acted by people and accompanied by meaning created or by belief preserved within its context. Cemeteries are the results of the living's activities, which involve preparing funeral materials, burying the dead, providing mourners with food and drink, or with a feast. When the mortuary activities happened, the living were both the main actors to perform and the centre to construct and transform the social memories/social bonds/social identities of the dead.

Through the combination of mortuary theory and ritual practice theory, we can gain a better understanding of the construction of social identities in burials, the formation of burial customs, and/or the condition of the transformation of burial customs. Considering the six characteristics of rituals concluded by Bell (2009: 138–169), all including formalism, traditionalism, invariance, rule-governance, sacral symbolism and performance could be defined in burial process. Formalism and performance indicate well organized public actions which mainly consist of speech, gestures, behaviours, but only the result of the actions can be traced from graves. Cemeteries are well-organized actions, with manipulated dead bodies, well organized burial goods assemblage, burial location and way, and meaning or belief behind. It is hard to trace whether people have employed specific speeches, gestures from materials in cemeteries, but it is known that materials are the results of organized actions and processes. Sacral symbolism refers to the sacred symbolism of rituals. Funerals, as a transformation of states and recognition of social identities of the dead, are sacred in general. Furthermore, mortuary activities containing sacrifice indicate special and specific meaning in the entire process. Traditionalism, invariance and rule-governance stress that rituals are governed by traditions, rules, and repetitive activities.

However, it is allowed to have adaption and creation in a new setting of environment in rituals. Ritualization working as a social control might allow some degree of individual appropriation (Bell 2009: 226), since ritual practices are social activities acted by peoples. On one hand, individuals have to obey the ritual structure; on the other hand, they have abilities and possibilities to alter the structure. In burials, personal wills, such as special expectations or favourite stuff from the dead when he or she was alive, and the reflection of special (high)

social position and/or rich life condition, might lead to diversities and differences. Likesome, variations in a broad scale are common. For a long period, burials in a stable society often follow traditional social customs and are repeated by generations. Even there are some gradual changes in mortuary activities, they are still linked to customs in past.

When it comes to a group/society/community, it is good to keep in mind that burials as a reflection of social identities and concept can be easily and rapidly influenced by the sharp political or economic shift. The typical example is that Western Roman Empire in the time of socio-economic, ideological, identical recreation led to a rapid mortuary change (Williams 2013). Burials as transformation of social identities and state directly reflect contemporary social and cultural background. Hence, I tend to assume that gradual changes in burials refer to a stable society, while dramatic changes indicate huge variations in a society or community.

2.2. Methodology

This research focuses on burial rites of the Xiaohe-Gumugou cultural horizon in the Tarim Basin, and this is also placed in the context of the Bronze Age cultural groups in the surroundings of the Tarim Basin, based on its geographical connections with the Eurasian Steppe. The research scale is both microcosmic and macrocosmic. From an overview perspective, the research task can be summarised in a few steps as below:

1. Identifying all possible burial sites from the Tarim Basin which can be contributed to the Xiaohe cultural horizon, and introducing the burial practices of the Xiaohe cemetery and the Gumugou cemetery in detail in order to get knowledge of the research material and background;
2. Providing a macrocosmic view of the burial features from the Bronze Age to the early Iron Age in the surroundings of the Tarim Basin, and the possible relations to the Afanasievo culture burials in the Altai Mountains and the Andronovo horizon burials in the Minusinsk Basin, in order to know about the complicated formation background of the Xiaohe society;
3. Separately analyse the burial features of the Gumugou cemetery and the Xiaohe cemetery by focusing on:
    - The construction of the coffins: shapes, materials, formations, monuments, etc;
    - How the dead had been manipulated: positions of the body, head directions, dressing of the body, etc;
    - How the burial goods had been assembled: locations in the grave, species of animals, amount of grave goods, differences between the sexes, special burial goods indicating different status, etc;
4. Tracing changes inside consistent communal cemeteries:
    - What changes there were from early time to late time within a cemetery;
    - What differences there were between female and male graves, or between graves of adults and children;
5. An in-depth comparison of the burial features between the Gumugou cemetery and the Xiaohe cemetery;
6. Discussing strategies for the constructions of social identities in each society, and the relation between the Gumugou society and the Xiaohe society.

By identifying similar burial sites, it provides us with a large database to compare common burial features from. The Xiaohe and the Gumugou cemeteries were communal cemeteries containing consistent and rich information since they were so well preserved. Other burial sites are expected to be complementary in information, to help in the interpretation of the burial practices in the transitional economic and geographical area.

Through analysing differences and similarities in burial elements, I wish to discuss the dispersion of different mortuary traditions. If such cultural dispersion of burial elements has

ever existed, it can further be questioned whether they moved with the migration of population and acted as part of identities, or if they were transferred between culturally parallel communities/groups that developed further relations through sharing traditions but also maintaining differences, or if we should understand the development as something else completely.

This research would mainly focus on the mortuary rituals of the Gumugou cemetery and the Xiaohe cemetery. Funeral rituals will primarily be considered from two aspects. On one hand, the centre is with the mourners, who are performers to construct and transform memories and statements about the dead. Memories of ancestors are created and transformed by mourners through ritual funeral actions. On the other hand, the centre is the burial contexts itself, which contain another important element of funeral rituals – the dead. The framework of funeral rituals is constructed through human actions in both inner and outer contexts. The inner context contains the dead body, burial goods, locations of different burial goods in the grave, spaces between bodies and burial goods, and the outer shapes of cemeteries. In general, the dead body locates in the centre, showing his or her crucial importance. The outer environment contains the geographical location of the cemeteries, with environmental settings in which different kinds of materials could be attained, that in turn determines what kind of materials are valuable, what kind of geographical connections there are and what kind of cultural interactions there are that could lead to different cultural development.

This research would apply geographical features and ArcGIS analysis to analyse potential for mobility and zones of interaction surrounding the Tarim Basin, in order to explore possibility for mobility as a way to interpret interaction and cultural complexes. The Eurasian Steppe grasslands connects with the Asian grasslands, and hence provide entrances into China from its frontiers, not only along the Tian Shan and the Altai Mountains, but also through the Mongolian plateau, and the North China Plain (see *Fig. 2 and 3*). Bronze Age cemeteries in frontier areas differed from those in central China. Considering the frontier location of Xinjiang, it is difficult to discuss the prehistoric cultures without looking at its vicinities, like the Bronze Age cultures along the Tian Shan (mountains), the Altai Mountains, and on the Eurasian Steppe (in Central Asia and East Europe). To break up country boundary limitations and construct an integrated geographic context, it helps to understand peoples' living situation and possible cultural contacts. It seems easily for us to tend to think that the Taklamakan Desert in the Tarim Basin has blocked the movement of the Xiaohe-Gumugou people, while as the early occupants came into this region and still different groups arrived there later. Hence, this is something essential to discuss.

This research will also rely on osteological and biological research to provide complementary knowledge and a background for a better understanding of the Xiaohe-Gumugou archaeological cultures. With the development of osteological analysis, and especially ancient DNA, research about the link between archaeological cultures and population groups has gained much interest in recent times. The morphological features of the dead and their appearance can show similarities with contemporary people from different areas, or how different they are. Since ancient DNA makes it possible to trace people's ancestral lineages, it is now possible to discuss how some different burial elements were brought into a society through migration, and explore how a group dealt with potential conflicts of burial traditions arising from interaction between different groups.

Considering the questions outlined above, in this thesis I will attempt to reconstruct the cultural environment surrounding the Tarim Basin and explicate the ecological environment occupied by the Xiaohe-Gumugou people in the Tarim Basin during the Bronze Age, to understand their concepts of death, and how this relates to their social identities. In their burials, people had to deal with the limited access to different resources, and it might be unavoidable to rely mostly on local resources like timbers, ephedra, sheep, and cattle. On the other hand, the ecological environment would reshape their concepts of death with the knowledge accumulated in daily life, which has been inherited as memories from generation to generation. Meanwhile, the mixed population indicate that the first generation buried here might contain some of the

original belief and technologies, while at the same time with new knowledge acquired, in an adjustment to the local environment. By investigating the development of the Bronze Age cultures around the Eurasian Steppe, we would expect to find some common archaeological features both inside and outside the Tarim Basin. From this material, we will continue to look for shifting memories and traces of cultural transition. A key element is the question about the relations between the people living in the Tarim Basin and contemporary nomadic groups from the Eurasian Steppe. The desert environment has shaped the lives of the people living there with local features, but it did not block the way to the outside, or hinder the spread of cultural interactions and influences between different groups during the Bronze Age.

3. The Xiaohe-Gumugou cemeteries and the Bronze Age cemeteries in their surroundings

This thesis will mainly focus on two Bronze Age sites: the Xiaohe and the Gumugou cemeteries in the Tarim Basin. The two main cemeteries shared several burial features, from the way of making coffins to dressing the dead and assembling burial goods inside. The Bronze Age graves found in the Lop Nur area of the Tarim Basin have been typologically grouped as belonging to the Xiaohe cultural horizon (Xinjiang 2011: 6; Mallory 2015). Horizon concept was firstly introduced in American archaeology, and refers to distinct cultures or periods in a large group, which are brought together through periodic cultural patterns and/or typical artefacts (Darvill 2009). Horizon in archaeology generally indicates distinct archaeological cultures in certain geographic areas and time period, which might share similar economic, dressing, living, eating ways and spirits, and are often defined through similar tools, artefacts, burial customs, settlement patterns, etc. The Xiaohe cemetery is located at around 4 km east[1] of the Xiao He (also called as the Small River), which was a branch of the Peacock River, in Ruoqiang county, Xinjiang province. The Gumugou cemetery is located at the northern bank downstream from the Peacock River.

There are some other Bronze Age graves scattered across the Lop Nur region that should be counted as belonging to the Xiaohe cultural horizon, since their burial features are similar to the Xiaohe cemetery. These scattered graves include Grave 36 & 37, Tiebanhe graves M1 & 2, LF, LQ, LS, LT, Yuli-09-Xianshuiquan-Nr.10 graves, Ruoqiang-09LE04 & 50 graves. Grave 36 and Grave 37 are located in the western part of the Lop Nur area; M1 and M2 in Tiebanhe area and the northern part of the Lop Nur area; LF, LQ, LS, LT from Stein (1928)'s survey in the western and northern parts of the Lop Nur area; Yuli-09-Xianshuiquan-Nr.10 graves in the northern bank of the Peacock River; Ruoqiang-09LE04/50 graves in the northern part of Lop Nur area.

The Keliyahe northern cemetery was found in 2008, and recognised as belonging to the Xiaohe cultural horizon. The cemetery is located at the downstream part of the Keliya River in the southern part of the Tarim Basin, and the cemetery area is as long as 50 m, wide as 30 m. There are also some graves recently found in the Ruoqiang area, discovered during the third national survey of immovable cultural heritage from year 2007 to 2011. Unfortunately, before it was processed to excavate in 2011, the whole cemetery had been plundered and most things were gone (Zhang 2017). These graves have also been defined as belonging to the Xiaohe cultural horizon. Since most of the scattered graves have been plundered and do not provide much useful information for comparison of burial contexts and goods, they will not be further discussed here. (see *Fig. 4*[2])

The Xiaohe cultural horizon in the Lop Nur region is thought to be related to two nomadic cultures in the Eurasian Steppe, namely the Afanasievo culture and the Andronovo culture. The Afanasievo culture (3300-2300 BCE) was thought to derive from the Repin culture in the Pontic-Caspian steppe, and firstly appeared in the western Altai mountains then reached the Irtysh River

[1] There is one report describing the location of the Xiaohe cemetery as "at the west of the Small River", while based on all other reports and the coordinates of the Xiaohe cemetery, it should be located to the east of the Small River.

[2] In the upper map of *Fig.4*, the point of the Keliyahe northern cemetery is only an indication of its location. Its exact location is not mentioned in any published reports or books. This point was made based on the its location description "in the downstream part of the Keliya River", not like other points which were based on decimal coordinates or digitized maps.

of western Siberia, and the Ob and Yenisei rivers in Minusinsk Basin (Anthony 2007: 300–317). The Andronovo horizon/cultural complex (2000-900 BCE) was widely spread in the steppes from the east of the Urals to the Yenisei River in the north of Altai mountains, and the Amu Darya River in Central Asia (Anthony 2007: 448–456). The common features of the Afanasievo burials and the Andronovo burials here were: low burial mounds, circular stone cromlechs/kerbs, and stone-pit graves in centre. The features of burial mounds, circular stone kerbs and stone-cists made of stone slabs can be commonly observed from the cemeteries of the surroundings of the Tarim Basin since the late Bronze Age. Hence, in order to understand the Xiaohe-Gumugou cemeteries, it is necessary to have an overview of the different burial customs in the surroundings of the Tarim Basin and the shift in burial customs.

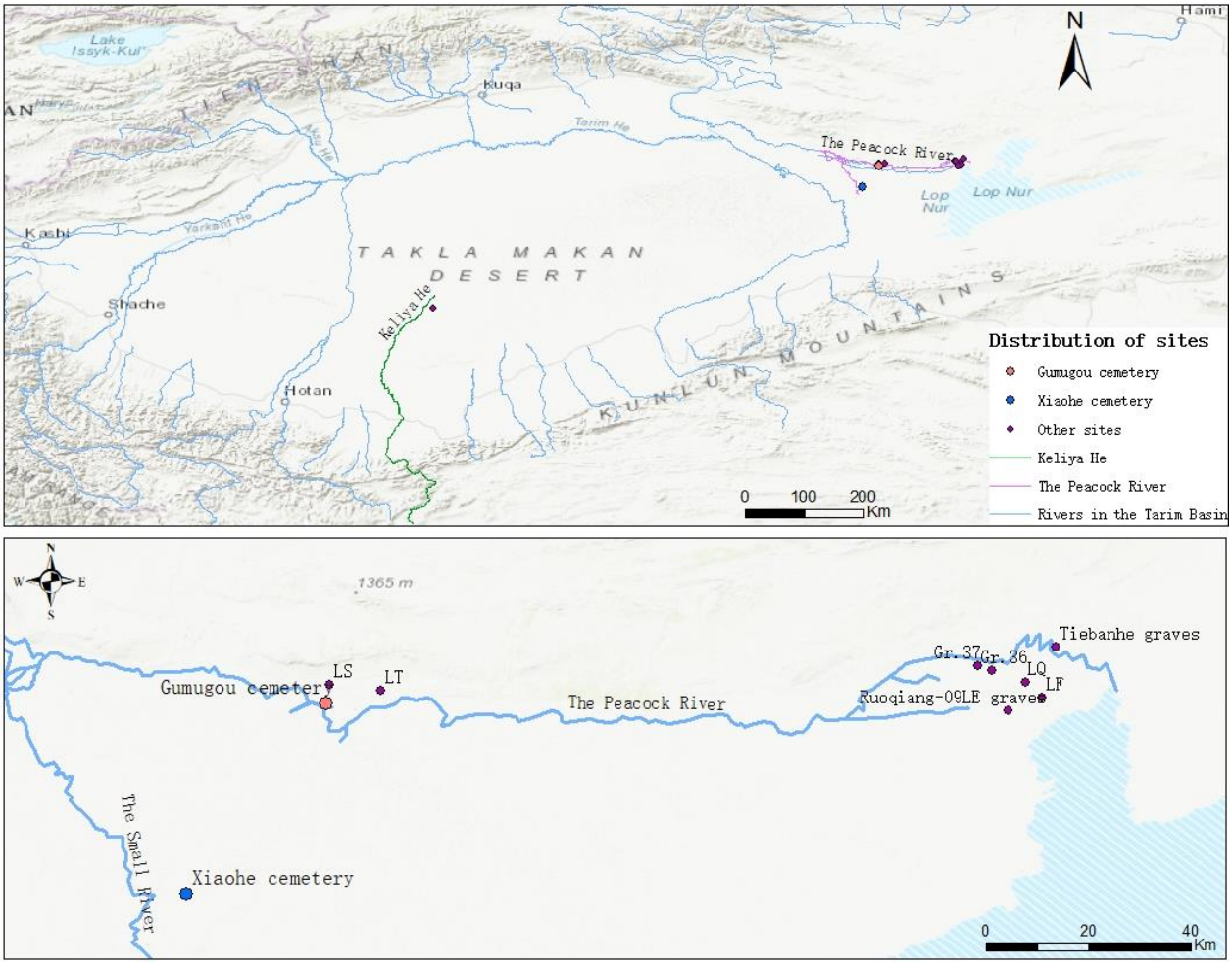


Figure 4 The distribution map of the sites in the Xiaohe cultural horizon

(The Gumugou cemetery decimal coordinates:88.91667,40.66667; the Xiaohe cemetery decimal coordinates:88.6725,40.3364; the location of the Keliyahe northern cemetery is only an indication.)

3.1. The Xiaohe cemetery

The Xiaohe cemetery is a communal cemetery consisting of five layers of phases. The cemetery was constructed on a sand hill. The constructions of the graves from different phases accumulated as layers upon layers have resulted in a much larger elliptic-shaped sand hill. The hill is up to 7.75 m high,74 m long, and 35 m wide. Because of the strong seasonal wind from northeast, the eastern part of the sand burial mound is a gentle slope, and the western slope is rather steep. There is a big wooden palisade-wall in the middle of the burial mound, and a small

shorter wooden palisade-wall at the edge of the steep western slope. Both palisade-walls run from northwest to southeast. The dead were buried in boat-shaped wooden coffins without bottoms, covered by wooden lids and cattle hides. Several of the dead bodies have been naturally mummified in the arid environment of the desert, and textiles and organic materials have been well preserved.

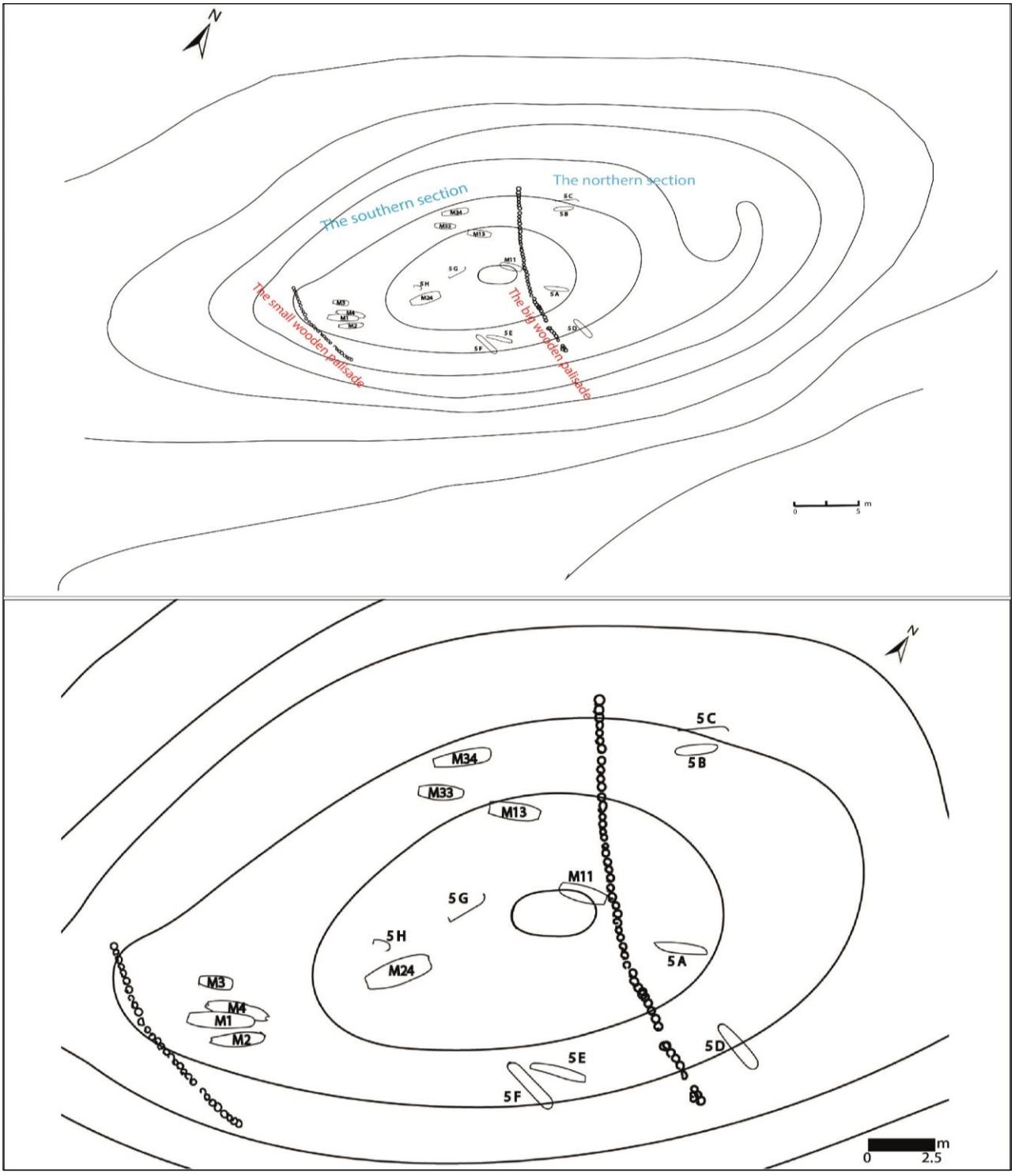


Figure 5 The plan of the Xiaohe cemetery in the study scope

(Constructed from different report resources)

The Xiaohe cemetery contains more than 179 graves. Swedish archaeologist Folke Bergman (1939) first discovered and surveyed twelve graves in the cemetery in 1934. The cemetery was

named after “Cemetery 5” or “Ördek’s necropolis” at that time. Bergman’s team explored four burial spots along the Small River including place 4, 5, 6, and 7. Cemetery 5 was found at spot 5. Graves in burial place 6, 7 and 4 (all in poor condition) were significantly different from Cemetery 5 and dated to much later periods than Cemetery 5, considering the silk materials of their dead’s clothes. The twelve graves of the Cemetery 5 were numbered as 5.A, B, C, D, E, F, G, H, I, J, K, L. Grave 5.A was untouched and well preserved. Graves 5.B-F were found plundered but still in situ. The remaining graves 5.G-L were moved from their situ. Since Bergman did not excavate the cemetery to its full depth, these twelve graves would be assumed as belonging to the first or second burial layers. Later I will also carefully examine the burial features of these twelve graves to see if they are consistent with that of the top burial layers excavated by the Institute of Cultural Relics and Archaeology of Xinjiang (2004, 2007) since 2002.

The complete excavation of the Xiaohe cemetery was carried out by the Xinjiang Institute between 2002 and 2005. 167 graves were excavated. The whole cemetery mound was divided as a northern section in the northeast of the middle palisade-wall, and a southern section between the two palisade-walls. In the northern section, there were twenty-eight graves in two burial layers. With the strong wind blowing from northeast, the graves in the northern section had been eroded and were not well preserved. In the southern section, there were 139 graves in five burial layers. These graves were correspondingly intact and well preserved. Based on the published simplified excavation reports, there are nine graves with detailed information available, including graves M1, 3, 11, 13, 24, 33, 34. Most of the seven graves were intact. They represent graves from different chronological burial layers, which allows us to explore possible changes of burial features over time. Graves M11, 13 belong to the first burial layer. Graves M1, 3, 24, 33, 34 belong to the second burial layer. Graves M2, 4 should belong to the third burial layer, since they were located at the same burial layer and M4 was discovered less than 20 cm under M1. To synthesize all the graves of the Xiaohe cemetery mentioned above, the plan of their distributions and burial layers is shown as *Fig. 5*.

Based on radiocarbon dating, the time period of burials at the Xiaohe cemetery range 2000-1500 BCE (Xinjiang 2011: 8, 2012b: 514) or 2000-1450 BCE (see radiocarbon dating in appendix 3).

3.2. Gumugou cemetery

The Gumugou cemetery is a communal cemetery with two contemporary types of burials, one sun-radiating-spokes burial type and one type similar to the boat-shapes coffins in the Xiaohe cemetery. The cemetery area is an elliptic-shape sand area 45 m long and 35 m wide.

The Gumugou cemetery contains forty-two graves. The cemetery was excavated in 1979, directed by Wang, Binghua (2014). The full excavation report was recently published in 2014, 35 years after the excavations. It seems that some information has been lost since the excavations in 1979. The preservation of organic materials and textiles in the graves are not as good as in the Xiaohe cemetery.

There are six graves belonging to type I: the sun-radiating-spokes burial pattern, including graves 79LQ2M1, 6, 7, 8, 9, 10. These graves are located in the northern part of the cemetery area in two parallel lines. The reason that the graves have been called “sun-burial” is that each grave was enclosed by seven concentric rows of wooden poles standing tightly in an ellipse shape (see *Fig. 6 and Fig. 8*). Outside the ellipse-shaped palisade of the grave, there are additional wooden poles standing in rows in a radial pattern from the edge of elliptic palisades outwards. From remaining patterns of ash, it has been interpreted that the dead might have been buried in wooden rectangular coffins at the centre (Wang 2014: 15-32).

The remaining 36 graves belong to type II: the normal and main pattern, which shares a lot of burial features with Xiaohe cemetery. These graves are: 79LQ2M2, 3, 4, 5, 11, 12, 13, 14, 15,

Figure 6 Plan of the Gumugou cemetery (Modified from: Wang 2013)

16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42 (see *Fig. 6*). These graves are located in the southern and south-western parts of the cemetery. The construction of each grave consists of two side-planks, wooden boards as lid, and with no bottoms to the coffins. Such construction is similar to that of the boat-shaped coffins in the Xiaohe cemetery.

The two types of graves stratigraphically overlie each other, so they would be from the same time period. The dating of the cemetery has been argued extensively, since the early radiocarbon dating shows a time gap of more than a thousand-year between 3650±60 BP and 2120±105 BP (Han 1986). Based on the later radiocarbon dating, the time period of the Gumugou cemetery is estimated to have been around 1900-1800 BCE (Wang 2014: 167, 2017) or around 1800 BCE (Xinjiang 2011: 10).

3.3. Bronze Age archaeological cultures in the Tarim Basin and its surroundings

In Bronze Age Xinjiang, burials were diverse but also show some common features between different geographic sections. The main three mountains, including Kunlun Mountains, Tian Shan (mountains) and Altai Mountains, enclose the Tarim Basin, and the Dzungaria Basin, but

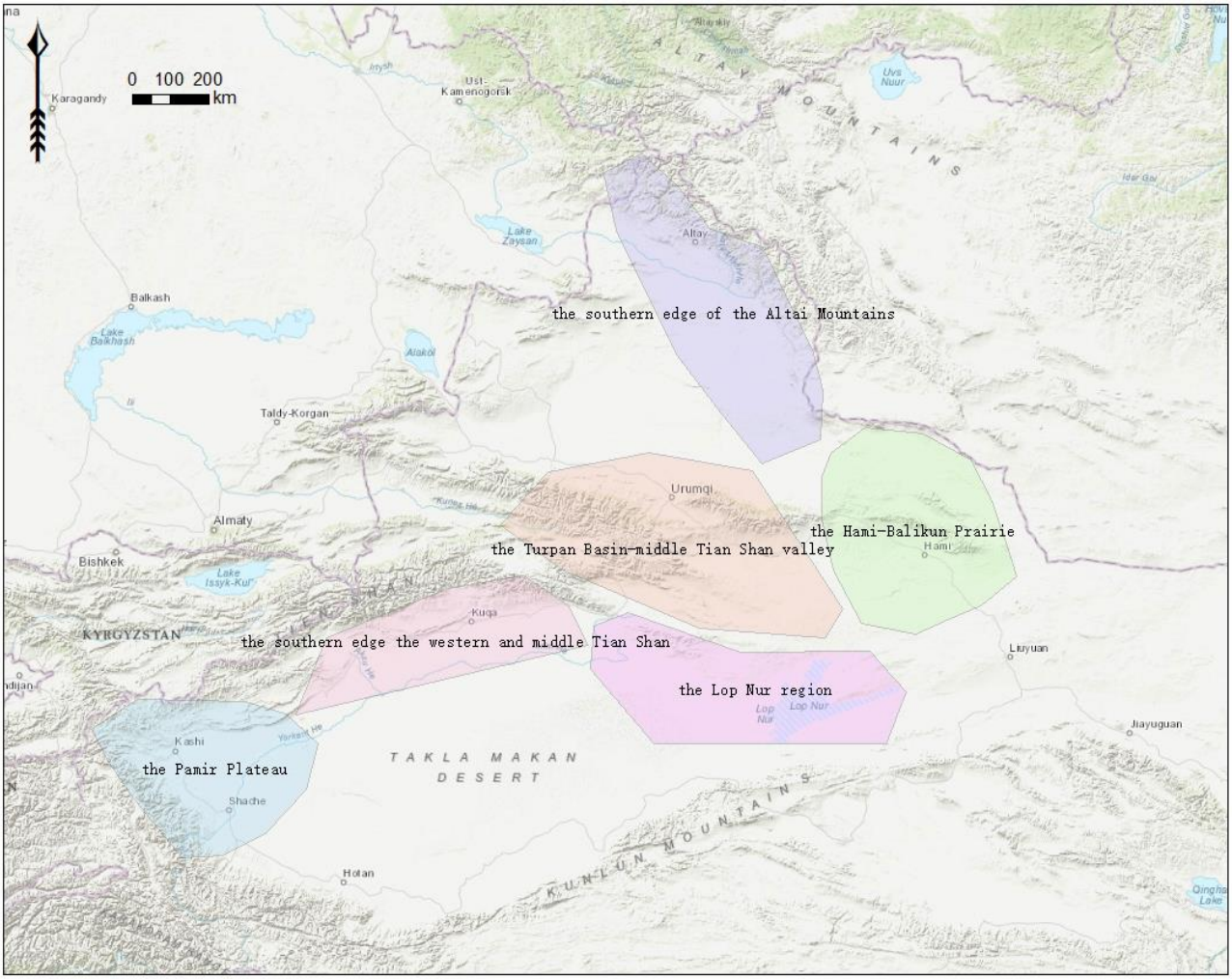


Figure 7 The area-division of the Tarim Basin and its surroundings

(The division is made based on the mountain ranges including the Altai Mountains, the Tian Shan, and the Kunlun Mountains, and also the distribution of ancient cemeteries in the whole Xinjiang generally.)

leave the eastern part of the Tarim Basin and the south-eastern part of the Dzungaria Basin open (with easy access to the surroundings). The Hami Basin is located at the transitional area, connecting the two basins. Burials are mainly spread along the edge of the mountain ranges. The main geographical sections that I will describe include the Lop Nur region, the southern edge of the Altai Mountains, the Hami Basin-the Balikun Grassland, the Turpan Basin-the middle part of Tian Shan, the southern edge of the western and middle part of Tian Shan, and the Pamir Plateau (see *Fig. 7*).

3.3.1. The Lop Nur region

In the Lop Nur region, the Xiaohe cemetery (2000-1450 BCE) and the Gumugou cemetery (1900-1800 BCE) had many common features shared (see *Fig. 8*), and so is the Keliyahe northern cemetery:

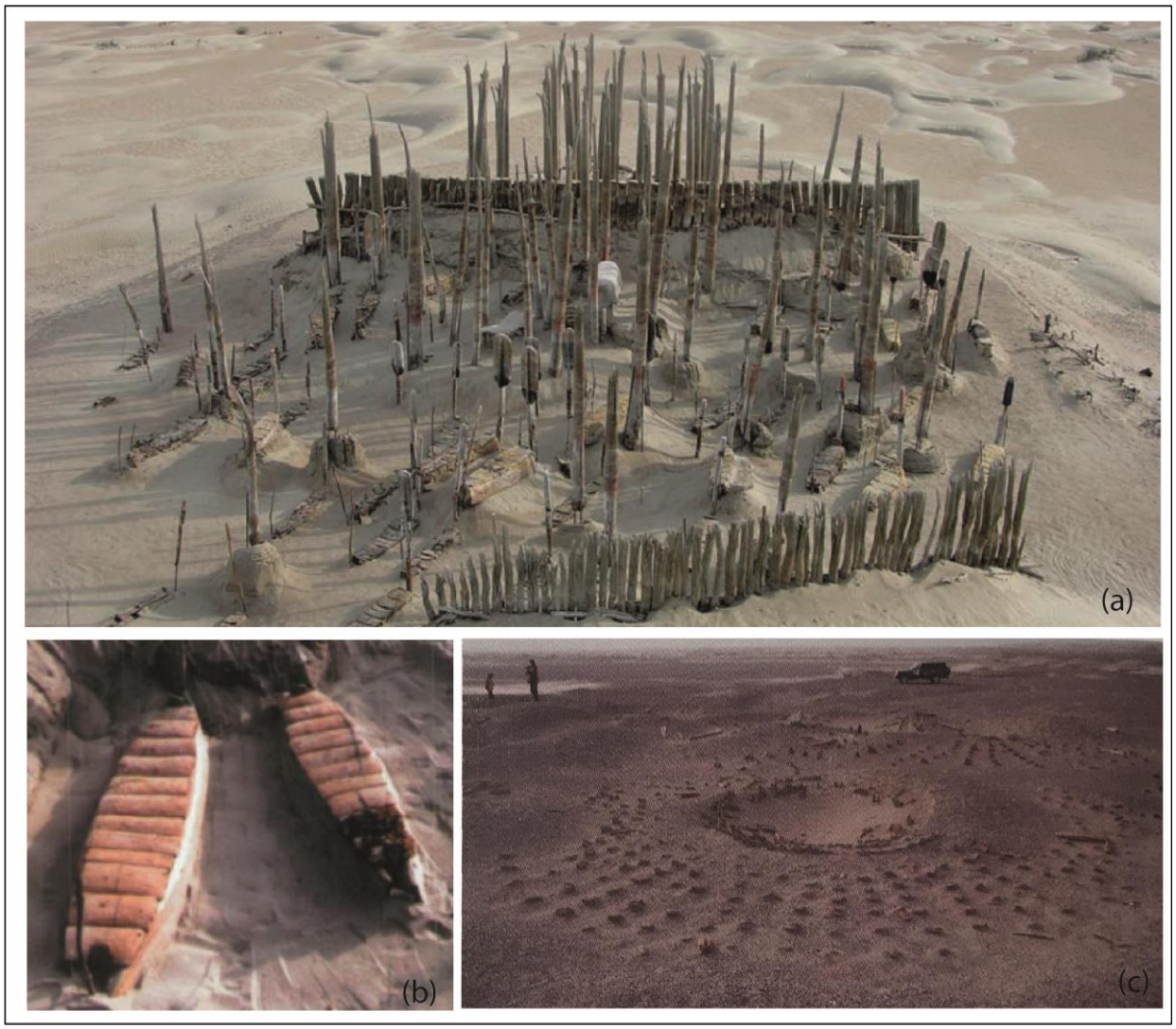


Figure 8 Images to give a preliminary impression on the Xiaohe and the Gumugou cemeteries

(a). An overview of the Xiaohe cemetery 4th-5th layers in the southern section (Source: Xinjiang 2011, 7)

(b). M2 and M4 after removed the cattle hides in the Xiaohe cemetery (Source: Xinjiang 2004)

(c). The sun-radiating-spokes burial type of the Gumugou cemetery (Source: Xinjiang 2011, 10)

- Cemeteries were located in sandy areas;
- Rectangular/boat-shaped wooden coffins with monuments of wooden planks or poles;

- Coffins had no bottoms;
- The dead were placed lying straight on the back;
- The dead were commonly buried in single graves.

The Gumugou cemetery contained six special sun-radiating-spokes burial pattern in addition to the normal burials, which were similar to the wooden coffin graves of the Xiaohe cemetery.

3.3.2. The southern edge of the Altai Mountains

At the southern edge of the Altai Mountains area, the main representative cemetery is the Qiemu'erqieke cemetery (2000 bce-?) (*see Fig. 9*). The main burial features here were:

- Rectangular stone pit graves, formed of huge stone slabs as pit floors and walls;
- Burial mounds, consisting of either earth or stones;
- Stone slabs erected as a rectangular or circular kerb, sometimes centred a stone cist;
- Human stone sculptures, erected as a monument;
- The dead were mainly placed lying straight on the back;
- There were both a single dead or multiple dead in one grave.

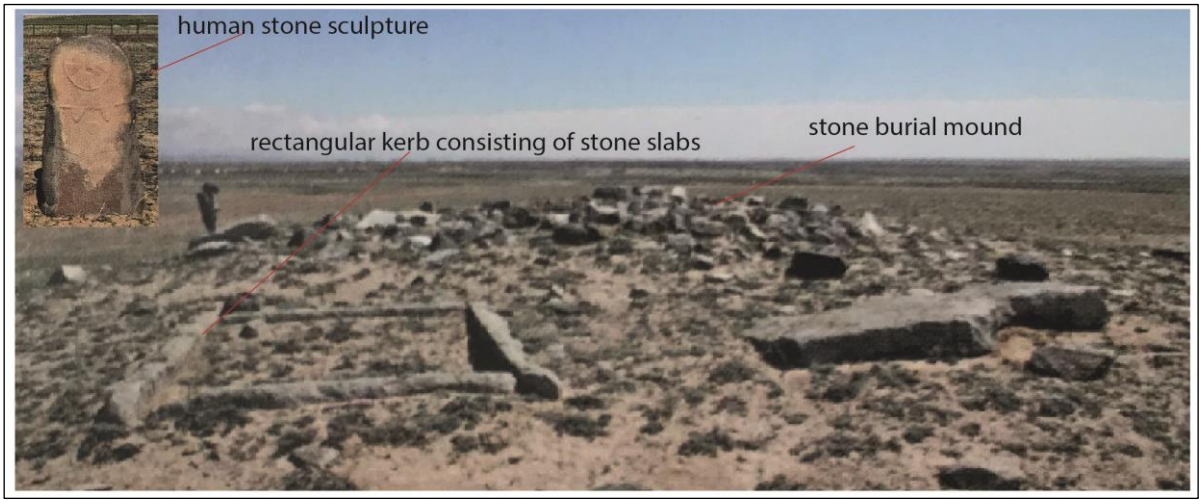


Figure 9 A representative site of the Qiemu'erqieke cemetery horizon

(Adapted from: Xinjiang 2011, 244)

Burials in the Qiemu'erqieke cemetery at the southern edge of the Altai Mountains had obvious steppe burial features, with the stone-pits, circular or rectangular stone kerbs, and burial mounds. The burial features strongly indicate cultural links with the Andronovo culture in the southern Siberia.

3.3.3. The Hami Basin-the Balikun Grassland

The Hami Basin-the Balikun Grassland area is located at the eastern part of Tian Shan (see *Fig. 7*). The area is divided in a northern basin and a southern basin by the east-west stretch of the Tian Shan. In the Hami Basin-the Balikun Grassland area, the main type of burials were earth-pit graves in the early Bronze Age, and burials of stone-pit with barrows became more common in the late Bronze Age. The Hami-Tianshan-Beilu cemetery is a representative of the earth-pit graves. The features of the Hami-Tianshan-Beilu cemetery (2000-1500 bce) here were:

- Rectangular earth pit graves;
- The dead were often in a hocker position lying on one side;
- Commonly a single dead in one grave.

The Hami-Wubu cemetery (earlier than 1000 bce) and the Yanbulake cemetery (1200-600

Figure 10 Some representatives of stone burials in the Hami Basin-the Balikun Grassland in the Iron Age
(Adapted from: Xinjiang 2011, 29-41)

bce) are representatives of another common earth-pit graves. Common features here were:

- Rectangular earth pits, with two storeys and/or roofed with wooden boards;
- The dead was placed in a hocker position lying on one side;
- Mostly a single dead in one grave.

Later there appeared more stone-pit graves (see *Fig. 10*) in this area, and the features can be summarized as:

- Round burial mounds, commonly constructed by stones or a mix of stones and earth;
- Burial mounds with a sunken top or a normal (dome) top;
- The diameter of the burial mounds varied between 3 and 25.4 m (but not necessarily limited in this scope);
- Circular or rectangular stone kerbs;
- Rectangular stone pits, constructed by earth, or stones, or a mix of earth and stones;
- Rectangular stone pits contained wooden coffins (represented by the Yiwu Baiqi'er cemetery).

In the Hami Basin, the Bronze Age cemeteries show common burial features like earth pits and hocker position of the dead. With similar pottery styles in the Hami-Tianshan-Beilu cemetery to those in the Machang and Siba cultures (Xinjiang 2011: 17), it suggests possible cultural influence or people's migrating from the Hexi Corridor in the east.

In the Balikun Grassland, burials in an earlier time contained mostly earth-pit graves but also a small number of stone-pit graves. The pebbles were imbedded in the floors and the walls of the graves in a rectangular shape, e.g. the Balikun-Nanwan cemetery (1600-1000 bce). In a later time, there appeared huge burial mounds with a sunken top, and with the diameters of the burial mounds varying from 3 to 25.4 m, e.g. the Balikun-Dongheigou cemetery and the Balikun-Heigouliang cemetery. The Yiwu-Bai'erqi and the Yiwu-Kuola cemeteries contained either round stone burial mounds or circular stone kerbs on the ground surface. Considering the three burial elements including burial mounds, stone pits and circular kerbs, the later period cemeteries in the Balikun Grassland were actually similar to cemeteries from the southern edge of the Altai Mountain area.

3.3.4. The Turpan Basin-the middle part of Tian Shan

Turpan Basin is located at the western part of the Hami Basin, and lies at the southern edge of the eastern Tian Shan (see *Fig.7*). In the Turpan Basin-the middle part of Tian Shan area, the main representative of the Bronze Age cemeteries is the Yanghai Nr.1 cemetery. The features here were:

- Elliptic earth pit graves, commonly covered by round logs on the top;
- Some graves contained burial beds made of round logs or reeds;
- The dead were mainly placed lying straight on the back;
- Mostly a single dead in one grave.

In Iron Age, the stone burials became dominant, but the stone burials varied in different regions of the Turpan Basin-the middle part of Tian Shan area. Graves containing burial mounds, stone pit, and circular stone kerbs (see *Fig. 11*) are represented by the Shanshan-Ertanggou cemetery, the Tuokexun-Alagou cemetery, the Urumqi-Chaiwobu cemetery and the Urumqi-Yizihu-Sayi cemetery, etc. The stone funeral construction features here are similar to those contemporary cemeteries in the Hami Basin-the Balikun Grassland area.

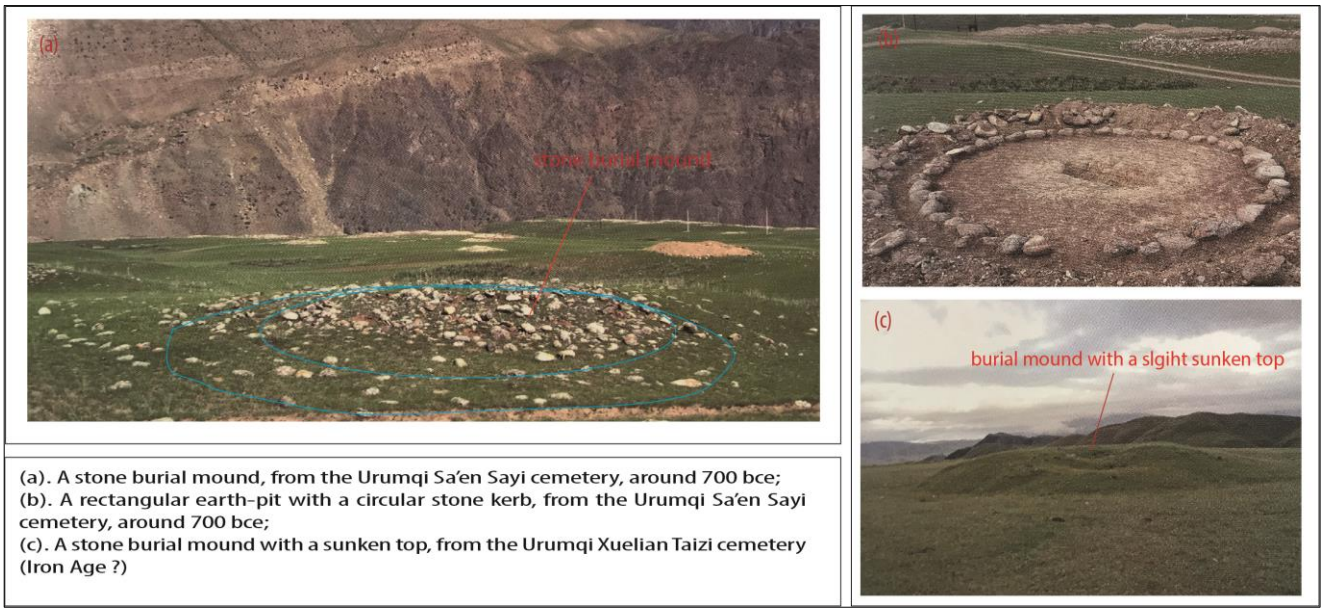


Figure 11 Some representatives of stone burials in the Turpan Basin-the middle part of Tian Shan in the Iron Age
(Adapted from: Xinjiang 2011, 67-69)

3.3.5. The southern edge of the western and middle part of Tian Shan

In the southern edge of the western and middle part of Tian Shan area, the main representatives of the late Bronze Age cemeteries are the Hejing-Chawuhu Nr.4 cemetery (around 1000-500 bce), the Hejing-Xiaoshankou cemetery, the Baicheng-cemetery, etc. The main burial features of the late Bronze Age and the early Iron Age cemeteries (see *Fig.12*) here were:

- Burial mounds, constructed by stones or a mix of stones and earth;
- Irregular circular or rectangular stone kerbs;
- Stone pit graves in a bell-shape or a rectangular shape;
- Stone pit graves constructed by imbedding pebbles or stone slabs in walls and floors;
- The dead were often placed lying on their back with bent legs;
- The dead were commonly reburied a second time with multiple burials.

From the late Bronze Age to the early Iron Age in this area, the burial traditions tended to be in a more varied way. In the stone burials with stone kerbs, there is a mixture of stone pit and earth pit graves. The burial features of the Iron Age cemeteries in this section were similar to those contemporary both in the Hami Basin-the Balikun Grassland area and in the Turpan Basin-the middle part of Tian Shan area.

3.3.6. The Pamir Plateau

A typical Bronze Age cemetery from the Pamir Plateau area is the Tashenku'ergan-Xiabandi cemetery (around 1000-500 bce). The burial features here were:

- Mainly inhumations, but also a few cremations;
- Burial mounds, constructed of stones;
- Irregular circular or rectangular stone kerbs;
- Mostly a single dead in one grave;
- The dead was placed in a hocker position lying on one side.

a.1 A stone pit grave constructed by impeding pebbles
a.2 An overview of the Nr.1 cemetery zone (From the Hejing Chawuhu cemeteries, the late Bronze Age)

b.1 A stone burial mound enclosed by a circular stone kerb, from the Hejing Haoteke Nr.1 cemetery (Iron Age ?)
b.2 A stone burial mound enclosed by a rectangular stone kerb, from the Hejing Wula Hadebei cemeteries (Iron Age ?)

c.1 A stone pit grave constructed by stone slabs
c.2 Reburied in a second time with multiple burials
c.3 a stone pit grave enclosed by a circular

Figure 12 Some representatives of stone burials in the southern edge of the western and middle part of Tian Shan
(Adapted from: Xinjiang 2011, 101-117)

3.3.7. A summary

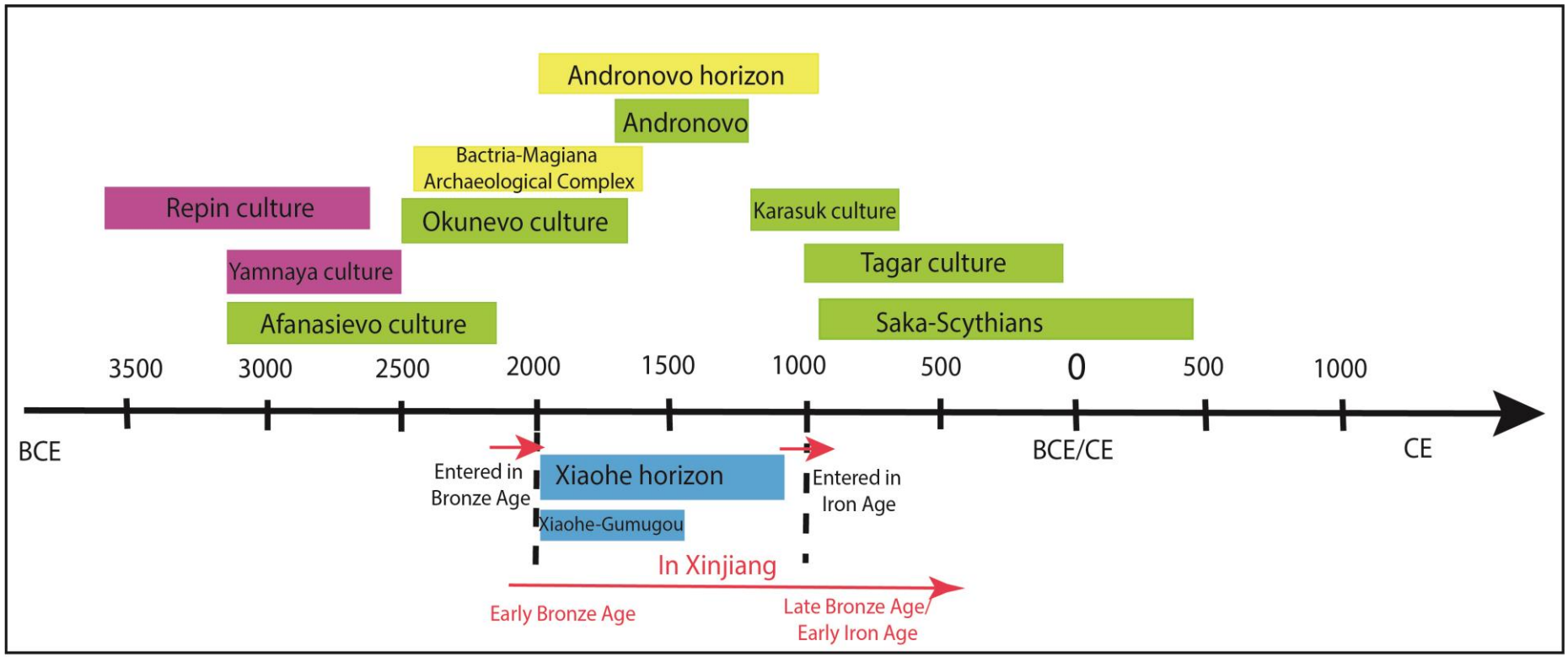
In the early Bronze Age, there are distinct regional differences in the burial customs (see *Table 1* about summarized and compared burial features) in and surrounding the Tarim Basin. At the southern edge of the Altai Mountains area, the burial customs included stone burial mounds, stone pit graves, circular or rectangular stone kerbs and stone human sculptures; the dead were placed lying straight on the back. In the Hami Basin-the Balikun Grassland area, the burial customs included earth pit graves; the dead were placed in a hocker position lying on one side. In the Turpan Basin-the middle part of Tian Shan area, the burial customs included earth pit graves; the dead were placed lying straight on the back. In the Lop Nur region, the burial customs included wooden coffins buried in sand; the dead were placed lying straight on the back.

But from the late Bronze Age to the early Iron Age (see *Fig. 13* about the timeline covering all relevant archaeological sites in this study), there was a common shift in burial customs from earth pit graves to stone burials in the Hami Basin-the Balikun Grassland area and in the Turpan Basin-the middle part of Tian Shan area. The main features of the stone burials include stone burial mounds, circular or rectangular stone kerbs, and the stone pit graves in the cemeteries. Similar stone burial customs commonly appeared at the southern edge of the western and middle part of Tian Shan area and the Pamir Plateau area in Iron Age. The burial features in most areas are in a mixture of both the earth pit graves and stone pit graves, especially in the Hami Basin-the Balikun Grassland area and the Turpan Basin-the middle part of Tian Shan area.

Table 1 The comparisons of burial customs in the six divided areas in Bronze Age and Iron Age

	Burial mound	**Grave**	**Coffin**	**Outside grave**	**The body**	**Time period**
LN	No	In sand	Wooden coffin	Wooden monument	Lying straight on back	2000-1500 BCE
sAM	Earth or stones	Stone pit	Stone slabs	Rectangular/circular stone kerb; stone monument	Lying straight on back	2000 bce-
HMB-BLK	-	Earth pit	No	No	Hocker position	2000-1500 bce
	No	Earth pit	No; some wooden boards to cover on top	No	Hocker position	Earlier than 1000 bce; 1200-600 bce
	Earth and stones; some with sunken tops	Earth, stone pit	No; stone cist; wooden coffins	Circular stone kerb	-	Later time, in Iron Age?
TB-mTS	No	Earth pit	Covered by round logs on top; some burial beds made of logs	No	Lying straight on back	2000-1000 bce
	Some mounds with sunken tops	Stone pit; earth pit	Stone pebbles; logs to cover	Circular stone kerb	Lying straight on back; hocker position	After 770 bce
sw&mTS	Stone and/or sand	Stone pit; earth pit	Stone pebbles; some wooden coffins	Irregular circular/rectangular stone kerb	Lying on back with bent legs; commonly reburied in a second time	1000-500 bce
	Stone and/or sand, some with sunken tops	Stone pit; earth pit	Stone pebbles; stone slabs; some wooden coffins	Irregular circular/rectangular stone kerb	Lying on back with bent legs; hocker position	500-220 bce
PP	Stones	Earth pit?	No	Circular/rectangular stone kerb	Hocker position	1000-500 bce

Note: LN=the Lop Nur, sAM=the southern edge of Altai Mountains, HMB-BLK=the Hami Basin-the Balikun Grassland, TB-mTS=the Turpan Basin-the middle part of Tian Shan, sw&mTS=the southern edge of the western and middle part of Tian Shan, PP=the Pamir Plateau, -=Unknown.



Note:

1. The time period chosen: Repin: 3700-2880BCE; Yamnaya: 3300-2500BCE; BMAC: 2400-1600BCE; Afanasievo: 3300-2300BCE; Andronovo in Minusinsk Basin: 1800-1400BCE, Andronovo horizon: 2000-900BCE; Karasuk: 1400-800BCE; Tagar: 1000-200BCE; Saka-Scythians: 900BCE-400CE.
2. The location chosen: In the Pontic-Caspian steppe: Repin, Yamnaya. In the Central Asia: Andronovo horizon, BMAC. In the Minusinsk Basin: Afanasievo, Okunevo, Andronovo, Karasuk, Tagar, Saka-Scythians.

Figure 13 A rough timeline of related archaeological sites

4. Analyses of the burials from the Gumugou and the Xiaohe cemeteries

In this chapter I will make an in-depth examination of the Gumugou cemetery and the Xiaohe cemetery. The main focus is on the burial customs and how the dead has been treated in each cemetery, by looking at the way to make coffins, how the dead has been dressed, what burials goods were accompanying the dead, and also what special burial goods that might be presented in the graves. This will result in a comparison of the burial traditions of the two cemeteries.

It is worth noting there are some differences in the treatment of the female dead and the male dead in the Xiaohe cemetery. The differences in burial customs associated with gender will be analysed in detail as it can be expected that gender had played an important role in the burial customs here. Such different treatment of gender is not observed from the Gumugou cemetery.

There is an extensive material of burial goods available from the excavations of the Xiaohe cemetery. Common burials goods include baskets, tamarisk twigs, grains, tendon-made strings, especially Ephedra[3] twigs, animal ears and arrows. For some special burials, the amount of Ephedra twigs, animal ears and arrows (in male graves) is considerably larger, which I think is a way to show the special social status/position of the dead in the Xiaohe society.

It is common to see different wooden sculptures in both the Xiaohe and the Gumugou cemeteries. The wooden sculptures are in different format with different functions. Some can be observed from both cemeteries, such as carved wooden masks with protuberant human facial features as burial goods in graves; some can be only found in one of the cemeteries, such as whole wooden sculptures covered with animal hides to represent the dead in the Xiaohe cemetery, carved small wooden sculptures of human images as burial goods in the Gumugou cemetery, and high carved wooden sculptures of human images as monuments in the Xiaohe cemetery.

4.1. The burial customs in the Gumugou cemetery

There are forty-two graves in the Gumugou cemetery, that can be divided into two burial types: type I and II. Burial type I represents the sun-radiating-spokes burial pattern, and consists of only six graves. Burial type II is the general burial pattern of wooden-coffin graves, which is similar to the Xiaohe cemetery, and contains thirty-six graves. In total, there are thirteen females, fifteen males, thirteen children/infants, and one of unknown sex (see *Table 2*). All the six dead in burial type I are adult males.

Table 2 The statistics of sex and adults-children in the Gumugou cemetery

Sex	*Count of coffins*
Adult females	13
Adult males	15
Children/infants	13
Unknown	1
Grand Total	42

Burial type I and II have quite different formats in the construction of graves. In type I, the sun-radiating-spokes type (see *Fig. 6, 8, and 14*), the coffins and most burial goods have been

[3] Ephedra is a kind of green plant, commonly used for medical purposes.

decomposed and are not preserved. But from the shape of burial pits and remains of wood, it is clear that the graves are in rectangular shapes, and the dead were buried in wooden coffins. Above the ground, the graves have special sun-radiating-spokes burial mounds, which are constructed by a lot of wooden poles. In the centre is a rectangular wooden coffin buried the dead. Around the coffin are seven concentric circles of wooden poles standing in an elliptic shape at regular intervals. The wooden poles are gradually thicker and thicker in diameter, and higher and higher in height from the inner circles to the outer circles. The height of the poles is from around 10 cm to 1 m or more. The long-diameter of the innermost concentric circle of wooden poles varies between 2.8 m to 4.5 m, and the short-diameter varies between 1.8 m to 2.5 m. Outside the concentric circles of wooden poles, are wooden pole-rows in a radiating-spokes shape. And each row usually consists of seven wooden poles in a line.

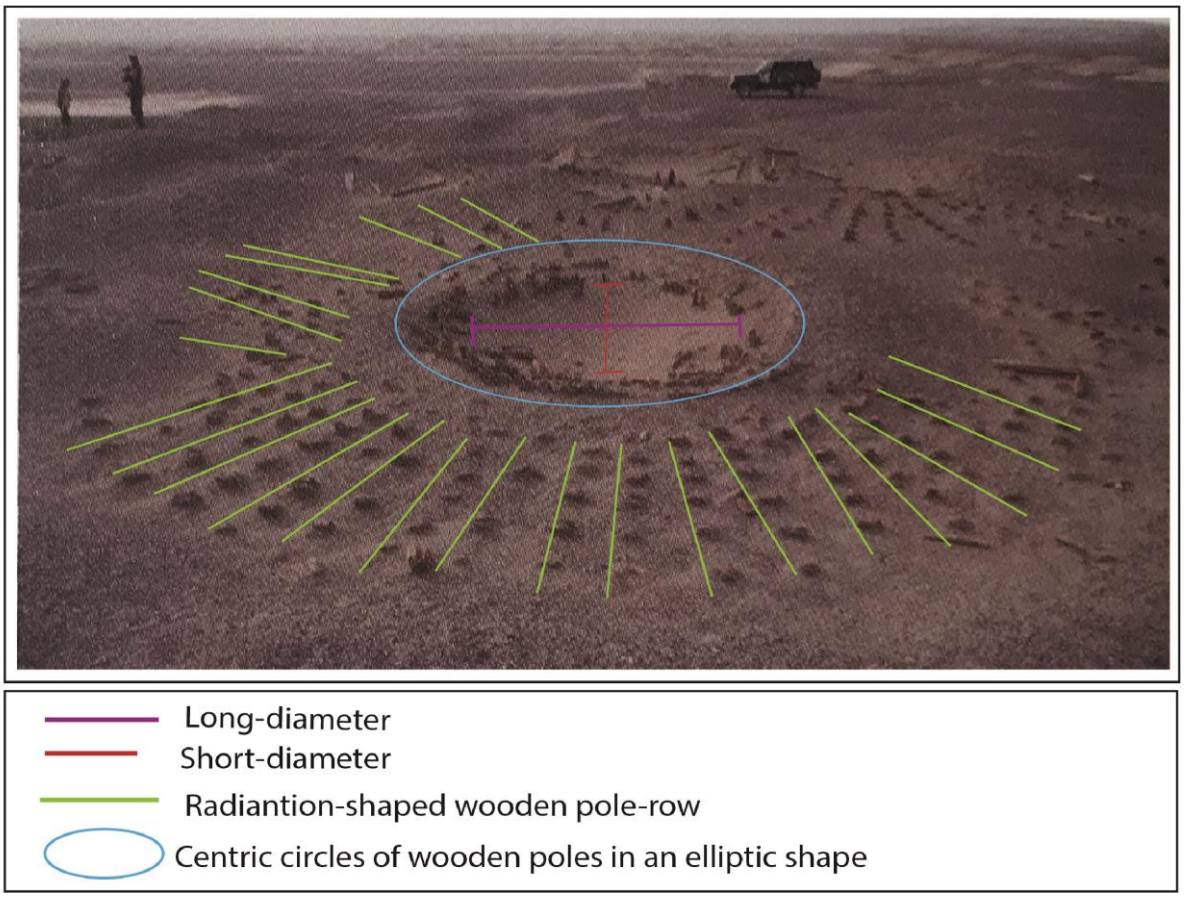
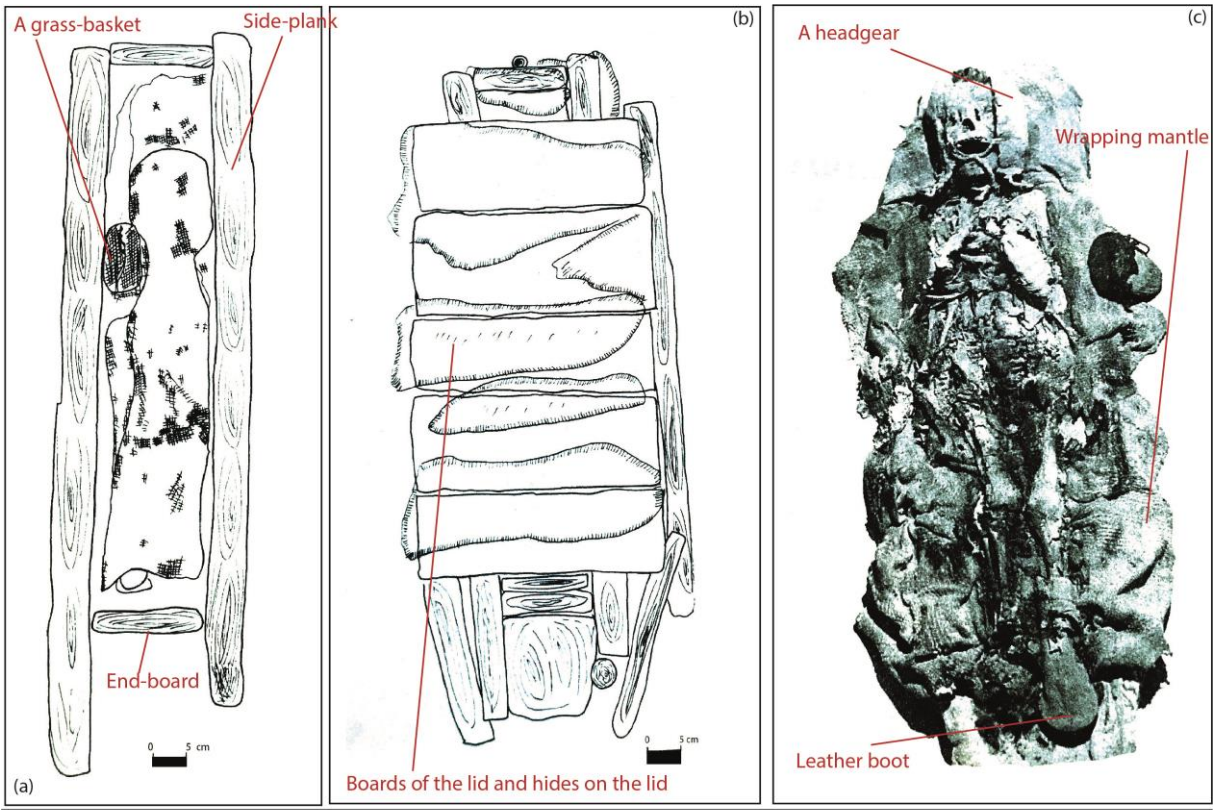


Figure 14 The sun-radiating-spokes burial type from the Gumugou cemetery
(Adapted from: Xinjiang 2011, 10)

In burial type II, the general burial type (see *Fig. 6, and 15*), the way to bury the adult females, males and the children/infants are quite similar (see *Table 3*). The graves are rectangular pits with wooden coffins to bury the dead. Coffins have no bottoms but covered with wooden boards and some livestock hides.

The construction of the coffins in the Gumugou cemetery is the same for the adult males, females and children/infants. Most coffins consist of two long straight side-planks, two end-boards connecting to the side-planks, and a lid formed by several short boards that are not fixed together (see *Fig. 15*). But M3 has a special construction as its side-planks are formed by nine short separated boards instead of two intact long planks. The coffins are in a rectangular shape, and the head section of the coffins is often wider than the feet section. The head end-board is often longer than the feet end-board. In some cases, there are several end-boards standing together at the section of the coffin, like for M26 with three end-boards and M38 with two. The

coffins are covered by a few hides of sheep/goats skin to prevent sand from entering in, but not all the coffins have something to cover the lids. Burial M17 has three pieces of cattle-hides instead of sheep/goats-hides, and M38 has hides together with cloth. M23 has a worn dust-pan like container on the lid at the feet end of the coffin. The coffins generally lie in an E-W direction, and the head of the dead is always placed in the east end of the coffin. The special feature of the coffins is that they have no floor, so the dead are placed directly on the ground.



(a). The coffin M5 consisted of two side-planks, two end-boards; the dead was wrapped with a big mantle, and placed on the floor of the ground.
(b). The coffin M5 was covered by five boards as a lid, then four pieces of sheep/goats hides on the lid.
(c). The naturally mummified infant dead

Figure 15 An example of the normal burial type (type II), the infant grave M5 from the Gumugou cemetery (Background images adapted from: Wang 2013, 45-46)

For the male burials, there are two multi-burial graves. Grave M30 contains two males, and grave M41 have three male individuals buried. M30 and M41 are also wider than others in size. Except for using wooden boards to cover the coffin, M30 has a piece of red mat to cover at the feet end of the coffin. Above M35, there is a bunch of Ephedra twigs, six cattle and sheep/goats horns, and a carved jagged wooden object. These objects were found 47 cm above the surface of coffin M35.

The infant or children burials are generally smaller than the adults' burials. It is common to see that sheep/goats hides and or other animal hides are used to cover the coffins. Grave M13 has no end-board. Grave M2 is made from a tree trunk to a body container, by cutting and firing the centre of the trunk to make it hollow. The head-end of the trunk-coffin is intact, and through the feet-end is a square hole drilled. Above M24, in addition to the sheep/goats and animal hides covering on the lid, there are also two dust-pan like containers at the feet end of the coffin.

Table 3 The comparison of the construction of coffins as regards adult females, males and children in the Gumugou cemetery

Coffin (79QL2-)	Sex	Shape	Bottom	Side-plank	End-board	Lid-board	Animal-hide	Direcion	Degree (From N)	Head
M3	Female	Rectangular	No	9	2	0	No	NE-SW	80	East
M11	Female	Rectangular	x	2	2	8	Sheep/goats-hide	E-W	x	East
M12	Female	Rectangular	x	2	1	8	Animal-hide	E-W	90	East
M17	Female	Rectangular	No	2	2	6	3 cattle-hide	E-W	90	East
M18	Female	Rectangular	No	2	2	9	No	E-W	x	East
M19	Female	Rectangular	No	2	2	9	No	SE-NW	95	East
M20	Female	Rectangular	No	2	2	8	No	E-W	90	East
M22	Female	Rectangular	x	x	x	x	x	NE-SW	80	East
M23	Female	Rectangular	No	2	2	12	x	NE-SW	75	East
M26	Female	Rectangular	No	2	4	x	1 sheep/goats-hide	E-W	90	East
M34	Female	Rectangular	No	2	2	6	x	E-W	90	East
M38	Female	Rectangular	No	2	3	11	2 sheep/goats-hide; 1 cloth	NE-SW	70	East
M39	Female	Rectangular	No	2	2	9	Sheep/goats-hide	NE-SW	86	East
M42	Female	x	No	2	2	9	x	NE-SW	60	East
M21	Male	Rectangular	x	x	x	x	x	NE-SW	70	East
M25	Male	Rectangular	No	2	2	4	2 sheep/goats-hide	E-W	90	East
M28	Male	Rectangular	x	x	x	x	No	NE-SW	81	East
M29	Male	Rectangular	No	2	2	18	No	NE-SW	85	East
M30	2 Male	Rectangular	No	2	3	8	No	E-W	56	East
M31	Male	Rectangular	No	2	2	9	No	SE-NW	100	East
M35	Male	Rectangular	No	2	2	10	3 animal-hide	NE-SW	75	East
M39	x	Rectangular	No	2	2	9	Sheep/goats-hide	NE-SW	86	East
M40	Male	Rectangular	No	2	2	x	x	NE-SW	85	East
M41	3 Male	Iregular trapzoid	x	2	2	12	x	NE-SW	80	East
M2	Infant	Trunk log	No	1		1	1 sheep/goats-hide	E-W	x	East
M4	Infant	Trapezoid	No	2	2	5	3 sheep/goats-hide	NE-SW	70	East
M5	Infant	Rectangular	No	2	2	5	4 sheep/goats-hide	NE-SW	80	East
M13	Infant	Rectangular	No	2	0	6	No	NE-SW	70	East
M14	Infant	Trapezoid	No	2	2	7	No	SE-NW	95	East
M15	Infant	Rectangular	No	2	2	5	Yes	E-W	90	East
M16	Infant	Rectangular	x	2	2	4	x	SE-NW	100	East
M24	Infant	Rectangular	No	2	2	6	Sheep/goats-hide Animal hide	NE-SW	83	East
M27	Infant	Rectangular	No	2	2	8	No	E-W	90	East
M32	Infant	Rectangular	No	2	2	4	x	E-W	90	East
M33	Infant	Rectangular	x	x	x	x	x	E-W	x	East
M36	Child	Rectangular	No	2	2	x	Sheep/goats-hide	E-W	90	East
M37	Infant	Rectangular	No	2	2	5	Sheep/goats-hide	NE-SW	80	East
M39	x	Rectangular	No	2	2	9	Sheep/goats-hide	NE-SW	86	East

Note: x means Unknown.

There are seven special graves M11, 12, 13, 14, 18, 20 and 29, in constructing coffins and designing their burial ground (see *Fig. 16*). Above M12, twelve rectangular wooden boards stand at the feet end of the coffin and follow the shape of the coffin; the top part of the wooden boards is above ground. This type of wooden boards standing above the coffin can be also seen in graves M11, 14 and 20. For M11, there are four rectangular wooden boards standing above the coffin erected in the burial sand; the wooden boards are completely covered by sand. For M14, there is a rectangular wooden board standing in sand and its top can be seen above ground. Graves M13, 18 and 20 have wooden poles and reeds to enclose the graves and prevent sands from flowing in. In M13, there are three wooden poles standing at each corner of the grave; some reeds are standing between the wooden poles fixed by mud to form a framework/wall around the grave. M18 has three wooden poles standing at each corner of the grave too, but reeds are fastened to the wooden poles. In M20, there are remains of a reed-wall at the southwestern corner of the grave, which is similar to that in M13; ten wooden boards stand above the coffin and follow the shape of the coffin/above ground; two wooden poles each go through from holes of the standing boards at both eastern and western sides. The standing boards in M11, 12 and 14 might have had the same function as that in M20, to form a wooden fence wall to frame the grave and protect the coffins. M29 has four wooden poles standing at the head end of the coffin; the function is unknown.

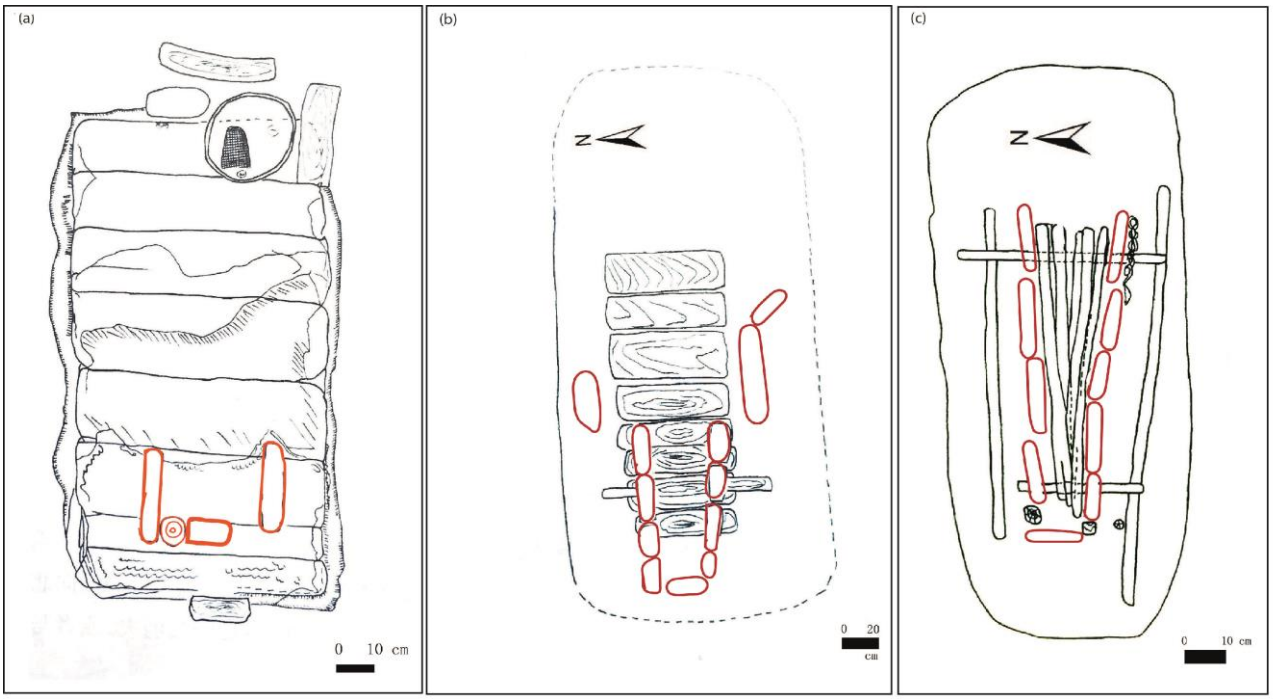


Figure 16 Representatives of some special coffin-constructions, wooden boards (marked in red lines) standing above coffins to enclose the coffin like a fence and reaching out of the ground

(a). M11, a female grave; (b). M12, a female grave; (c). M20, a female grave

(Images adapted from: Wang 2013, 52-91)

In both burial types, the dead's heads are placed at the eastern end of their coffins. The dead are lying on their backs. Because of the natural degradation, textiles like wrapping mantles, felt headgears, and boots in some graves are gone or only partially preserved. Twenty-one graves still have textiles left inside, ten graves only with remains, and seven graves have no textiles inside.

Table 4 The dead was commonly dressed/decorated with a mantle, a headgear, and boots from some rather well-preserved graves in the Gumugou cemetery

Coffin (79QL2-)	**Sex**	**Mantle**	**Headgear**	**Boots**	**Necklace**	**Bracelet**	**Hide-pillow**
M2	Infant	1	1	1		1	1
M4	Infant	1	1	2	1		
M5	Infant	1	1	2			1
M11	Female	1	1	1 or 2			
M23	Female	1	1	2			
M26	Female	1	1				
M27	Infant	1	1			1	
M30	2 Male	Yes	2				
M37	Infant	1	1				
M38	Female	1	1		2		2
M39	x	1	1				
M41	3 Male	Yes	Yes			2 strings	
Note: x means Unknown.							

From the rather well-preserved graves, we can see that the way to dress the dead show great similarities (see *Table 4*). The dead often wears a felt headgear and a pair of leather boots, and is wrapped by a huge felt mantle to cover the whole body. The wrapping mantles are often fastened by wooden pins (in M2, 11, 31, 42) or bone pins (in M10, 11, 21, 28, 30, 41, 42). Some of the dead are placed on a hide-pillow, for example, M2, 4 and 38 all have sheep/goats-hides placed under the heads of the dead. It is not seen that any dead has clothes on the body except for the wrapping mantles. Some dead have personal ornaments like necklaces (in M4, 20, 28, 38) and/or bracelets (in M10, 2, 3, 19, 21, 27, 28, 40, 41) on. The bracelets are often fastened on the right wrists of the dead (see *Table 5*).

Table 5 The bracelet was fastened on the right wrist of the dead in the Gumugou cemetery

Coffin (79LQ2-)	*M10*	*M2*	*M3*	*M19*	*M21*	*M27*	*M28*	*M40*	*M41*
Sex	Male	Infant	Female	Female	Male	Infant	Male	Male	3 Males
Bracelets	1 string	1	1 string	1	1 string	1	1 string	1	2 strings
Wrist (R/L)	R	x	R	x	R	R	R	R	R
Note: *R=Right wrist; x=No bracelet.*									

In terms of burial goods, it is commonly to find a grass-basket in graves, and some baskets contain grains of wheat or millet inside (see *Table 6*). The grass basket is often placed beside the dead's head or neck. In the baskets of M2, 4, 5 and 38, there are grains of wheat; in the basket of M15, there is grains of millets. The amount of grains varies.

Table 6 Grains preserved inside the grass-baskets in some graves of the Gumugou cemetery

Coffin (79LQ2-)	*M2*	*M4*	*M5*	*M11*	*M12*	*M13*	*M15*	*M23*	*M24*	*M26*	*M27*	*M28*	*M30*	*M37*	*M38*	*M41*	*M42*
Numbers of baskets	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	3
Things inside baskets	W	W	W	?	x	x	M	x	?	x	x	x	x	x	G	x	x
Note: W=Grains of wheat; M=Grains of millet; x=No grains; G=Grains (not sure what it is).																	

There is also a small mantle bag with Ephedra twigs inside in M2, 4, 5, 11, 12, 19, 27 and 38 each (see *Table 7*). A bunch of Ephedra twigs are wrapped by a small piece of felt mantle. From the Xiaohe cemetery, this kind of Ephedra-twig bags are often fastened to a corner of the wrapping felt mantles of the dead. In the Gumugou cemetery, tying Ephedra twig bags to the wrapping mantles can be only seen in M2; the location of the others show that the Ephedra twig bags might have been dealt with in similar way.

Table 7 Where the Ephedra-twigs bags to be placed in the Gumugou cemetery

Coffin (79LQ2-)	*M2*	*M4*	*M11*	*M12*	*M19*	*M27*	*M38*
Numbers of Ephedra-twigs bags	1	1	2	1	1	1	1
Where to be placed	Fastened to mantle	Placed on right shoulder	Unknown (disturbed)	In sand, above coffin	Close to head	Above mantle	Above breast

It is common to see wooden objects in some graves, such as food containers like bowls, cups, spoons, some sculptures of humans and some with unknown functions. Wooden bowls, pots, cups, and spoons were found in M11, 12, 13, 14, 17, 18, and 31. Such food containers or tools were not found in the Xiaohe cemetery. Wooden sculptures of human images were found in M8, 3, 12, 14, 19, and 20 (see *Fig. 29* in chapter 4.5 and *Table 8*). M18 contains a stone sculpture. Most the sculptures are carved to whole or upper body images, but it is a carved facial mask in M19. As for the burial goods, there is no fixed way or location to decide how to put or where to place the sculptures. Wooden sculptures in M12 and 14 are not only carved, but also with painted faces, in M12 even dressed.

Table 8 The carved wooden human sculptures in the Gumugou cemetery

Coffin (79LQ2-)	*M8*	*M3*	*M12*	*M14*	*M19*	*M20*	*M18*
The sex of the dead	Male	Female	Female	Infant	Female	Female	Female
Sculpture material	Wood	Wood	Wood	Wood	Wood	Wood	Stone
Sculpture image	Whole body	Upper body	Upper body	Upper body	Mask	Whole body	Whole body
The way to make	Carved	Carved	Carved/painted /dressed clothes	Carved/painted	Carved	Carved	Carved

Animal horns including cattle and sheep/goats horns were only found in five graves (see *Table 9*). M20 has twenty-six cattle and sheep/goats horns which were buried at the eastern side of the grave outside the coffin. Some wooden sticks embedded in three of the animal horns each (see *Fig.17*). The way to insert a wooden stick through the horn is also seen in M4 and 35. The horns were placed outside the head-end part of the coffin in M20 and 21, but over the coffin in M35.

Table 9 The amount and the location of the assembled livestock horns (cattle or sheep/goats horns) in the Gumugou cemetery

Coffin (79LQ2-)	*M4*	*M11*	*M20*	*M21*	*M35*
Sex of the dead	Infant	Female	Female	Male	Male
Number of horns	1	1	26	3	6
Type of horns	Cattle	Sheep/goats	Cattle, sheep/goats	Cattle, sheep/goats	Cattle, sheep/goats
Location of horns	x	Beside head of the dead (disturbed)	East/outside coffin	East/outside coffin	In burial sand/over coffin

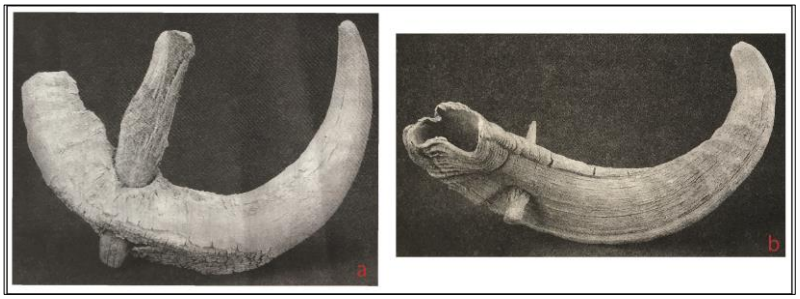


Figure 17 A cattle-horn and a sheep/goat-horn with a wooden stick embedded through the root-part each, from grave M20, in the Gumugou cemetery (Cited from: Wang 2013, 92-93)

There were also a few burial objects in limited graves, e.g. a bronze bead in M20, which all can be found as a table in the appendix 4. It can be noted, however, that there were four arrow shafts in M4 and a stone arrowhead (not sure) in M30. Four arrow shafts mixed with some Ephedra twigs were tightly wrapped by felt mantle and placed on the bottom of the coffin. The stone arrowhead was inserted in the right hip bone of the dead, lying on the right side.

4.2. The burial customs in the Xiaohe cemetery

The graves in the Xiaohe cemetery (see *Fig. 8 and Fig. 18*) have been well preserved inside the sand burial mounds. Since the two side-planks of the wooden coffins were made curved to enclose properly and carefully covered with fresh animal hides on top, the dead bodies have been naturally mummified, and textiles and organic objects were kept well. It is possible to trace detailed information, for example, how the dead was dressed, what burial objects were assembled, and how and where the burial goods were placed in the graves.

The way to construct a coffin (see *Table 10 and Fig. 18*) is rather similar and consistent for the graves in the Xiaohe cemetery. All coffins were made of wood. A coffin consisted of two side-planks, two end-boards, and a lid formed by several short straight boards. The arc-shaped side-planks leaned tightly against each other and were connected by inserting an end-board into the grooves at each end of the side-planks, so the coffin became a tightly enclosed space. The fresh cattle hides covered the top of the lid to protect sand from entering the coffin. Animal hides placed on the coffins in the Xiaohe cemetery were cattle hides only. In the Gumugou cemetery, most animal hides were sheep/goats hides. There was no floor for a coffin. Coffins were generally placed in an East-West direction with some variations, such as Southwest-Northeast or Northwest-Southeast. But the head of the dead was always placed on the eastern end of the coffin.

Table 10 Similar ways to construct wooden coffins in the Xiaohe cemetery

Coffin	Abration	Shape	Bottom	Side-plank	End-board	Lid-board	Animal-hide (cattle hide)	Direcion	Head
5.A	Intact	Boat	No	2	2	10	A few	S76˚W-N76˚E	East
5.B	Plundered	Boat	No	2	2	2	0	S65˚W-N65˚E	x
5.C	Plundered	x	No	1	1	0	0	S65˚W-N65˚E	x
5.D	Plundered	Boat	No	2	1	8	A few	N55˚W-S55˚E	x
5.E	Plundered	x	No	0	0	1	0	E-W	East
5.F	Plundered	x	No	1	1	Half	A few	N60˚W-S60˚E	East
M1	Plundered	Boat	No	2	2	10	A few	N90˚E-S90˚W	East
M2	Intact	Boat	No	2	2	10	3 pieces	N81˚E-S81˚W	East
M3	Plundered	x	No	2	2	2	A few	N88˚E-S88˚W	x
M4	Intact	Boat	No	2	2	12	Unknown	N93˚E-S93˚W	East
M11	Intact	Boat	No	2	2	11	3 pieces	E-W	East
M13	Intact	Boat	No	2	2	11	3 pieces	E-W	East
M24	Intact	Boat	No	2	2	10	4 pieces	NE-SW	East
M33	Plundered	Boat	No	2	2	10	2 pieces	E-W	East
M34	Intact	Boat	No	2	2	12	3 pieces	E-W	East

Note: x=Unknown (Since the coffins are not intact, it is unknown on the shapes of coffins or the head-direction of the dead.)

a. A wooden post stood in front of the head-end of the coffin M13.
b. Some cattle hides were used to cover the lid of the coffin M13.
c. The two side-planks of M13 were tightly enclosed, and the dead was placed lying straight on her back.
d. How the dead looked like, when the wrapping mantle was unfolded.

Figure 18 Image-examples of M13 and M11 from the Xiaohe cemetery, to gain a preliminary impression of the burial customs (Cited from: Xinjiang 2007, 9-12)

Female and male dead have been treated differently in some regards, in the construction of the coffins, the inside dressing, and the burial goods. In terms of coffin constructions, different wooden poles stood in front of the head-end of the coffins (see *Table.11*). For female dead, there often stood a round wooden post in front of the coffin. For male dead, instead there commonly stood a wooden oar-plank.

Table 11 The known sex of the dead with the type of wooden pole-marks in the head-end of coffins

Coffin	*Inside-abrasion*	*Sex*	*Coffin front monument*
M4	Intact	Female	Post
M11	Intact	Female	Post
M13	Intact	Female	Post
M2	Intact	Male	Oar-plank
M24	Intact	Male	Oar-plank
5.A	Intact	Male	Pole/Unsure
M33	Intact	Male	Lost
M34	Intact	Male	Lost

Posts and oar-planks were decorated in different ways. The top of the post was generally painted in red and has usually been pointed. There were also some twined woollen strings under the painted top part and a bundle of grass fastened (Xinjiang 2007). For the oar-planks, the upper blade part was painted in black while the lower handle part was painted red. Some graves contained wooden arrows and bows beside the oar-plank, such as M2 and M24. The head of the oar-planks varied in different shapes (see *Fig. 19*), some in a large ellipse shape, some in a fan shape, some like a narrow oar.

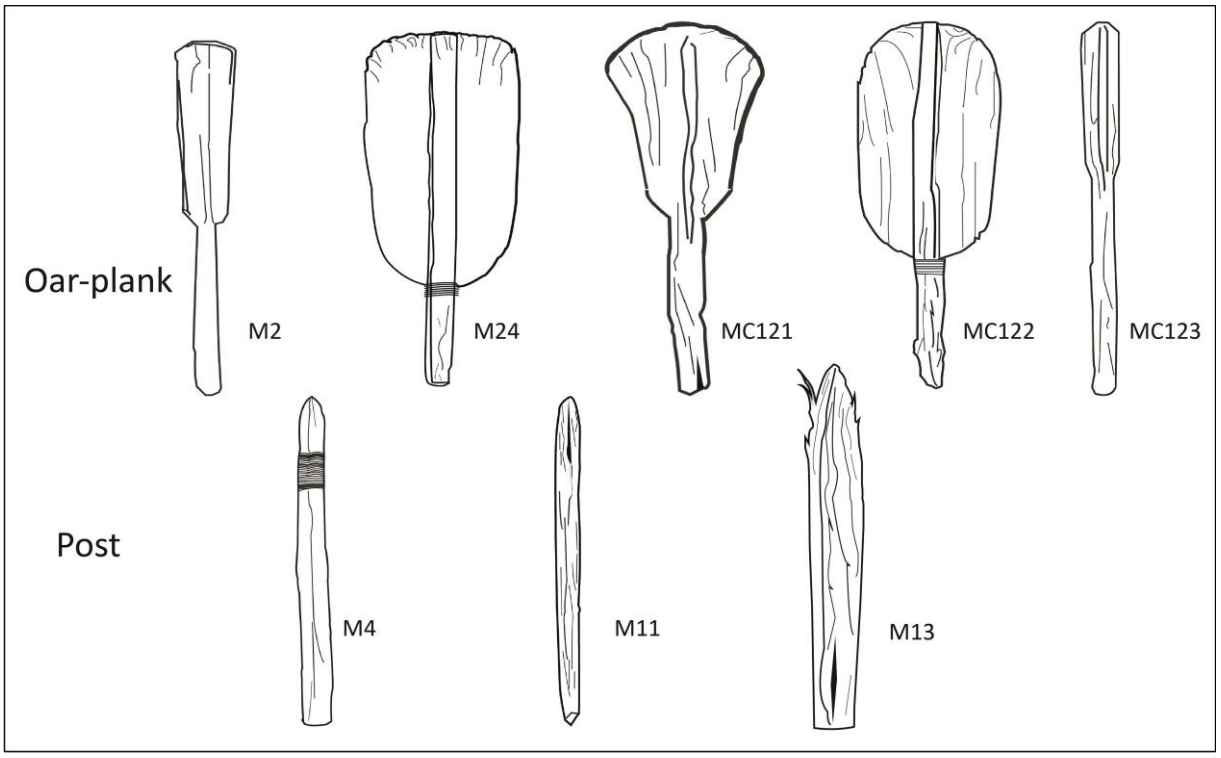


Figure 19 Oar-planks and posts standing in front of the head-ends of coffins in the Xiaohe cemetery

For some of the male graves, wooden arrows were inserted in the oar-planks, and wooden bows were placed beside the oar-planks, e.g. both M2 and M24 containing three arrows and one bow. M24 was more special. Here there was also a bundle of tamarisk and reed twigs fastened on its oar-plank. Inside the grass-bundle, there were four ephedra twigs twined by woollen yarns and four sheep/goats leg bones. A piece of cattle dung lay on the top of the grass-bundle, and a basket was placed beside.

The dead were always placed lying straight on their backs in the coffins. Before the burial, the dead need to be dressed and decorated properly. The dead all wore a headgear, with strings from the headgear fastening under his or her chin; clothes put on to cover the middle body part; and all wore a pair of leather boots (see *Table 12*). Each dead was wrapped in a large felt mantle with the head, lower parts of legs, and feet left outside. The wrapping mantles were fastened with a few of wooden pins above the breast or shoulders parts, mostly on the right side. It was common to have a wrapping mantle for each dead. In some graves, there was also a bottom mantle such as in M4, 13, 24, 34, and/or a fur pillow in M2, 11, 13, 24, 33, and 34.

Table 12 How the dead were addressed in the Xiaohe cemetery

Coffin	*Condition*	*Sex*	*Age*	*Height/m*	*Headgear*	*Clothes*	*Boots*	*Mantle*
5.A	Dried body	Male	Adult	1.52	1	1	2	1
5.B	A few bones left	x	x	x	x	1	x	1
5.C	x	x	x	x	x	x	x	x
5.D	x	x	x	x	x	x	x	x
5.E	Legs left	x	x	x	x	x	2	1
5.F	Head missing	x	x	x	x	1	2	1
M1	Arms, feet left	x	x	x	x	x	x	x
M2	Wood covered skin	Male	x	1.35	1	1	2	1
M3	Only a skull left	x	Kid	x	1	x	x	x
M4	Dried body	Female	Adult	1.58	1	1	2	1
M11	Dried body	Female	Adult	1.52	1	1	2	1
M13	Dried body	Female	Adult	1.50	1	1	2	1
M24	Dried body	Male	Adult	1.64	1	1	2	1
M33	Wood covered skin	Male	x	1.09	1	1	2	1
M34	Head/arms and wooden body/legs	Male	x	1.37	1	1	2	1

Note: x=Unknown (Since some graves were plundered, some information was missing.)

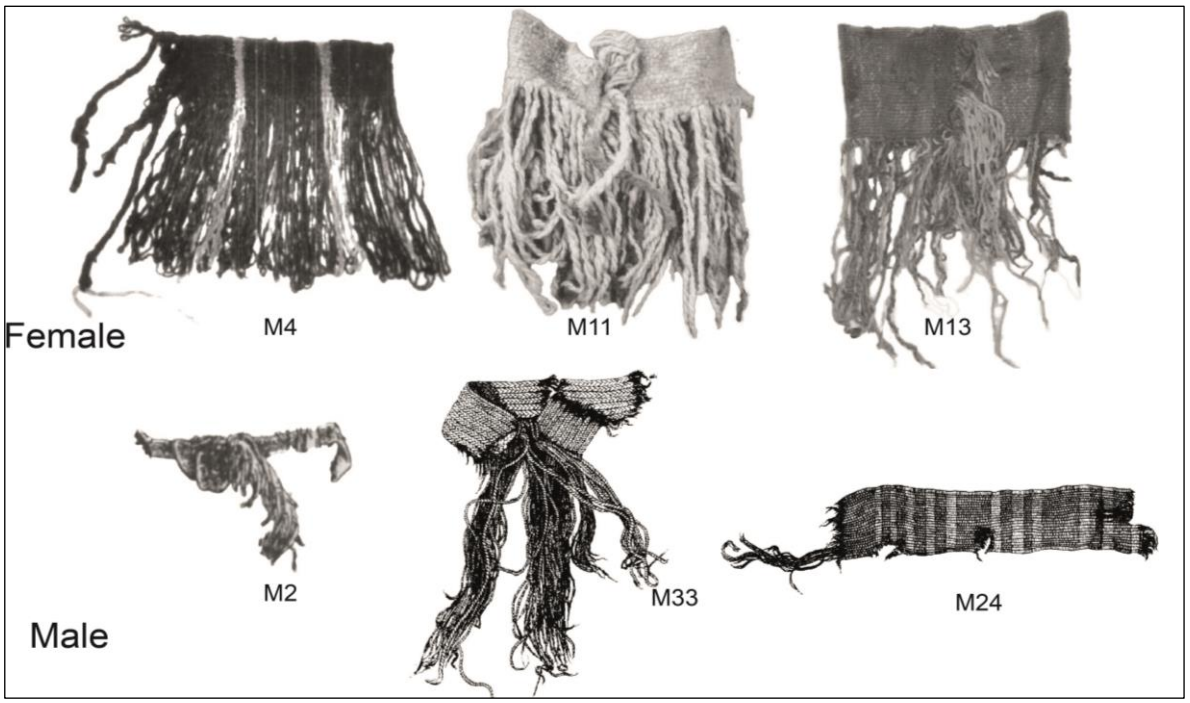


Figure 20 Comparisons of loin-cloth for female and male dead in the Xiaohe cemetery (Images modified from: Xinjiang 2004, 352, 图版十; Xinjiang 2007, 11, 12, 29, 36)

Regarding the dressing, both female and male dead were treated in similar ways, with painted hair and even the whole body painted with white. Many bodies wore a jade-bracelet on the right wrist, and a headgear, a loin-cloth and a pair of boots, and sometimes wore earrings or necklaces. The difference might be that most male dead were wrapped with the fringes[4] of the mantles around feet, while female dead were wrapped with the fringes of the mantle around their necks instead (Xinjiang 2007). The male dead's loin-cloth were mostly a narrow cloth belt, while female dead's loin-cloth looked like a short skirt with long strings on the downside (see *Fig. 20*).

As can be observed from the rather well-preserved bodies, some of the dead have been painted on their hair, faces, bodies including arms, legs and even boots, such as M4, 11, 13, 24, 33, and 34 (see *Table 13*). In M4, the dead's hair seemed to be brushed with whitish sticky materials, so her hair stuck together. In M11, the whole body was painted with whitish sticky material, including the hair and even the surface of her leather boots. In M13, the dead's face was painted with red lines on the forehead and nose. Her whole face, hair, and naked legs were painted with whitish sticky material. The surface of her leather boots was also painted in the same way. In M24, the dead's hair, face, body, and legs were slightly brushed with whitish sticky material. Under the white layer, his face was painted with red lines on his forehead and nose, which is same with that of the dead in M13. In M33, the dead's face and body were painted with whitish sticky material. In M34, the painting is different from the others. His face was covered with mud on his skull, then painted totally in black. The hair was pasted on his head and mixed with greyish black mud. His body, arms, and legs were painted in black.

Table 13 The paintings (of whitish sticky materials) and decorations on the dead in the Xiaohe cemetery

Coffin	*Sex*	*Hair*	*Face*	*Body*	*Legs*	*Boots*	*Ears*	*Neck*	*Left arm*	*Right arm (bracelet)*
5.A	Male	No	No	No	No	No	No	No	No	1 bead of opal
M2	Male	No	No	No	No	No	No	No	No	1 bead of jade
M4	Female	Painted	No	No	No	No	No	Necklace	No	1 bead of jade
M11	Female	Painted	Painted	Painted	Painted	Painted	No	Necklace	No	1 bead of jade
M13	Female	Painted	Painted	No	Painted	Painted	Earrings	Necklace	No	1 bead of jade
M24	Male	Painted	Painted	Painted	Painted	No	Earrings	No	No	2 beads of jade
M33	Male	No	Painted	Painted	No	No	No	No	No	1 bead of jade
M34	Male	Painted	Painted	Painted	Painted	No	No	No	No	1 bead of jade

The whitish sticky materials are guessed to be dairy products or milk based materials. The reason to deduce so is mainly based on the known examined results on some milk or dairy products in both the Xiaohe cemetery and the Gumugou cemetery. The deposition in grass-made baskets in the Gumugou cemetery were strained sour milk deposition (Xie *et al*. 2016). It has also been examined that some white or yellow crumbs, spreading around the necks, shoulders and chests of the dead bodies, were kefir cheese which was made by combining milk, acid bacteria and yeasts (The Institute of Archaeology 2013; Yang *et al*. 2014; Deter-Wolf *et al*. 2016). But about what the whitish sticky materials really were, it needs further scientific examination in future.

Except for the painting of the dead, it was commonly to see each dead wears a bracelet around the right wrist (see *Table 13*). The bracelet was often made from beads of opal or jade, e.g. valuable stones. In M24, the dead had two beads of jade. Personal ornaments like earrings or necklace appeared in M4, 11, 13, and 24.

In terms of burial goods, there were some common features applying to both genders (see *Table 14*). A few small bags with plants in were often fastened to the right corner of the wrapping mantle. The plant-bags contained grains of wheat, millet, or Ephedra twigs. It was commonly to have a grass-basket for each dead. The grass-baskets were often placed either under or beside the dead outside the wrapping mantles. All the grass-baskets appeared on the

[4] Fringes here mean decorations attached on the mantles and loin-cloth, consisting of a row of hanging strips or threads (see *Fig.20*).

right side of the dead in 5.A, M2, 4, 11, 13, 24, 33, and 34. Inside the grass-baskets were dried food except for in M4. In M13, there was also grains of wheat and millet. It has been examined that the dried-materials in 5.A consist of millet porridge (Bergman *et al*. 1939: 91). Plant bags and grass-baskets were outside the wrapping mantles. Inside the dead's wrapping mantles was commonly plants including long tamarisk twigs, Ephedra twigs, grains of wheat or millet, and animal-related objects including tendon-made strings and animal ears spread around the dead. The long tamarisk twig was often held or placed close to the right hand of the dead, which can be seen from 5.A, M2, 4, 11, 24, 33, and 34. Several Ephedra twigs, grains of wheat and/or millet, and tendon-made strings were spread around the body. Animal ears were often placed around the neck and shoulders.

Table 14 What, how and where the burial goods were commonly placed for both genders in the Xiaohe cemetery

Coffin	***Sex***	***Plant bag***	***Basket***	***Tamarisk twig***	***Ephedra twig (spread)***	***Wheat/millet (spread)***	***Tendon-made string (spread)***	***Animal ear (spread)***
5.A	Male	O-A-R	O-U-R	I-B-R hand	Upper body	Upper body	Some	Neck
M2	Male	O-A-R	O-U-R	Right "hand"	Spread, body	Spread, body	Spread, body	No
M4	Female	O-A-R	O-U-R	Right hand	Spread, body	No	No	Shoulders
M11	Female	O-A-R	O-U-R	I-A-R close hand	breast	Spread, body	Spread, body	Shoulders
M13	Female	O-A-R	O-U-R	I-A/U-R	Under body	Stomach	Arms/hip	Shoulders
M24	Male	O-A-R	O-U-R	I-A-M or I-U-R	A/U body	No	No	Shoulders
M33	Male	O-A-R	O-B-R	I-B-R	Upper body	Under back/hip	Under back	Neck
M34	Male	O-A-R	O-B-R	I-B-R	A/B upper body	A/U upper body	I-A/B-M	Neck

Note: A=Above/On (the body), B=Beside (the body), I=Inside (the mantle), M=Middle (on the middle part of the body), O=Outside (the mantle), R=Right (corner of mantles for plant bags, body side or hand for baskets and tamarisk twigs), U=Under (the body). E.g. 5.A: Plant bag: O-A-R means the plant bag of 5.A was fastened on the right corner of the wrapping mantle, and placed on it.

There were also some differences between female and male dead as regards burial goods (see *Table 15*). For female dead, there was often a comb placed under the right hip, a leather bag surrounding the waist, and a wooden "phallic object" close by. For male dead, most of them had feather arrows placed either under or above their bodies, or just wooden arrow shafts.

Table 15 Differences on what burial goods and how they were accompanied with the female and male dead in the Xiaohe cemetery

Coffin	***Sex***	***Bone arrow***	***Feather arrow***	***Arrow shaft***	***Comb***	***Wooden phallic objects***	***Leather bag***
5.A	Male	No	I-U-M	No	No	No	No
M2	Male	No	I-U-R	No	No	No	No
M24	Male	I-A-R	I-A-R/M/L	No	No	No	No
M33	Male	No	I-A-R	No	No	No	No
M34	Male	No	0	No	No	No	No
M4	Female	No	No	No	I-U-R	I-B-R	I-B-R
M11	Female	No	No	No	I-U-R	I-A-M	I-B-R
M13	Female	No	No	No	I-U-R	I-B-L	I-A-R

Note: A=Above (or on the body), B=Beside (the body), I=Inside (the mantle), M=Middle (part of the body), R=Right (hip for combs, or body side for wooden phalluses and leather bags). E.g. M4: Comb: I-U-R means the comb from M4 was placed under the right hip of the dead inside the wrapping mantle.

By synthesizing the differences in gender treatment from the eight graves with known sex of the dead, it is possible to make a few general observations. When a coffin contained burial features like a standing cylindrical post at the head-end of the coffin; the dead wore a skirt-like loin-cloth with its long fringes on the lower side; assembled burial goods contained combs, a wooden "phallic object", or leather bags with the dead; the grave can be assumed to be a female grave. When a coffin contained burial features like a standing oar-plank monument at the head-end of the coffin, sometimes with arrows inserted, or bows placed beside the wooden oar-planks;

the dead was wearing a narrow loin-cloth with fringes on its left and right ends; arrows or arrow shafts were assembled with the dead; the grave can be assumed to be a male grave.

4.3. Gender and sexual identities in the Xiaohe cemetery

Based on all features which have been observed in the eight intact graves in the Xiaohe cemetery, it is possible to deduct possible sex/gender of the remaining seven graves including M1, M3, 5.B, C, D, E and F (about their locations, see *Fig. 5*). The main way is to look for indications of the sex/gender in the treatment of the dead from the plundered graves, even if there was not much left in these.

For the plundered grave M1, there was a wooden oar-plank standing in front of the head-end of the coffin with three wooden arrows inserted beside it. Four feather arrows were found beside a wooden pole at the feet-end of the grave. The grave has been almost completely emptied by plunders, and only arms and feet of the dead were left. However, from the construction of the grave we can assume that the dead in M1 might be a male.

For the plundered grave M3, there were three wooden arrows inserted beside one wooden pole. There was only a child's head left in the middle of the coffin. A hypothesis is that the dead in M3 might be a male child.

All graves 5.A-F were excavated from the first, uppermost, burial layer of the Xiaohe cemetery, 5.A-D from the northern section and 5.E-F from the southern section (see *Fig. 5*). For the intact 5.A, it has already been established from the mummified body that the dead was a young man. He wore a narrow loin-cloth with fringes on left and right ends, round his hips. A bundle of four feather arrows which were tied together were placed under his back. From Bergman's (1939: 68) report it is a bit hard to know if the thin pole standing at the head-end of the coffin is an oar-plank or a post without images. A possible reason that Bergman described it as a "thin pole" can be either because of the natural decomposition of the oar part, or the oar part was too narrow to recognize, like the shape of the oar/pole from MC123 (see *Fig. 19*).

For the plundered grave 5.B, there were mainly a few human bones left, mixed with sand. The remains of the dress were a piece of yellow woollen mantle and parts of loin-cloth with fringes on the lower part. Burial goods left were fragments of arrow-shafts, possibly a small tooth from a comb, Ephedra twigs and the lower jaw of a vulture. The side-planks were straighter and thicker, and the end-boards were broader than those of coffin 5.A. There were only two boards of the lid left. The coffin from 5.B lied in a S65˚W-N65˚E direction at a depth of 1m and was adjacent to coffin 5.C. The fragments of the loin-cloth were too broken to give clear information about its form. The "wooden comb-tooth" could also be a wooden pin used to fasten the dead's wrapping mantle, considering the similarities in their shape and way to make (see *Fig. 22*). From the fragments of arrow-shafts which were decorated with small curved triangles in spiral rows and painted in red, the dead in 5.B should be a male. The decoration of the arrow shaft is similar to that in M24 (see *Fig. 21*).

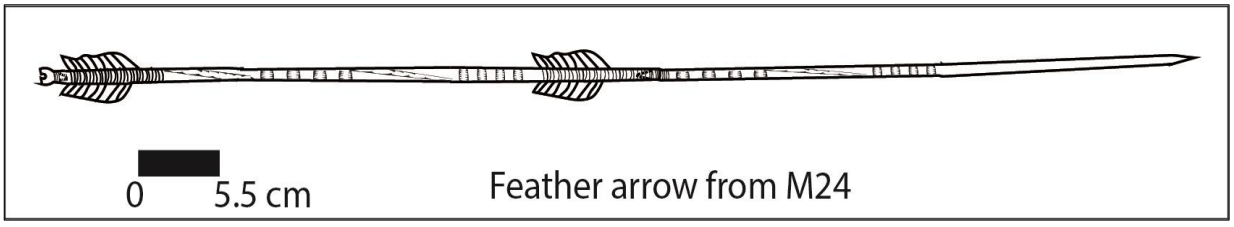


Figure 21 A feather arrow decorated with incised triangles spiral rows from M24 in the Xiaohe cemetery

For the plundered grave 5.C, both the dead and the dressing were missing. There were only some fragments of wooden objects with unknown functions left. Only the eastern end-board and

the northern long side-plank were intact. Grave 5.C was situated close to 5.B and in the same direction, S65˚W-N65˚E, but 30 cm higher. Near the eastern end of the coffin stood a red-painted pole twined by camel-wool string. The red-painted columnar pole standing at one end of the coffin indicates that there was possibly a female dead in 5.C.

For the plundered 5.D grave, there was no remains of the body. The coffin was filled with sand and no objects were found inside. The south-eastern end-board and two of the lid-boards were missing. The missing end-board part was close to the ground surface and the other end of the coffin was covered with 0.9 m of sand and lay 1.5 m lower than coffin 5.A. A few ox-hides covered the remains of the lid. The coffin lied in a N55˚W-S55˚E direction and close to the eastern side of the big wooden palisade. Although there were no objects left inside the coffin, some objects were left around the coffin, which might have dropped from the body as it was removed. A wooden arrow-shaft with feathers or incised triangles in spiral rows indicate the dead in 5.D could have been a male.

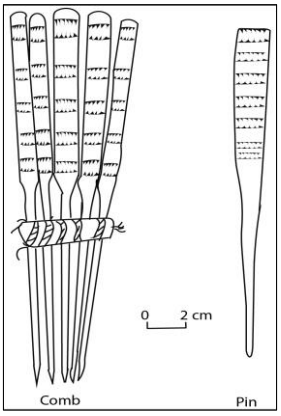


Figure 22 A comb and a pin from M4 in the Xiaohe cemetery (After: Xinjiang 2004, 362, 图三五)

For the plundered gave 5.E, there were only parts of the dead left inside the coffin, namely the mummified legs with brownish hair and leather boots tied by thick string below each knee, left in situ. There was also a mantle with short fringes. A red painted wooden arrow was at the right side of the dead. The location where of the remaining objects is unknown. These included grains of wheat, Ephedra twigs, arrow-shafts and two halves wooden objects like a horse-leg. In terms of the coffin, only the western end of the lid was intact. The coffin lay between an oar-shaped pole and a big pole in an E-W direction, near the western side and the southern end of the big wooden palisade. Outside the coffin an oar-plank stood at one end. All these features including arrows, arrow shafts and oar-plank indicate that the dead in 5.E should be a male.

For the plundered 5.F grave, the head of the body was missing. The dead was wrapped in a rough grey mantle, with a narrow loin-cloth and a pair of leather boots. Near the upper end of the wrapping-mantle, the edge was tied into three small bags (two containing Ephedra twigs, and one grains of wheat and/or millet). Inside the wrapping mantle on the right side of the dead, was four long arrow-shafts with feathers and a thin branch of tamarisk. Outside the wrapping mantle, there was a basket, containing a porridge of millet (Bergman *et al*. 1939: 84), near and below the right hip. There were also some Ephedra twigs strewn on top of the dead inside the wrapping mantle. A worn mantle was placed under the dead as a matting. There was a “horse-leg” wooden-object similar to the wooden objects in grave 5.D and 5.E, but without a known location. The coffin had been covered with hides. The eastern part of the coffin was open, and half the lid was gone. The coffin was located to the west of grave 5.E and was situated in a N60˚W-S60˚E direction. Considering the narrow loin-cloth and arrow shafts, the dead in 5.F can be interpreted as a male.

Table 16 The deduction results of the dead's sex

Sex	Count of Coffin
Female	3
Male	5
Unknown	7
Grand Total	15

⇩

Sex	Count of Coffin
Male	11
Female	4
Grand Total	15

Coffin	Inside abrasion	Sex
5.B	Plundered	Male
5.C	Plundered	Female
5.D	Plundered	Male
5.E	Plundered	Male
5.F	Plundered	Male
M1	Plundered	Male
M3	Plundered	Male

From the deduction of sex, it can be estimated that of the seven-unknown dead, one was a female and six were males (see as *Table 16*). There seems to be a distinct difference in the treatment of the deceased in the Xiaohe cemetery, including their dressing, related burial goods and monuments erecting outside the coffins. The sexual identity from their society might have been carried into the graves, which were firstly shown in how to dress the dead. It is far from enough to only indicate their biological sex, what's more, it seems that the deceased have been arranged to represent their different social actions, roles and behaviours.

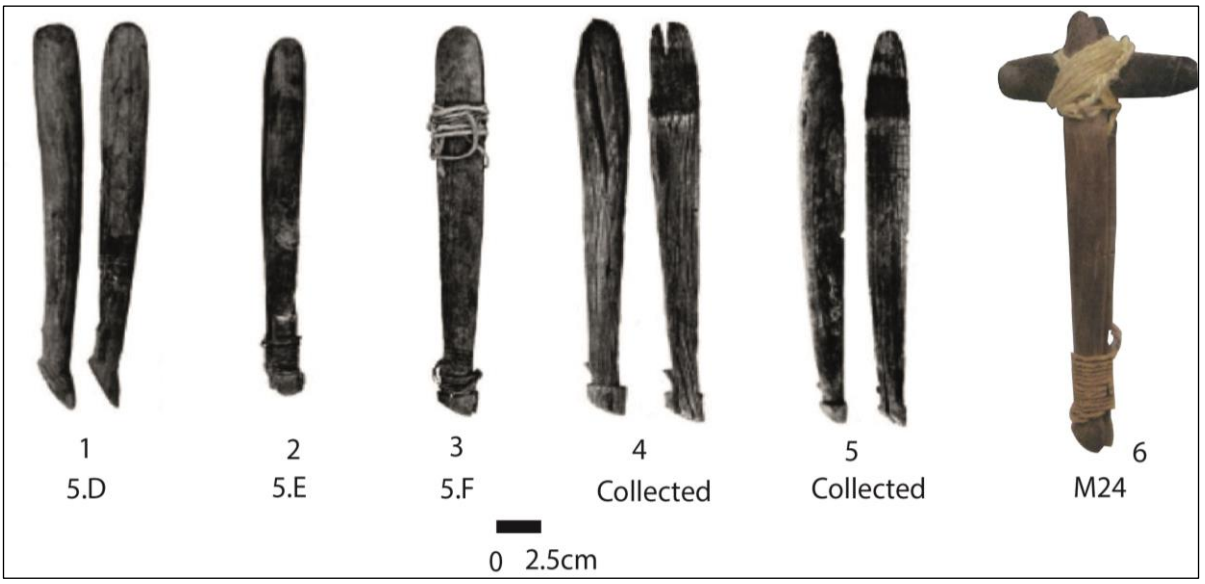


Figure 23 Animal-leg-like wooden objects from the Xiaohe cemetery
(Adapted from: Bergman 1939, P1.8; Xinjiang 2011, 16)

There were animal-leg-like wooden objects (see *Fig. 23*) in some male graves such as 5.D, 5.E, 5.F and M24. The wooden objects were in a shape of animals' legs with a hard hoof, and consisted of two similar halves of wooden parts leaning against each other on their flat sides. In Bergman's (1939: 61–99) description, these animal-leg-like wooden objects (from no.1-5 of *Fig. 23*) were interpreted as leg-representations of beasts, horses or cows. The object in M24 (no.6 in *Fig. 23*) was described as a horse-leg-like object (Xinjiang 2007). From the shape of these wooden objects, it is not easy to distinguish and confirm what animals they represented. The hooves of no.1 and no.6 look like a cloven-foot and more pointed from the heel to its toe; from the side-view, they are in a triangle-shape. These features are similar to even-toed livestock such as cattle or sheep/goats (see *Fig. 24*). Hooves of no. 2-4 have an irregular-square shape from the side view and the top of their hooves are flat. When the legs of no. 2 and 3 were fastened together, the hoofs look more like an entire piece of odd-toed horse-hoof.

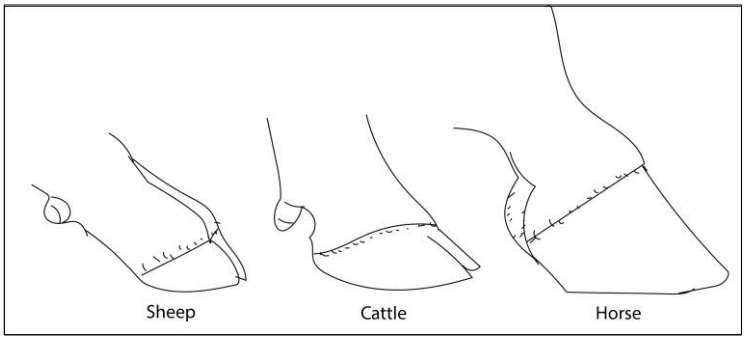


Figure 24 Drawing of hooves of sheep, cattle and horses

There also were some remains/proofs of special treatment on the animal-leg like objects (see *Fig. 23*). The object no.1 (from 5.D) had incised transverse lines on the flat sides and was fired to black surrounding the lines. The object no.2 (from 5.E) was also incised with transverse lines and painted in red. The object no.3 (from 5.F) was incised four transverse lines above the hoof and fastened with a bronze ring. The object no. 5 (collected) was incised with seven transverse lines on the flat sides. The object no.6 (from M24) was incised with seven lines on the stone bar, seven red transverse lines on each flat side of the wooden legs, seven lines on the hoof, and also fastened with a metal ring above the hoof.

If we turn our attention to the female burial goods, these included leather bags, combs and wooden phallic-objects. Graves M4, M11 and M13 contained leather bags (see *Fig. 25*). The bags were made of animal skin and sewed to a round bucket shape with woollen yarn. The leather bag from grave M11 was filled with brown wool.

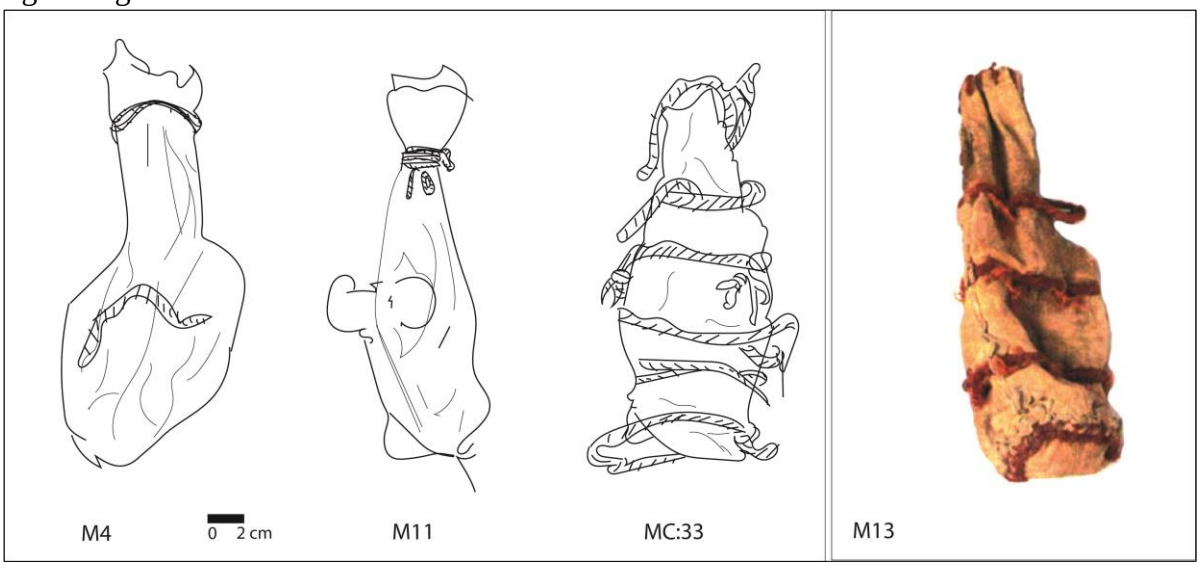


Figure 25 Leather bags from the Xiaohe cemetery

(The leather bag from M13 adapted from: Xinjiang 2007, 13)

Combs (see *Fig. 26*) only appeared in female graves, and were placed under the right hip of the dead. Most of them were made by inserting wooden pins into an animal tendon, e.g. the combs in M11, M13, and two collected combs 5:56 and 5:136, or inserting into fur fastened with woollen yarn, e.g. comb in M4. The size of the comb from M11 and 5:136 might be practical, while the others were too long to be of practical use (size see *Table 17*). Further, combs from grave M4, M13 and the comb 5:56 had been given special treatment by incising seven transverse small-triangle-lines and were painting red.

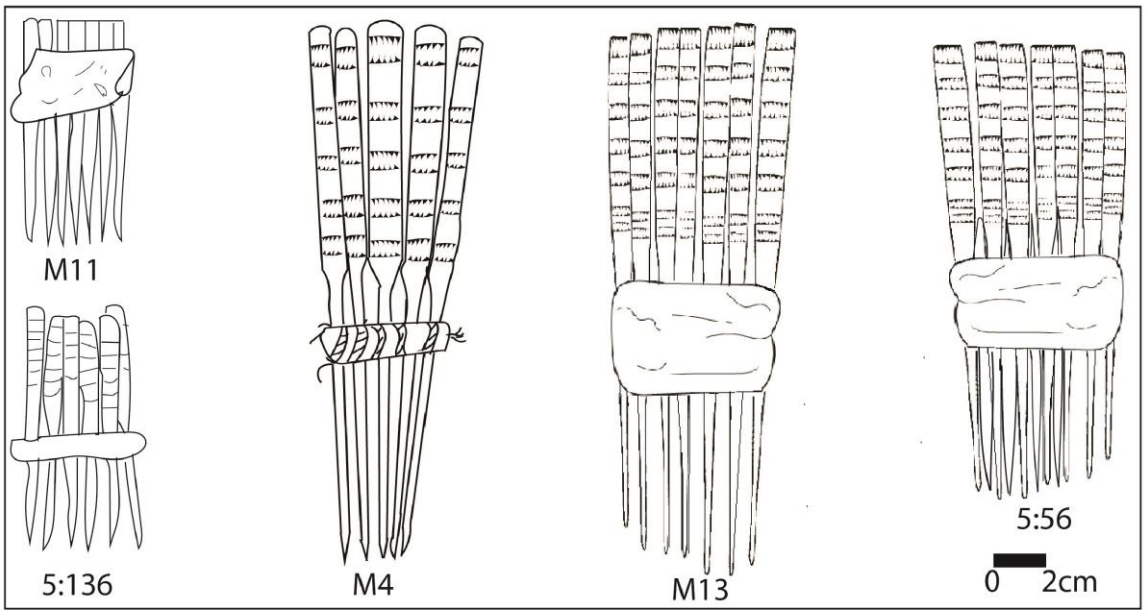


Figure 26 Combs or comb-like objects in the Xiaohe cemetery

A large number of combs had incised transverse triangular lines and were painted in red. Such triangular-decoration has commonly been observed from Neolithic cultures in Gansu and are called "death pattern" (Andersson 1925: 13–14). At the beginning of the twentieth century, it was popular to interpret triangular motif decorated on funeral goods as an indication of magic or a symbol of power (Rydh 1927), which I believe is reasonable and make sense, but is difficult to confirm or evaluate. As shown in *Fig. 22*, *26* and *Table 17*, the wooden combs were quite similar to the wooden pins which often were used to fasten wrapping mantles at the shoulders. The pointed sharp end and the excessive length of combs are not only unnecessary but also make it really hard to use for combing the hair. Also, for this reason, the combs were considered both as a personal ornament and as an amulet (Bergman et al. 1939: 78).

Table 17 The sizes of wooden combs and pins[5]

Grave	*Comb*		*Pin*
	Length/cm	**Width/cm**	**L/cm**
M11	8.5	4.5	22/24
5:136	9.5	4.8	-
M4	21.5	7-13	19.8
M13	22	6.8	23.4-26.2
5:56	18	6.5	9.7
5.B	-	-	9.5
5:55	-	-	18-18.8
5:57-59	-	-	17.9-24.9
5:130-135	-	-	17.5
5.D	-	-	15.3/17.3
5.L(1,2)	-	-	24/24.5
M24	-	-	9.7
Note: - means there were no comb or pins regarding the graves.			

There were several well decorated wooden pins that were painted in red on the cylindrical head part and incised with the same triangle ornamentation as the combs. The other end was pointed sharp. The pins were in similar sizes like the combs (size see *Table 17*). The shorter pins were often simple, mostly just pointed sharp at one end, while the longer ones were often carefully decorated and polished. Most pins were found inserted on the wrapping mantles as fasteners. Considering that combs consisted of similar pins as comb-teeth, by inserting into

[5] The 5:55 pin was not intact and only has its head part.

animal sinews, I would rather interpret these combs as also having same practical use as pins, e.g. to fasten the wrapping mantles, etc. The teeth of the combs were embedded in animal tendons or sinews, and such technology to produce such a comb is unnecessary for working as a comb, but instead could function as storage, to get them out to use when needed. Pins were used to fasten mantles as we can see from graves, but may be also have been used to sew leather boots and bags, which consisted of leather pieces and were sewed by cords made of animal tendon or by woollen yarn.

Wooden phallic objects (see *Fig. 27*) were found in some female graves, e.g. M4:16, M11:15 and M13:21, or collected from the Xiaohe cemetery site, e.g. 5.L:4, 5.L:5 and 5:128. The phallic-objects consisted of two halves of semi-circular wooden parts, with both ends larger than the body part and the top end bluntly pointed. Most of the flat sides of the semi-circular halves were hollowed out, and some of them were filled with different things. In the grooves of 5.L:4, the filling materials were a bundle of feathers and a few lizard-head-bones. In the hollow of M4:16 were tendon-strings, reeds, and hair. In the grooves of M13:21 was possibly an entire lizard. The length of these phallic objects was between seven and twelve centimetres. The whole of the objects was twined with woollen yarn to fasten the two halves together. For 5.L:5, only the left half remained, and its hollowed part was painted red.

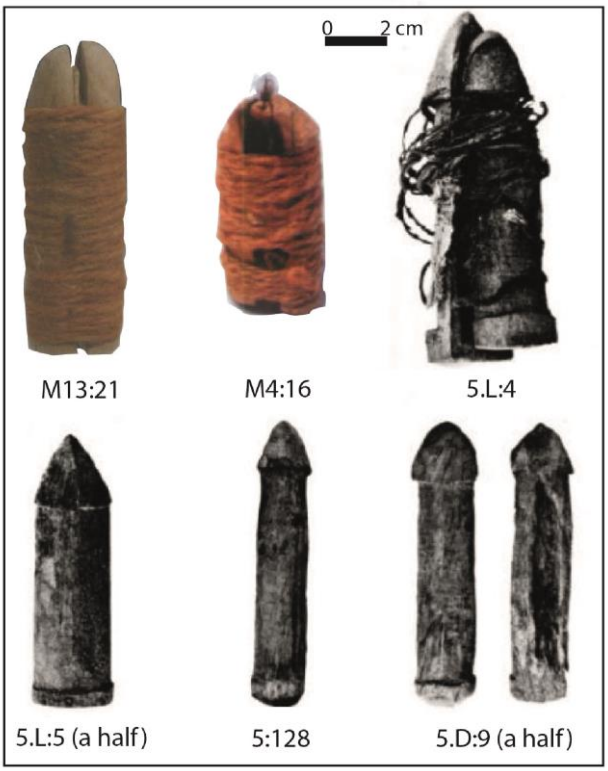
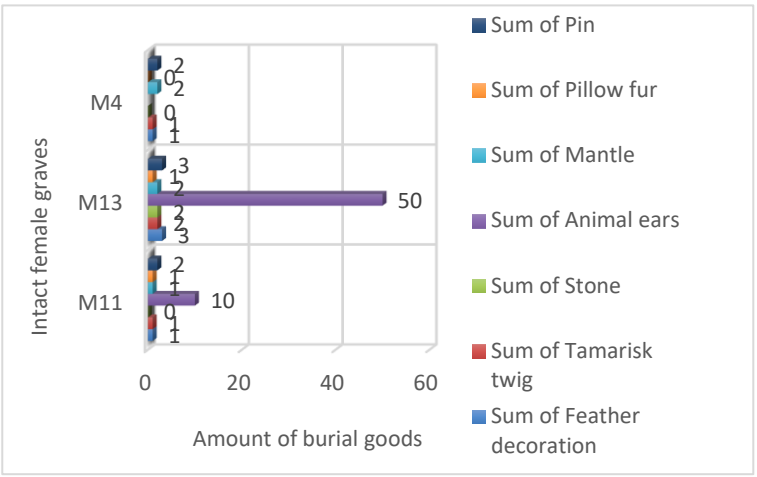


Figure 27 Wooden phallic-objects from the Xiaohe cemetery
(Adapted from: Bergman 1939, P1.8; Xinjiang 2004, 图版十.)

4.4. The most common burial goods in the two special graves M13 and M24 in the Xiaohe cemetery

Two graves in the Xiaohe cemetery, M13 and M24, contained extremely rich burial goods and also some special objects such as decorated bull-heads, small carved wooden face-masks, and wooden sticks carved with faces. M13 contained a female dead, and grave M24 a male dead. I will examine the common burial goods in these, including wooden pins, pillows, mantles, animal ears, stones, tamarisk twigs, Ephedra twigs, feather decoration, grains, and animal products, to see what burial goods were most frequent compared with other females' or males' graves.

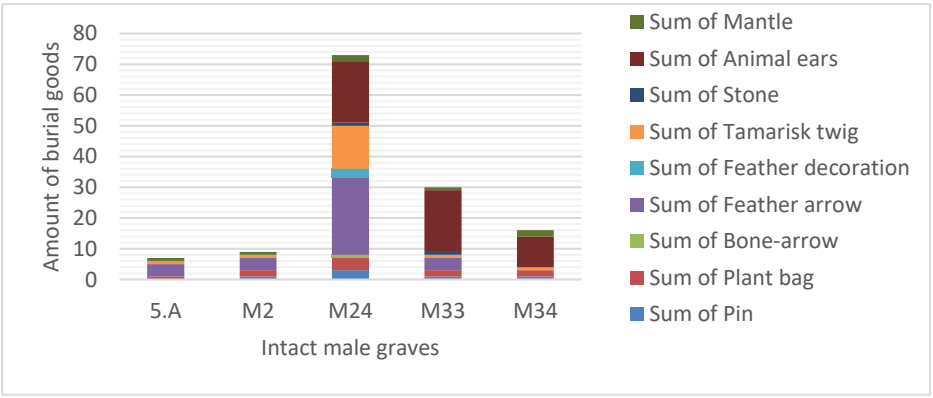
Table 18 Comparisons of the amount of burial goods in female graves of the Xiaohe cemetery



From comparison (see *Table 18*), the intact female grave, M13 contained considerably more objects than other female graves, especially when it comes to the amount of animal ears. The rich burial goods included more pins which were used to fasten the wrapping mantles, small stones, tamarisk twigs, feather decorations, and animal ears. Furthermore, the dead in M13 had both a bottom mantle and a wrapping mantle, and her head lay on a fur-pillow. From *Table 18*, we can see that animal ears take up a large percentage in both M13 and M11. We can assume animal ears might be important burial objects, so that the mourners increased the burial number a lot for their deceased to possibly show the different social state of the dead.

Grave M24 clearly contained much more objects than other male graves (see *Table 19*). Except for animal ears, arrows should be highlighted as another important burial element in male graves. The male dead in M24 was provided with many feather arrows and a bone-arrow, animal ears, tamarisk twigs, feather decorations, and plant bags. He had two mantles and a pillow just like the female in grave M13. From *Table 19*, we can see a large amount of animal ears in the

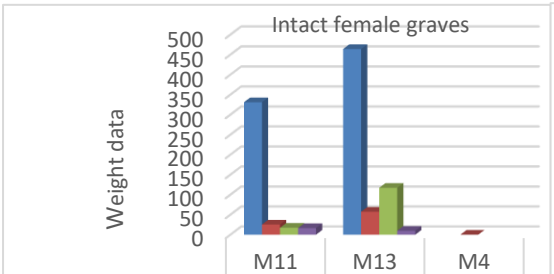
Table 19 Comparisons of the amount of the burial goods in male graves of the Xiaohe cemetery



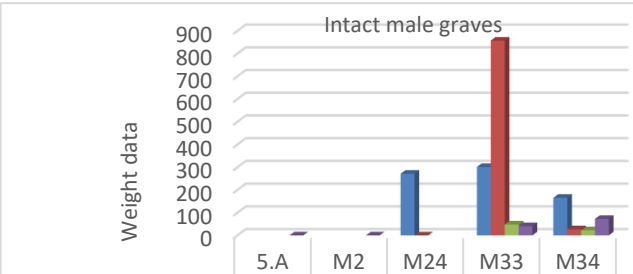
graves M24, M33, and M34, and arrows in the graves 5.A, M2, M24 and M33. Tamarisk twigs were not frequent in other male graves except for M24. As described before, these tamarisk twigs were carefully treated, some with pointed ends, some twined with weasels, some carved in snake-shape, and some covered with leather. Some of the feather arrows in M24 were decorated with carved triangles in spiral rows and painted in red, and an arrow with a bone arrowhead was the only one that made of bone material in the Xiaohe cemetery as far as know. We can conclude that the amount of almost every single type of burial goods was higher in M24, but animal ears, arrows and tamarisk twigs were extremely frequent and also well decorated.

Ephedra twigs were another important burial element for both females and males. As seen in *Table 20*[6], there was quite a lot of ephedra twigs in the female graves M11, M13, and in the male graves M24, M33, and M34. Although M24 contained more objects generally, M33 had the most ephedra twigs and grains of wheat or millet. M24 contained some tendon-made strings and whitish sticky materials, but there were no weight data to compare that with the amount in M33. The dead in M33 might also be important considering his burial goods, but he was mainly distinguished in the way that his body was constructed of carved woods and was covered with animal skins, which I will discuss later.

Table 20 Comparisons of the weight of burial goods in both female and male graves of the Xiaohe cemetery



	M11	M13	M4
Sum of Ephedra twig/g	331	464	
Sum of Grain/g	25.3	57.2	0
Sum of Animal string/g	17.3	117	
Sum of White sticky/g	16.3	9.66	



	5.A	M2	M24	M33	M34
Sum of Ephedra twig/g			271	301	165.2
Sum of Grain/g			0	857	26.8
Sum of Animal string/g				47.8	22.8
Sum of White sticky/g	0	0		40.8	72.5

For rich burial graves, the amount of burial goods increased generally, including some valuable objects, probably without practical functions, e.g. small valuable stones in M13, M24, and M33; general bracelet stones; feather decorations in M24; rare bronze pieces in M13 (being decorated on the loin-cloth), in M33 (with bronze pieces mixed with grain under the back of the dead), in M34 (with bronze pieces placed close to the neck of the dead), or in the plundered M2 (placed on the breast of the dead). But these unpractical valuable things or fortunes do not give us much more clues except for indicating the high social status of the dead and the possession of more social resources. Instead, the common shared burial goods such as from baskets, tamarisk twigs, to grains, tendon-made strings, especially ephedra twigs, animal ears and arrows whose amount the mourners have increased quite a lot for their special deceased, may help us better understand the social life behind them.

4.5. Wooden human sculptures from the Xiaohe and the Gumugou cemeteries

Wooden sculptures were common from both the Xiaohe and the Gumugou cemeteries. The wooden sculptures were in different forms and functions. The wooden sculptures can be mainly

[6] The blank columns mean that these graves contained such objects but there is no information about weight.

catalogued to five types. Type I is a whole wooden sculpture, more or less in human beings' size, covered with animal hides to represent the dead; type II is a carved small wooden (or stone) sculpture with human features, given as burial goods in graves; type III is a carved wooden mask with protuberant human facial features, as burial goods; type IV is a high carved wooden sculpture shaped as a human, placed as a monument on the cemetery; type V is a pair of wooden sticks with human faces, buried in graves.

Table 21 Summaries of the main features of the type I wooden human sculptures in the Xiaohe cemetery

Coffin	*Sex*	*Wooden sculpture*	*Height/m*	*Hide as skin*	*Hide hair*	*Painted*	*Dressed*	*Coffin length/m*	*Cemetery*
M2	Male	Whole sculpture	1.35	Badger hide	Hair removed	Yes	Yes	1.92	Xiaohe
M33	Male	Whole sculpture	1.05	Animal hide	Hair on	Yes	Yes	1.81	Xiaohe
M34	Male	Wooden body, legs	1.37	Animal hide	Hair on	Yes	Yes	2.31	Xiaohe

Type I (sizes see *Table 21* and images see *Fig. 28*) has been interpreted as a substitute of the dead, e.g. in graves M2, 33, and 34 at the Xiaohe cemetery. The wooden substitutes of the dead were generally rough-made, then covered with animal hides and dressed like a normal dead. The size of the wooden sculptures was similar but a bit shorter than the normal height of the dead. Their facial parts were mostly carefully made with a lot of details. In both graves M2 and M33, the eyes and mouths of the faces were carved; then the faces were covered with skins, and

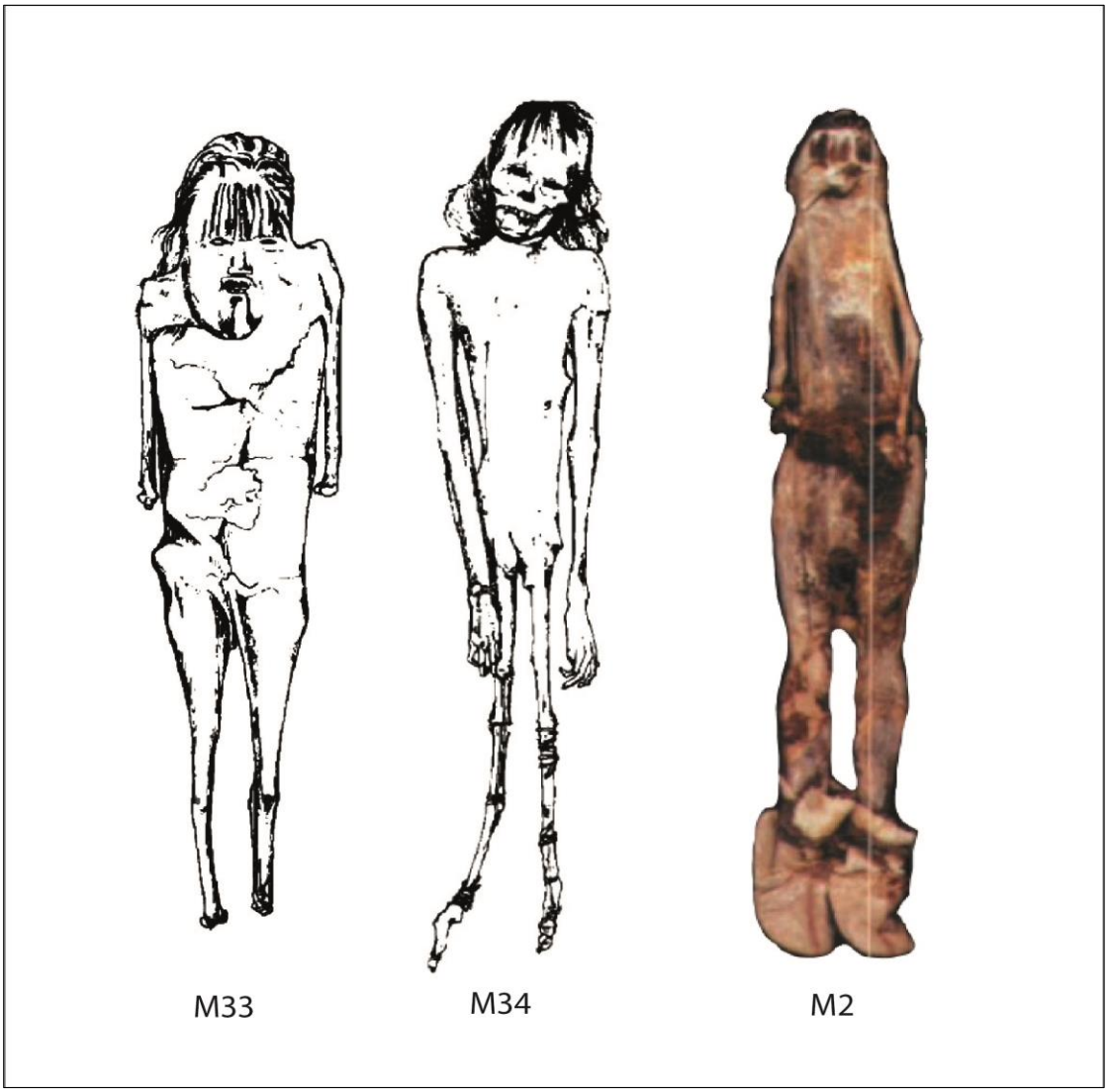


Figure 28 Wooden human sculptures as substitutes of the dead in the Xiaohe cemetery
(Modified from: Xinjiang 2004, 图版七; Xinjiang 2007, 35, 38)

pasted with hairs, eyelashes and moustaches. In grave M34, the dead was a combination of a wooden body with his real head, arms and legs; his face was remade by clay.

In grave M2, the dead was substituted by a wooden sculpture covered with badger hide with removing its hair. The height of the sculpture was 1.35 m. There was a simple carved head, limbs, a body, and thin eyes, a mouth and a nose. The wooden arms and legs have been separately put into the upper and lower limbs of the badger hide. There was a skin face covering the wooden head with three holes to show the carved eyes and mouth. On the top and the forehead was blackish brown hair. Thin and long eyelashes were pasted on his left eye. The badger hide was mainly enclosed on the dead's head and back.

In grave M33, the body was a wooden substitute covered with animal hide with remaining hair on. The height was 1.05 m. It was roughly made, and complete with a head, a body and legs in wood. The wooden substitute had a big head, short arms, a wide body narrowing in the lower part, and legs. The wooden arms and legs have been put into the upper and lower limbs of the animal-hide respectively, exactly in the same way as with the grave M2. His face and body had been painted with a white colour. Under the painting on his face were indications of a nose, a lower jaw, a mouth and eyes. There was a piece of fur pasted above each eye to indicate eyebrows. In the open mouth where four white teeth in both the upper and lower parts. The teeth were covered with the skin to stay fixed in the mouth. Above the mouth and under the low jaw, fur with long hair were pasted to represent a moustache. The forehead and the top of the head were decorated with a few bundles of brownish black hair, which were long enough to reach his eyebrows and chest. On the middle of his back was a groove whose function is unknown.

In grave M34, the body was more special than those in graves M2 and M33. The dead was complemented with parts carved of wood as the body and legs, and his remained head and arms were inserted in the wooden body with thin sticks. The body and legs were made of one entire piece of wood. The height was 1.37 m tall. The arms were still with dried skins on, but the head was not so well preserved and only the skull remained. The body and legs were put into an animal hide with hair still on, but the head and two front limbs removed. His face was covered by yellowish clay to highlight his nose, eyebrows, nose, and eyes and then painted black. Parts of his brownish hair were intact. Both the skull, wooden body and legs were painted black, but his arms were painted with the whitish sticky materials like the other dead.

Table 22 Summaies of the main features of the sculptures of type II in both the Xiaohe and Gumugou cemeteries

Coffin	***Sex of the dead***	***Sex of the sculpture***	***Sculpture image***	***Height (cm)***	***Painted***	***Dressed***	***Location***	***Cemetery***
79LQ2M8	Male	x	Upper body	55	No	No	Found in sand	Gumugou
79LQ2M3	Female	Male?	Upper body	37.5	No	No	At the feet	Gumugou
79LQ2M12	Female	Female	Upper body	56	Yes	Yes	Inside coffin	Gumugou
79LQ2M14	Baby	Male	Upper body	51	Yes	No	Inside coffin	Gumugou
79LQ2M20	Female	Female	Whole body	44.5	No	No	Outside coffin	Gumugou
79LQ2M18	Female	Female	Whole body	27.5	No	No	Inside coffin	Gumugou
A clay-lid wooden coffin	x	Male?	Whole body	50	Yes	Yes	Inside coffin?	Xiaohe
Note: x means Unknown.								

Sculptures of type II (size see *Table 22* and image see *Fig. 29*) are carved small wooden (or stone) sculptures of human features as burial goods in graves, e.g. in graves 79LQ2M8, 3, 12, 14, and 20 in the Gumugou cemetery and a clay-lid wooden coffin in the Xiaohe cemetery. A special sculpture is the stone sculpture in grave 79LQ2M18. The sculptures were either carved as whole human shapes or only of the upper bodies. Comparing the sex of the dead and that of the sculptures, there seemed to be no clear patterns. Wooden sculptures in grave 79LQ2M12 and 14 were not only carved, but also with painted faces or bodies (Wang 2014, 59–77), and even dressed

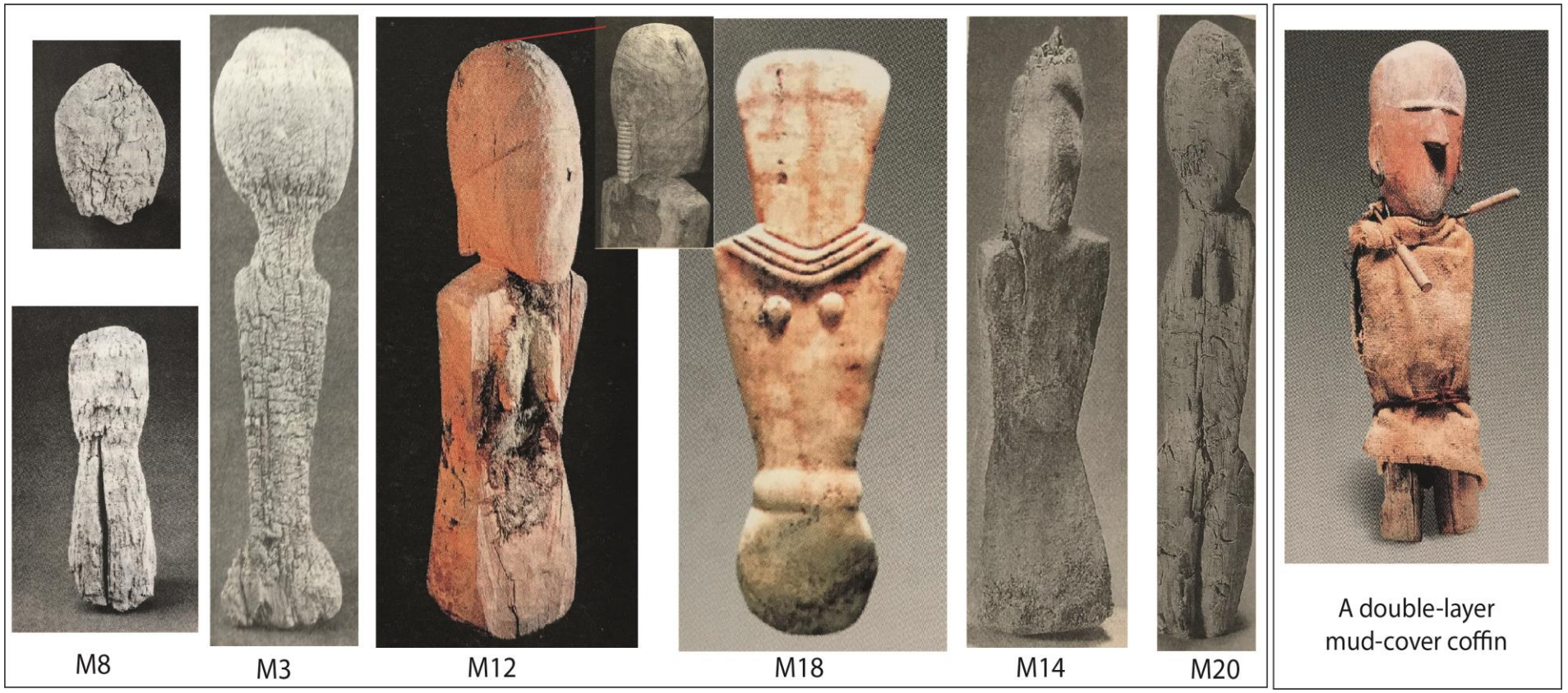


Figure 29 Sculptures of type II from both the Gumugou and the Xiaohe cemeteries
(Adapted from: Xinjiang 2011, 9-10; Wang 2013, 26, 38, 62, 76, 95)

in grave 79LQ2M12. Unfortunately, the painted features cannot be observed from the pictures.

The sculpture in grave 79LQ2M8 is a rough wooden sculpture carved as the upper part of a body with a height of 55 cm. The head was round, and the body had wide shoulders and a slim waist. The dead and body were separated. The sculpture might have been exposed to air after the burial. The location of the burial is unknown. The indicated sex of the sculpture is also unknown.

The sculpture in grave 79LQ2M3 is also a rough wooden figure carved as the upper part of a body with a height of 37.5 cm. The sculpture had a round head which is larger than the body and with a thin neck. The facial features were lost due to decay. The sculpture was found by the feet of the dead in the grave. From the flat chest, the indicated sex of the sculpture might be a male.

The sculpture in grave 79LQ2M12 is a carefully carved and painted wooden sculpture of the upper part of a body with a height of 56 cm. The head was elliptic with a carved headgear on top. On the reverse of the head, hair was carved. The facial features had been drawn in black lines and the whole body was painted in red. The sculpture had clothes on and was located in the eastern part of the coffin. From the highlighted breasts, it can be assumed that the sculpture should be a female.

The sculpture in grave 79LQ2M14 is a carefully carved and painted wooden sculpture of the upper part of a body with a height of 51 cm. The head was elliptic with a carved headgear on top. The body had wide shoulders and a slim waist. The sculpture was found at the eastern end of the grave. From the flat chest, the indicated sex of the sculpture should be a male.

The sculpture in grave 79LQ2M20 is a wooden full-body sculpture to a height of 44.5 cm. The head was rough with a bunch of carved hair on the back. There were no facial features on the front of the head. The sculpture had highlighted breasts, wide hips and thick legs. It was located at the north-western corner of the grave, outside the coffin. The indicated sex of the sculpture is clearly a female.

The sculpture in grave 79LQ2M18 is a stone sculpture carved as an upper body. The height was 27.5 cm, and the sculpture was rather flat. The head was in an irregular rectangular shape. On the face, there were no facial features except for four horizontal black lines intersected by a vertical black line. Under the neck were three protuberant wide lines which might indicate either neck ornaments or clothes. The sculpture had wide shoulders, breasts, and a thin waist with carved waistband. The bottom looked round. The sculpture was located in the eastern part of the coffin. From the highlighted breasts, the indicated sex of the sculpture should be a female.

The sculpture in a clay-lid wooden coffin covered in mud is a wooden sculpture of a whole-body. The height was 50 cm with an elliptic head with a large top part and a thin and pointed chin part. The whole head was rather large in comparison to the body. There were carved eyebrows, a high nose and ears. Each ear had a bronze earring. The face was painted red. The sculpture was wrapped in a piece of mantle and fixed with two wooden pins fastening on shoulders and a red woollen string twining around the waist. The indicated sex might be a male.

Table 23 Summaries of the wooden masks of type III from both the Xiaohe and the Gumugou cemeteries

Mask	***Skin***	***Painted***	***Eyes***	***Teeth***	***Strings***	***Height/width***	***Location***	***Cemetery***
M13:14	Yes	Red	White beads	8	7	9.1/6.7 cm	On left breast	Xiaohe
M24:17	Yes	Red	White beads	13	7	10/6.5 cm	At right elbow	Xiaohe
MC:93	x	Red	No	2	7+1	8.7/5.1 cm	x	Xiaohe
MC:94	x	x	x	No	x	8.1/4.5 cm	x	Xiaohe
79LQ2M19:1	x	x	No	No	x	8/6 cm	On the breast	Gumugou
Note: x means Unknown.								

Sculptures of type III (size see *Table 23* and a represented image see *Fig. 30*) are carved wooden masks with protuberant human facial features, left as burial goods in graves, e.g. M13:14, M24:17, MC:93, MC:94 in the Xiaohe cemetery and 79LQ2M19:1 in the Gumugou cemetery. The mask was generally in an elliptic shape. The facial side was protuberant, and the reverse either a bit hollow or flat. The more well-made masks were often covered with a layer of skin, and then painted red. Under the protuberant eyebrows were two white beads as eyes. Above the nose, there were often seven transverse twined woollen strings. There were white teeth in the mouth. Some masks were rough-made. The mask was a burial goods which often can be found on the breast of the dead.

Figure 30 The wooden carved facial mask from M13 in the Xiaohe cemetery
(Source: Xinjiang 2007, 14)

M13:14 is a carved wooden mask with an elliptic shape. The face was covered with a thin layer of skin and painted red. Under the protuberant eyebrows, were two white beads as eyes. Above the nose were seven transverse woollen strings twined. There were eight teeth made of white stems of feathers (Xinjiang 2007). On the forehead was a small hole. The mask was located on the left side of the chest of the dead.

M24:17 is a carved wooden mask. It is almost the same as M13:14. It was in an elliptic shape and the face was covered with a thin layer of skin painted red. Under the protuberant eyebrows were two white beads as eyes. Above the nose seven transverse woollen strings were twined. The main difference was that M24:17 has thirteen white teeth in the mouth and two small bronze pieces, one pasted to the forehead and another to the chin. There were two holes on the forehead, and also two holes on each side of the face. Woollen strings went through the holes. The mask was located by the right elbow of the dead.

MC:93 and MC:94 were collected from the cemetery area, and they were decayed to some extent. MC:93 is similar to M24:17. The face was painted red and with two white teeth left. Above the nose, seven transverse woollen strings were twined. There was also a horizontal woollen string above the forehead. There were two holes on the forehead, and two holes on each side of the face. MC:94 was made quite roughly. A hole can be seen at the edge of the forehead.

79LQ2M19:1 is a carved wooden mask in elliptic shape. The face was a bit flat compared to that of M13:14 and M24:17. The eyes were drilled as two deep holes. There were no teeth. There were holes both on the forehead and on each side of the face. The mask was located on the chest of the dead.

Table 24 Summaries of the main features of the carve high wooden sculptures of type IV in the Xiaohe cemetery

Sculpture	***Whole height/m***	***Figure height/m***	***Pillar***	***Base***	***Face***	***Painting***	***Location***	***Cemetery***
MC:117	3.05	1.67	Yes	Yes	Flat	No	150 m to the north of the cemetery	Xiaohe
MC:118	2.97	1.6	Yes	Yes	Flat	Probably	150 m to the south of the cemetery	Xiaohe
MC:119	2.22	0.82	Yes	No	Flat	No	On the northern slope of the cemetery	Xiaohe

Sculpture	**Indicated sex**	**Face**	**Figure height/m**	**Pillar & base**	**Painting**	**Location**	**Cemetery**
P1. V a	Female	Flat	1.58	No	Probably	On the eastern slope of the burial hill	Xiaohe
P1. V d (left)	Male	Carved	1.43	No	Red	On the lower part of the southern slope of the burial hill, in sand	Xiaohe
P1. V d (right)	Female	Flat	1.34	No	Red	Less 100 m to the east of the hill	Xiaohe

Type IV (size see *Table 24* and image see *Fig. 31*) sculptures are carved high wooden sculptures of human shapes as monuments on the cemetery, e.g. MC:117, MC:118, and MC:119 collected in the Xiaohe cemetery. The monument consisted of three parts including a human figure, a pillar, and a base. The highest one was MC:117 whose whole height was 3.05 m with a figure height of 1.67 m. The figure images of MC:117 and 118 were carved with heads, arms, and legs, but with no facial features; the figure image of MC:119 had no arms or legs. These three monuments were collected from the ground of the cemetery area. They might have been moved from their original location, but the high sizes indicate that they might have been ground monuments of the cemetery, possibly standing together with the high poles.

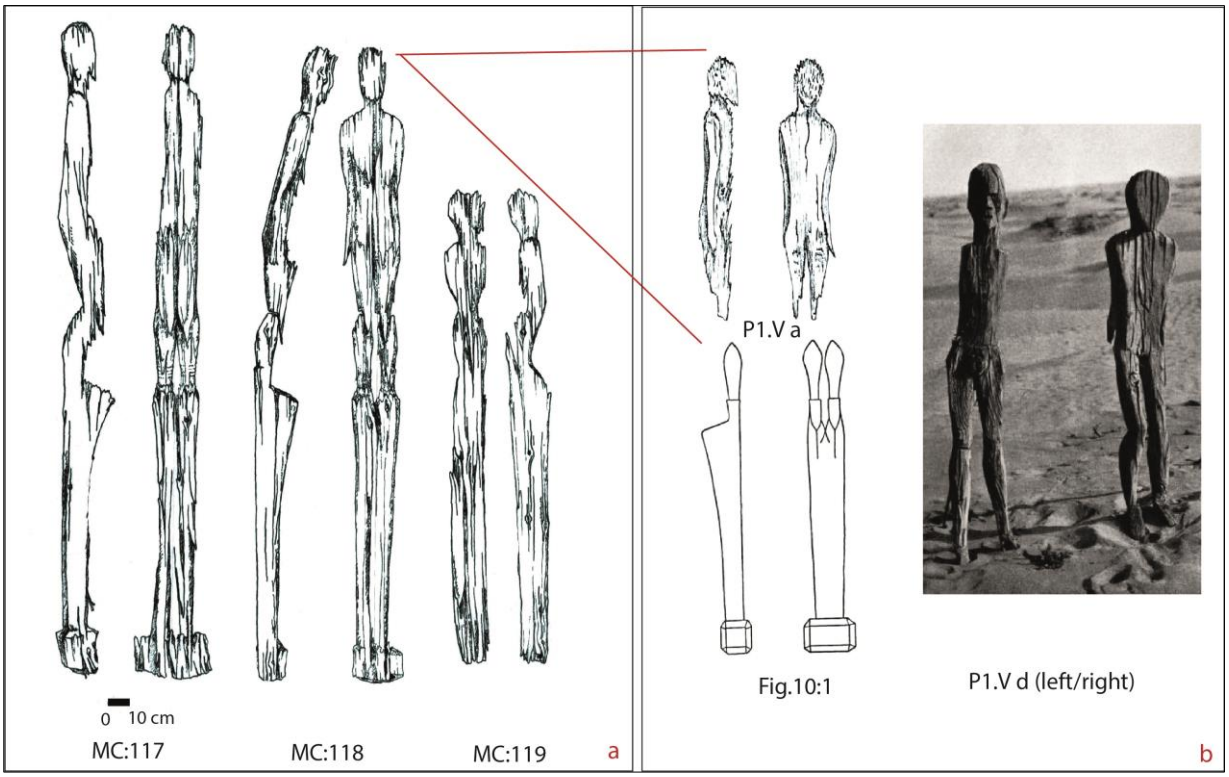


Figure 31 The high wooden human sculptures of type IV as monuments in the Xiaohe cemetery (Adapted from: Bergman 1939, 64, P1. V; Xinjiang 2004, 374)

Bergman (1939: 67) found three human figures of wooden sculptures P1. V a, P1. V d (left & right) and an unclassified wooden object, shown as "Fig. 10:1". He recorded the images and information but did not take them with him back to Sweden. The wooden figures and objects were later found in excavations. It is suggested that P1. V a, a wooden human figure and "Fig. 10:1", the bottom part of a wooden object, belong together to form the monument MC:118

(Xinjiang 2004). The other two wooden human figures P1. V d (left & right) had remains of red paint. P1. V d (left) had carved eyes, nose, mouth, and ears, P1. V d (right) had not facial features except for a flat surface. The two wooden figures might belong together to form a monument, like MC:117, 118 and 119.

Table 25 Size information of the wooden sticks with facial images of type V in the Xiaohe cemetery

Stick with face image	Whole height /cm	Face height/cm	Face width/cm	Nose height /cm
M24:9	66	11	1.2	2.3

Sculptures of type V (size see *Table 25* and image see *Fig. 32*) is a pair of wooden sticks with human faces, e.g. M24:9 and M24:10 from the Xiaohe cemetery. Such special wooden sticks were only found from the grave M24. The two sticks were fairly similar. The top of the M24:9 stick was round and big, and the other end was slim and pointed. On the top part of the M24:9, a pair of bone human faces which had a high nose each inserted into the grooves on the flat front, pasted and fastened to be fixed at the position. On the reverse side of its face, four thick feathers were pasted and fastened. Under the face, a bunch of Ephedra twigs, four tamarisk twigs, some brown fur and light-yellow bristle were fastened around the stick and twined around by (bristle-string and) woollen string. The bristle of M24:10 was black, and so was its bristle-string. Of the pair of sticks with face images, one was inserted in front of the dead's head and the other behind the feet in the coffin.

Figure 32 Wooden sticks with facial images of type V in the Xiaohe cemetery (Source: Xinjiang 2007, 15)

4.6. Comparisons of burials in the Xiaohe and the Gumugou cemeteries

The burial features in each cemetery (Xiaohe or Gumugou) itself were rather consistent and hardly to see some obvious changes with time. The Xiaohe and Gumugou cemeteries shared some common burial features from the way to construct the coffins, dress the dead to what burial goods and how to place, but also quite different in some ways.

In the Xiaohe cemetery, the coffins listed in this study were from three burial layers. As it was described in chapter 3.1, most coffins were from the first burial layer, including 5.A, B, C, D, E, F, and M11, 13. In second burial layer were coffin M1, 3, 24, 33, and 34. In the third burial layer were coffin M2 and 4. From the analyses of chapter 4.2, it was similar to construct the coffins, erect wooden monuments, dress the dead, and place burial goods. No obvious changes in the graves can be observed from the third burial layer to the first/surface layer. In the fourth and fifth burial layers the Xiaohe cemetery, we can see there commonly contained some normal coffins but in a rectangular shape instead of a boat shape from some published images, and less than ten clay-lid wooden coffins (Wang 2017). The main features

of the clay-lid wooden coffins[7] (see *Fig. 33*) were here:

- No coffin floors;
- Wooden rectangular coffins;
- Over the coffin lid were put some grass-mats and a layer of clay;
- Grass-ropes were used (to fasten/decorate the coffin?);
- On one end of the coffin was a drilled hole embedding a wooden pole;
- Close to each end of the coffin inserting a long wooden pole through the side-planks of the coffin.

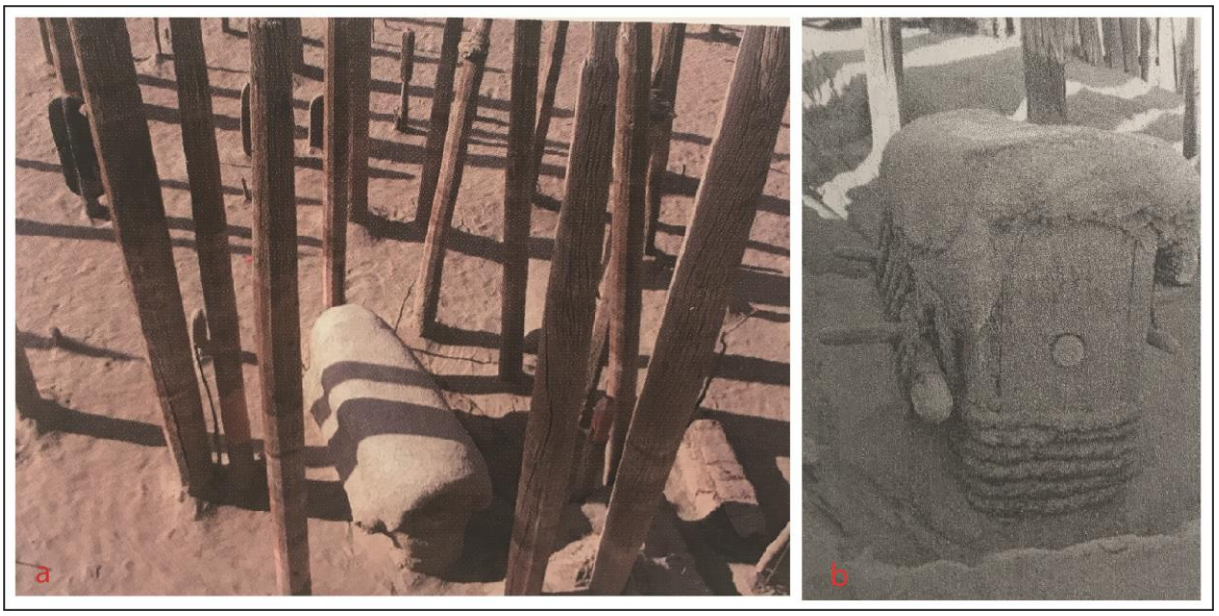


Figure 33 Clay-lid wooden coffins from the 4th and 5th burial layers of the Xiaohe cemetery (Source: Xinjiang 2011: 9; Wang 2017: 15, 图13)

Till now, we can conclude that the burial customs in the Xiaohe cemetery were consistent on the whole. Graves in burial layers 1-3 were similar and consistent, while in burial layers 4-5 contained a few special clay-lid wooden coffins (less than ten). Does it mean there was a burial shift from layers 4-5 to layers 1-3? I would rather think the clay-lid wooden coffins were some special graves mixed with the other normal rectangular wooden coffins in the early time period of the communal cemetery. With time, the normal rectangular wooden coffins gradually developed into boat-shape (that better prevented sand from flowing into coffins from practical point of view)[8].

In the Gumugou cemetery, the main difference was the two burial types, type I the sun-radiating-spokes burial pattern, and type II the normal rectangular wooden coffins. In each burial type, the way to construct the coffin, dress the dead, and place burial goods were similar and consistent. But in the type II the normal rectangular wooden coffins, how to construct coffins varied, e.g. graves M11, 12, 13, 14, 18, 20 and 29.

The two types of graves stratigraphically overlay each other, so they should be from the same time period. The six special sun-radiating-spokes graves address two assumptions: one that these six males came from another place and had their own ancestor memories and social identities; the other that the six males had special social status in the Gumugou society. Anyway, the two assumptions were not contradicted in considering the various constructions of coffins in the Gumugou cemetery, which indicates the Gumugou society was a preliminary developing society, not limited in strict social rules. We might conclude that the main burial customs of the

[7] The image of the clay-lid coffin can also be seen from (Baumer 2012: 122).

[8] The boat-shape coffins could also be a cultural phenomenon than a technological development.

Gumugou cemetery were consistent but varied a bit.

Between the Xiaohe cemetery and the Gumugou cemetery, there were some common burial features (see *Table 26*). In both cemeteries, the coffins were buried in sand. The coffins were made of wood without floors. The structure of coffins was similar in consisting of two side-planks, mainly two end-boards, some lid-boards, and animal hides covering on the top of the coffins. It can be assumed that both cemeteries had burial ceremonies from the Ephedra twigs, tamarisk twigs or livestock horns and leg bones either above the coffin in the Gumugou cemetery or beside the wooden monuments in the Xiaohe cemetery.

Table 26 Similarities of the burial customs between the Xiaohe cemetery and the Gumugou cemetery

	Xiaohe	***Gumugou***
Wooden coffins	Yes	Yes
No bottom	Yes	Yes
Side-planks	Yes	Yes
Lid boards	Yes	Yes
Ceremony after burials	Tamarisk, Ephedra twigs, livestock	Ephedra twigs, livestock
Lying on the back	Yes	Yes
Head direction	East	East
Headgears	Yes	Yes
Leather boots	Yes	Yes
Wrapping mantles	Yes	Yes
Bracelets	Right wrist	Right wrist
Personal ornaments	Necklace, earrings	Necklace
Grass baskets	Yes	Yes
Ephedra twigs	Yes	Yes
Animal ears	Yes	Yes
Wooden masks	Yes	Yes
Stones and bronze	Yes	Yes

The way how to dress the dead was similar too. The dead was placed lying straight on his or her back on the ground, with a headgear and a pair of leather boots on, s wrapped into a big felt mantle. The wrapping mantles were fastened with wooden pins. The head of the dead was always placed on the east end of the coffin. It was common to see a bracelet be fastened on the right wrist of the dead. Some dead had their personal ornaments such as necklaces or earrings on. Common burial goods in the two cemeteries were grass baskets, Ephedra twigs, animal ears, wooden masks, some valuable stones and also small bronze pieces.

There were also some obvious burial differences (see *Table 27*) in the two cemeteries in how to construct coffins, what burial goods and where to place, and slightly difference in how to dress the dead. In terms of the way to construct the coffins, in the Xiaohe cemetery, the curved side-planks of coffins were tightly connected by inserting end-boards into grooves of the side-planks, so the coffins looked like in a boat shape. In the Gumugou cemetery, the side-planks were straight and not connected, so they loosely formed a rectangular coffin, and the end of the coffin where to put the head of the dead was often larger than the feet end. In the Xiaohe cemetery, the coffins were often covered by cattle hides and with a mixture of tamarisk twigs and reeds above the hides. In the Gumugou cemetery, above the coffin, mostly were sheep/goats hides instead of cattle hides, and above the hides were place dustpan-shape grass-made containers sometimes. In the Xiaohe cemetery, there were wooden monuments erecting in front of the head-end of coffins to indicate different gender of the dead, female dead with a wooden cylindrical post and male dead with a wooden oar-plank monument. In the Gumugou cemetery, there were no such wooden monuments, but some graves contained erected wooden boards around the coffin, which possibly formed a wooden wall/fence as part of the grave constructions, e.g. graves M11, 12, 14 and 20. In terms of the special graves in each cemetery, the Xiaohe cemetery had some special clay-lid wooden coffins in its early time period, and the Gumugou cemetery had six sun-radiating-spokes burials.

Table 27 Differences of the burial customs between the Xiaohe cemetery and the Gumugou cemetery

	Xiaohe	***Gumugou***
Monuments	Yes	No
Shape of coffins	Boat/rectagualar	Rectangular
End-boards	Inserted/between	Between
Animal-hides	Cattle	Mainly sheep/goats, cattle
Above animal hides	Tamarisk twigs/reeds/stones	Dustpan-shape container, reed mats
Special graves	Clay-lid wooden coffins	Sun-radiating-spokes burials
Grass-made baskets	Porriage of millet, grains of wheat and millet, dairy products	Grains of wheat and millet
Plant bags	Ephedra twigs, grains of wheat/millet	Ephedra twigs
Arrows or arrow-shafts	Common in male graves	Only in M11, female
Combs	Female dead	No
Wooden phalluses	Female dead	No
Leather bags	Female dead	No
Tamarisk twigs	Yes	No
Tendon-made strings	Yes	No
Wooden containers	No	Bowls, cups, spoons, pots
Wooden sculptures	To represent the dead/as monument	As burial goods
Heads/Horns of livestocks	Cattle heads	Sheep/goats horns, a very few cattle horns
Horse-leg like woods	Yes	No

In terms of burial goods, in the Xiaohe cemetery, a few grass-baskets contained both cooked food and raw cereals, e.g. porridge of millet and grains of wheat and millet in 5.F:1 (Bergman *et al*. 1939: 84) or dairy products (Liang *et al*. 2012). In the Gumugou cemetery, the grass-baskets contained uncooked food such as grains of wheat or millet. In the Xiaohe cemetery were not only Ephedra twigs in plant bags fastened to the wrapping mantles, but also grains of wheat or millet in pant bags. In the Gumugou cemetery were only Ephedra twigs in the plant bags. In the Xiaohe cemetery, there were a lot of arrows or arrow-shafts buried in male graves, and combs, wooden phallic objects and leather bags in female graves. In the Gumugou cemetery, such burial goods with gender distinctions cannot be observed, but there were arrow shafts in M11, where the dead is a female. In the Xiaohe cemetery, burial goods included tamarisk twigs, tendon-made strings. In the Gumugou cemetery, burial goods included wooden bowls, cups, spoons and pots instead. In the Xiaohe cemetery, the wooden sculptures were carved as similar sizes of human beings and covered with animal hides to be used in coffins as substitutes of the dead, e.g. wooden sculptures of type I in chapter 4.5, or carved as a human image standing on a high wooden pillar with a base and might be used as a monument in cemetery, e.g. wooden sculptures of type IV in chapter 4.5. In the Gumugou cemetery, the wooden sculptures were carved as upper body image or a small whole-body image and placed inside coffins as burial goods, e.g. sculptures or mainly wooden sculptures of type II in chapter 4.5. In the Xiaohe cemetery, were livestock-heads buried inside or outside the coffins. In the Gumugou cemetery, instead, were often livestock-horns buried.

5. Discussions

In chapter 4, an in-depth examination of the Xiaohe cemetery and the Gumugou cemetery was carried out, that how the coffins were constructed, how the dead were dressed, and what and how burial goods were placed. Then, a comparison between the two cemeteries was followed. I will here in this chapter outline the general burial process of each cemetery, and develop a further discussion on how the gender identity acted as an important part of the social identity in the Xiaohe society, and what the possible relations between the Gumugou society and the Xiaohe society were.

With the results from osteological and ancient DNA research, the main discussion focuses on the relations between the Xiaohe and Gumugou societies, and if the similar morphological characteristics or ancestry lineages indicate that the Xiaohe or the Gumugou people can be understood as derived from the Afanasievo culture or the Andronovo culture. Also, the Xiaohe-Gumugou cemeteries need to be understood by considering the surrounding Bronze Age cultures in the Altai-Tianshan-Kunlun Mountains and the possible connections to the Afanasievo culture and/or Andronovo culture in the Eurasian Steppe in the Bronze Age.

5.1. The general burial process of the Xiaohe cemetery and the Gumugou cemetery

In the Xiaohe cemetery, all graves were buried in the sand. The burials (burial process of the Xiaohe cemetery see *Fig. 34*) here mostly shared some common features in term of how to dress the dead, how to assemble burial goods with the dead, and how to construct the coffin. But the graves with clay-lid wooden coffins from the early phases were quite different from the later graves with general rectangular/boat-shaped wooden coffins.

The dead had been decorated and dressed up before they were put into coffin. The dead bodies were often painted with a kind of whitish sticky material, possibly from milk or other dairy products, on their hair, faces, and even bodies. Considering the large number of objects in the graves related to livestock, e.g. cattle and sheep/goats heads, tendon-made strings (such as strings made of cattle-tendons), calf ears, cattle hides, it seems probable that the whitish sticky material was milk or other dairy products. The dead wore a felt headgear and a pair of leather boots and a narrow woollen loin-cloth. On the right wrist of the dead were always at least one bead bracelet of jade or opal. Such dressing code with a headgear, a loin-cloth, a pair of leather boots, and a bracelet were common features for almost everyone. When the dead's body were not available to allow the mourners to bury them, it was still important to bury "the dead" into the community cemetery. As a substitute for the body, the mourners used wooden sculptures in a real life size to represent the dead. The wooden sculptures would first be covered with animal skins, but apart from that "the dead" were still dressed the same way as otherwise when there was a real body.

After the dead was decorated properly, it was time to make the grave. Since the graves had no floors, the mourners only needed to flatten the ground to place the dead. Sometimes the mourners put a bottom mantle on the ground and a lamb-fur pillow to let their dead lie on instead of lying directly on the ground. Before or after the dead was placed, the mourners always put a basket containing cooked food in the grave. A large woollen mantle was stretched out, so the dead and his or her burial goods could be well assembled inside this wrapping mantle. Female

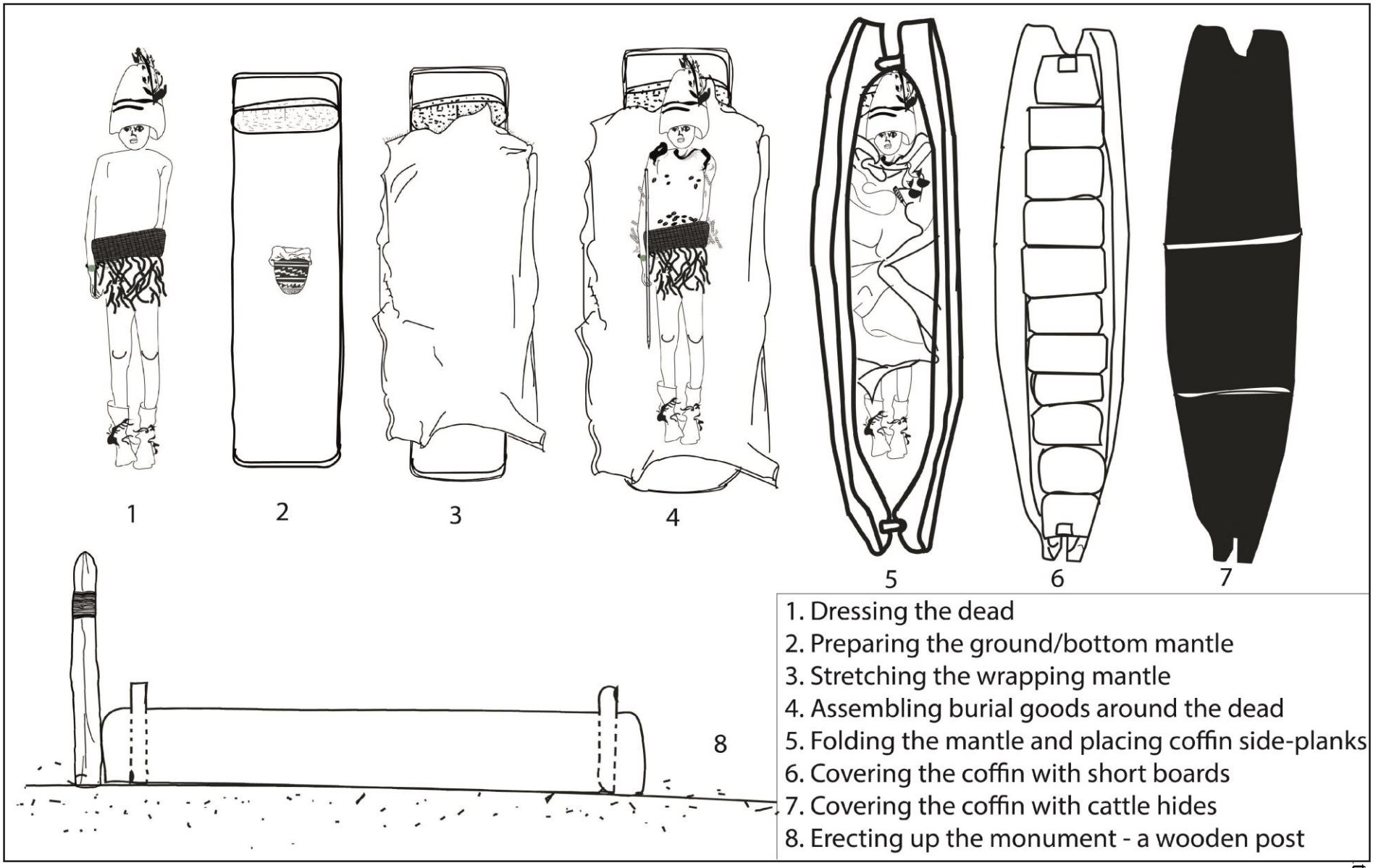


Figure 34 The general process of burying the dead in the Xiaohe cemetery

a comb, a leather bag and a wooden phallus, while the male dead would be given arrows or shafts for arrows. The dead often held a tamarisk twig in the right hand. Several ephedra twigs, tendon-made strings, grains of wheat or millet, animal ears, tendon-made strings and pieces of white sticky cubes (dairy products like kefir cheese) were spread surrounding the upper bodies. Graves with cattle heads often contained rich burial goods, generally more than other graves, and could also include some valuable goods such as feather decoration, valuable stones, bronze pieces or decorations, and some rich wooden objects.

Then the mantle was folded and wrapped together from right to left and wooden pins were attached to the mantle in the middle. On the right corner of the mantle, a few bags containing ephedra twigs and grains of wheat or millet were often fastened. The main part of the body was covered, with the head, legs and feet left outside.

All the graves were without floors. After the dead was properly provided with burial goods, two curved side-planks were put together on the left and right side of the dead, and two narrow straight end-boards were inserted into the grooves on the ends of the side-planks. Finally, around ten lid-boards in different length and width were put on the top to perfectly enclose the coffin, which then was tightly covered by a few pieces of fresh cattle hides. Above the cattle hides, commonly twelve tamarisk twigs and a reed twig were often placed, sometimes even small stones. In general, the head-end of the coffin would be marked by a post or an oar-plank.

After the dead was buried, the ceremony would continue. As observed in all the excavation reports, the cattle hides were tightly covered on the top of the coffins to prevent sand from entering, which indicates the cattle hides were fresh in use. There was also a pile of dried cattle dung placed on the top of the grass-bundle with four sheep/goats-shank bones mixed in the grass-bundle fastened to the wooden monument at the head end of the coffin M24. Two red cosmetic sticks from M17 and 22 were made from cattle heart and hematite powders as pigments to paint (Mai *et al*. 2016). The use of fresh cattle hides, dung, sheep/goats shank bones, cattle horns and related paint means that there was a huge need of livestock during the ceremony, and a convenient way to make the progress smooth might be to kill and butcher the livestock at the burial place. Cattle and sheep/goats were brought to the burial place, and the animals were killed to bury the horns into the coffin with part heads remained, apply their hides to covering the coffins, use cattle heart to make the cosmetic heart to paint the dead, cattle heads, or the wooden monuments, and collect cattle dung to place on top of the bundle of grass. After the dead were buried, perhaps the mourners consumed the remaining meat during the ceremony.

In the Gumugou cemetery, all the graves were also buried in sand. The burials (burial process of the Gumugou cemetery see *Fig. 35*) of the type II, the normal wooden coffins, shared some common features in term of how to dress the dead, how to assemble burial goods with the dead, and how to construct the coffin. However, burial type I, the sun-radiating-spokes burial pattern, was extremely different in terms of the outer construction of the burial mound.

The way to decorate the dead was quite similar to the Xiaohe cemetery. Before the dead being buried, they were provided with headgears, leather boots, and a bracelet of bead was fastened on the right wrist. Then the body was wrapped into a large felt mantle. A difference from the Xiaohe cemetery is that the dead here had no loin-cloth. The mantles were fastened either with wooden or bone pins. After dressing the dead properly, the dead was placed on the ground, lying straight on the back. The head was always towards the eastern end of the coffin.

In terms of burial goods, it was commonly to have a grass basket in graves, and some baskets contained grains of wheat or millet. The grass basket was often placed beside the dead's head or neck. A bundle of Ephedra twigs was wrapped with a small piece of felt mantles. Gender distinction in burial goods cannot be observed from the Gumugou cemetery. It was common to have wooden objects, some food containers like bowls, cups, spoons and some wooden sculptures of human images (e.g. the wooden sculptures of type II in chapter 4.5). Such wooden sculptures buried in graves were only observed from the early phases in a clay-lid wooden coffin in the Xiaohe cemetery. Beside this, the burial goods included animal horns from cattle and sheep/goats which were treated different from the Xiaohe cemetery, and some grass-containers in dustpan shape which had not been seen from the Xiaohe cemetery.

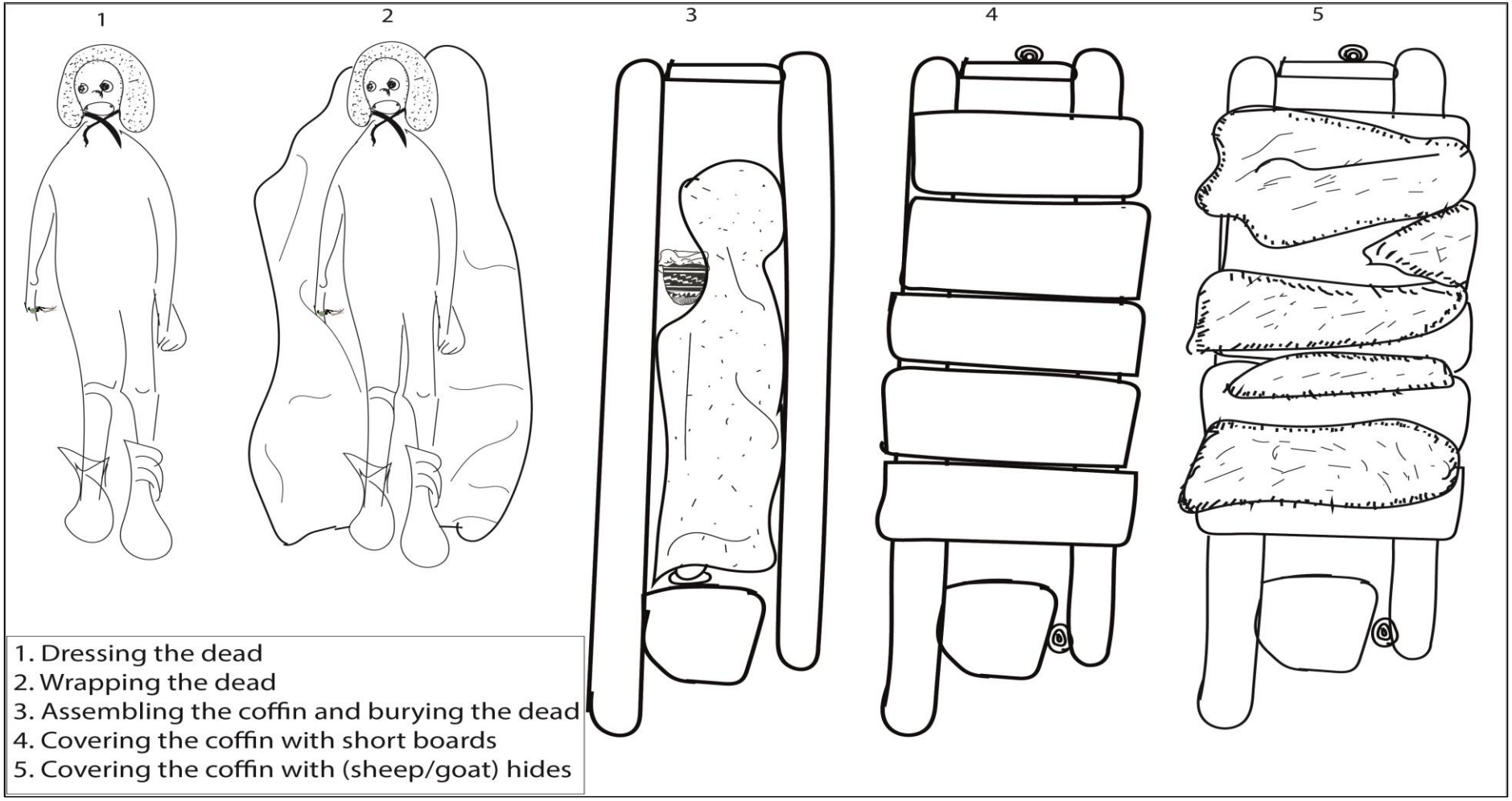


Figure 35 The general process of burying the dead in the Gumugou cemetery
(*The basket is only an indication image.)*

The construction of the coffins was similar to the Xiaohe cemetery but not limited by very strict rules. Most coffins consisted of two long straight side-planks, two end-boards connecting to the side-planks, and a lid formed by several short boards not fixed together. The coffins were in a rectangular shape and the head part of the coffins was often wider than the feet part. The head end-board of the coffins was often longer than the feet end-board. The coffins were covered by a few pieces of sheep/goats hides to prevent sand from entering in. Cattle hides were not common, and sometimes reed-made mats or dustpan-shaped grass-made containers were used to cover the coffins. The coffins generally lay in an east-west direction and the head of the dead was always placed in the east end of the coffin. The coffins had no bottoms.

In the construction of the graves, there were two special technologies applied. One is to erect rectangular wooden boards following the shape of the coffins and higher than the coffin to form a wooden fence-wall, as can be observed from grave M11, 12, 14 and 20. Another is to place wooden poles and reeds to shape the framework of graves and prevent sands flowing into the coffins, which can be observed for graves M13, 18 and 20. A typical example is M13, that had three wooden poles standing at each corner of the grave, with some reeds standing between the wooden poles, fixed by mud to form a grave framework/wall.

5.2. Sexual identity as part of social identity and the life-death beliefs

Sexual identity as a social identity contains both individual and social levels, with a dynamic development (Katz-Wise *et al.* 2011). The personal level relates to how individuals consider their gender as a male, a female or other, which are often the same with their actual biological sexes, but also might be different. The social level refers to how people consider and expect different genders to act and behave under the social and cultural framework. Here I see sexual identity as part of social identity and want to stress the interpersonal relationship instead of personal cognition. As we have discussed in chapter 2.1, graves mostly show relationships between the living and the dead. The mourners acted the mortuary ritual to not only bury their dead, but also achieve the transformation of the dead in the communal cemetery, from life to death, and from individuals to groups. When a group member died, the living constructed and confirmed his or her former social identities by following certain rules, which normally we understand as burial customs or burial behaviours. Such conformation of social identities of the dead in burials was based on the social bond between the dead and the living. The social bond existed before and still need to be maintained even people died. Sextual identity is part of social identity, and can be shown/expressed in burials from how to dress the dead, and what burial goods to assemble. As we commonly admitted, graves mostly show relationship between the living and the dead. When the mourners acted the mortuary ritual to bury their deceased, sexual identity would be possibly reflected in graves based on their contemporary social cognition.

In an archaeological context, sexual identity was expressed with specific burial goods such as combs, wooden phalluses, leather-bags for females, and arrows, bows, and sometimes animal-leg-like wooden objects for males in the Xiaohe cemetery. These objects have been included from people's real life and have possibly been expected to have a function for the afterlife too. No one has experienced afterlife, instead, people have assumed some similar need for the dead and their afterlife by analogy to the daily life in the society. In a really limited burial space, one would not expect that all things, which can cover every part of daily life, would have been included in the grave. Instead, some elements would be given priority. From the case of the Xiaohe cemetery, I suggest that at least two elements of grave goods can be observed and highlighted in the burial context: namely life supplies and objects related to rebirth and fertility. Life supplies included cooked food porridge of millet, dairy products in the grass-baskets, plant seeds e.g. grains of wheat and millet either in grass-baskets or spreading around the dead, and possible medical herbs in the form of Ephedra twigs in plant bags or spreading out surrounding the dead. Ephedra twigs and grains of wheat and millet were also found in the Gumugou cemetery. Rebirth and fertility were primarily represented through the phallic-objects, and

especial the ones with lizards inside.

In the Xiaohe society, men might mainly burden the responsibility for hunting in life. Arrows, arrow-shafts and bows were always included in male graves. Considering the function of arrows and bows, they could be used for combat in wars, hunting or for games. Such tools appeared in male graves in a few different ways, either buried with the dead inside the coffins, or placed outside the coffins just beside the erect wooden oar-plank monuments. Even for a small boy (in grave M3), there were arrows provided. Plenty of cattle hides, and other objects made from domestic animals (e.g. cattle heads, tendon/sinew-made strings, leather boots, leather bags, felt headgears, mantles and loin-cloth, calf ears, woollen yarns, and sheep/goats fur pillows) tell us that the Xiaohe group had rich livestock for providing food, clothes and for sacrifice in burial rituals. Furthermore, in the practice to use animal products to make glue (Rao *et al*. 2015) and cattle heart as pigment for cosmetic sticks (Mai *et al*. 2016) proves that the Xiaohe group had really advanced knowledge of the use of cattle for a variety of purposes. In addition, three cereals from the Xiaohe cemetery have been identified: common millet, bread wheat and love grass (R. Yang *et al*. 2014). Millet was cooked with milk as a porridge. Grass was used to feed the livestock or make baskets. Hence, we may safely assume that the Xiaohe group relied on their domestic cattle and sheep/goats, but also applied agriculture and hunting as a supplement to the diet.

There was a big need for the hunting of wild animals in the Xiaohe group. Wild animals like vultures, weasels, badgers, lizards and snakes can be observed from the graves, e.g. a lower jaw of a vulture in grave 5.B, weasels decorated on felt headgears in graves M4, 11, 13, 24 and twined around wooden sticks in graves M13 and 24, badger hide that covered the wooden body in grave M2, lizards in the grooves of wooden phallic objects in graves 5.L and M13, dried snake and snake skin in grave M15 (Wang 2017), and hide covering some wooden sticks in grave M24. Hunting tools such as arrows and bows only shown in male graves indicate that hunting activities were dominated by men in the Xiaohe society.

In female graves commonly were leather bags, "magic combs" (pin-kits), and phallic objects. Some leather bags had cosmetic sticks, made from cattle heart and hematite powder as pigment for paint (Mai *et al*. 2016). It is difficult to know whether Xiaohe people used such cosmetic sticks in daily life, or only for ritual painting in burials. Red lines painted on the foreheads of the dead were common, as were transverse lines in red on the animal-leg-like objects, red triangle decorations on arrow shafts or combs, red lines painted on bull-head, and posts or oar-planks monuments painted in red. The materials suggest that women possibly acted as painters in some special occasion such as a burial ritual. The combs are too long to function as combing hair, instead, combs possibly have same practical use as pins (as discussed in chapter 4.3). In practical use, women can take off the pins (comb-teeth) from the tendon-made containers, to fasten wrapping mantles or sew leather boots, and bags, etc. When the work was done, they collected pins back inserting to the tendons, and easily took the pin-kits with them.

Phallic objects are often interpreted as related to fertility worship or cult, concerned with birth and the continuation of human beings. Fertility worship or cult often reflect the concern of subsistence or offspring. Hunter-gathers care about animal reproduction and farmers mostly pay attention to the fertility of soil (Anati 1985). In primitive societies, except for the supply of food, another essential care is with people's own fertility, which is often shown as a worship related to sex and sexual behavior. The most direct sex worship is either to highlight round breasts, hips, bellies of females, or phallus of males, since they carry functions related to giving birth. As an extension, some other objects are symbolized and related either with fertility or indications of sex. Two features mainly matter in symbolism, that is either the similar shapes or the shared characters between objects and the indicated sex. Upright objects such as erect stones, mounds, poles and trees, or masculine power related animals or objects such as bulls, snakes, bows, arrows, horses are related to males (Brown 2009: 34–68). The interpretation of the possible indication of the same object may vary. The symbolism of lizards has been interpreted either as related to female fertility (Rydh 1927) or to male fertility (Zhao 1993). What we can conclude is that lizards were often used in primitive societies to indicate fertility. The context of the

symbolized objects is important when dealing with a specific case, rather than discussing possible universal symbolism.

In the burial context of this study, a lizard head and a bundle of feathers were embedded in the groove of the wooden phallic object 5.L:4, and an entire lizard in the groove of M13:21. Lizards have strong regenerative ability of the tails. Once they lose their tails, they can soon grow a new tail. Such regeneration capability was expected to give to the females through the phallic objects placed in female graves in the Xiaohe cemetery. The burial display of the wooden phalluses with lizards embedded in, shows concepts of both the regeneration and cooperation between females and males. In a global perspective, it is common to see fertility worship such as Priapus in Greek and Italy, Khem/Min in Egypt, Frey in Scandinavia (Brown 2009: 13–34). About cooperation work between two genders, lingam (phallus) and Yoni (vulvae/womb) in India indicates the process of regeneration created by both sexes (Doniger 2011; Bohidar 2015). There are also other gender cooperation examples in ritual, e.g. anthropological cases about gender-collaboration in fertility cult in Papua New Guinea (Stewart *et al*. 1999), and ritual gender dualism in protection of their fertility in Nigerian Kulere (Frank 2004), etc. In the Xiaohe cemetery, death was related to the renewal of life, and supposed to be achieved through cooperation between the two genders.

Mortuary rituals have carried the transition from the living to the dead, from life to death. However, the end of the death was regeneration. Considering the rebirth of the dead, food and subsistence would be reasonable to appear in the graves. Both cooked food and plants were provided to the dead. Men and women were attributed with different objects except for their common burial goods, as they had been responsible for different parts in daily life before dying.

5.3. Peoples and cultures in the Tarim Basin

Recent osteological and DNA research is providing a clearer idea about who the dead might be and where they came from. The mummies in the Xiaohe cemetery clearly show some European facial characteristics, as deep eyes, straight and high noses, and brownish hair. The morphological features of skulls from the Gumugou cemetery are examined and concluded to be similar to the Bronze Age Afanasievo and Andronovo people, possibly originating from southern Siberia, Altai, Kazakhstan or Central Asia (Han 1986, 1994). Two male skulls, L.T.03 and L.S.2.07, collected during Stein's third expedition (1912-1915) have European-like morphological features (Keith 1929). Later DNA analysis shows that the Xiaohe people have a diverse maternal ancestry originating from Europe, central/eastern Siberia and southern/western Asia and that the population is a mixture between the east and the west (Li *et al*. 2010, 2015)[9]/[10]. We can see morphological features of skulls tell us what Gumugou people looked like, and ancient DNA[11] analysis show what the Xiaohe people's ancestral lineages were.

[9] The ancient DNA research published in 2010 did analyses on both Y chromosomal and mitochondrial DNA of the 5th stratigraphic burial layer of the Xiaohe cemetery. The result indicates that Xiaohe people contained both the East and West Eurasian maternal lineages, while the males only had western paternal lineage.

[10] The ancient DNA research published in 2015 did analyses only on mitochondrial DNA of the dead from 4th-1st stratigraphic burial layers of the Xiaohe cemetery. The result indicates that Xiaohe people carried diverse maternal lineages, including East, West and Indian maternal lineages.

[11] Mitochondrial DNA means the DNA located in mitochondria. MtDNA research can be used to trace the maternal lineage, since DNA in mitochondria can be only inherited from the mother and can be traced far back (Hine *et al*. 2015b; Sykes 2010). Y chromosome is a sex chromosome in humans, who contained 23 pairs of chromosomes including one pair of sex chromosomes, namely male as XY and female as XX. Since sex chromosomes contain genes of developing sex organs and Y chromosome is only contained by men (Hine *et al*. 2015c; Martin 2015), Y chromosome research have been widely used to trace the paternal lineage. Both mtDNA and Y chromosome research here mainly relate to "haplotype" and "haplogroup". Haplotype is a group of genes or alleles within an organism that were inherited from either parent (Anon n.d.; Hine *et al*. 2015a), and

Both the Xiaohe and the Gumugou groups are suggested as possibly originating from southern Siberia or Central Asia and being related to Afanasievo and Andronovo people (Han 1986, 1994; Li *et al.* 2010, 2015). But a latest research suggest that the Xiaohe males are genetic distinct from the Afanasievo males, considering the paternal lineages (Hollard *et al*. 2018)[12]. From genetic evidence, it is suggested that southern Siberia and Central Asia were dominated by Europeans during the Bronze Age. Southern Siberia was predominant by Europeans since the Bronze Age as a result of eastward migration of Kurgan people (Keyser *et al*. 2009). Central Asia started to have an eastern Eurasian maternal lineage that coexisted with the previous western maternal lineage from around 700 BCE (Lalueza-Fox *et al*. 2004). Based on the research mentioned above, we can conclude as that the Xiaohe and the Gumugou people possibly came from the southern Siberia or Central Asia.

When to consider the early Bronze Age cultures in the Tarim Basin, discussions are often related to the nomadic cultures in the Eurasian Steppe, like the Afanasievo culture or the Andronovo culture, or to the oasis cultures such as the Bactria-Margiana Archaeological Complex (BMAC). There are two hypotheses about the origins of the Xiaohe horizon. The "steppe hypothesis" assumes that the early settlers (Gumugou people) of the Tarim Basin came from the Afanasievo culture in the Minusinsk Basin-Altai Mountains regions (Kuz'mina *et al*. 2008; Mallory *et al*. 2008). The "oasis hypothesis" argues that the early settlers were related to the spreading of the oasis-based agricultural groups from the Bactria and Margiana parts of the southern Central Asia area (Chen *et al*. 1995). Both hypotheses mainly relied on the use of some materials such as animal cattle, sheep/goats, camel hair, and plant wheat, whose origins were bound to western traditions. But these proofs cannot provide enough support to claim that the Xiaohe horizon cultures were from Afanasievo or BMAC cultures, except for telling there were possible cultural connections or interactions among them. What's more, there were no horses or potteries in the Xiaohe horizon.

It is worth noting that Ephedra plant is commonly thought as a strong candidate of the Soma or Haoma sacred drink for the ancient Indians or Iranians. Soma is the name recorded in the Vedic Brahmanism religious literature *Rigveda*, Haoma in the Zoroastrianism *Avesta*, and indicates as a ritual drink from plant juice. The reason to address Ephedra plant to Soma-Haoma drink is mainly because of its ephedrine, which works on muscle strength, low blood pressure, (and asthma) to make people get rid of tiredness (Houben 2013). Furthermore, it is thought that Ephedra with anti-fatigue function gives gods or the dead immortality, longevity, and resurrection (Mahdihassan 1987). From a mobile consideration of Vedic Aryans perspective, it is thought Vedic Aryans made use of Ephedra, cannabis and poppy to produce Soma drink in Margiana, only Ephedra in Bactria and in Indian mountains area, but other substitutes in Indian plains (Shah 2014). From the Ephedra perspective, it is agreeable that the Xiaohe-Gumugou people were related to the Indo-Aryan peoples (Mallory *et al*. 1997; Wang 2017).

Does similar morphological characteristics mean that the Gumugou people actually derived from the Afanasievo or the Andronovo cultures? My answer is no. From burials, the Gumugou cemetery had heterogeneous burials, such as type I the sun-radiating-spokes burial pattern and type II the normal burial pattern. From a morphological view, skulls from burial type I, sun-radiating-spokes burial pattern, are more similar to Andronovo people, and skulls from burial type II, the normal burial pattern, are more similar to Afanasievo people (Han 1986). But there remain two problems. First, to what extent it is possible to distinguish the Afanasievo and

haplogroup is a group of similar haplotypes that share a common ancestor from a patriline or a matriline (Arora *et al*. 2015; Anon n.d.). Similar haplotypes form a haplogroup that is represented by alphabet and indicate a group of people with a same male or female ancestor.

[12] The research result shows that most Afanasievo males in examination had single haplogroup R1b1a1a. It is different from the early males of the Xiaohe cemetery, who had only R1a1a haplogroup. Besides, Afanasievo and Andronovo people had genetic distinctions, considering the Y chromosomal DNA ancestral lineages. Thus the author suggested that the Xiaohe group might be related to Andronovo groups, but not the result of the southward migration of the Afanasievo people.

Andronovo skulls, since both of them were related to the (proto) Indo-Europeans. Second, the two types of burials in the Gumugou cemetery coexisted[13], which is different from the time gap between the Afanasievo and the Andronovo cultures. The Afanasievo culture started around one millennium earlier and ended a few hundred years earlier than the Andronovo culture. Based on the time gap, it is expected that the two burial types in the Gumugou cemetery should have chronological difference, rather than being contemporary.

How we can understand the sun-radiating-spokes burial pattern. As for burial practices, the sun-radiating-spokes burial pattern in the Gumugou cemetery is very distinct from the normal burials, and also from graves at the Xiaohe cemetery. The sun-radiating-spokes pattern, to some extent, seems similar to the circular stone kerbs of the stone-pit graves, whose features can be found not only in both Afanasievo and Andronovo burials, but also in the late Bronze Age and the early Iron Age burials in Xinjiang, e.g. burials in in the Hami Basin-the Balikun Grassland, the Turpan Basin-the middle part of Tian Shan valley, and the southern edge of the western and middle part of Tian Shan. The reason to claim that is the features with circular kerbs and sunken tops. The sun-radiating-spokes burial mound is constructed by seven concentric circles of wooden poles standing in an elliptic shape at regular intervals. The wooden poles are gradually higher and higher in height from the inner circles to the outer circles. This sun-radiating-spokes burial pattern looks like a similar version of circular stone kerbs of the stone-pit graves, but adapted to the desert environment. I tend to think the six males buried in the sun-radiating-spokes burial pattern possibly came from the Andronovo horizon. When the six males were buried in the Gumugou communal cemetery, they kept their own ancestry memories and preserved such memories in a special way.

It has been pointed out that the Xiaohe people were genetically distinct from the Afanasievo people, but might be related to the Andronovo people considering the paternal lineage (Hollard *et al*. 2018). The burials customs and burial goods between the Xiaohe horizon and the Afanasievo culture are not similar either (Wang *et al*. 2017). The Xiaohe cemetery had both the special clay-lid wooden coffins and the normal coffins in its early phase (from burial layers 4th-5th), then turned to be stable and consistent with the normal coffins (from burial layers 1st-3rd), and have developed better coffin-construction technology. The early period graves were heterogenous, but the clay-lid coffins only took up a small percentage of the cemetery. Special burial types indicate the special role of the dead in their related societies, either the dead had high social positions or possibly they actually had different ancestry origins, just like the sun-radiating-spokes burials in the Gumugou cemetery. In the Xiaohe cemetery, there appeared an Indian maternal lineage, and both western and eastern maternal lineages turned to be more frequent in later period (Li *et al*. 2015). With the time, the populations had more diverse origins, which means newcomers kept joining the group. The Xiaohe society was not isolated, but rather open to the outside. The newcomers in the Xiaohe group have inherited burial customs, which strongly indicates that they were part of the community and had adopted their social identity, possibly through marriage. As a result, the diverse populations can well explain the coexistence of different cultural elements, e.g. cattle, sheep/goats, camel hair (from Central Asia), grains of wheat (from west) and millet (from east), etc.

From the cereal grains of wheat and millet, we can see that both the Gumugou and the Xiaohe people have developed agriculture to some extent, and the living condition would be an oasis environment. In the Xiaohe cemetery, the grains of wheat were bread wheat (Li *et al*. 2011; R. Yang *et al*. 2014); and in some grass-baskets, there were cooked food like porridge made of millet and milk (Bergman *et al*. 1939: 91), or dairy products (Liang *et al*. 2012). In the Gumugou

[13] At the beginning, it was thought that burial type I, sun radiation burial pattern, is earlier than burial type II, the normal burial pattern, but then it was rectified as the two burial types coexisted at the same time because of their interacted geographic overlapping with each other (Wang 2014, 7–8).

cemetery, there were also wheat and millet. From the application of cereal grains in life, the Xiaohe people might have developed agriculture to a better extent than the Gumugou people. It is reasonable to claim that the Xiaohe and the Gumugou people lived in an oasis environment, from the agricultural plants like cereal grains, wild plants like Ephedra twigs, love grass, tamarisk twigs, reeds etc, and the volume of livestock husbandry including cattle and sheep/goats in cemeteries. The Xiaohe people mainly relied on cattle, while the Gumugou people favoured sheep/goats. Although the desert environment was arid, the Peacock River has provided plants for human beings' herding here.

The economic system of the Xiaohe and the Gumugou were similar but to a different state/extent, which can be also observed from their social structure in burials. In the Xiaohe cemetery, men and women had different burial objects, dress, and wooden monuments by the head end of coffins. Such sexual identities in burials indicate the dead's responding social identities and organisation of work while they were alive. The gender work distributions were not shown in the Gumugou cemetery, hence Gumugou people might have a less developed economic system or less distinguished social work for genders. One possible relation between the Xiaohe and the Gumugou people is that they were two parallel groups who shared similar economic system because of the similar environment, or that the Gumugou people may have existed earlier as we cannot know for sure about the time span from the limited chronological information.

So, we may conclude that the Xiaohe group, as a more stable local society, has formed its own burial traditions which were maintained and followed by the whole social community. The Gumugou society was less stable and consistent compared to the Xiaohe society, which means that there were more direct indications about people's different origins, such as the sun-radiating-spokes burials. Since the Xiaohe society has been developed to be more stable and consistent in its later phases, it would be expected to contain less direct links in burial traditions. Even if the contemporary Andronovo people joined such a mature Xiaohe society, the adoption of a common burial customs might happen in order to achieve the same social recognition. But it is worth noting that the early clay-lid coffins were special and different from others, and there were also wooden horse-hoof objects in some male graves in the later phases.

The animal-leg-shape wooden objects were found in some male graves like 5.D, 5.E, 5.F and M24, etc. From the examination in chapter 4.3, some objects were more like entire pieces of odd-toed horse-hooves, and others were similar to even-toed livestock such as cattle or sheep/goats. It is straight-forward to understand the burial context by considering the animal-leg-like objects as an indication of livestock such as cattle, sheep/goats. Cattle and sheep/goats have played important roles in the Xiaohe people's daily lives as part of their subsistence. Such important roles can be also traced through their felt caps and mantles, woollen yarn, leather bags, leather boots, cattle hides covered on coffins, dairy products in food baskets (Liang *et al*. 2012), animal ears and tendon-made strings in the graves. Perhaps the Xiaohe people expected that cattle and sheep/goats would continue to provide life and food supplies for the afterlife. Or even that people used such objects as gifts to their deities in order to gain supernatural power or establish connections with their ancestors. The use of wooden-made objects to represent the real ones can often be observed from some dead, e.g. the wooden-made bodies in graves M33 and M34.

Although there were no horse bones, no related harness set, or wagons found in the Xiaohe cemetery (or in the Gumugou cemetery), horse-hoof objects still appeared in burials. We may assume that the wooden horse-hoof objects were possibly an indication of horses, which probably did not exist in their daily lives anymore, but possibly were related to some settlers' ancestral memories. Based on the oasis environment, formed along the river in the desert, the Xiaohe society has developed a system mixed of livestock husbandry and agriculture. Horses were (probably) not part of the economy and daily life, but some members in the society may have had earlier relations to horses, such as from a nomadic society. Such memory or personal identity have been carried into the person grave, despite the persons need to conform to his or her new social identity. The whole burial ritual was carried out by the living in its fixed

traditions, rules and activities in the Xiaohe society, but it was also allowed to add personal objects in the grave, reflecting different backgrounds.

This ancestral memory assumption is consistent with the economic condition of the Xiaohe society, and can also be explained by the burial ritual theory. On the one hand, individuals have to obey the ritual structure of the society; on the other hand, they have ability and possibility to alter the structure to some extent. In burials, personal will such as special expectations or favourite objects of the dead from when he or she was alive, might lead to diversity and slight difference. Variations on a broad regional scale are also common. For long time periods, burials in a stable society can often follow traditional social customs and be repeated by generations. Even when there are some gradual changes in mortuary activities, they are still linked to customs in past.

5.4. The relations of the Bronze Age cultures in the Tarim Basin and its surroundings

In Bronze Age Xinjiang, burials were diverse but also show some common features between different geographic sections. Based on the geographic divisions in chapter 3.3, there are six areas including the Lop Nur region, the southern edge of the Altai Mountains, the Hami Basin-the Balikun Grassland, the Turpan Basin-the middle part of Tian Shan valley, the southern edge of the western and middle part of Tian Shan, and the Pamir Plateau.

In the early Bronze Age, the burials in different areas had some clear typical geographical features in Xinjiang. In the southern edge of the Altai Mountains area, there were stone-pit graves with stone kerbs and monuments, and the dead were placed lying straight on their back. In the Hami Basin-the Balikun Grassland area there were earth-pit graves, and the dead were placed lying in a hocker position. In the Turpan Basin-the middle part of Tian Shan valley area there were earth-pit graves and the dead were placed lying straight on back. And in the Lop Nur region there were wooden coffins burials in sand, and the dead were placed lying straight on their back.

In the late Bronze Age and the early Iron Age, there commonly appeared stone-pit graves with burial features like burial mounds and stone kerbs in some areas, e.g. the Hami Basin-the Balikun Grassland area, the Turpan Basin-the middle part of Tian Shan valley area, the western and middle part of Tian Shan area, and the Pamir Plateau area. The burial features in most areas were a mixture of both the earth-pit graves and stone-pit graves, especially in the Hami Basin-the Balikun Grassland and the Turpan Basin-the middle part of Tian Shan valley areas.

Considering the location and the geographical features of these areas, the Altai Mountains and the Tian Shan leave an open access from the Eurasian Steppe to the Dzungarian Basin. The Hami Basin-the Balikun Grassland is the first intersection area to combine the possible western and eastern cultural influences. To pass by the Turpan Basin and enter into the Tarim Basin, there are two possible routes, one northern route along the southern edge of Tian Shan, and one southern route along the northern edge of Kunlun Mountains. A common feature of the two routes is that there are rivers formed by the melted snow water from each mountain in the valleys. The Pamir Plateau is located at the western side of Xinjiang, and connected to the Kazakhstan Steppe, which possibly functions as another an intersection zone between the west and the east.

Bronze Age burials at the southern edge of the Altai Mountains had obvious steppe features, with the stone-pits, circular or rectangular stone kerbs, and burial mounds, which strongly suggests possible cultural links with the Andronovo culture at the southern Siberia.

Bronze Age burials in the Hami Basin show common similarities, especially features like earth pits and hocker position of the dead, which suggests possible cultural influence or people's migrating from the Hexi Corridor in the east. The Hami Basin was were dominant by the earth-pit graves in the early Bronze Age. The Balikun Grassland experienced a shift of burial features: in the late Bronze Age it was a mixture of earth-pit and stone-pit graves; in the Iron Age it turned to be dominated by stone-pit graves with burial barrows/mounds in various forms. Considering

the three burial elements including burial mounds, stone-pits and circular kerbs, the late Bronze Age and the early Iron Age cemeteries in the Balikun Grassland were actually similar to the Bronze Age cemeteries at the southern edge of the Altai Mountain area. The shift of the burial features in the Hami Basin-the Balikun Grassland area should be considered within the context of people's movement from the Eurasian Steppe (e.g. The Yanbulake cultural groups might have strong mobility, which can be deduced from the common wooden wheels in graves.) and the Hexi Corridor.

Bronze Age burials in the Turpan Basin-the middle part of Tian Shan valley had features like earth pits and the dead lying straight on the back. The Iron Age burial features of the stone funeral constructions, in the Turpan Basin-the middle part of Tian Shan valley, were similar to those contemporary cemeteries in the Hami Basin-the Balikun Grassland area. The similar burial features and the time coincidence strongly indicate that the Iron Age cemeteries with burial mounds, stone pits and stone kerbs, might spread from the southern edge of the Altai Mountains, southward go through the Balikun Grassland then the Hami Basin, and eastward enter the Turpan Basin and the middle Tian Shan valley. Another proof can also support the possible cultural link between the Altai Mountains area and the Turpan Basin-the middle part of Tian Shan area, that the dead had similar dressing style, especially the tall caps between a Subeixi woman (see *Fig. 36*) and a Pazyryk women[14] in around 700 BCE.

Figure 36 Dress of Subeixi women

(1,2: Mummified females and their dress, source: Xinjiang 2011, 51)

Burials, at the southern edge of the western and middle part of Tian Shan, and in the Pamir Plateau, were comparatively late, mainly in the late Bronze Age and the Iron Age. At the southern edge of the western and middle part of Tian Shan, burial constructions were a mixture of stone-pit and earth-pit graves in a varied way, with burial mounds and rectangular/circular stone kerbs. Some burials were similar to the Iron Age cemeteries both in the Hami Basin-the

[14] The reconstruction images of Pazyryk women can be seen from *Scythians: warriors of ancient Siberia* (Simpson 2017, 94-95).

Balikun Grassland area and in the Turpan Basin-the middle part of Tian Shan area. In the Pamir Plateau, burial features mainly contained burial mounds, earth-pits (?) and circular/rectangular stone kerbs.

Till now, we may conclude that the Bronze Age burials were different with their own typical local features, then the Iron Age burials with features of stone-pits, burial mounds and stone kerbs have widely spread from the Altai Mountains through the Hami and the Turpan Basins into the Tarim Basin (spreading routes and directions see *Fig. 37*). Considering the distinct local burial features of the Bronze Age cemeteries in Xinjiang, it seems that burials in the four locations were relatively "isolated", e.g. the southern edge of the Altai Mountains: stone burials; the Hami Basin-the Balikun Grassland: earth-pit graves and the dead lying in a hocker position; the Turpan Basin-the middle part of Tian Shan valley: earth-pit graves and the dead lying straight on back; and the Lop Nur region: wooden coffins in a rectangular or a boat shape. However, actually, connections or cultural influence have already existed, possibly with people's migrating. For example, cemeteries in the Hami Basin had cultural influence from the Hexi Corridor in the east; the Gumugou people and Xiaohe people were suggested to come from the southern Siberia or Central Asia. We may safely assume the connection between the west and the east have already happened in Xinjiang during the Bronze Age, and turned to be more and frequent in the Iron Age. The Hami Basin and the Turpan Basin acted as a connection among the northwest Dzungaria Basin, the southeast Hexi Corridor and the southwest Tarim Basin.

In the southern parts of Siberia, from the Neolithic Age to the Iron Age, the archaeological cultural sequence was "Afanasievo Culture - Okunde Culture - Andronovo Culture - Karasuk Culture - Tagar Culture – Saka/Scythian Culture" (see *Fig. 13* about time). Afanasievo culture (3300-2300 BCE/from 3300 BCE) was thought to derive from a subgroup of the Repin culture (3700-2880 BCE) in the Pontic-Caspian steppe region (Anthony 2007: 263–306), or directly from the Yamnaya culture (Thornton *et al*. 2004). The subgroup has gone across the Kazakhstan steppe and reached to the western Altai Mountains. The Yamnaya culture appeared at similar time with the Afanasievo culture. Yamnaya horizon (3300-2500 BCE) was diffused in the east and the west of the Eurasian steppe. It is commonly understood that the Yamnaya and the Afanasievo Bronze Age cultures shared some archaeological cultural similarities, such as inhumations in pit graves, kurgans (low burial mounds), burial goods including cattle, sheep/goats and horses, etc. Furthermore, it has been confirmed that there were genetic links between Yamnaya and Afanasievo (Hollard *et al*. 2018). The Afanasievo culture was succeeded by the Okunde culture (Hollard *et al*. 2018); the Andronovo culture was followed by the Karasuk culture (Legrand 2006; Hollard *et al*. 2018); and the Karasuk culture was succeeded by the Iron Age Tagar culture (Bokovenko 2006).

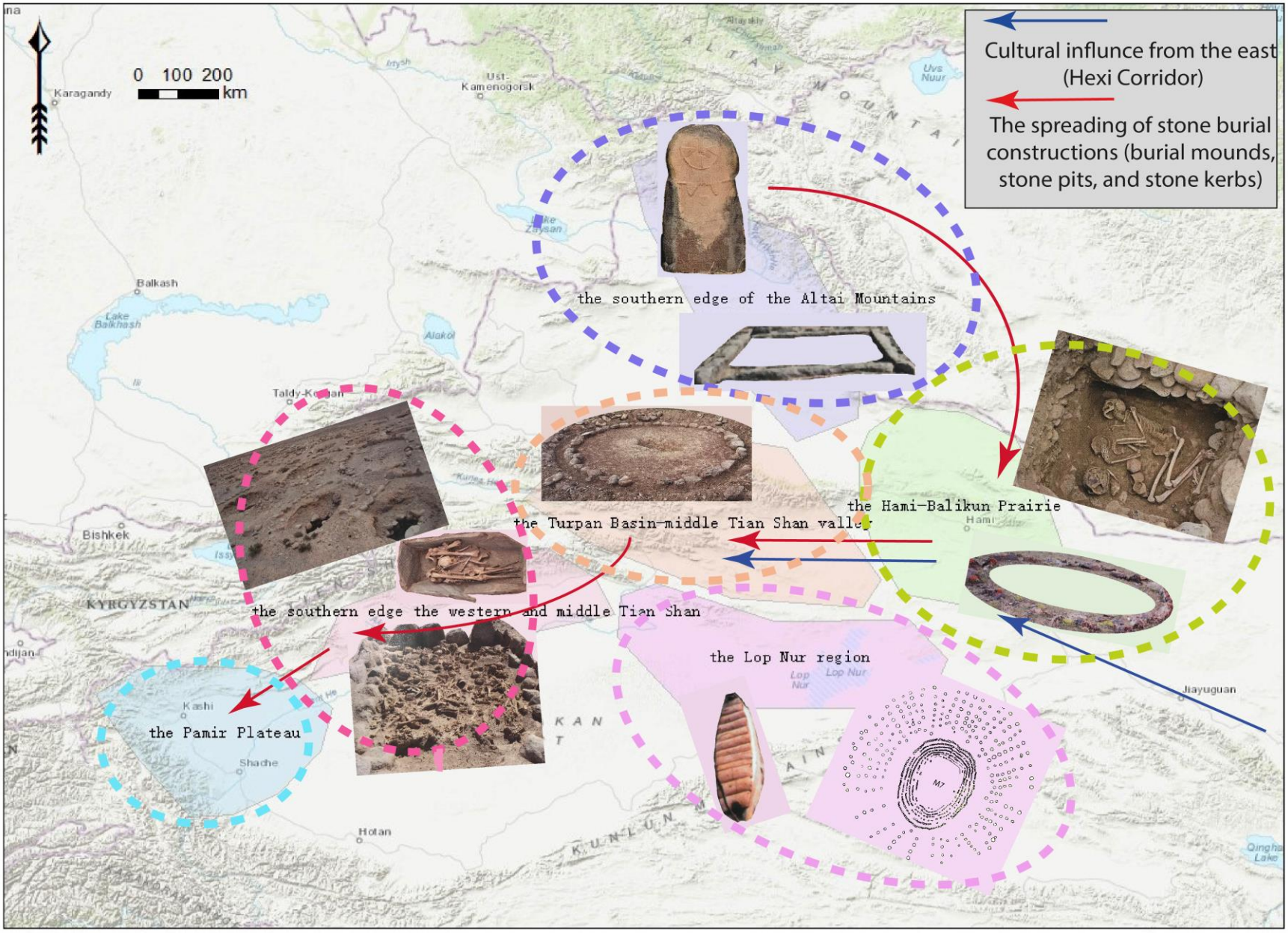


Figure 37 An assumption of the spreading/expansion routes of the stone burial constructions, and cultural influence from the east

In the Andronovo horizon (2000-900 BCE), similar burials with low burial mounds, stone cromlechs/kerbs and stone-pit graves have spread widely to the east of the Ural steppes, reaching the west of the Altai Mountains and the south of the Kazakhstan steppe. The expansion of the Bronze Age Afanasievo and Andronovo cultures (distribution see *Fig. 38*) is often thought as expansion of nomadic groups of the proto Indo-Europeans moving eastward. In the late Bronze Age and early Iron Age, there appeared common burial features (with burial mounds, stone-pits and stone kerbs) spreading widely in different areas of Xinjiang, such as in the Pamir Plateau section, the western and middle Tianshan section, the Turpan Basin-middle Tianshan valley section and the Hami Basin-the Balikun Grassland section. Osteological research (Keith 1929; Han 1986, 1990, 1994; Zhang 2013; Zhang *et al*. 2013) of ancient skulls from the northwest of China have suggested there were obvious admixtures of morphological features including Proto-European, Pamir-Fergana, Mediterranean peoples that were dominant in most areas of Xinjiang, and a small portion of East Asian peoples that mixed with Europeans. The European features have spread eastward, at the same time East Asian features spread westward along the Hexi Corridor. Corresponding to the mixed morphological features between the west and the east, the burial features were shown as a great mixture and tended to be in more varied ways in the late Bronze Age to the early Iron Age. Two locations, including the Hami-the Balikun Grassland and the Turpan Basin-the middle part of Tian Shan valley, acted as a transitional passage to connect the west from the Altai mountains and the east from the Hexi Corridor. The Altai Mountains area was directly linked to the steppe nomadic groups such as the Andronovo culture in the late Bronze Age. The Tarim Basin was open in a less extent compared to other areas, rather than "isolated". However, once the early occupants entered into this area, people have developed their own economic systems based on the oasis environment along the Peacock River. From the Gumugou to the Xiaohe communities, people in the Tarim Basin were possibly parallel to the Andronovo horizon but with their own typical local features.

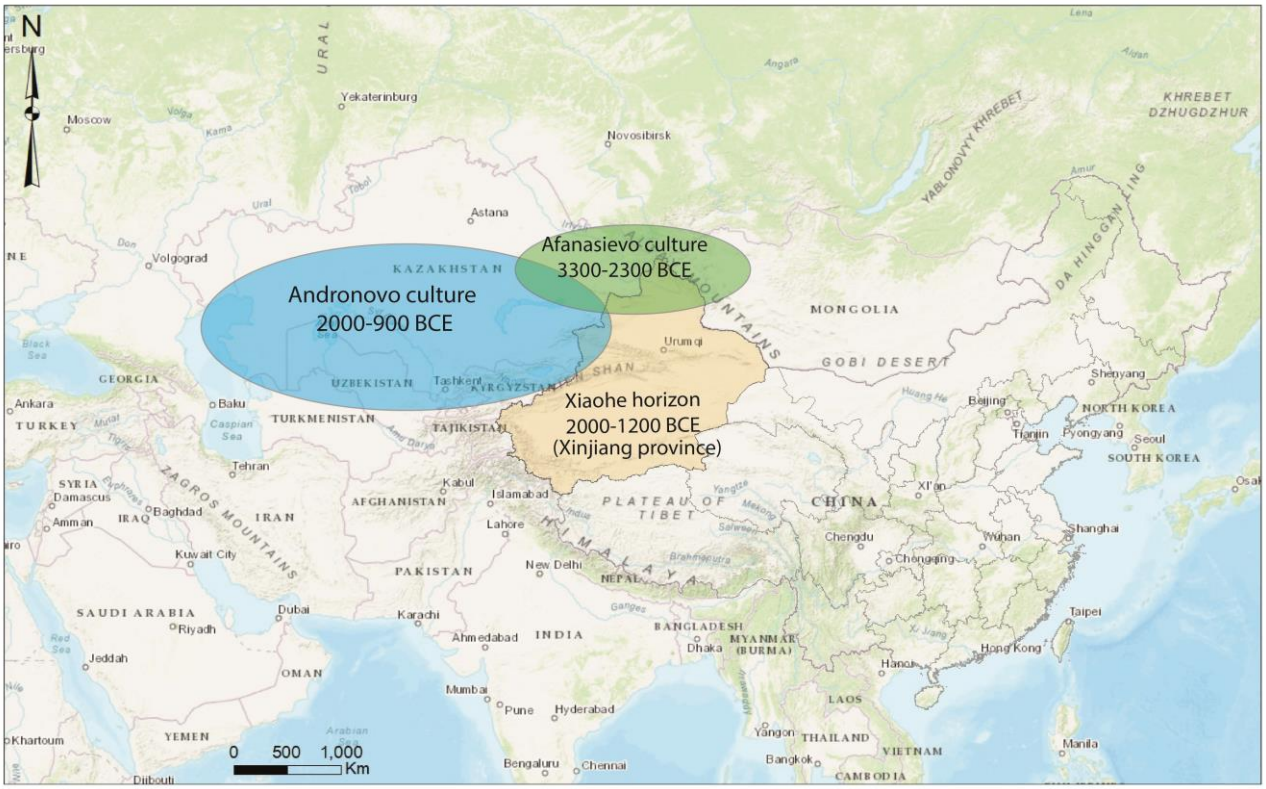


Figure 38 General distribution scope of the Afanasievo and the Andronovo cultures

6. Conclusions

This study centres on death, memories (understood as social bonds/identities), rituals, and burial practices during the Bronze Age culture complex in the northwest of China. It aims to explore how the Xiaohe and the Gumugou societies constructed their social identities and what possible relations there was between the two groups. The main objective of this thesis is to analyse similarities and differences of burial practices in the Bronze Age burial sites of the Xiaohe horizon (2000-1200 BCE) of the Tarim Basin. These burial practices are discussed against the background of population, contacts and the relation between archaeological cultures in and surrounding the Tarim Basin as a way to understand the cultural dynamics of the area.

The Tarim Basin represents a mix of people, languages and cultures since the Bronze Age, and hence have developed the foundation for the Silk Road phenomenon: mobility and an openness for new influences. The area is highly associated to the migrations and diffusions of Europeans and Asians since the Early Bronze Age. The Xiaohe horizon is crucial to understand the formation and interaction of the Bronze Age cultures (Afanasievo culture, Andronovo culture, and BMAC) in Central Asia, southern Siberian, northwest of China, and the cultural shifts from Bronze Age to Iron Age (Andronovo culture, and Scythians) in the northwest of China. The special oasis environment mainly along the Peacock River in the Taklamakan Desert has promoted the formation of a number of local ethnicities, collectively known as the Xiaohe horizon people. While sharing similar features, if has been suggested that they came from a diverse ancestral background.

In order to explore how the Xiaohe horizon societies constructed their social identities through burial customs, this study focuses on the cultural indications in the graves, including the way to construct coffins, how to dress the dead, what burial assemblages were placed around the dead, etc. The mourners acted the mortuary ritual not only to bury their dead, but also to achieve the transformation of the dead in the communal cemetery, from life to death, and from individuals to groups. When a group member died, the living constructed and confirmed his or her former social identity by following certain rules, which normally we understand as burial customs or burial behaviours.

Both the Xiaohe and the Gumugou groups maintained similar burial customs, but we can distinguish a developing process from the slight diverse ways of the Gumugou cemetery to the highly consistent and advanced technology in making coffins of the Xiaohe cemetery. In terms of the dressing, the dead wore a felt cap, a pair of leather boots, a bracelet twined on the right wrist, and was wrapped in a big felt mantle. The dead in the Xiaohe cemetery also wore a loin-cloth. Commonly, both cemeteries contained burials goods of Ephedra twigs, grains of wheat and millet, grass-made baskets, animal ears (such as calf ears), and livestock. Wooden coffins in the two cemeteries were constructed in a similar way, by assembling two side-planks, two end-boards, a lid consisting of a few short straight boards, and covered with livestock hide (mainly cattle hide in the Xiaohe cemetery and sheep/goats hide in the Gumugou cemetery).

Considering the similar and continuous burial behaviours in the two cemeteries, it can be assumed that both the Xiaohe and the Gumugou societies were stable and consistent. The Xiaohe cemetery had both the special clay-lid wooden coffins and the normal coffins in its early phase (burial layers 4^{th}-5^{th}), then turned to be stable and consistent with the normal coffins (burial layers 1^{st}-3^{rd}), and have developed better construction of the boat-shape coffins. The Gumugou cemetery contained two main burial patterns, type I; the sun-radiating-spokes burials and type II; the normal burials, which coexisted during the same time. Burials of type II were similar but not limited to strict rules. Burials in both the Xiaohe and the Gumugou cemetery were fairly

heterogeneous, and the clay-lid wooden coffins in the Xiaohe cemetery and the sun-radiating-spokes burials in the Gumugou cemetery only took up in a small percentage of each cemetery. These special burial types could indicate special roles of the dead in their related societies. Either the dead had high social positions or possibly they actually had a different ancestry origin. It is argued here that the latter is something that is quite possible, considering the mixed populations in the two cemeteries. The sun-radiating-spokes burials share some features with a similar type of grave, constructed of circular stone kerbs of the stone-pit graves. The sun-radiating-spokes burials might represent an adaption to the local desert environment, which had better access to wood rather than stones. Circular stone kerbs with stone-pit in centre were widely seen in Bronze Age Afanasievo and Andronovo burials, and also in the late Bronze Age and early Iron Age burials along the Tian Shan. The present study suggests a high possibility that the six males buried in the sun-radiating-spokes graves came from the contemporary parallel Andronovo horizon, and kept some of their own ancestry memories in an adapted way.

Although the Xiaohe and Gumugou societies were stable and consistent, it does not mean that the societies were isolated, and we can see strong indications of them being open to the outside. With time, the Xiaohe population were getting even more diverse origins, as newcomers kept joining the group from outside. However, the burial behaviours in the Xiaohe cemetery did not change as a consequence if these additions. This suggests that the newcomers inherited the local burial customs, and strongly indicates that they became part of the community and adopted the new social identity, possibly through marriage. As a result, the diverse populations can well explain the coexistence of different cultural elements in the burials, e.g. cattle, sheep/goats, camel hair (from Central Asia), grains of wheat (from the west) and millet (from the east), etc.

The Xiaohe and the Gumugou societies were similar, but the Xiaohe society developed to a more advanced level both in economy and in social structure. First, the oasis-based economic system of the Xiaohe and the Gumugou had similar husbandry, but later this was developed to different extent. Both societies mainly relied on livestock, and while the Xiaohe people favoured cattle, the Gumugou people favoured sheep/goats. The two societies also developed agriculture, which can be seen from the grains of wheat and millet. It has been shown that grains of wheat are bread wheat. The Xiaohe people also cooked porridge with millet and milk, and had dairy products. From these evidences, we can assume that the Xiaohe people have developed a stronger economic level. Secondly, the Xiaohe society had more distinguished gender roles, resulting in different social roles for men and women in terms of work and religions. The female and male dead were buried in a distinguished way with loin-cloths and wooden monuments. Sextual identity on a social level refers to how people consider and expect different genders to act and behave under the social and cultural framework. In the Xiaohe society, men carried out hunting tasks (creatures like vultures, badgers, lizards, snakes); women were associated to the rebirth of lives. To synthesize, a possible relation between the Xiaohe and the Gumugou societies is that they represent two parallel groups who shared similar economic systems because of the similar environment, or that there is a chronological difference where the Gumugou people may have existed earlier. The absolute dating information from the two cemeteries is insufficient to rule out the second situation.

To place the Xiaohe horizon in the larger context of the Bronze Age burials in its surroundings, the hypothesis presented in this study is that the Xiaohe-Gumugou people might possibly represent a parallel to the Andronovo groups, with an eastward migration, that developed their own societies and ethnicities in the Tarim Basin with some ancestral memories still preserved. Considering the location and the geographical features of Xinjiang, the Altai Mountains and the Tian Shan left open access from the Eurasian Steppe to the Dzungarian Basin. The Hami Basin-the Balikun Grassland was the first intersection area to combine the possible western and eastern cultural influences. To pass by the Turpan Basin and enter into the Tarim Basin, there were two possible routes, one northern route along the southern edge of Tian Shan, and one southern route along the northern edge of Kunlun Mountains. In the early Bronze Age, the burials in Xinjiang had some clear typical geographic features that distinguish them from their surroundings. But from the late Bronze Age to the early Iron Age, the tradition with circular

kerbs of stones with stone-pits burials expanded along the southern edge of the Tian Shan, which was a major shift of burial practise that possibly could be linked to the expansion of the Andronovo horizon or a general nomadic expansion. Although there were no horses or wagons found in the Xiaohe burials, the wooden horse-hoof objects were an indication of horses, which did not exist in their daily lives anymore, but possibly were related to some settlers' ancestral memories of their nomadic origins. However, it was more important for them to assimilate to the common social identities of their new group. After people died, it was preferred to be buried in the communal cemetery. Even if the dead bodies were lost, wooden substitutes will be used in graves to represent the dead, since they believed in afterlife and thought that the end of the death is rebirth.

In the end, it needs to be pointed out that a culture horizon concept is dynamic and will be better defined with more archaeological sites found and excavated. This study is based on the two communal cemeteries that partially have not been published yet There are no excavation reports describing the 4th and 5th burial layers of the Xiaohe cemetery, so this has not been included in the study. With more information our understanding of the Xiaohe-Gumugou societies will be better and more detailed. Because of the great mixture of people, languages and cultures in Xinjiang since the Bronze Age, and the fast cultural shift under the flexible nomadic mobility, studies of this area cannot be limited to a narrow geographic area. Instead, it should be broadened to the southern Siberian, Central Asian, even to the area between the Mediterranean Sea and the Caspian Sea. Besides, this study demonstrates the burial shift from Bronze Age to Iron Age along the Tian Shan, shows the expansion of nomadic groups on a large scale and as a possible expansion of the Andronovo horizon. In the future, we still need more interdisciplinary cooperation. Important areas of further research would be to combine genetics, archaeological studies that compare material from extensive areas, and interdisciplinary approaches that include linguistic analyses. Some important steps would be:

1. Analysis of Y chromosomal DNA on the males from 4th-1st layers of the Xiaohe cemetery: it is not clear if they were genetically distinct from the Afanasievo (and Yamnaya) males, and consistent to the Andronovo males.
2. More research on ancient DNA of the six males buried in type I the sun-radiating-spokes graves: the six males were so different in the Gumugou cemetery, and we don't know who they were. In this study, it has been suggested that they came from the parallel Andronovo horizon, and preserved some of their original social identities.
3. Analysis of the white sticky materials painted on the dead's hair, faces, and bodies: it is not clear what this material is. It might be application of dairy/milk products with some holy functions. And the interesting point is why the dead was painted on such materials, for holy reasons, and/or was embalmed that way for preventing decay of the dead bodies?
4. Research on the use of Ephedra plants: Ephedra twigs were common and important in both cemeteries. Were they related to the "Soma" in ancient India (*Vedas*) and/or "Haoma" in ancient Iran (*Avesta*)? Were the Ephedra twigs related to the body painting (whitish sticky materials painting on skins of the dead)? Was there a common use of Ephedra plant in more nomadic groups in the Eurasian Steppe?
5. Research on the comparisons between the Andronovo burials and the stone circular - kerbs with stone-pits in Xinjiang: a major obstacle to such research is the language barriers, with the material published in English, Chinese and Russian. Such research is, however, essential to understand the conjunction of the geographical areas, the expansion of nomadic groups, the spreading of horses and wagons (linked to the noble groups of the Shang Dynasty (1600-1046 BCE) in central China), the formation of the Silk Road in this area (till the expansion of Han Dynasty (206 BCE-220 CE)), the moving of Indo-Iranians, the expansion of Scythians (900 BCE-400 CE), etc.

Abbreviations

Anon.	Anonymous
BCE	Before the Current Era
bce	Before the Current Era (uncalibrated)
BMAC	Bactria-Margiana Archaeological Complex
BP	Before Present
CE	Current Era
ed.	Editor
(7^{th}/9^{th}) ed.	(Seventh/Ninth) edition
eds.	Editors
e.g.	Example given
etc.	And so on
Fig.	Figure
g	Gram
idem	The same
m	Metre
M	Grave ("M" is often used to represent "grave" in Chinese reports)
mg	Milligram
km	Kilometre
79LQ2	Nr.2 cemetery along the Peacock River in the Lop Nur region, 1979 (It was the beginning name of the Gumugou cemetery.)
Xinjiang (as an author of the reference in texts)	The Cultural Relics and Archaeology Institute of Xinjiang Autonomous Region/The Cultural Relics of Xinjiang Autonomous Religion

Illustration credits

Fig. 1 Map Made by author, basemap sources: Esri, DeLorme, HERE, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, and the GIS User Community.

Fig. 2 Map Made by author, basemap sources: idem.

Fig. 3 Map Made by author, basemap sources: idem.

Fig. 4 Map Made by author, base map sources: idem. The map is constructed from the coordinates of the Xiaohe and Gumugou cemeteries, also by digitizing a few maps; but the location of the Keliyahe northern cemetery is only an indication. The Gumugou cemetery decimal coordinates is 88.91667,40.66667, and the Xiaohe cemetery decimal coordinates is 88.6725,40.3364.

Fig. 5 Illustration Constructed by author. The distribution of the graves is constructed from different reports. The base plan is mainly after Bergman, F., Ljung, H., Konow, S., & Sylwan, V. 1939. *Archaeological researches in Sinkiang: especially the Lop-nor region*. Stockholm: Thule: p.63, Fig. 9.

Fig. 6 Illustration Source: Wang, B. 2013. *古墓沟*. 乌鲁木齐: 新疆人民出版社: the plan in the last page.

Fig. 7 Map Made by author, the division is made based on the mountain ranges including the Altai Mountains, the Tian Shan, and the Kunlun Mountains, and also the distribution of ancient cemeteries in the whole Xinjiang generally. Basemap sources: Esri, DeLorme, HERE, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, and the GIS User Community.

Fig. 8 Photos Sources: Institute of Cultural Relics and Archaeology of Xinjiang, 新疆维吾尔自治区文物局 ed. 2011. *新疆古墓葬*. 北京: 科学出版社: p.7, 10. Institute of Cultural Relics and Archaeology of Xinjiang, 新疆文物考古研究所. 2004. 2002 年小河墓地考古调查与发掘报告. *边疆考古研究 3*: 图版六.

Fig. 9 Illustration Adapted from two photos. Photos source: Institute of Cultural Relics and Archaeology of Xinjiang, 新疆维吾尔自治区文物局 ed. 2011. *新疆古墓葬*. 北京: 科学出版社: p.244.

Fig. 10 Illustration Adapted from seven photos. Photos source: idem.: a.1 from p.29, a.2 from p.41, a.3 from p.36, b.1 from p.32, b.2 from p.37, c.1 from p.39, c.2 from p.31.

Fig. 11 Illustration Adapted from three photos. Photos source: idem.: (a), (b) from p.67, (c) from p.69.

Fig. 12 Illustration Adapted from seven photos. Photos source: idem.: a.1, a.2 from p.101; b.1 from p.117, b.2 from p.115; c.1, c.2, c.3 from p.104-105.

Fig. 13 Illustration Made by author.

Fig. 14 Illustration Adapted from a photo. Photo source: Institute of Cultural Relics and Archaeology of Xinjiang, 新疆维吾尔自治区文物局 ed. 2011. *新疆古墓葬*. 北京: 科学出版社: p.10.

Fig. 15 Illustration After Wang, B. 2013. *古墓沟*. 乌鲁木齐: 新疆人民出版社: (a) and (c) from p.46, (b) from p.45.

Fig. 16 Illustration After idem.: (a) from p.52, (b) from p.59, (c) from p.91.

Fig. 17 Photos Source: idem.: a from p.92, b from p.93.

Fig. 18 Adapted from five photos. Photos Source: Institute of Cultural Relics and Archaeology of Xinjiang, 新疆文物考古研究所. 2007. 新疆罗布泊小河墓地 2003 年发掘简报. *文物.* 617(10): p.9-12.

Fig. 19 Illustration Drawn by author.

Fig. 20 Illustration Photos source: Institute of Cultural Relics and Archaeology of Xinjiang, 新疆文物考古研究所. 2004. 2002 年小河墓地考古调查与发掘报告. *边疆考古研究 3*: p.352，图版十. Institute of Cultural Relics and Archaeology of Xinjiang, 新疆文物考古研究所. 2007. 新疆罗布泊小河墓地 2003 年发掘简报. *文物.* 617(10): p.11, 12, 29, 36.

Fig. 21 Illustration Drawn by author.

Fig. 22 Illustration Drawn by author, based on: Institute of Cultural Relics and Archaeology of Xinjiang, 新疆文物考古研究所. 2004. 2002 年小河墓地考古调查与发掘报告. *边疆考古研究* 3: 图三五.

Fig. 23 Illustration Photos sources: Bergman, F., Ljung, H., Konow, S., & Sylwan, V. 1939. *Archaeological researches in Sinkiang: especially the Lop-nor region*. Stockholm: Thule: P1.8. Institute of Cultural Relics and Archaeology of Xinjiang, 新疆文物考古研究所. 2007. 新疆罗布泊小河墓地 2003 年发掘简报. *文物.* 617(10): p.16.

Fig. 24 Illustration Drawn by author.

Fig. 25 Illustration The front three were drawn by author; the last one was adapted from: Institute of Cultural Relics and Archaeology of Xinjiang, 新疆文物考古研究所. 2007. 新疆罗布泊小河墓地 2003 年发掘简报. *文物.* 617(10): p.13.

Fig. 26 Illustration Drawn by author.

Fig. 27 Illustration Photos sources: Bergman, F., Ljung, H., Konow, S., & Sylwan, V. 1939. *Archaeological researches in Sinkiang: especially the Lop-nor region*. Stockholm: Thule: P1.8. Institute of Cultural Relics and Archaeology of Xinjiang, 新疆文物考古研究所. 2004. 2002 年小河墓地考古调查与发掘报告. *边疆考古研究 3*: 图版十.

Fig. 28 Illustration Photos source: Institute of Cultural Relics and Archaeology of Xinjiang, 新疆文物考古研究所. 2004. 2002 年小河墓地考古调查与发掘报告. *边疆考古研究 3*: 图版七. Institute of Cultural Relics and Archaeology of Xinjiang, 新疆文物考古研究所. 2007. 新疆罗布泊小河墓地 2003 年发掘简报. *文物.* 617(10): p.35, 38.

Fig. 29 Illustration Photos sources: Institute of Cultural Relics and Archaeology of Xinjiang, 新疆维吾尔自治区文物局 ed. 2011. *新疆古墓葬.* 北京: 科学出版社: p.9-10. Wang, B. 2013. *古墓沟.* 乌鲁木齐: 新疆人民出版社:p.26, 38, 62, 76, 95.

Fig. 30 Photo Source: Institute of Cultural Relics and Archaeology of Xinjiang, 新疆文物考古研究所. 2007. 新疆罗布泊小河墓地 2003 年发掘简报. *文物.* 617(10): p.14.

Fig. 31 Illustration Adapted from: Bergman, F., Ljung, H., Konow, S., & Sylwan, V. 1939. *Archaeological researches in Sinkiang: especially the Lop-nor region*. Stockholm: Thule: p.64, P1.V. Institute of Cultural Relics and Archaeology of Xinjiang, 新疆文物考古研究所. 2004. 2002 年小河墓地考古调查与发掘报告. *边疆考古研究 3*: p.374.

Fig. 32 Photo Source: Institute of Cultural Relics and Archaeology of Xinjiang, 新疆文物考古研究所. 2007. 新疆罗布泊小河墓地 2003 年发掘简报. *文物.* 617(10): p.15.

Fig. 33 Photo Source: a from Institute of Cultural Relics and Archaeology of Xinjiang, 新疆维吾尔自治区文物局 ed. 2011. *新疆古墓葬.* 北京: 科学出版社: p.9. b from Wang, B. 2013. *古墓沟.* 乌鲁木齐: 新疆人民出版社: p.15.

Fig. 34 Illustration Drawn by author.

Fig. 35 Illustration Drawn by author.

Fig. 36 Illustration: photos sources: Institute of Cultural Relics and Archaeology of Xinjiang, 新疆维吾尔自治区文物局 ed. 2011. *新疆古墓葬*. 北京: 科学出版社: p.51.

Fig. 37 Map Made by author, basemap sources: Esri, DeLorme, HERE, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, and the GIS User Community.

Fig. 38 Map Made by author, basemap sources: idem. The cultural scope is made based on: Afanasievo culture occupying the Minusinsk Basin, and the Altai Mountains; Andronovo horizon occupying the Minusinsk Basin to the east, the southern Ural Mountains to the west, scattering to the Central Asia including Turkmenistan, Tajikistan, and the Kyrgyzstan, etc.

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Appendix 1: Name difference list

Name in thesis	Name in Pinyin inscription	Name in other English literatures	Name in Simplified Chinese
Altai Mountains	A'ertai Shan	Altay Mountains	阿尔泰山
Baicheng-Duogang cemetery	Baicheng Duogang Mudi	-	拜城多岗墓地
Balikun-Dongheigou cemetery	Balikun Dongheigou Muqun	-	巴里坤东黑沟墓群
Balikun-Heigouliang cemetery	Balikun Heigouliang Mudi	-	巴里坤黑沟梁墓地
Balikun-Nanwan cemetery	Balikun Nanwan Mudi	-	巴里坤南湾墓地
Gansu	Gansu	Kansu	甘肃
Gumugou cemetery	Gumugou Muzang	Qäwrighul	古墓沟墓葬
Hami-Aisikexia'ernan cemetery	Hami Aisikexia'ernan Muzang	-	哈密艾斯克霞尔南墓群
Hami-Tian Shan-Beilu cemetery	Hami Tian Shan Beilu Mudi	-	哈密天山北路墓地
Hami-Wubu cemetery	Hami Wubu Mudi	Qumul Qizilchoqa	哈密五堡墓地
Hami-Yanbulake cemetery	Hami Yanbulake Mudi	Qumul Yanbulaq	哈密焉不拉克墓地
Hejing-Chawuhu cemetery	Hejing Chawuhu Muqun	-	和静察吾乎墓群
Hejing-Xiaoshankou cemetery	Hejing Xiaoshankou Muqun	-	和静小山口墓群
Heshuo-Quhuigou cemetery	Heshuo Quhuigou Muqun	-	和硕曲惠沟墓群
Hexi Corridor	Hexi Zoulang	-	河西走廊
Keliyahe northern cemetery	Keliyahe Beifang Mudi	-	克里雅河北方墓地
Lop Nur	Luobupo	Lop-nur/Lopnor	罗布泊
Machang culture	Machang Wenhua	-	马厂文化
Qiemu'erqieke cemetery	Qiemu'erqieke Muqun	-	切木尔切克墓群
Ruoqiang-09LE04/50 graves	Ruoqiang 09 LE 4/50 Mudi	-	若羌 09LE4 号/50 号墓地
Shanshan-Ertanggou cemetery	Shanshan Ertanggou Muqun	-	鄯善二塘沟墓群
Shanshan-Subeixi cemetery	Shanshan Subeixi Muqun	-	鄯善苏贝希墓群
Shanshan-Yanghai cemetery	Shanshan Yanghai Muqun	-	鄯善洋海墓群
Shihezi-Zongchang cemetery	Shihezi Zongchang	-	石河子总场墓地

	Mudi		
Siba culture	Siba Wenhua	-	四坝文化
Subeixi culture	Subeixi Wenhua	Subeshi	苏贝希文化
Tashenku'ergan-Xiabandi cemetery	Tashenku'ergan Xiabandi Mudi	-	塔什库尔干下坂地墓地
Tashenku'ergan-Xiangbaobao cemetery	Tashenku'ergan Xiangbaobao Mudi	Shambabay	塔什库尔干香宝宝墓地
The Keliya River	Keliya He	-	克里雅河
The Peacock River	Kongque He	The Peacock River	孔雀河
Tian Shan	Tianshan	-	天山
Tiebanhe	Tieban He	Töwan River	铁板河
Xinjiang	Xinjiang	Sinkiang	新疆

Appendix 2: Description of burials

i. Grave 5.A in the Xiaohe cemetery

The dead was a mummified young male. His body rested on the back and head at the eastern part of the coffin. He had brown-black skin, long eyelashes and thick eyebrows. His hair was tied at the back with a red string. There was a big fracture spot on the forehead and contained a grimace on his face indicating his suffering.

About his dressing, his head was covered with a white felt cap with feather-peg decoration on the left; the cap reached under ears and was fastened by a string under the chin. On his right wrist, there tied a round bead with white string twice and the bead was placed on the inner side of the wrist. Round his hips, he wore a narrow loin-cloth with fringes at its both sides. The loin-cloth has been tied in front of penis. He wore leather boots with hair remaining (outside?).

In terms of burial goods connected to the body of the dead, he was wrapped in a coarse mantle of yellowish-white wool, except for his head and feet. Near the head, the right edge of mantle was tied into a small bag containing grains of wheat. Outside the mantle, at the outer side of the right thigh, there found a small basket with dried porridge of millet inside. Inside the mantle, under the back, there were a bunch of four feather arrows tied together. In his right hand, there was a tamarisk twig. At his throat, there were pieces of animal ears probably calves ears. The whole front of the body was spread with grains of wheat and twigs of Ephedra, most of them sunken down inside the open part of the body.

The container of the dead consists of two side planks, a lid formed by ten short boards, two connection boards and some ox-hides covering on the lid. The dead has been put on the ground and then coffin was assembled over him. There was no bottom of the coffin. The two large curved side planks leaned against each other to form a semi-enclosed space. Two small vertical end-boards connected the side planks by being inserted into the deep grooves of the side planks. There were no any nails or dowels to connect different parts of the coffin. Ten short boards laid on the coffin and cut to follow the outline. Above the lid, there covered a few ox-hides with hair on. The ox-hides fitted closely to the lid and no sand entered the coffin. At the both end, there stood a thin pole. The grave located the east of the big palisade. The coffin was lying in the direction S76˚W-N76˚E.

ii. Grave M2 in the Xiaohe cemetery

The dead was made by a wooden substitute covered with badger-hide by removing its hair. The dead rested on the back. There was simple curved head, limbs, body, and thin eyes, mouth and nose. The wooden arms and legs have been separately put into the upper and lower limbs of the badger. There was a skin face covered on the wooden head with three holes on to show curved eyes and mouth. On the top and the forehead, there was a bunch of blackish brown hair. The head was to east.

About the dressing, the whole head was covered with a large brown felt cap, and a lamp-cushion with hair was lying under the head. On the right wrist, there tied a rectangular stone-

jade bead with brown string round twice. Round the waist, there tied a narrow deep brown loin-cloth with fringes. (It could be a string to tie the badger-hide, since there was nothing to cover and the cloth is too thin to cover anything.) The feet were put into a pair of leather boots.

In terms of burial goods connected to the body of the dead, the whole body was covered in a greyish brown woollen mantle except for the head. The mantle was fixed with a wooden pin on the waist part. Closing to the head, the right side of the mantle was tied into two small bags, which contained kernels of wheat. Outside the mantle, there lied a basket beside the right shoulder. Inside the mantle, the dead held a long thin tamarisk twig in the right hand; on the breast, there were a few bronze pieces (which were the only bronze things in Xiaohe Cemetery?); under the right side of the dead, there lied a bunch of feather arrows; besides, there were some grains of wheat, millet, tendon-made strings, and Ephedra twigs spreading on and under the dead.

The container of the dead consisted of two arc-shaped side planks, a lid formed by ten short straight boards, two connection boards and three large pieces of ox-hide with hair covering on the lid. On ox-hide, there lied ten small and thin tamarisk twigs in the middle location of the coffin. In front of the coffin, there stood one oar-plank and one post tightly connected. Behind the coffin, there stood a post. There inserted three feather-arrows beside the front oar-plank and post. The grave located the east of the western palisade-wall, and 20cm under coffin M1 and less than 20cm east of that. The coffin was lying in the direction N81˚E-S81˚W.

iii. Grave M4 in the Xiaohe cemetery

The dead was a mummified adult female. She was lying on her back and head was to the northeast. Her skin was pale and grey. The head part was most well-preserved part, with narrow forehead, wide cheekbone, deep eyes, a few eyelashes, small nose and closed mouth. She has greyish brown hair reaching her shoulders, and the hair was divided through the middle part to two sides. On the surface of the hair, it seemed to be painted by jelly-stuff so that it got stuck together. Her breasts were obviously down.

About the dressing, she wore a light brown round felt cap with its top a bit pointed, and on its left side decorated with leather-peg and dried-weasel. Under her head, there lied a lamp-leather with hair on. She had a loin-cloth fastened on her waist and wore short ox-leather boots with hair outside on the sole. she had a necklace consisting of stone-bead, jade-piece, and feathers and there tied a jade bracelet on her right wrist.

In terms of burial goods, the whole body was covered into a brown mantle except for her head and feet. The mantle was upside-down, with its fringes-side up to head. Around the breast, the mantle was fastened by two wooden pins. Inside the mantle, there spread some calves (or sheep) ears around her neck and shoulders; on her right and close to her stomach, there lied a leather bag and a wooden penis consisting of two wooden parts with grass and hair in the middle; inside her right arm and under her body, there put a straight and peeled tamarisk twig; under her body, there lied a wooden comb with five teeth; besides, there were also animal-string, woollen yarn under her body, and some Ephedra twigs above and beneath her, and surrounding her arms. There were some whitish lumps spreading her neck, shoulders, stomach, and legs (which were possibly cheese production?).

The container of the dead consisted of two arc-shaped side planks, a lid formed by ten short straight boards, two connection boards and three large pieces of ox-hide with hair covering on the lid. On ox-hide, there lied twelve small and thin tamarisk twigs in the middle location of the coffin. In front of the coffin, there stood one post painted in red; behind the coffin, there stood a crooked tamarisk twig tightly connected to the coffin. In the front part of the covered ox-hide, there fastened some small felt with woollen yarn. The grave located the same level with and on the west of M2. The coffin was lying in the direction N93˚E-S93˚W.

iv. Grave M11 in the Xiaohe cemetery

The dead was a mummified adult female. She was lying on her back and head was to the east. She had deep eyes, long brownish eyelashes, straight nose, and lightly opened thin mouth. Her thick hair was long to reach her breast and split from the middle. There painted some whitish sticky stuff on her hair. Her breasts and stomach looked round. Her whole body was painted with whitish sticky pulp-stuff.

About her dressing, she wore white round felt cap with leather-peg and dried weasel decorated on the left side. (The cap was fastened by two side strings under her chin.) Under her head, there lied a piece of white lamp-leather (pillow). She had a white loin-cloth with its fringes closing to her knees. The loin-cloth was fastened with two side-string above her stomach. She wore a pair of short leather boots with hair outside on the sole. There were painted some whitish pulp-stuff on the surface of boots. On her neck, there had a bead-feather necklace, and on her right wrist there fastened a pipe-shape jade bracelet.

In terms of burial goods, the whole body was covered into a white mantle except for her head, shanks and feet. The side with fringes were up. The mantle was fastened with two curved wooden pins and two short tamarisk twigs. On the right edge of the mantle, there fastened three bags containing Ephedra twigs inside. Outside the mantle, there lied a basket closing to her right knee. The open part of the basket was covered by a greyish white felt and fastened with brownish yellow woollen yarn. Inside the basket, there were some dried food on its bottom. Inside the mantle, on her neck and breast, there spread some Ephedra twigs, animal ears, whitish pulp-stuff, and animal-string; above the Ephedra twigs in the middle of her breasts, there was a leather-arrow and a penis-shape stuff wrapped by yellow strings; on her stomach, there were some millet and unknown grains; between her right arm and her body, there put a leather bag with its open part fastened by a red string, and a tamarisk twig; under her hip, there put a wooden comb painted in red and it contained seven teeth.

The container of the dead consisted of two arc-shaped side planks, a lid formed by eleven short straight boards, two connection boards and three large pieces of ox-hide with hair on covering on the lid. The different colour of ox-hide indicates that they came from three different oxen. Above the middle ox-hide, there covered a white mantle and put twelve thin tamarisk twigs on. In front of the coffin, there stood a post. The grave located the southwest of the large eastern palisade wall and in W-E direction. The coffin head was to the east and almost reached the palisade wall.

v. Grave M13 in the Xiaohe cemetery

The dead was an adult female. She was lying on her back and head was to the east. Except for her head and the below part of legs, the rest body was decayed. She had deep eyes, high cheekbones, sank cheek, tightly closed mouth, and brownish hair shorter than her neck. Her face had been painted with red lines on the forehead and nose. Her whole face, hair, and naked legs were painted with whitish sticky pulp-stuff.

About her dressing, she wore a white round felt cap with leather-peg, dried weasel and red woollen yarn decorated on the left side. The cap was fastened by two side strings under her chin. Under her head, there was a piece of white lamp-leather (pillow) with hair on. She had a loin-cloth decorated with seven round bronze pieces by equidistance. The fringes of loin-cloth almost reached her knees. She wore a pair of short leather boots with hair outside on the sole. The surfaces of the boots have been painted with white sticky pulp-stuff. She wore a bead-necklace and a jade-bracelet on her right wrist.

In terms of burial goods, the whole body was covered into a white mantle with red stripe except for her head, crus and feet. The side with short fringes were up. The mantle was fastened with three curved wooden pins and three short tamarisk twigs. On the right edge of the mantle, there fastened three bags, one containing millet grains, one ephedra twigs inside, and one being

broken. Outside the wrapping mantle, she had a large extra thick greyish white bottom-mantle as a cushion for her lying. Above the cushion-mantle and outside the wrapping-mantle, there lied a basket closing to her right hipbone. The open part of the basket was covered by a white felt and fastened with white woollen yarn. Inside the basket, there were some dried food, millet and wheat grains on its bottom. Besides, there put a painted bull head above her stomach. Inside the wrapping mantle, on her left breast there put a small wooden mask; outside her left wrist, there lied a wooden penis-shape stuff; on her right stomach there was a big leather-bag and three feather decorations; under her right hand, there put two small stones; above her right body part, there put a tamarisk twig twinned a dried weasel; under her right arm there lied a tamarisk twig with one side pointed; under her right hip there was a wooden comb painted in red and with seven teeth; on her stomach, there spread some millet grains; under her body, there spread a lot of ephedra twigs; under her arms and beside her left hap, there were some tendon-made strings; and around her neck and shoulders, there were a few animal ears.

The container of the dead consisted of two arc-shaped side planks, a lid formed by eleven short straight boards, two connection boards a bit higher than the planks and three large pieces of ox-hide with hair on covering on the lid. Based on the colour, the ox-hide came from three different oxen. On the middle ox-hide, there were twelve thin tamarisk twigs mixed a thin reed. Some sand flew into the coffin and covered the right shank of the dead. In front of the coffin, there stood a post. The grave located the southwest of the large eastern palisade wall and in W-E direction. M13 located northwest of M11.

vi. Grave M24 in the Xiaohe cemetery

The dead was a mummified adult male. He was lying on his back and head was to the northeast. His stomach was sinking. The muscles of breast part and arms looked strong. He had a narrow forehead, wide cheekbones, thick deep brown eyebrows, deep eyes, blonde beard and light brown hair mixed a bit blonde and white colour. His hair was unfastened at the back and long as to his shoulders. The whole face, hair and body were slightly painted with white sticky pulp-stuff. After removed the white stuff on his face, there could see some red lines painted on his forehead and nose.

About his dressing, he wore a deep brown round felt cap with two leather-pegs decorated on the left side and dried weasels on each side. The cap was fastened by two side strings under his chin. His head was lying on a piece of purplish brown lamp-leather (pillow) with hair on. He had a light brown loin-cloth on. He wore a pair of short leather boots with hair outside on the sole. He wore an earring on each side. On his right wrist, there was a white bead-bracelet twined for seven times and a jade-bracelet.

He had plenty of burial goods. The whole body was covered into a deep brown mantle with red stripe except for his upper head, shanks and feet. The side with fringes were on downside. The mantle was covered from right to left and fastened with three curved wooden pins and three short tamarisk twigs. On the right edge of the mantle, there fastened four bags, one with ephedra twigs, the rest three broken and spread some wheat grains surrounding. Outside the mantle, in front of his head and behind feet, there was inserted a wooden sceptre inlayed a bone carving face on each side; on his stomach, there put a painted bull-head with big horns; beside his right hipbone, there lied a basket with dried food in, covered by a brown felt, fastened by woollen yarn and with string to carry. On the bottom of the coffin, he had a bottom-mantle acted as a cushion to lie down. Inside the mantle, the burial goods mostly piled up on his right and the lower body part; surrounding his right arm and body, there piled up feather arrows (11), a bunch of Ephedra twigs, a feather-decoration, wooden sticks covered with leather-suit (2), tamarisk twigs (2), two half-horse-leg wooden stuffs with strip-stone fastened between (2), and pointed wooden sticks on both ends (6); surrounding his left arm and body, there were some animal ears (20) close to his neck, a curved wooden face close to his breast (the curved face might have faced up at his breast but be moved to his left side accidently), and feather arrows inside left arm (2);

on the middle part of his body, there lied feather-decorations (2) and a small stone; above his legs, there piled up curved snake-shape wooden sticks (3), wooden stick covered with leather-suit (2), pointed wooden sticks on both ends (2), feather-arrow (12) concentrated between his legs, wooden stick twined with dried weasel on one pointed end (3), and a bone-arrow.

The container of the dead consisted of two arc-shaped side planks, a lid formed by ten short straight boards, two connection boards a bit higher than the planks and four large pieces of cattle hide with hair on covering on the lid. Based on the colour, the cattle-hide might come from two cattle. On the middle cattle-hide, there were ten thin tamarisk twigs mixed a thin reed twig. Some sand flew into the coffin and covered the right crus of the dead. In front of the coffin, there stood an oar-plank painted in black and a high pole painted in red. There inserted three arrows on one side of the oar-plank, and a bow on the other side. On the bottom part of the high round post, there fastened a grass-bunch consisting of a long thick tamarisk, a reed, four Ephedra twigs twined with woollen yarn, and four lamp-shank bones. A dried cattle dung was put on the top of the grass-bunch. Beside the bunch-grass, there put a basket covered by felt on the open part. The grave located the southwest of the large eastern palisade wall and in W-E direction. M34 located west of M13 and deeper than M13.

vii. Grave M33 in the Xiaohe cemetery

The dead was made by a wooden substitute covered with animal-hide keeping hair on. It was roughly made with an entire wood. The wooden dead had a big head, short arms, wide body narrowing in the low part, and legs. The wooden arms and legs have been respectively put into the upper and lower limbs of the animal-hide. There was a skin face covered on the wooden head with three holes on to show eyes and mouth. On the top and the forehead, there was a bunch of black hair.

About the dressing, the whole head was covered with a large brown felt cap, and a lamp-cushion with hair was lying under the head. On the right wrist, there tied a rectangular stone-jade bead with brown string round twice. Round the waist, there tied a narrow deep brown loin-cloth with fringes. (It could be a string to tie the badger-hide, since there was nothing to cover and the cloth is too thin to cover anything.) The feet were put into a pair of leather boots.

In terms of burial goods connected to the body of the dead, the whole body was covered in a greyish brown woollen mantle except for the head. The mantle was fixed with a wooden pin on the waist part. Closing to the head, the right side of the mantle was tied into two small bags, which contained kernels of wheat. Outside the mantle, there lied a basket beside the right shoulder. Inside the mantle, the dead held a long thin tamarisk twig in the right hand; on the breast, there were a few bronze pieces (which were the only bronze things in Xiaohe Cemetery?); under the right side of the dead, there lied a bunch of feather arrows; besides, there were some grains of wheat, millet, tendon-made strings, and Ephedra twigs spreading on and under the dead.

The container of the dead consisted of two arc-shaped side planks, a lid formed by ten short straight boards, two connection boards and three large pieces of ox-hide with hair covering on the lid. On ox-hide, there lied ten small and thin tamarisk twigs in the middle location of the coffin. In front of the coffin, there stood one oar-plank and one post tightly connected. Behind the coffin, there stood a post. There inserted three feather-arrows beside the front oar-plank and post. The grave located the east of the western palisade-wall, and 20cm under coffin M1 and less than 20cm east of that. The coffin was lying in the direction N81˚E-S81˚W.

viii. Grave M34 in the Xiaohe cemetery

The dead consisted of his own head, two arms, wooden body and legs. The length was 137 cm. His head was almost left as a skull. It has been painted black of his cheekbones, lower body part

including his legs. There fastened a bead twined with white woollen yarn twice.

He was dressed in a felt cap, a loin-cloth, a pair of felt socks and leather boots. His boots were a bit different with others, whose fur on the soles were inside not outside. He was lying on a lamb-fur pillow and a worn mantle. The brown wrapping mantle covered him with his head, legs and feet left outside. The fringes of the wrapping mantle were on the lower side. The mantle was fastened by a pointed tamarisk twig on the left shoulder part and fastened with two bags of plant on the right corner of the mantle, one with grains of millet and another small ephedra twigs.

Outside the wrapping mantle, there placed a basket beside his right waist. Inside the wrapping mantle, there placed a long tamarisk twig on his right; spread plenty of small ephedra twigs surround upper body, grains of millet above the breast and stomach. There were a few lumps of whitish stuff above his breast, a bronze piece near his neck, some animal ears around both sides of the neck, and some animal tendon strings above the breast, stomach and besides the body part.

The wooden monument in front of the coffin was gone, with three incomplete wooden arrows inserted into the sand. There contained twelve short boards as coffin lid with a consistent black line painting and three pieces of ox-hide with hair on covering on the lid. Above the ox-hide, there placed twelve thin tamarisk twigs and a reed twig.

ix. Grave 79LQ2M7 in the Gumugou cemetery

This grave belongs to burial type I in the Gumugou cemetery. The dead was an elderly male. Only his skeletons were remained. It is suggested that he is older than fifty-five years old (Han 1986). He was lying on his back and his head was to the east. On his body part, there were some blackish brown ash remains which seemed to be the clothes remains. In terms of the burial goods, there was only a small bronze roll beside his breastbone.

The container was a rectangular wooden coffin without bottom. The whole shape was in trapezoid shape with the head part of the coffin wider than the feet part. Since there were only coffin ash remains, it is not clear that how the coffin was constructed. The coffin was buried in sand.

Above the ground, the grave had a well preserved intact burial mound. The whole burial mound looked like a sun-radiating-spokes pattern. The centre of the burial mound consisted of seven circles of wooden poles standing in ellipse. The distance between two elliptical palisades was about 10 cm. The long diameter of the innermost elliptical palisade was 3.5 m, the short diameter was 2 m. There were six hundred forty-five wooden poles in total to form the elliptical palisades. The diameters of the wooden poles were from 2 to 15 cm, and height from 20 to 100 cm.

Outside the elliptical palisades, there were forty-five radial rows of wooden poles spreading from the edge of the outermost elliptical palisade to different directions outside. Most radial rows contained seven wooden poles each; some only had six or five wooden poles each. There were two hundred forty-nine wooden poles in total to form the radial rows pattern. The diameter of the wooden poles was from 15 to 35 cm, and height reaching 1 m. The wooden poles were pointed at the bottom end and inserted into the ground. The grave was located at the northeast part of the cemetery area.

x. Grave 79LQ2M35 in the Gumugou cemetery

This grave belongs to the burial type II in the Gumugou cemetery. The dead was a male. He was lying on his back and his head was for the east. Only his skeletons were remained. Both of his shinbones were broken in the middle part and were wrapped in cloth each. The textiles of his wrapping mantles, cap, and shoes were decayed and gone.

No burial goods were found inside the coffin. Outside the coffin, there were six cattle and sheep/goats horns, a bunch of Ephedra twigs, a piece of wood with one edge carved in raw shape in the burial sand forty centimetres above the coffin.

The container of the dead was a rectangular wooden coffin without bottom. The whole shape was in trapezoid shape with the head part of the coffin wider than the feet part. The coffin consisted of two long straight side-planks, a lid formed of ten short ten short boards, two connection boards at each end of the coffin, and was covered by three pieces of animal-hides. The coffin was lying in the direction N75˚W-S75˚E. The grave was located at the southwestern part of the cemetery area.

xi. Grave 79LQ2M5 in the Gumugou cemetery

This grave belongs to the burial type II in the Gumugou cemetery. The dead was a naturally mummified baby with twenty teeth, who might be younger than six years old. The baby was lying on the back. The hair was blond and straight. The baby only wore a yellow felt headgear and a leather-boot with high waist on the left foot. Another leather-boot with high waist was found under a piece of lamb-hide beside the upper body part. The whole body was wrapped in a rough felt mantle. The head was for the east.

In terms of burial goods, there were a piece of lamb-hide beside the upper body part of the baby. A (felt) bag was grasped in the right hand and its felt stripes twined around both the thumb and the middle finger. There was a grass-made basket with grains of wheat inside. The location of the grass-made basket is unknown. A piece of dried beef with fur on was connected with a string of thirty pieces of cattle ears. The beef and cattle ears were wrapped in a felt cloth and placed under the baby. There was also a leather clothes[15] with fur inside. But it is unknown if the leather clothes belong to M5 and what the position of the clothes was originally.

The container of the dead was a rectangular wooden coffin without bottom. The coffin consisted of two long straight side-planks, a lid formed of five short boards, two connection boards at each end of the coffin. There was a small wooden pole standing at each end of the coffin to fix the coffin. The coffin was covered by four pieces of lamb-hides on the top. The coffin was lying in the direction N80˚W-S80˚E. The grave was located at the southwestern edge of the cemetery area.

xii. Grave 79LQ2M26 in the Gumugou cemetery

This grave belongs to the burial type II in the Gumugou cemetery. The dead was an elderly female[16] whose age was between forty and fifty years old. She was lying on her back and wrapped in a felt mantle. Her skeletons were remained and preserved well. She wore a felt headgear. Her head was for the east.

In terms of burial goods, a grass-made basket was placed on the right of her head. Above the feet end of the coffin, there were seventeen cattle and sheep/goats horns in the burial sand. But it is suggested the horns might belong to the connected coffin 79LQ2M20 (Wang 2014, 110).

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[15] As Wang (2014, 45–51) mentioned, the whole grave was packed and transported back to the museum since 1970s. When they started to sort out the materials in 2010, they found the dead was moved out and the wrapping mantle was open. The leather clothes were found at the feet of the dead. The leather clothes in the Gumugou Cemetery is unique to see. So, it is not sure if the clothes actually belonged to 79LQM5.

[16] In Wang (2014, 110–114)'s report, the dead is a male. But in Han (1986)'s osteological research, the dead is a female between forty and fifty years old. Here I record the dead as female since I think the osteological research is more reliable.

The container of the dead was a rectangular wooden coffin without bottom. The whole shape of the coffin was in a trapezoid shape with the head part wider than the feet part. The coffin consisted of two long straight side-planks, a lid formed of several short boards, four end boards with three at the head end and one at the feet end. The coffin was covered by (a large piece of) white lamb-hide. Above the hide, a dust-pan shape container was placed at the feet end of the coffin. The dust-pan shape container was made of plant twigs and dried grass. The coffin was lying in the direction W-E. The grave 79LQ2M26 was closely located at the east of the grave 79LQ2M20 in the southwestern part of the cemetery area

Appendix 3: Radiocarbon dating and the absolute time[17]

Cemeteries or graves	Uncalibrated date	Calibrated date	Calibrated date (expressed in BCE)
Tiebanhe graves	3580±70 BP	3880±95 BP	Around 1880±95 BCE
Gumugou cemetery	-	3900-3800 BP	Around 1900-1800 BCE
M38: coffin	3660±80 BP	Around 3980 BP	-
M38: a wrapping mantle			
M38: a sheep/goats hide	3480±100 BP	Around 3765 BP	
M4: coffin	3615±170 BP	Around 3925 BP	
	3525±70 BP	Around 3810 BP	
Xiaohe cemetery	-	-	Around 1670-1420 BCE in early time
5th layer: a felt mantle/an animal ear	-	1670-1490 BCE	-
4th layer:	-	1690-1420 BCE	
M34: millet/M29: wheat, animal ears			
Keliyahe northern cemetery	-	-	Around 1450-1200 BCE
Grains of wheat	1879-1622 bce	3422±44 BP	-
Ephedra twigs	1950-1693 bce	3505±48 BP	
Beans	1744-1533 bce	3365±38 BP	
A woollen string	1665-1506 bce	3306±29 BP	
A felt mantle	1677-1521 bce	3315±26 BP	
A felt product	1607-1437 bce	3239±29 BP	
A felt mantle	1733-1453 bce	3302±56 BP	
A grass-made basket	1746-1536 bce	3372±34 BP	

Note: This table is a summary about the radiocarbon dating information (Wang 2017).

Cemeteries or graves	Samples	Suggested time (Calibrated?)
Xiaohe cemetery (5 layers)	Seeds of plants, animal furs (30)	1950-1400 bce/BCE
Xiaohe cemetery	Collected samples (4)	2200-1880 bce/BCE

[17] In this study, I apply the time spanning as: the Xiaohe cemetery (2000-1450 BCE), the Gumugou cemetery (1900-1800 BCE), the Xiaohe-Gumugou site (2000-1450 BCE), the Xiaohe horizon (2000-1200 BCE).

Keliyahe northern cemetery	? (5)	1880-1700 bce/BCE

Note: This table is a summary about the dating time from the website of the Institute of Archaeology in Chinese Academy of Social Sciences, access: http://www.kaogu.cn/cn/xueshuyanjiu/yanjiuxinlun/kejikaogu/2013/1111/44443.html

Appendix 4: Data of the Xiaohe and the Gumugou cemeteries

The data consists of eight sheets with the entire information on the coffins, the dead, the locations of burial goods, the amount of burial goods in the Xiaohe cemetery and the Gumugou cemetery. These data were foundation information to do my study analyses and draw conclusions. Some information was picked up and presented as tables in the thesis texts, some were not, but still important for drawing conclusions. Here I have published the data in DiVA in ".csv" format, as eight separated documents, for people who have interests to this study or future study in this area. The documents together are counted as appendix 4, which includes:

- 4.1 Data of coffins in the Xiaohe cemetery
- 4.2 Data of the dead in the Xiaohe cemetery
- 4.3 Data of the locations of burial goods in the Xiaohe cemetery
- 4.4 Data of the amount of burial goods in the Xiaohe cemetery
- 4.5 Data of coffins in the Gumugou cemetery
- 4.6 Data of the dead in the Gumugou cemetery
- 4.7 Data of burial goods in the Gumugou cemetery
- 4.8 Data of the sun-radiating-spokes burial pattern in the Gumugou cemetery

In order to understand different mark-indication in the data recording, the notes are shown here: x=Unknown (Since the coffins are not intact, it is unknown on the shapes of coffins or the head-direction of the dead.), A=Above/On (the body), B=Beside (the body), I=Inside (the mantle), M=Middle (on the middle part of the body), O=Outside (the mantle), R=Right (corner of mantles for plant bags, body side or hand for baskets and tamarisk twigs), U=Under (the body). E.g. 5.A: Plant bag: O-A-R means the plant bag of 5.A was fastened on the right corner of the wrapping mantle, and placed on it.