The Silk Road

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(continued)

Book notices (except as noted, by Daniel C. Waugh)

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From the editor's desktop

This volume inaugurates the appearance of *The Silk Road* as an annual publication, instead of semi-annually as previously. Most of our contributors are appearing in the journal for the first time. Some are well published scholars; others at the beginning of what one may hope will be long and fruitful academic careers. As always, I learned a great deal from working with our authors. If it may seen that the editor is exercising undue privilege in contributing more than one piece this time, that indulgence has been undertaken in one instance as a collaborative venture with a leading specialist and in the other only after having received substantial input from scholars who read the article in advance and encouraged its publication.

I have as well decided to inaugurate here a photo essay series featuring important objects of material culture and art displayed in museums along the "Silk Roads" which I have been privileged to visit, some of them off the map of most tourist itineraries. In many cases these days, of course, museums themselves have developed extensive websites and are putting their collections on-line. Others have yet to do so. These photo essays (best viewed in color in the pdf version of the journal) are but a sampling of a much more extensive collection of photographs which is incrementally being posted to "Silk Road Seattle" (http://depts.washington.edu/silkroad/) as part of its effort to make the arts of the Silk Road more readily available for teaching and study purposes.

As in several previous instances, this volume of the journal happens to have a fairly heavy concentration of material about Mongolia. Readers should keep in mind though that our perspective remains a broad one both geographically and chronologically. To date Western Asia has been under-represented here, something that we may hope to remedy in the future. As one who has recently returned from a month in Iran and is expecting to spend additional time in the Middle East this year, I am developing an ever greater appreciation for the idea that the Silk Roads are much more than the routes of exchange affecting East and Central Asia.

The only way the journal can continue to be a success and maintain a broad perspective is by receiving good submissions for future issues. While our target audience is still a general one, the journal welcomes a range of contributions. We expect to continue to publish work by established specialists, but also welcome work by others who can contribute carefully crafted articles of general interest. New discoveries, of course, are most welcome, but good summaries of existing knowledge may have their place too. *As I write these lines, next year's volume of the journal is still wide open for contributions*, which should be in my hands no later than the beginning of summer 2011.

We can offer the advantage of a generally short turn-around time between submission and publication, unlike the case of academic journals and edited volumes where a year or two (or even much longer) is the norm. I am happy to help authors for whom writing in English is a challenge, although I will not translate articles (Russian being an exception) which have been written in other languages. If you have questions about submissions, send them to the editor; also look at the new guidelines which have been posted to the Silkroad Foundation's website at the URL listed on the previous page.

— Daniel C. Waugh
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Featured museum

Images from Ancient Iran: Selected Treasures from the National Museum in Tehran

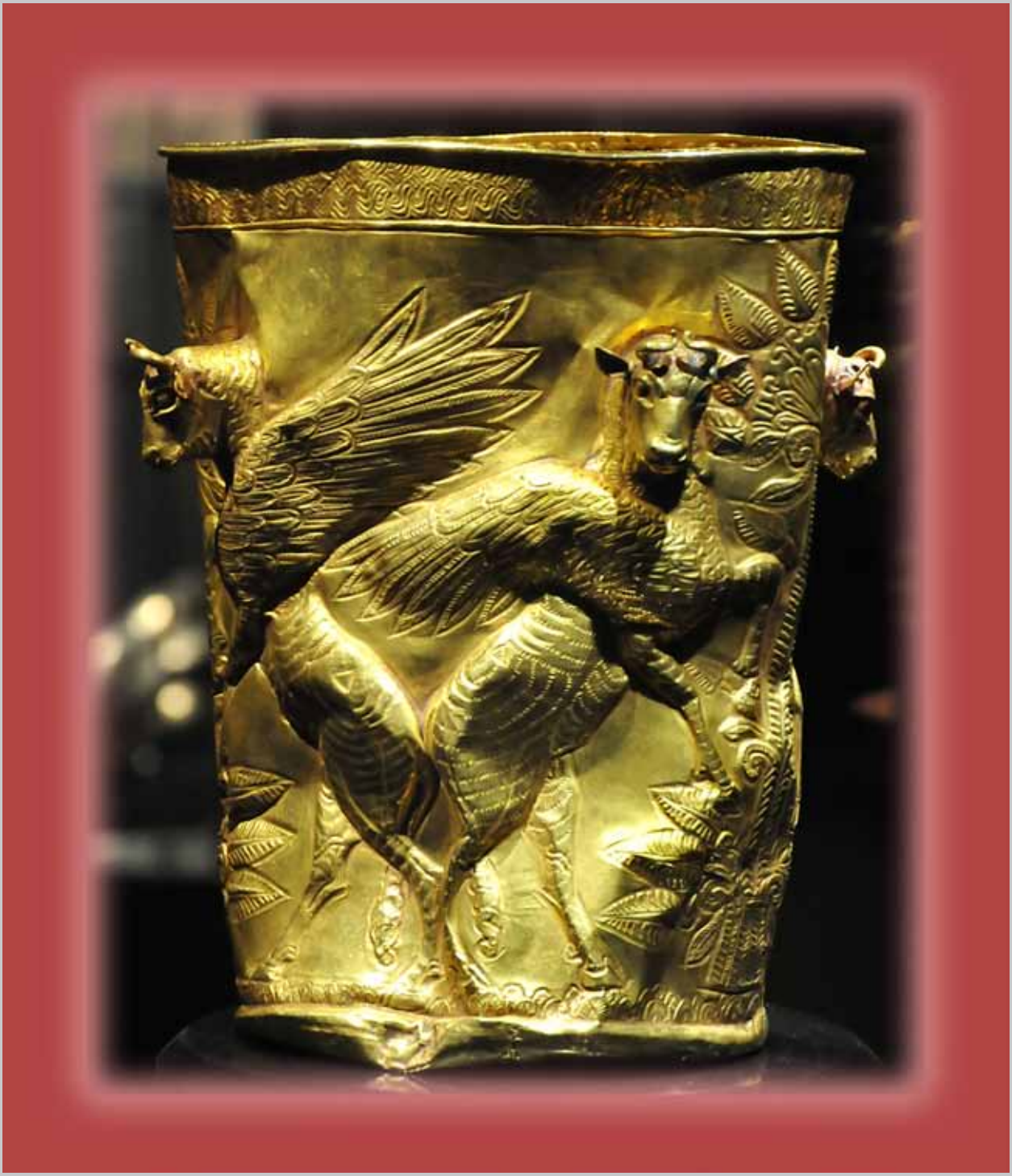
Audience hall scene depicting Darius I or Xerxes I,
Treasury Palace, Persepolis. 5th century BCE

A photographic essay

Footed pottery vessel. Shahr-e Soukhteh – Sistan. Late 3rd millennium BCE

Ceramic charioteer. Amarlu – Gilan. 1st millennium BCE

Bronze quiver. Sorkh dom – Luristan. 800–700 BCE



Gold goblet with winged bulls. Marlik – Gilan. Early 1st millennium BCE

Lapis lazuli vessel encrusted with gold. Hasanlu –
West Azerbaijan. Early 1st millennium BCE.

Gold earrings. Pasargad – Fars. Achaemenid period.

Statue of Darius I, with inscription on base in Egyptian hieroglyphs. Found at Susa. 6th–5th century BCE.

Silver foundation tablet of Darius I with inscription in Old Persian, Elamite and Babylonian cuneiform. Persepolis – Fars.

Gold rhyton. Hamedan. Achaemenid period.

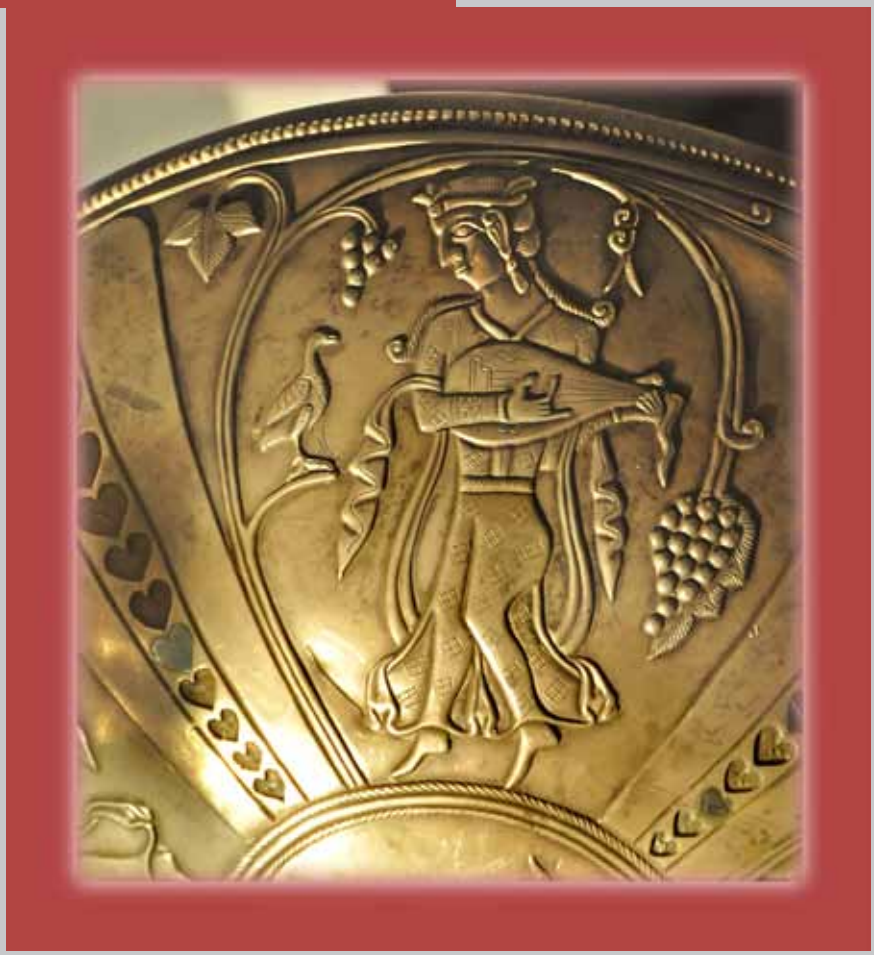
The upper part of a stone capital from Persepolis. 5th century BCE.

Bronze statue of Parthian prince. Shami – (Izeh) Khuzistan.

Zeus. Nahavand – Hamedan. Seleucid period.

Floor mosaic (fragment). Shapur's palace, Bishapur – Fars. 3rd (?) century CE.

Stucco bust.
Hajiabad – Fars.
Sasanian.



Silver bowl (detail).
Klardasht – Mazandaran.
Sasanian.

Ancient Uighur Mausolea Discovered in Mongolia

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The modern nation of Mongolia, located between Russian Siberia and China, is mostly wide-open steppes — an area where animal husbandry, hunting, and a nomadic lifestyle have been optimal for thousands of years. Dynamic competition for pasture and conquests by different groups led to the establishment of many powerful steppe empires: the Xiongnu (3rd century BCE – 1st century CE), Turkish (552 – 745 CE), Uighur (744 – 840), Khitan (Liao, 9th – 11th centuries CE) and Mongol Empires (12th – 14th centuries) succeeded one another in ruling the steppes of Central Asia. The Uighur groups that gained power in the Mongolian steppes were of similar language and culture with the ancient Turks who came before them. Even though the territories of Mongolia are rich with archaeological sites attributed to the Uighurs, very few excavations on this period have been done. Most researchers who have studied the Uighurs have focused on their inscriptions.

Since 2005, a joint Mongolian–Chinese archaeological project has investigated archaeological sites in Mongolia. The participating institutions are the National Museum of Mongolia, the International Institute for the Study of Nomadic Civilizations (Ulaanbaatar) and the Inner Mongolia Research Institute of Cultural Relics and Archaeology (Hohhot).[1] In 2005 we traveled over 3000 km in Mongolia and visited hundreds of archaeological sites in order to introduce them to the Chinese scholars and select the ones to investigate for the next five years. This survey of sites from all periods is now published in Mongolian and Chinese (Enkhtuvshin et al. 2008a).

Fig. 1. Location of durvuljin*.*

After the survey, we chose to investigate sites in Central Mongolia known as durvuljin. Local people call them "square sites" (*durvuljin*) because of the square or rectangular shape. There is some information from scholars who visited these sites before, but they had no idea about their function. There is but one brief article, by Mongolian Academician Huduugiin Perlee, in which he proposed that the site might be a Turkic royal tomb (Perlee 1941/2001). We therefore chose this kind of site in order better to understand its function and determine its date. Most durvuljins have been found in the Orkhon Valley [Fig. 1], where we chose to investigate those located in Khotont county of Arkhangai province, near the Uighur capital of Khar Balgas (Ordu-Balik) [Fig 2].

The only other confirmed durvuljin site outside of the Orkhon Valley, located to the north in Bulgan province, is the one named Mogoin Shine Us or Moyunchur stele [Fig. 3]. We compared

Fig. 2. The Uighur capital Ordu-Balik (Khar Balgas). 360°+ panorama photo © 2007 Daniel C. Waugh, taken from NW corner of "palace" in SE corner of citadel.

Fig. 3. The Moyunchur ritual site.

the Moyunchur site complex with the durvuljin in the Orkhon Valley and saw that their general shapes are very similar, but there is no stele in the durvuljin sites in the Orkhon Valley. There are famous Uighur inscriptions on the Moyunchur stele; so we thought it possible that the durvuljin were from the Uighur period of the 8th – 9th centuries [Fig. 4].

Fig. 4. The stele with a runic inscription at Moyunchur.

We discovered about 40 durvuljin in the Orkhon valley during preliminary vehicle surveys and by asking local people. These sites are very easy to see in the open landscape, often located in groups of three to eight in the gorges along the edges of mountains and hills. The structure of durvuljin square sites is a rectangular shaped earthen wall only about 0.5 – 1 m high, with a water channel dug outside the wall. There is a small mound inside the wall made of earth, stone and bricks. The wall gate is always located on the east side.

While our goal was to excavate only the durvuljin Uighur sites, we found and excavated within the durvuljin complexes burials from other periods, some from before the Uighur period and some belonging to the later Mongol period. For example, a Xiongnu grave (3rd century BCE – 1st century CE) was dug 2000 years ago beneath the Khulhiin am site. Eight centuries later the Uighur people placed their square site on top of it. Since most Xiongnu graves have stone surface markings, the Uighurs probably knew the burial was there. The Xiongnu grave was disturbed by the process of digging and building up the durvuljin wall but had not been looted — the bones and artifacts were moved around but had not been removed from the pit. Then 400 years after the Uighur square site was built, the Mongols buried eight of their dead inside the walls of the Uighur durvuljin. Therefore, there are three different cultures together in one place at the Khulhiin am square site.

So far we have excavated six durvuljin: two sites of Uvur havtsaliin am in 2006 (no. 3) and 2009 (no. 5), Khulhiin am in 2006-2007 (no. 1), Khundiin khooloi in 2007 (no. 3), and two additional durvuljin at Khundiin khooloi in 2008 (nos. 5, 6). Here is a brief summary of the discoveries.

1. Khulhiin am site no. 1

We excavated the better preserved durvuljin no. 1 among the three square sites found in a narrow valley here [Fig. 5, next page], starting with the Mongol graves inside the square walls. In them, we found gold ornaments and buttons, pearls, and a birch bark hat which were used by Mongol wives of the 13th – 14th centuries. When later we excavated the walls, we discovered the Xiongnu tomb beneath the northern earthen wall. In this disturbed grave were pottery fragments, many bone arrowheads, bone bow pieces, bronze decoration, and other wooden and bone artifacts.

Fig. 5. Durvuljin at Khulhiin am.

The durvuljin walls measured 48 x 40 m and stood 0.5 m high. Surrounding this rammed earthen wall was a ditch. We also discovered a small brickwork water channel projecting from the northern wall, constructed apparently for drainage. Also, we found a pit used to mix plaster from chalk for preparing a plaster layer for wall decoration. There is one rectangular structure in the middle of the wall enclosure — a foundation of rammed earth surrounded by bricks, and then plastered over. There were many bricks for walls on top of this foundation, probably for another building, but the bricks were very disturbed.

We found a total of six graves inside the wall enclosure, located to the west, north and east of the central building. Each grave had a distinct structure, different from the others. The bigger chamber tombs were oriented with their entryways at the east side of each chamber. Some of them were circular, others tunnel-shaped. Some tunnels were lined with bricks inside, while others had natural soil walls. All the big chamber tombs (graves 2, 3, 4 and 5) had been looted but not the small pit burials (nos. 1 and 6).

Grave no. 1 is a pit burial to the east of the central building, found 45 cm beneath the surface and measuring 113 x 112 cm across and 70 cm deep [Fig. 6]. Buried here underneath a small tunnel vault of bricks was a baby around 1 ½ years old. Because small rodents had disturbed the grave it was difficult to know the manner of burial. The baby's head was to the west; so maybe this was the orientation. The baby had a gold earring.

Fig. 6. Grave no. 1 and gold earring, Khulhiin am.

Fig. 7. Grave no. 6 and gold earrings, Khulhiin am.

Grave no. 6 was found from a soil spot 35 cm below the surface to the east of the central building [Fig. 7]. This pit was 74 x 32 cm and 115 cm deep. A brick box with a lid of wood, stone and brick was set into a side niche aligned southwest – northwest, with a natural step opposite the box. Skeletal remains of a baby, also 1 ½ years old, were inside the box, and a couple of tiny gold earrings and three beads were found on the floor of the grave. The orientation of the baby also appears to have been to the west.

Fig.8. Graves no. 3 (above and lower right); no. 2 (right) Khulhiin am.

Grave no. 3 was also located to the east of the central building [Figs. 8, 11 next page]. The looters' hole was 1.5 m in diameter. In it we found human and animal bones, brick fragments, thick gray-colored architectural fragments which had fallen in from above, ceramic fragments decorated with patterns, white and red plaster fragments, human skull fragments, and brown and black ceramics. 170 cm deep into the hole were leg bones, shoulder bones and stacked bricks. At a depth of 270 cm was a chamber tomb constructed of bricks and packed clay. The looters' hole penetrated the entrance of the tomb chamber. Inside, the chamber measured 190 x 115 cm and 104 cm tall, with an extra length for the chamber entrance. The chamber was filled with soil; there were scattered human bones of a teenager and a skull in the northwest corner.

Grave no. 2, found beneath a layer of building fragments from the central structure, has a long entryway with stairs measuring 4.8 x 1.2 m and oriented northwest to southeast. The chamber entrance, made of bricks, was damaged by looters when opened. Two fragments of a small burned ceramic pot lay on the floor outside the entrance, perhaps used for a lamp. The chamber is shaped like a bent tunnel, 5.4 m long and 1 m high. The tunnel was walled and floored with bricks packed with clay.

The bones of the body lay close to the entrance, and the skull was found in a tight cloth bag to the east of the chest [Fig. 8]. The jaw was outside of the bag; because there were no teeth maybe it was from an older person. Under the chest were two badly preserved leather boots whose shape and decoration could still be discerned. We also found two bone bow joints, on one of which is a runic inscription with 5 letters [Fig. 9]. According to Japanese and

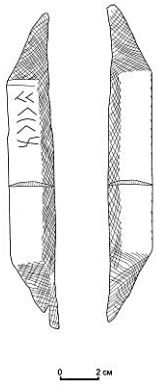

Fig. 9. Bow joint with runic inscription, Grave no. 2, Khulhiin am.

Fig. 10. Entrance to Grave no. 4 and bronze coin from Grave no. 5, Khulhiin am.

Mongolian specialists they read "tonuz," possibly a name, maybe that of the dead person, or maybe someone else's, inscribed on an object which had been given to him. We found an analogous example on the bone bow piece with markings from the Xiongnu tomb under the square site wall — demonstrating that there was a long tradition of inscribing bow pieces.

Grave no. 4 consisted of a long stepped entryway 3.8 m long and 1.2 m wide, and a chambered pit 325 x 280 cm, with a constructed entrance between these two sections [Fig. 10]. At the top of the chamber roof looters had made a hole, in which were bricks, sheep/goat bones and some ceramic fragments. The vaulted brick ceiling of the chamber was 1.6 m high. Small stones were set between the bricks to secure them in position and then packed with fine clay. Unlike the bricks of the wall, the bricks in the roof had on one side the imprint of a rope. This was probably not for decoration or from being pressed into a mold, but rather for fitting the bricks in the ceiling to protect them from sliding. The chamber entrance wall was painted with red ochre, and a bronze belt decoration was found on the entry stairs. This find is not a ritual object, just something that was lost when the tomb was being built. Since the looters came in through the roof, the chamber entrance was intact — the bricked entrance was covered with a layer of mud. The entire chamber floor was paved with bricks, and a second tier of bricks formed a platform in the north part of the chamber, probably the resting place for the deceased before the looters scattered the bones.

Grave no. 5 was also a chamber tomb. The entryway was 3.2 x 1.3 m and 2.8 m deep, and many animal bones and brick fragments

Fig. 11. Entrance to Grave no. 3 and looters' hole, Khulhiin am.

Fig. 12. Step-shaped bricks from Grave no. 5, Khulhiin am.

were found in this section [Fig. 12]. As with the other chamber tombs, the bricked entrance was small, only 62 cm tall; the looters had entered through its upper part. The chamber floor was paved with bricks. In the entryway was a bronze coin fragment, a *kai yuan tongbao* from the early Tang Dynasty (625 CE) [Fig. 10]. This gives a terminus post quem for the site, although one should remember that many coins are kept for a long time. Enough of the bones remained to determine that the dead person was a teenager.

Although the children's burials were not looted, the destruction caused by small rodents makes it difficult to determine the burial practices. The looters passed over the children's graves either because they thought they were poorer than the bigger tombs or perhaps simply because they did not notice such small graves, which left few traces. Since there were 3 gold earrings and 3 beads in the two children's graves, it is reasonable to assume that the bigger tombs were very rich before looting. Some of the bigger tombs were looted several times, which would suggest that significant time might have elapsed between the separate incursions.

2. Uvur havtsal site no. 3

We have excavated two of nine square sites in this mountain pass (here we report on the excavation of 2006, but not the one done in 2009). There are no deep trenches outside of the earthen wall of site no. 3, nor is the wall high, only about 0.4 m. The outer wall measures 31 m east–west by 34 m north–south, and there is a 3 m wide gate on the east side. A rammed earth mound in the middle of the walled enclosure is 1.5 m high and 12 m wide; its surface is covered with some brick fragments and gray and buff-colored roof tiles. It is also walled with bricks and covered in a chalk plaster layer around the perimeter. In addition to bricks, tiles and pottery fragments, we found decorative pieces of a zoomorphic design. At first we thought they were bats, but larger pieces proved to be stylized dragons.

We found one brick chamber tomb with a stepped entryway and small bricked entrance northwest of the central structure [Fig. 13]. The entryway measured 5 m long and 1 m wide;

Fig. 13. Chamber tomb at Uvur khavtsal site no. 3.

the diameter of the circular brick chamber itself is 4.3 m and the height of its dome 2.3 m. Inside were a cow's head, human vertebrae and some foot bones, a human jaw, some fragments of pottery and construction materials.

3. Khundiin khooloi site no. 3

At Khundiin khooloi, we excavated three of seven square sites [Figs. 14, 15, next page]. At site no. 3, the earthen wall with an eastern gate has a ditch around it, and a rammed earthen mound, 15 m wide and 1.8 m high, lies in the middle. Architectural elements like bricks, tiles, and pottery fragments are similar to those found at the other sites excavated, but this mound is distinct in that it has a circular shape. The bricks at this site look more worn

and maybe are old and were recycled from another construction. The most interesting thing is that there was no chamber tomb here, which shows that not all durvuljin sites have tombs.

Fig. 14 (below). Durvuljin at Khundiin khooloi site no. 3.

Fig. 15 (right). Central mound at Khundiin khooloi site no. 3.

Fig. 16. The 6th durvuljin at Khundiin khooloi.

4. Khundiin khooloi site no. 6

At Khundiin khooloi, we found two durvuljin sites next to each other. Square site no. 6 is on the north side of durvuljin no. 5 [Fig. 16]. Site no. 6 measured 21 m wide and had a wall with outside ditch and central mound with brick and chalk plaster construction as at the other sites. Here also there were no tombs.

5. Khundiin khooloi site no.5

This is the biggest square site we excavated up through 2008 [Fig. 17]. The outer earthen wall measures 34 x 51 m, and its gate faces southeast. The central structure is a large stone mound covered with a layer of mud and with a flat top and some steps. There was probably a larger stone structure like a pagoda built on this foundation. A ramp of bricks on the east side forms a

Fig. 17. The 5th dur-vuljin at Khundiin khooloi.

kind of stair to this mound. Excavation of the site revealed six other foundations around the central structure. Most of them are rammed earth and brick walls and floors like the central structures of other square sites, though some are only rammed earth.

• The second structure measures 6.8 x 7 m and stands 1 m high [Fig. 18]. Only the east side does not have a brick wall around the rammed earthen foundation.

• The third structure is 5 x 5 m square and 0.9 m high [Fig. 19]. There were many chalk plaster fragments around this platform, which was faced with brick.

• The fourth structure connects to the northwestern side of the central structure [Fig. 20, next page]. It measures 6 x 4 m and 1 m high. We discovered inside the rammed earth foundation wooden poles, 3 along the eastern part and 3 along the western part.

• The base of the fifth structure was made of rammed clay 10 cm thick, on top of which there was a small earthen foundation, 1 x 0.8 m, covered with bricks [Fig. 21].

• The sixth structure is badly disrupted and stands only 0.4 m high; so it is difficult to

Fig. 18 (above). Structure no. 2, Khundiin khooloi site no. 5.

Fig. 19 (below). Structure no. 3, Khundiin khooloi site no. 5.

Fig. 20. Structure no. 4, Khundiin khooloi site no. 5.

see the shape [Fig. 22]. It has plastered brick walls. We found 3 pits for chalk plaster mixing aligned along the south wall. There was some dried chalk plaster on the bottom of the pits indicating that they were used to prepare the mortar for those buildings.

During the excavation we found one brick chamber tomb to the north of the central stone mound. The entryway is 5.4 m in length and consists of five natural earth steps. The bricked entrance is just large enough for an adult person to enter. The chamber diameter is 3 meters; its dome has a height of 2 m. The entryway is 4 m long, and 1.3 m wide. At the top of the dome is a 0.8 m diameter hole from the looters. The floor is rammed clay, and in the middle of the chamber floor is a small standing wood beam whose bottom is surrounded by small stones. This may have been a pillar in the center of the chamber room. At the front of the chamber, stones and bricks remain from a partitioning wall.

Fig. 21. Structure no. 5, Khundiin khooloi site no. 5.

There were mural paintings on the back north wall of the chamber, the first such discovered in Mongolia [Fig. 23]. The mural is 74 cm high and extends 2.3 m around the curved back wall. White chalk plaster was put onto a mud layer that covered the bricks of the chamber wall, and a detailed drawing of a flower was repeated 5 times. The paint is from natural earthen colors: black, reddish-orange, green and chalk-white. This wall painting of flowers presumably expresses the idea of a peaceful afterlife for the dead. They look similar to the lotus, which can symbolize sleep and peace. Apart from the interesting mural, human leg bones were the only artifacts from this looted tomb.

Conclusions regarding the durvuljin sites

In conclusion, we summarize our observations regarding several important questions:

Date. Because many of the bricks look old and show much eroding and crumbling, we think the Uighurs re-used these bricks from other structures and that they were not always made expressly for the square sites or chambers. Maybe they were brought from other places nearby such as Khar Balgas (Ordu-Balik) city. The architectural elements —

Fig. 22. Structure no. 6, Khundiin khooloi site no. 5; Ceramic decoration found near the central building on its northwest side.

Fig. 23. Mural painting in the chamber tomb at Khundiin khooloi site no. 5.

bricks, tiles and decorative clay pieces — look very much like the pieces from Uighur cities and sites such as Por-Bajin in Tuva, Russia.[2]

Some of the artifacts in the graves are also very similar to those from graves excavated in Tuva. The ceramic pots, bone and bronze arrowheads, and ceramic spindles are similar to ones commonly found in Tuva. Two coins indicate a date of the Tang Dynasty, and the durvuljin form looks like a site to the north where there is a famous Uighur inscription at Mogoin Shine Us. We also received ^{14}C dates from human bones and some wood which fall in the range of the 7th – 9th centuries CE (the Uighur Empire in Mongolia existed in the 8th – 9th centuries). All of this evidence makes us think these durvuljin sites are from the Uighur period.

Function. Most of the many graves we excavated at the six square sites used brick; the six brick chamber tombs varied in form. There were many kinds of people buried in these chambers: a 50(+)-year-old man, a 10-year-old boy, a 30-year-old woman, a 15-year-old boy, and even a one-year-old child. It demonstrates that these tombs are not just for older people nor just for men. Probably the chamber tombs were not for the common people but rather are those of the elite. Two of the square sites had no burials, two of them only one burial, and one of them had six burials. Many burials together in one place may indicate relatives. The sites without burials were maybe just ritual sites (perhaps constructed to commemorate someone who had died elsewhere) or constructed on the wish of a person who was dying.

Attribution. A number of arguments affirm that the durvuljin sites are to be connected with the Uighurs:

• The square architecture and layout are the same as those found at the ritual site of the second Uighur khagan Moyunchur.

• The ^{14}C data provided by Beijing University indicate a date of the 7th – 9th centuries, the time of the Uighur Empire's existence.

• There is the one runic inscription found at Khulhiin am. Among the Central Asian nomads, only the Turks and Uighurs used runic inscriptions. The durvuljin sites are very different from the ritual sites of the Turkic khagans.

• Architectural elements found at the durvuljin sites are similar to those found at the Uighur city of Por Bajin in Russian Tuva. Also, the bricks are like those found at the Uighur capital Ordu-Balik. Those bricks show that the Ordu-Balik and durvuljin sites are connected, a fact that is reinforced by the close proximity of the square sites to Ordu-Balik (17 km).

• Some of the finds at the square sites are are very similar to those made by the Russian archaeologist Leonid R. Kyzlasov, who excavated Uighur tombs in Tuva in the 1950s (Kyzlasov 1969, 1979).

We hope that our excavation of the durvuljin will encourage further investigation of ancient Uighur chamber tombs. Our results have already provided much new information for the study of the Uighurs' rituals and mortuary practices.

About the authors

Professor **Ayudai Ochir**, a historian, is currently coordinator of international research projects at the International Institute for the Study of Nomadic Civilizations. He was director of the Institute of History of the Mongolian Academy of Sciences from 1990-2001 and Director of the National Museum of Mongolia from 2003-2007. In the research on the durvuljins, he headed the Mongolian side of the Mongolian-Chinese archaeological team. **Tserendorj Odbaatar**, a Ph.D. candidate in archaeology at the Mongolian State University of Education, headed the durvuljin excavations and in particular supervised those at Khulhiin am and the 5th durvuljin at Uvur havtsaliin. He has been a curator and archaeologist at the National Museum of Mongolia since 2003. He may be contacted at <odbaatar@nationalmuseum.mn>. **Batsuuri Ankhbayar** is a Ph.D. candidate in archaeology at the Inner Mongolia University in China and a researcher at the International

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Notes

1. The scholars from the Inner Mongolia Research Institute of Cultural Relics and Archaeology (Hohhot) were Ta La, Chen Yongzhi, Son Guo Dong, Yue Gou Ming and Sarenbilge.

2. A brief overview what is known about the very interesting site of Por-Bajin may be found at <http://www.geomorph.org/sp/arch/Por-Bajin_Field_Workshop_1.pdf>. More detail is available in the booklet *Proekt "Krepost' Por-Bazhin". Nauchnyi al'manakh* (N.p., ca. 2007). A good many photographs of the site are at various places on the Internet, including Google Earth, where you type in the coordinates: 50°36'53.87" N, 97°23'6.57"E.

The Hydraulic Systems in Turfan (Xinjiang)

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The *qanat* system is a very old underground structure built since high antiquity to supply water in dry areas. This system contains a very rich nomenclature and depending on its location is designated by a different term. In Palestine we talk of *fuqara*, in Spain of *madjira*, in Arabia of *falaj*, in Morocco of *khottara*, in Sahara of *khottara*, in Afghanistan and in Xinjiang of *karez*. I have chosen the Iranian word *qanat* for this article (Loubes 1998, p. 222; Smith 1957; Briant 2001; Goblot 1979, p. 499).

This system is very simple in appearance and is usually characterized by two important aspects: When the area to tap the water is identified (usually next to a pre-mountainous alluvial fan [Trombert 2008, p. 118]), an underground down-slope tunnel is built in order to use gravity leading the aquifer water to the farms and the towns connected to this channel. On the down slope of the mountain, air shafts or wells are dug at regular intervals to aid in the construction and the maintenance of the tunnel. The water is provided by the *mader-tchah* (the mother well) (Goblot 1979, p. 30; Loubes 1998, pp. 221–222), the deepest of all the shafts and the first well connected to the water reservoir. Water is then released and flows naturally by gravity along the tunnel until arriving at the surface (Sala 2008) [Figs. 1, 2]. This system contains two main advantages: with a natural slope, there is no need for pumps or other devices to raise the water to a higher level. Secondly, the aquifer water is accessible all year long and, with the use of proper storage devices, human settlements can properly control its flow through the changing seasons.

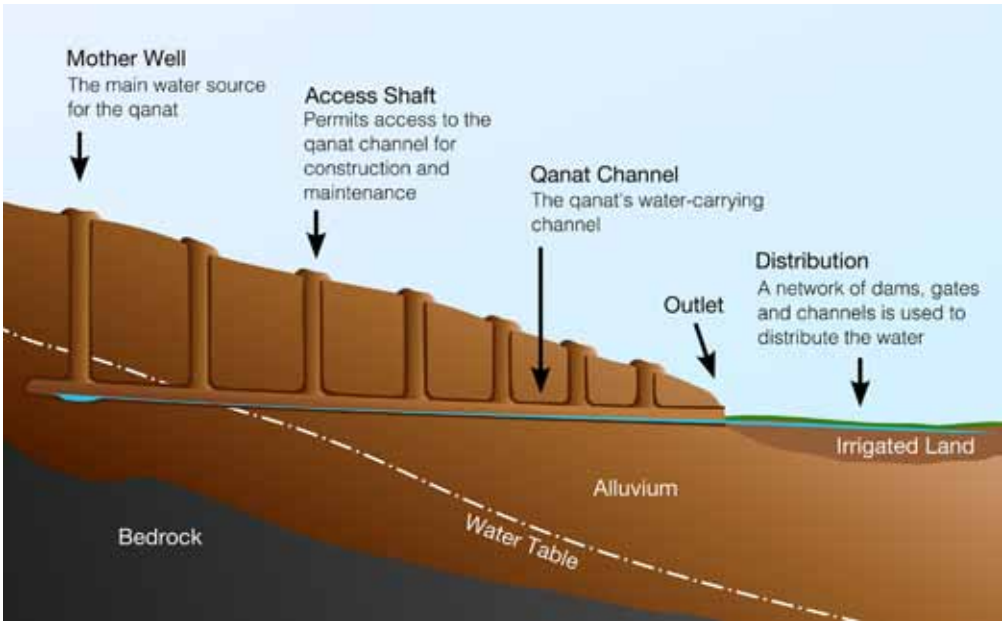

Fig. 1. Cross-section of a qanat. Created by Samuel Bailey (confuciou@gmail.com); from Wikipedia <http://en.wikipedia.org/wiki/File:Qanat_cross_section.svg>.

Fig. 2. Model of qanat supplying water to the city of Yazd, Iran. Photo (composite image) © 2010 Daniel C. Waugh taken at the Water Museum in Yazd, Iran.

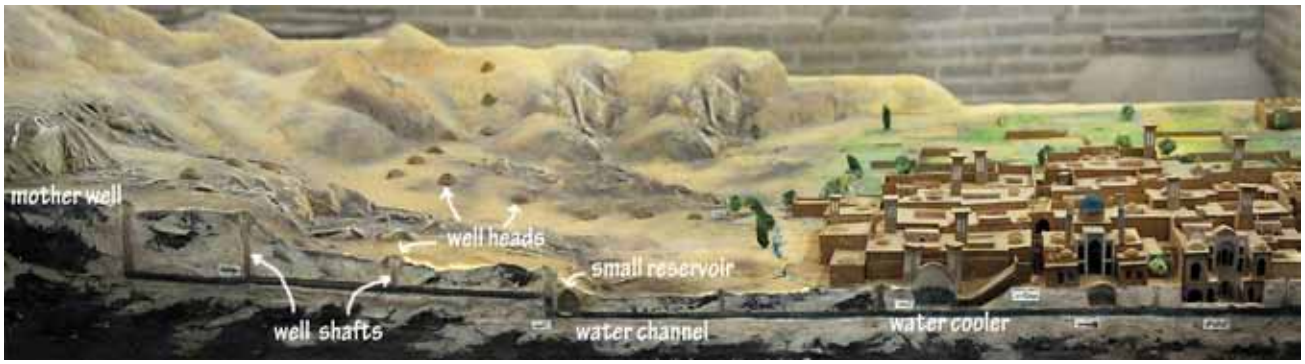

Fig. 3. Workers digging a qanat. *Photo © 2010 Daniel C. Waugh, from a photo in the Water Museum, Yazd.*

In its function, the qanat, from the Semitic definition "to dig" (Wulff 1968), has never been an irrigation system but a mining technique invented to bring the aquifer water to the surface by the use of underground shafts and tunnels (Goblot 1979, p. 27) [Fig. 3]. As with many different water devices in our world, past or present, we tend to generalize their functioning. Hence, we see very often that wells are used only for urban life, whereas water canals from a river, for example, are used only for irrigation (Bruneau 1991; 1994/95).

According to recent discoveries and research regarding the origin of this system, it seems that the oldest qanat are located in Iran on the northern edge of the Persian Gulf (Goblot 1963; Boucharlat 2001; *Qanat* 1989). During the Achaemenid period, this system was developed, very well controlled and widely spread along with the Persians conquests in the north, south and west, eventually reaching Egypt (Briant 2001, pp. 109–42; Chauveau 1996). Qanats have continued to be used until today in Central Asia (Sala 2008), in the Arab world (Lightfoot 2000), and in Xinjiang in the northwest of China (Huang 1994, pp. 70-71; Goblot 1963, pp. 504–05) [Fig. 4].

He who passes through Xinjiang, and stops in the Turfan oasis for a couple of hours, discovers the magic of these qanats, which are one of the many treasures of the oasis [Fig. 5]. Your Uighur guide will tell you everything about its performance, its origin, and perhaps the context of its introduction into Turfan. What you hear about the history though may well be wrong, since the subject has been controversial.

There is every reason to believe that the introduction of the qanat from Iran to the Turfan oasis occurred no earlier than the 17th and 18th centuries CE. Many scholars have discussed the

Fig. 4. The spread of the qanat. *From Goblot 1963. p. 504; used with permission.*

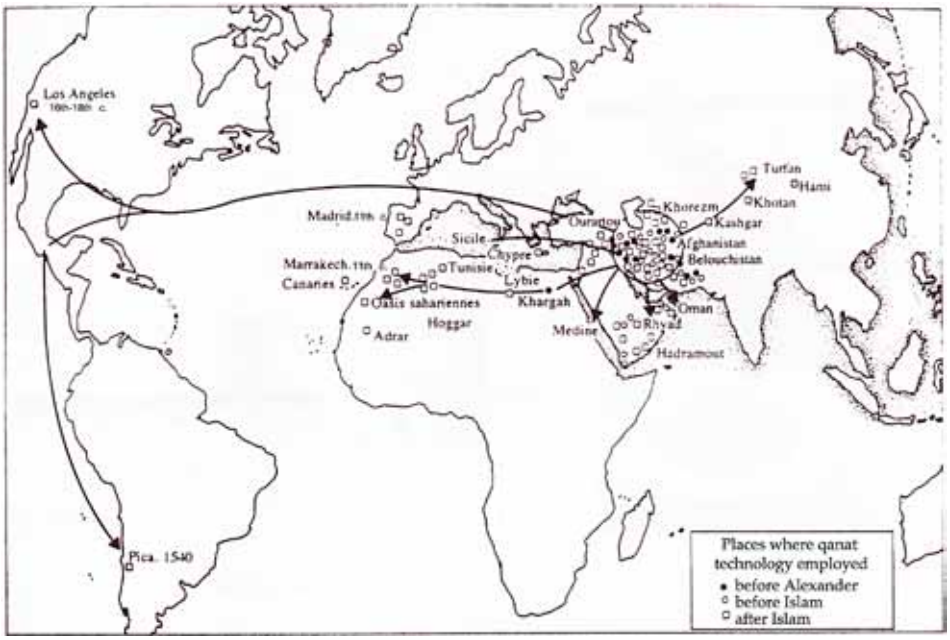

Fig. 5. The location of Turfan in Xinjiang. *Satellite photo: NASA Visible Earth, Taklimakan_A2002088_0525_1km.jpg.*

matter of the date, basing their arguments on evidence from different Chinese texts (Wang 1959, pp. 620–22; Trombert 2008). Some suggested that the qanat system was originally from China where it existed as early as the former Han dynasty. As Éric Trombert summarizes (2008, p. 117):

> In China, several theories have been advanced concerning the origins of karez technology in Xinjiang. Depending on individual authors, it was: (1) imported from Persia; (2) locally developed and refined through long-term experience; or (3) developed elsewhere in China's Central Plain and then imported with some minor modifications. Some combination of (1) and (2) seems the most probable. But until today, the Xinjiang Karez system is still commonly considered in China as 'one of the three Great Ancient Chinese Works,' the other two being the Great Wall and the Grand Canal.

Also, following leads first provided by the Otani expedition (Otani 1963), some specialists have maintained that evidence discovered in the cities of Gaochang and Jiaohe during the first half of the 20th century includes the remains of a qanat system dating from the early Tang dynasty. Thus they claim that China adopted the system from Turfan; this in turn would suggest a new date for the importation of the qanat in China.

Since Trombert's recent article (2008) has now provided us with a very complete analysis of the textual references to the qanat in the history of the Turfan oasis, there is now little reason to question a date of the 18th century for the system's introduction there. Assuming then that the date is not an issue, we need to explore other aspects of the hyrdological systems in Turfan. Indeed, the main role of this qanat system in the capture of water is clear, but what kinds of water devices were used prior to its introduciton needs to be determined. After examining this issue we can address the question of why the implantation in Turfan of the qanat was a success and why it arrived so late in history.

Our knowledge of the history of Turfan is now rather extensive, and we have documents and archeological proofs indicating that the main cities of the oasis (Gaochang, Jiaohe, Tocksun, Luckum…) were heavily populated. The demographic and cultural expansion continued until the conflicts which arose starting in the seventeenth century between Chinese and Muslims (Maillard 1973, pp. 19–43). There are some impressive statistics on population: for example, the Western Liang arrived with 10,000 families in Turfan at Gaochang city in 442 CE (Ibid.). Where there is life, there is water. Where such significant numbers of people are involved, we must discuss more precisely the different water techniques used to supply the families living in this space and to irrigate the fields and the grapes…

A geographical and hydrographical overview of the Turfan valley

It is not possible to assess the textual or archaeological evidence without making a thorough survey of the natural landscape of the Turfan basin and more precisely of the natural course of water through time.[1] Turfan is divided into three main counties: the Shanshan county on the east, the Turfan County in the center and the Toksun County on the west [Fig. 6]. The oasis, which measures around 2000 km², takes the form of a depression with very few reliefs and lies on the eastern part of the Tienshan 天山, whose highest peak, the Bogda Shan (in Turkic) or sky mountain, rises to 5455 m.

Turfan is separated from the Tienshan by the fire mountain (Huoyanshan 火焰山) located on the north of the south valley of the oasis. Because of the collapse of the Tarim plateau (Coque

Fig. 6. The oasis of Turfan with the three counties. After Loubes 1998, p. 244, № 104; used with permission.

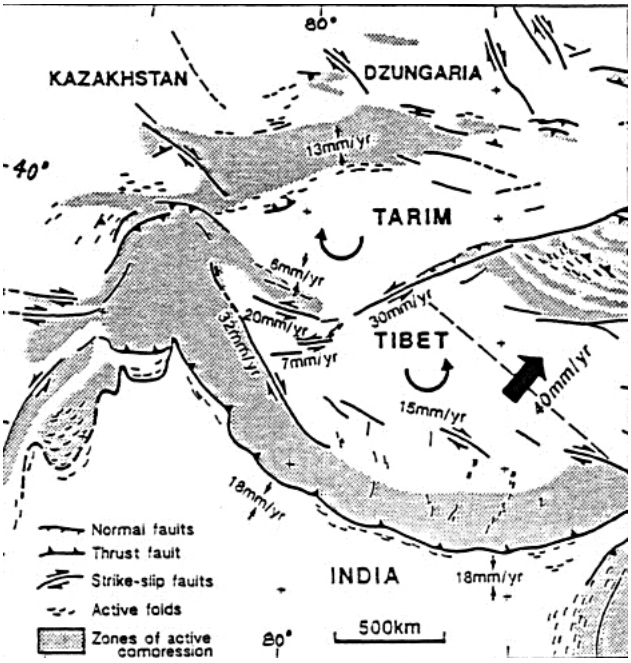

Fig. 7. The Tibetan plate moving against the Tarim plate. Reproduced with permission from Gentelle 1992, p.557.

Furthermore, this fault contributed to the depression of the Basin. Today, along with the Dead Sea in Israel, the Turfan basin is one of the two lowest points on earth, at around 162 m below sea level [Fig. 8]. The Yuehu 月湖 (salt lake or Aidingkol in Turkic), represents the lowest point of the basin, and the salt mountain (Cheul-tagh) rising to 1000 m, marks the southern boundary of the oasis. On the east side of the basin, the desert narrows access to the oasis, and only one direct road leads to the sites of Gaochang, Turfan and Toqsun in the east part. On the northwest side, the pass of Devan leads to the current Xinjiang capital of Urumqi.

The natural water course in this oasis is typical of the desert and mountain environments such as those of the Xinjiang region. Between autumn and spring water comes from the melting of the snow lying on the Tienshan in the north. The melting water funnels [Fig. 9] into

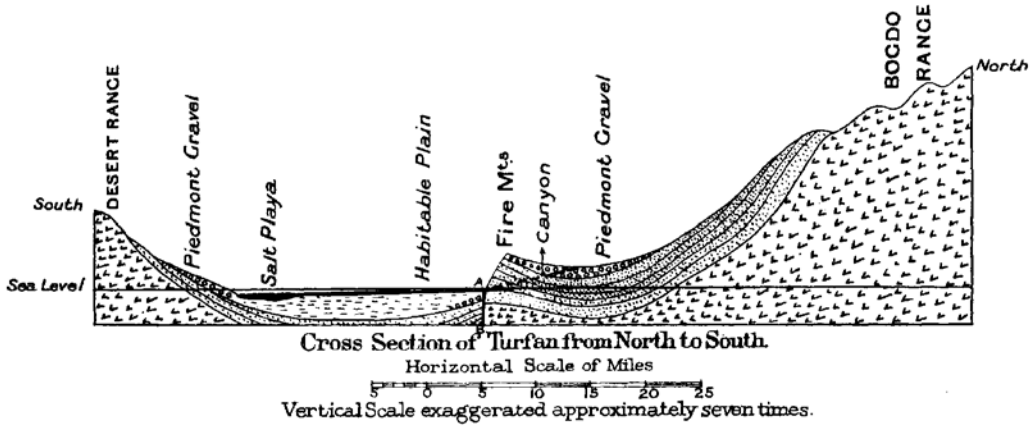

Fig. 8. Cross-section of Turfan from north to south. From Huntington 1907, p. 254.

1992; Gentelle 1992, pp. 555–58; Mercier 1980) into the Tienshan, an important geomorphologic fault [Fig. 7] appeared during the quaternary period dividing the basin in two, each area being the focus of settlement. In the northeast, on the fire mountain, we find some well known historic sites such as Bezeklik and Shengjiagou. In the west and south spreads the valley of Turfan with multiple cities and villages still flourishing today.

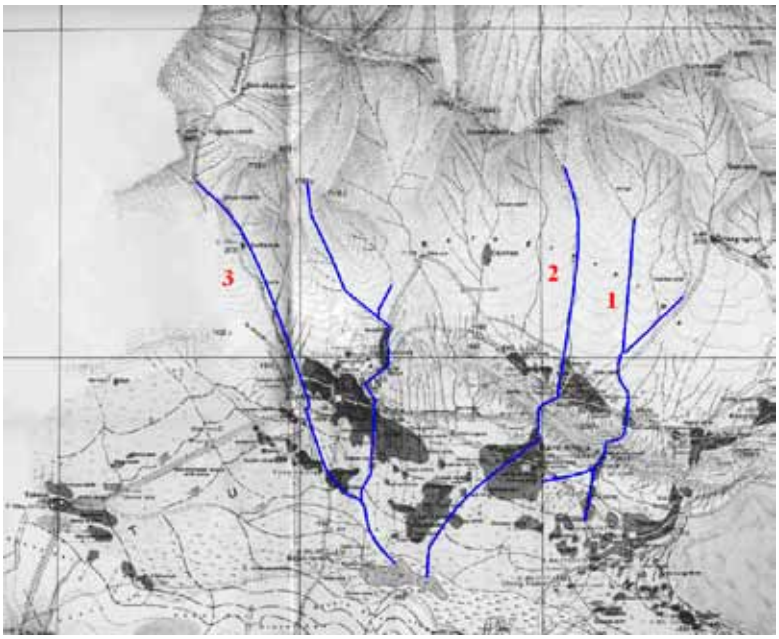

Fig. 9. Hydrographic relief of Turfan. Reproduced with permission from Maillard 1973, fig. 1. Base map from Survey of India map sheet no. N. K-45 (1922), reproduced in M. Aurel Stein, Innermost Asia *(1928), vol. IV, p. 31.*

small streams going down the slope and giving birth in the valley to rivers alimenting different parts of the oasis (Maillard 1973, p. 6). Three main gorges, here described from east to west, determine the entry points of the water into the oasis:

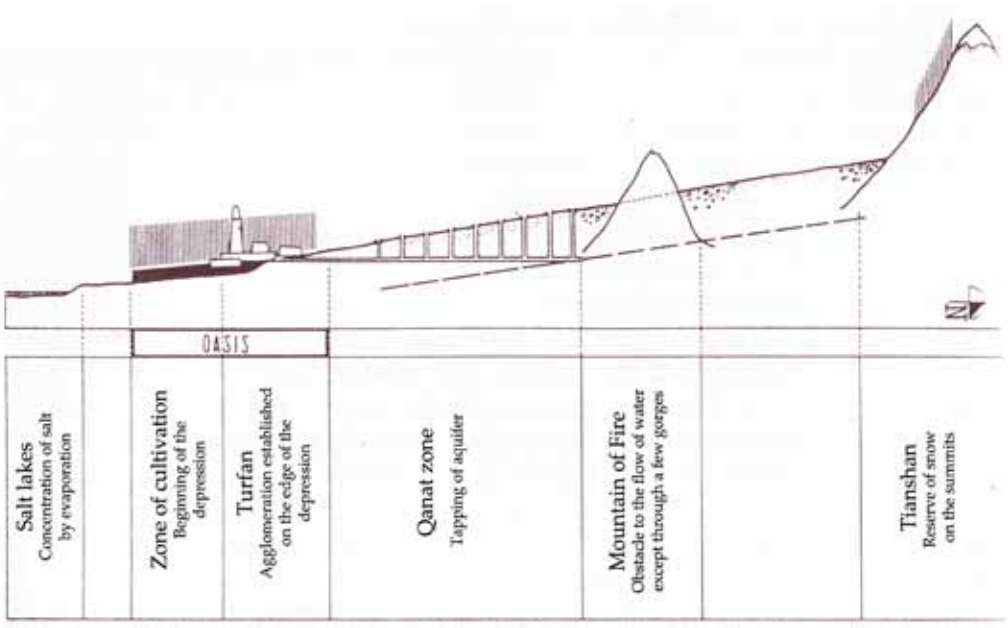

Fig. 10. Profile of a qanat in the Turfan valley. After Loubes 1998, fig. 103; reproduced with permission.

• Through the Toyuk gorge (no. 1 on the map), multiple small water courses from the Tienshan slopes meet to form an important river which flows through Subashi in the north-east and then passes west of Lukcun city.

• Via the Shengjinkou gorge (no. 2), a little farther west, a river passes through the cities of Murtuk and Sangym-Aghyz and below Bezeklik. In the valley of the oasis, the river flows west of Gaochang and finally arrives in the south of the basin.

• Finally through the Turfan gorge (no. 3), on the western side of the oasis, the Davandir River, which originates in the Devan corridor passes west of Huoyanshan and so flows without any obstacles to the modern city of Turfan and to the city of Jiaohe (two arms of the river pass around the city). At one time it reached the southern edge of the oasis, bringing water to Aydingkol lake.

In general it is difficult for these main rivers to penetrate to the southern part of the oasis. For example, the rivers and the shallow water slopes tend to create their own way through the Huoyanshan, but disappear in the gravel located on the southern end of the fire mountain. The Turfan region receives annually only 16,6 mm of precipitation. Hence, most of its supply must come from groundwater (Loubes 1998, p. 213).

Historically these rivers permitted many lands to be fertile and gave life to this oasis. However, as the geographer Ellsworth Huntington suggested a century ago, there is an obvious difference between the situation that prevailed under the Han dynasty and what can be observed in modern times (Huntington 1907). Rivers have disappeared or substantially diminished in length. An important desert is advancing in the west and the east of the oasis, bringing ultimately death to some places and birth to others.

The change of climate and hydrographic configuration brought the population of the Turfan Basin closer to the geological fault near the new capital of Turfan. Ancient cities have been abandoned for new sites and only the qanat keeps this oasis from drowning in the desert (Gentelle 1992; Coque 1991; Jing 2000) [Figs. 10, 11].

Fig. 11. Model of qanat system in Turpan Water Museum, looking N toward the mountains. From Wikimedia <http://upload.wikimedia.org/wikipedia/commons/9/9c/Turpan-karez-maqueta-d01.jpg>.

Fig. 12. Model of Jiaohe in museum at the site. Photograph © 2008 Daniel C. Waugh.

Water systems in the history of Gaochang 高昌 and Jiaohe 交河 cities

The two main cities of Turfan, Gaochang and Jiaohe, played a crucial role in the development of the oasis in pre-modern times (Li 1999), serving as its capitals until they were abandoned in the 15th –16th centuries. Located in the valley of the Turfan oasis, Gaochang could expand easily in the north, south and east. One of the main rivers passes close to the west side of the city. Jiaohe city [Fig. 12], located west of the Turfan capital, lies atop a 15 m high mesa. Its river, flowing from the north, divides to surround the city and join once more in the south.[2] Jiaohe is then about 20 m above groundwater and its river is located directly below the city in the plain. Therefore, considering the importance of these cities in the history of the oasis, they needed effective water devices. Their very different geographical features should indicate that the systems for bringing water were naturally different.

Over the period between the Han Dynasty and the 14th century CE, archaeological and textual evidence indicate that the two cities had three different water systems: wells, underground channels linked to surface channels and various kinds of canals (Ibid.; Sun 1983; Maillard 1973, p. 64).

Archaeological discoveries show that under the Jushi people[3] who controlled the oasis prior to the first conquest by the Han Dynasty in 90 BCE in Jiaohe city fields were irrigated by a certain form of irrigation system, about whose functioning we have no information. The *Hou Hanshu*, describing apparently the situation in the late first century BCE or early first century CE, suggests that the Jiaohe and Liuzhong kingdoms were already densely populated:

> The king of Nearer Jushi (Turfan) lives in the town of Jiaohe (Yarkhoto, 20 li west of Turfan). A river divides into two and surrounds the town, which is why it is called Jiaohe ('River Junction'). It is 80 li (33 km) from Liuzhong (Lukchun), the residence of the Chief Clerk. To the east it is 9,120 li (3,792 km) to Luoyang. He [the king] controls more than 1,500 households, more than 4,000 individuals, and 2,000 men able to bear arms [Hill 2009, p. 49].[4]

Given what seems to have been a substantial population of the Turfan oasis cities, especially Jaohe, we may assume that wells were built in the city by the local people before the first century BCE [Fig. 13]. This city was also occupied by the Xiongnu for a time. They used the natural defensive quality of the site for preparing multiple attacks on the other oases of Xinjiang and on the Chinese army during the campaigns launched under Han Wudi (141 – 87 BCE). The wells represented the only way to assure clean and protected water if the city was besieged (Briant 2001, pp. 30–31; Pulleyblank 1981). By the time of its reoccupation by the Chinese in 61 BCE, the city contained multiple deep wells. The city changed hands again. With

Fig. 13. Model of Jiaohe (detail). Photograph © 2008 Daniel C. Waugh.

its reconquest under the Eastern Han (73–102 CE), new wells were dug using the techniques employed to create the earlier ones (Li 1999, pp. 310–17; de Crespigny 1984, pp. 173–84; 1970; 1995).

The first archaeological evidence for these wells dates from as early as the Western Han Dynasty (Li 1999, p. 315), although the latest excavations have determined that most of the 300 wells discovered in Jaohe date between the 5th century (when the Western Liang and the Qu family controlled the oasis) and the end of the Tang Dynasty [Fig. 14]. Because rivers flowed on the east and west sides of Jiaohe, part of the water not used for irrigation fed the groundwater of Jaohe under the plateau. Hence, to capture this underground water and ensure its supply during the many different attacks on the city, wells were dug at least to a depth of 20 – 25 m.

An example is one excavated by Li Xiao's team in 1994 built on the same level as the troglodyte house No. 2 in the northeast of the city. After a first excavation at the surface of the city, the archaeologists discovered the top of the well in a 2 m high chamber called *xiadishi* 下地室. The well itself had extended down some 23 – 30 m before striking water (Ibid., pp. 310–19) [Fig. 15]. This xiadishi was connected to the *jiandifa* 减地法 (a tunnel leading to the house). While during the Han Dynasty the wells of the city had been dug directly from the surface, beginning in the 2nd to 3rd centuries and especially

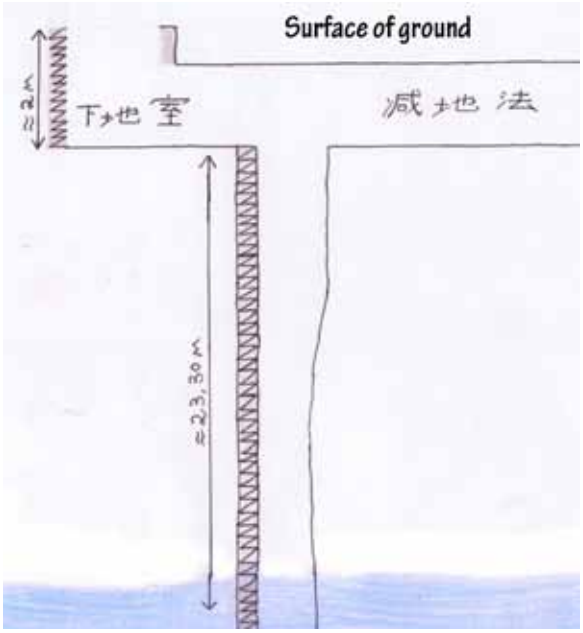

Fig. 14 (above). Sketch of the well from house № 2 of Jiaohe. Drawing © Arnaud Bertrand.

Fig. 15 (right). Picture of well of Jiaohe. Photo © Arnaud Bertrand.

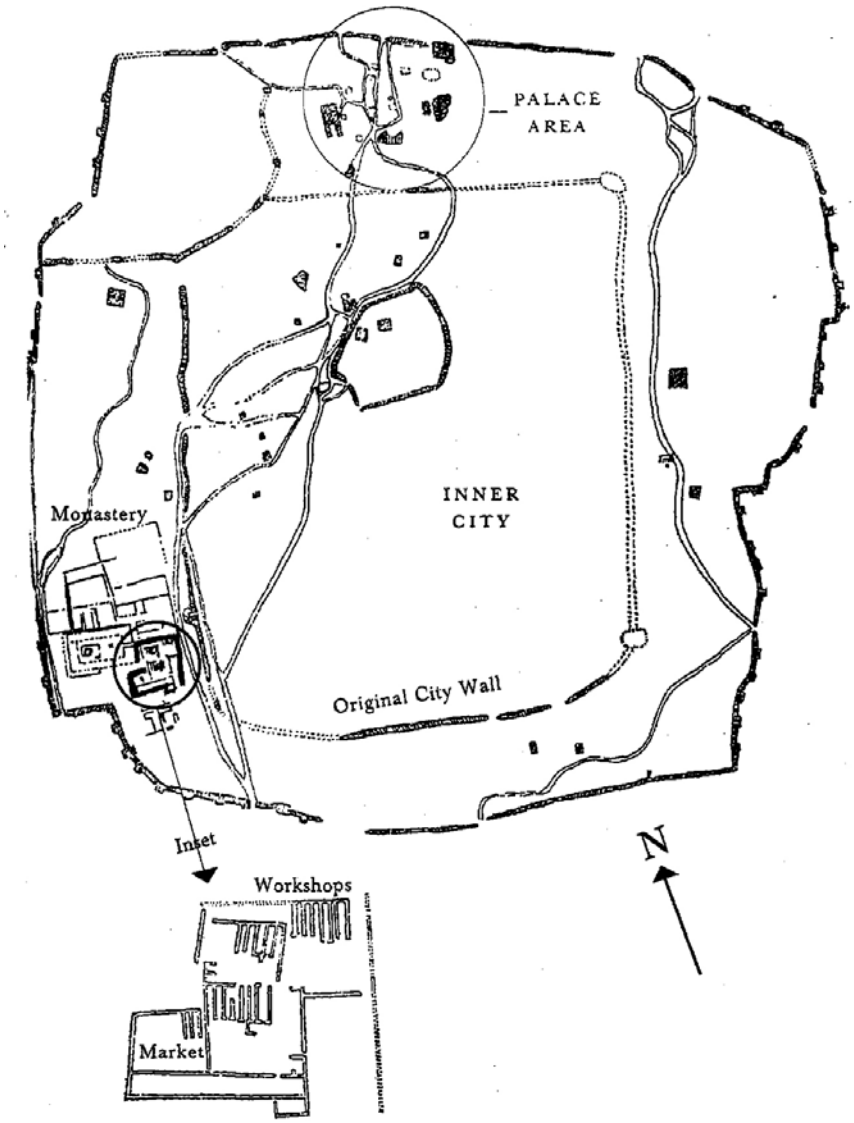

Fig. 16. Plan of Gaochang city, 5th to 8th centuries, and of its market place. Reproduced with permission from Hansen 2004, p. 11; after 新疆考古三十年/新疆社会科学院考古研究所编.

under the Tang dynasty, when the houses became troglodyte, some of the well-heads were moved underground to protect the water from the hot temperatures. With the building of the jiandifa corridor, the water could be brought through the tunnel directly to the house via a jar connected to a rope, thus avoiding the hot climate on the surface (Ibid., pp. 311–12).

The water systems of Gaochang city are more complex to understand because it appears that several devices were used at the same time for different tasks [Fig. 16]. During the conquest of the oasis by the western Han, the Chinese developed considerably the infrastructure of Turfan and positioned their garrison at the Gaochangbi 高昌壁 (the wall of Gaochang) during the first half of the first century BCE. The Han military strategically located its city next to the river on the west side of the town, which had the strongest flow at the time (Pulleyblank 1981; Gentelle 1992; Huntington 1907, pp. 254–67) and thus must have constituted the main water supply. Hence, when posted in Gaochang, the soldiers must have first tapped the river manually, and when the garrison became an actual town, they built channels going through the town irrigating the crops and supplying water to houses.

The first textual references (Pelliot 2002, p. 128; Yamamoto and Ikeda 1987; Guojia wenwu 1986-1987) mentioning a hydraulic system in Gaochang date between the independent Gaochang Kingdom (500 – 640 CE) and the end of the 8th century. A very ingenious water channel was built in order to irrigate the entire valley located in the vicinity of Gaochang. Located 20 li north of Gaochang City, in the Xinxing Gorge of the Kizil Range (near Sengging-aghiz), a main canal, "called the Manshui 满水 Canal (the full water canal), brought water into the heart of the oasis; it fed the ditch around the city wall and flowed on southward [Fig. 17]. The other canals were connected to it" (Trombert 2008, p. 130). The open air canals all functioned thanks to the existence of dykes and a reservoir (placed on the northern and southern ends of the city) which served as transfer station to irrigate the north and the south of Gaochang. It is still not certain whether this Manshui canal tapped a "well canal" 胡麻井渠 or underground canal built into the Kizil-tagh range. Many Chinese specialists have made a direct link between the "well canal" mentioned in the sources and the qanat system. As Trombert points out (Ibid. p. 133):

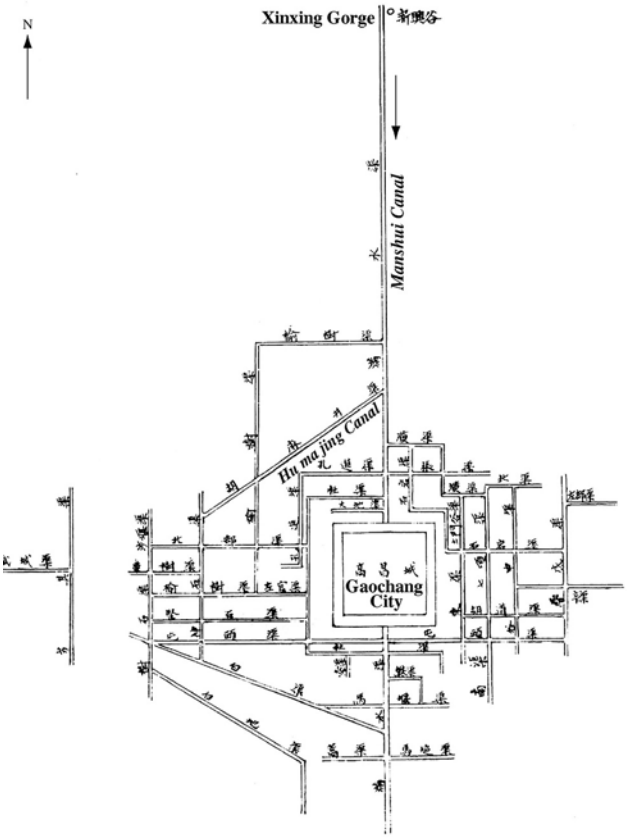

Fig. 17. The water canal plan near Gaochang from Turfan. Reproduced with permission from Trombert 2008, p. 130 (after Nishimura and Sun Xiaolin).

> Even if this interpretation were correct, it would only demonstrate that the qanat system was completely marginal in the Turfan Basin since none of the other forty canals was named 'well-canal,' not even the main canal that transferred the water from the Kizil range foothills to the cultivated plain: […] its name was 'Full-Water Canal'.

Such a canal system was probably used for irrigation both inside and outside the city. The city plan indicates that the main canal led directly into the city and fed a network of smaller canals around it. A system of canals enveloping a city is quite common in Chinese towns: Luoyang under the Wei is a good example (Pelliiot 2002, p. 43; Steinhardt 2002, p. 65). Today in Turfan city, irrigation for its trees and grapes is supplied by a canal. Were such canals also used for supplying water to human consumption? One canal went directly to the Buddhist monastery on the southeast side. If this open canal provided water for people, would not tanks and a decantation system have been needed to purify it? In the modern town of Turfan, decantation and reservoir systems are placed in front of many houses so that the water used for irrigation is also used for other purposes [Fig. 18]. Perhaps in Gaochang ancient city the same system was used. Further research is needed to test this hypothesis.

Apart from canals, the German archaeologists Grünwedel (1906) and von Le Coq (1913) discovered some wells in the city without giving their location. These wells were built directly in the clay soil of Gaochang and were usually 4–6 m maximum depth (much less than in Jiaohe) (Maillard 1973, p. 64). Groundwater was quite important until the 20th century, and the water was accessible from within the city by the building of proper wells. The existence of these wells confirms that Jiaohe and Gaochang used the same technique to access water even though their geographical features are completely different. Perhaps the well specialists were work-

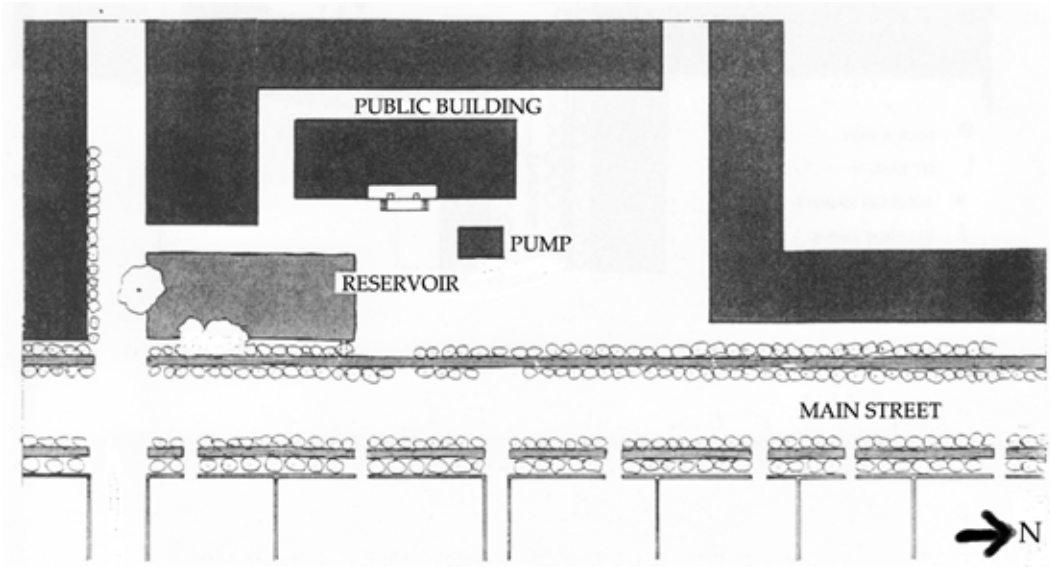

Fig. 18. Plan of a Uighur house of Turfan city with the water drainage system. After Loubes 1998, p. 289, № 126; reproduced with permission.

ing for both cities at the time? Surely the study of other ancient towns such as Tocskun or Bezeklik could further elucidate this point.

Why the success in the introduction of the qanat?

Now that we have an overview of the different systems used to bring water to the fields and the cities of Jiaohe and Gaochang, we can propose a practical explanation why in Turfan and not in Dunhuang, for example, the qanat managed to work (Trombert 2008, pp. 124–26).

The different water systems require similar expertise in excavation to create wells or underground channels and tap water from the mountains. Thus the methods used and the resulting structures correspond to those of the Iranian qanat. The deep wells in Jaohe, for example, are quite similar to the vertical shafts used for the qanat system. In Gaochang, the same can

Fig. 19. Even major buildings in Jiaohe were in some cases largely constructed below the ground, here an administrative building in the center of the city. Photo © 2008 Daniel C. Waugh.

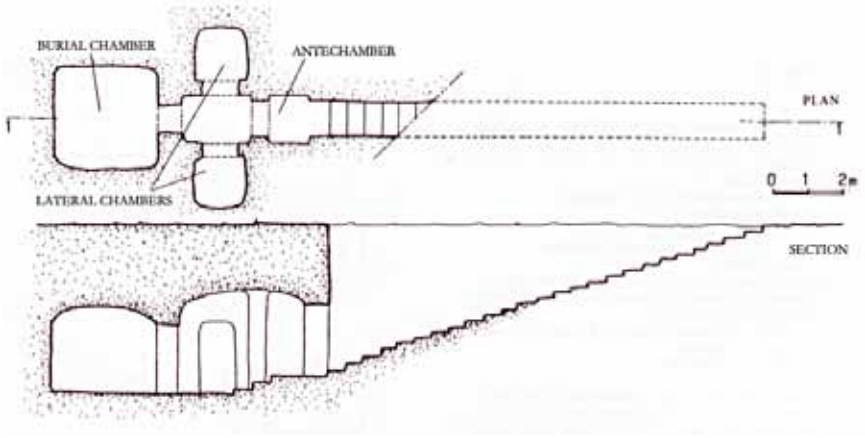

Fig. 20. Diagram of a tomb at Astana. Long entrance corridors to such tombs often had vertical shafts for ventilation and light. After Loubes 1998, p. 135; reproduced with permission.

said for the Manshui canal, which required substantial expertise to tap effectively the water from the Kizil Range. The people of Turfan thus were familiar with the techniques required to construct underground canals through alluvial soils and conglomerate.

This expertise in excavation techniques is reflected as well in other structures and drew on traditions going back over two millennia in the region. In Jiaohe, for example, there are various dwelling caves carved out in the first instance to protect people from the severe heat [Fig. 19]. The various Buddhist cave sites such as Bezeklik, north of Turfan in the Huoyanshan (fire mountain), are other illustrations of how the techniques relevant to well construction were employed. Further examples can be seen in the underground shafts of tombs at locations such as the famous Astana cemetery [Fig. 20]. Thus there was a base of practical knowledge that then could be applied to creat the qanat system centuries later. The tools may have been the same for these different constructions and used once more for the qanat system (Sala 2008) [Figs. 21, 22].

The historical evolution of an oasis like Turfan goes hand in hand with the evolution of water control. Over the centuries beginning with the end of the Eastern Han dynasty, the demographic evolution of Turfan required improvements in hydraulic engineering capacity. Yet by the 15th century Jiaohe and Gaochang cities were being abandoned. There are several probable explanations, above all, first, the destruc-

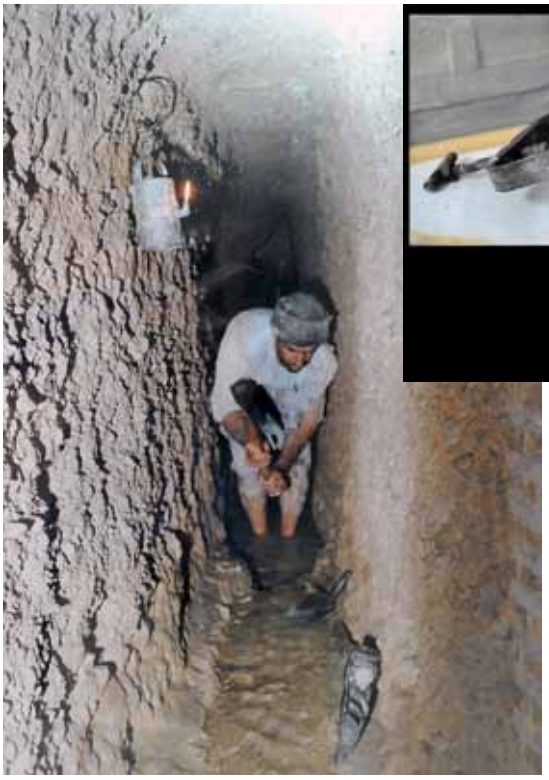

Fig. 21 (left). A worker cleaning a qanat. Photo © 2010 Daniel C. Waugh, from photo exhibited in Water Museum, Yazd.

Fig. 22 (above). Lamps and digging tools used by qanat workers; display in Water Museum, Yazd. Photos © 2010 Daniel C. Waugh.

tion from wars that started between the Muslims and the Chinese, and second, the destruction of the wells of Jiaohe and the canals of Gaochang, forcing the final abandoment of these two main cities. Climate change also seems to have played an important role with the south of the oasis progressively drying out, leading to increased salinity of the soil and remaining water. Hence, the people of Gaochang started to move north closer to Turfan city, where the water supplies could be guaranteed. (Gentelle 1992). A new Gaochang village, completely transformed by the Chinese in the 1960s, was built north of the ancient city (Loubes 1998, pp. 94–95). However, Jiaohe would never be occupied again.

The introduction of the qanat system in the 18th century, by then already known in other oases not far from Turfan on the north road of Xinjiang (Li 2005, pp. 25–28; Huang 1994), was a response to the need for a new water technology. Only the qanat could save the oasis from complete desertion such as had happened in other oases in Xinjiang due to a deficiency of water. The familiar examples are the cities of Loulan, Niya and Miran, located in the eastern and southeastern part of the Taklamakan Desert, which up to the fifth century were part of a flourishing kingdom of Kroraina (in Prakrit; Shanshan in Chinese). The abandonment of Loulan was mainly due to the failure of the Tarim River to continue supplying water to Lake Lop-nor. In the north of the Taklamakan as well, the ancient oases of Caohu, Tarim, Luntai and Yuli are now abandoned, because no solutions were advanced to bring back water to the villages and feed the crops (Berque 2005, pp. 277–80).

If the qanat had not been introduced to Turfan, the same situation would have happened there. And it worked there due to the suitable geographic conditions. The qanat must be established in a mountainous environment where there is sufficient groundwater and with space to link the system to the surface canals. The technical expertise developed over many centuries in constructing dwellings, wells and canals was available to take advantage of the favorable geography.

Can the qanat save Turfan now?

Today the qanat feeds the oasis, but cannot continue to do so into the future. Demand for water is growing, too many qanats are being built in close proximity and too many wells are being dug, thus exceeding the capacity of the ground water to keep the system functioning (Halik 2003; Lein and Shen 2006). From 1946 to 1981 in the Shanshan county of the Turfan oasis (on the east of the valley), about 1985 qanats and wells were dug [Fig. 24, next page]. The increase of wells lowers the groundwater level (Loubes 1998, p. 228): in 1949, the annual quantity of underground water reached

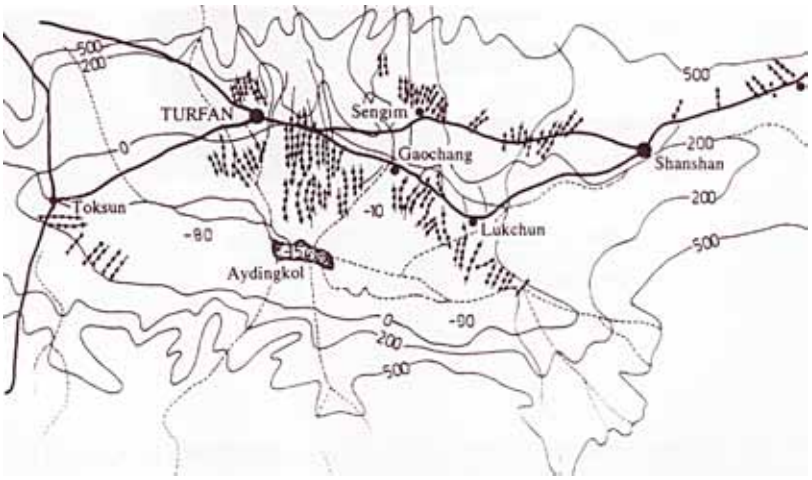

Fig. 23. Even a century ago, the qanat network in some parts of the Turfan area was quite dense. Reproduced with permission from Loubes 1998, p. 246, № 107; after the 1922 Survey of India map based on Aurel Stein's data.

2,101,300 m3; by 1985, the quantity was only 1,772,400 m3. Examples from Iran illustrate how exactly the same process has undermined the qanat system there (Qanat 1989, esp. Part III).

As Allés (2006, p. 413) puts it,

> Water is going to become in a few years a major problem in the oases [fed by the qanat system]. The local authorities announce the progressive extinction of the traditional wells (qanat), the water level being now too poor. Motor pumps are replacing them because we need to dig deeper in order to reach the groundwater level. In Xinjiang, new water systems like electronic water basins are tested in order to save these many oases gnawed by the qanat.

So it seems that very soon the people of Turfan will need to make a new choice: must they move elsewhere, or must they introduce a yet another new hydraulic system to save its beauty for the centuries to come?

About the author

A graduate student from the Sorbonne in Paris, **Arnaud Bertrand** is a specialist in the archaeology of the Xinjiang region. His field of research focuses on the ancient water systems in Chinese Central Asia and the history of the military conquest of Xinjiang under the Han Dynasty. He is now an associate curator at the Guimet Museum in Paris where he is working with Laure Feugère (official representative of the Buddhist Central Asian collections), Jacques Giès (director of Guimet Museum) and Zhao Fang (Donghua University Shanghai) on the publication of a catalogue regarding the collections of the ancient textiles discovered by Paul Pelliot in Dunhuang. After completing a year in Yale in the East Asian Department as a postgraduate, he will prepare his Ph.D. under the direction of Alain Thote (Director of Studies at the École Pratique des Hautes Etudes) and Éric Trombert (CNRS) in Paris.

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Notes

1. For a survey of the geography of Turfan see Huntington 1907, pp.254-257; Stein 1925, pp. 473-498; Maillard 1973, pp. 5-12.

2. The name Jiaohe means literally "between the rivers."

3. According to the archaeological evidence, the Jushi people, possibly Indo-Europeans, have been living in the Turfan basin since the late Bronze Age or early Iron Age (see Mair 1998, I, p. 242). On the history of Turfan before the Han conquest see Lin 2000; Luo 2009.

4. Many specialists have debated the accuracy of numbers in the official documents which tend to inflate the actual figures. On this matter see Loewe 1967; 1974.

New Evidence about Composite Bows and Their Arrows in Inner Asia

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University of Vienna

During the summer of 2008 the Mongol-American Khovd Archaeology Project excavated a cluster of eight graves at the burial ground of Shombuuziin-belchir (Miller et. al. 2009). Burials SBR-12, SBR-13 and SBR-16 yielded bow and arrow artifacts including bone bow-stiffening plates, bow-wood and arrow remains. Bow reinforcements have been found quite frequently but rarely in their original position (Sosnovskii 1946; Rudenko 1969; Davydova 1985; Tseveendorj 1989; Khudiakov and Tseveendorzh 1990; Gorbunov et al. 2006). The fact that the original position was preserved in the Khovd burials is significant for determining approximate lengths of the respective parts of the bow and allowing reconstruction of its shape. Analysis of the new finds and comparison of them with previously found artifacts advances our understanding of Inner Asian archery equipment and the development of archery equipment in general.

Evidence to date suggests that bows of this type may vary considerably in length. Rausing (1967) proposes a prototype ranging from 125–160 cm. Bone plate findings from widely distributed sites in Inner Asia indicate a length of 140–155 cm [Fig. 1].[1] The length of preserved bows from Niya and Yingpan in Xinjiang is in a similar range (142–155 cm; Hall 2005). The prototype of this bow is an asymmetrical one, the upper and lower part of the bow — and their reinforcements — being of unequal length (15–40 cm for the above-mentioned bows, Hall 2005, 2006).

The reinforcements cover the tips of the bow as well as the handle. A bow type that features reinforcement of both is frequently referred to as a "Hun," "Hunnic" or "Hsiung-nu" composite bow (Waele 2005, Hall 2006), suggesting an association that, though definitely valid, is not exclusive. This bow type may have developed in Central Asia during the 3rd to 2nd century BCE (Gorbunov and Tishkin 2006; Hall 2006), with earliest finds from the area of Lake Baikal, but was distributed across Eurasia in a way that does not indicate its use by only one people (or confederation of peoples).

The strengthening plates distinguish it from another bow type, which is similarly associated with various peoples referred to by an umbrella term, the "Scythian" bow. This bow type, best known for portrayals of its pronounced "cupid bow" shape, is notably smaller, and usually associated with smaller, bronze trilobate arrowheads featuring a socketed hafting method. A variation of this type has been found in the Tarim Basin at Subexi (Wieczorek and Lind 2007).

Fig. 1. Map of bow findings in Inner Asia. Sites mentioned in the text are: 1 Shombuuziin-belchir (SBR), 2 Khirgist-khooloi (HGH), 3 Il'movaya pad' (ILM), 4 Buryat region: Cheremukhov Pad (CHR), Derestuy Kultuk (DRS), 5 Yaloman II (Y II), 6 Subexi, 7 Yingpan, 8 Lop Nor region: Qum Darya (L.N.), 9 Niya

A composite tool set

Bow and arrow function as a composite tool: being in fact one weapon, they should

also be reviewed as such. A bow is a complex and powerful weapon with a broad range of potential applications. Precisely because of its broad application, it needs a counterpart which focuses on a narrower use. Thus, different arrows optimize a bow for use on dissimilar targets. Given the relative speed and relatively low cost of their manufacturing process and the quantity which a person may carry, it makes sense to specialize arrows for use on particular targets. Even if it is of poor quality, a bow can function effectively in shooting an arrow: "... arrow quality is normally more important [to accurate shooting] than [the] quality of the bow" (Lane 1968, p. 978).

The manufacturing of tools like bows and arrows will be influenced by a broad range of factors, not just the mechanics of the tools themselves. There are considerations involving the availability of materials and the manufacturing process, and there are contextual demands regarding the specialization for the use of the tools that are produced. Devising multi-purpose tools that have a broad application but also function effectively for specific purposes can be a challenge, and in general the various demands on the maker and by the user can conflict and thus require certain balancing or compromise.

The basic idea of a bow is a stave (acting like a two armed spring), spanned and held under tension by a string (McEwen et al. 1991). In the discussion which follows, I will refer to the bow handle, extending from which are the limbs, at the end of which the string is attached. The belly of the bow is the inside (facing the archer); the back is the outside. Drawing the bow applies different forces to different parts of the bow. With the bending of the limb, the belly is placed under compressive forces while the back is placed under tension. Drawing the bow increases the force continuously and, for a long, rather straight-limbed bow, results in a nearly linear *force-draw curve*. Changes in bow shape (e.g. reflex of the limbs, set-back at the handle, rigid end pieces) change this force-draw curve, leading to a steeper initial increase and a much more moderate one at the end of the draw. This is important, as aiming takes place at full draw where a maximum of energy must be employed to hold the draw and could, if excessive, damage accuracy. This force in fully drawn position is called the draw weight of the bow. (Klopsteg 1943, Kooi 1983, Kooi 1996). By loosing, the energy input accumulated in the limbs of the bow is (partly) transferred to the arrow, which, if constructed and cast (shot) correctly, will fly along the line of aim and transfer the remaining part of that energy to the target.

It is important to understand that the flight characteristics of the arrow are equally determined by the properties of the arrow and by the bow with which it is shot (Klopsteg 1943). The quality of the cast is a crucial factor that defines the functionality of both tools. To produce a powerful and accurate cast, the energy transfer, both from muscular effort to stored energy and from that to the arrow, must be optimized, and the act of discarding can not be detrimental to accuracy. Yet optimization means not only achieving a maximal cast by minimal energy input, but also achieving it by minimal material input – which is "a compromise between using as little material as one *dares* […] and using as much as one *must*, to avoid the hazard of breakage" (Klopsteg 1943, p.181).

Bow types

Bows can be described by their structural composition as well as by their shape (profile). While the first characterizes a bow by the used materials and their relative positions, the latter also reflects their exact arrangement. As similar shapes can be reached through different structural compositions and one kind of composition can result in different shapes, both approaches are used to describe unambiguously a bow. All types of bows deal with the same structural requirements and address the same mechanical problems to achieve a common goal — to propel an arrow with the necessary amount of force and speed for the intended purpose.

There are different ways to deal with the forces placed on the different parts of the bow. A bow may be made of different kinds of wood — or, for example, of harder heartwood for the belly and more elastic sapwood for the back. Other possible materials used to construct the bow or reinforce its stressed parts need to have a high capacity for withstanding the tensile and compressive forces without damage to the limb. A bow constructed of different pieces of the same material is called a *laminate* while a bow made up of different materials can be called a *reinforced*, *backed* or *composite bow* (Rausing, 1967).

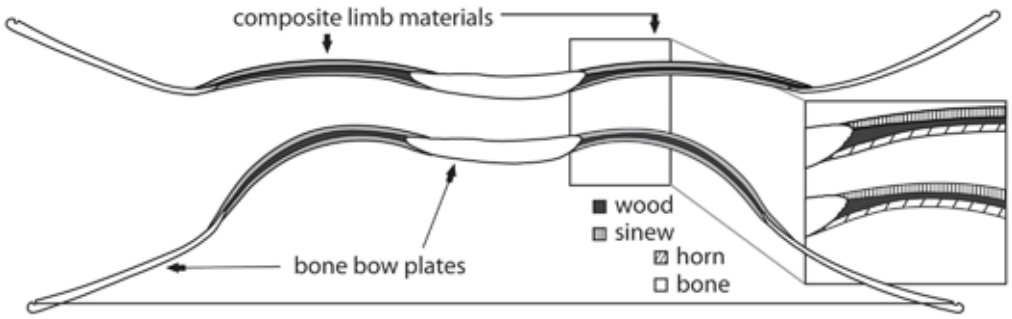


Fig. 2. Composite bow construction. Relative positions of horn, wood and sinew in a bow, with bone bow plates from SBR-16.

Backing is material applied to the back of the bow and can be of two types. While in a *reinforced bow* a string or (plaited) strands of sinews are lashed onto the back of the bow ("free" backing, used for example by the Inuit), a *backed bow* is reinforced by a whole layer of material that is firmly attached (glued) to the back ("close" backing; Balfour 1980, Kooi 1983). A composite bow features not only a close backing but several layers of different materials, held together using an adhesive (like hide- or skin-glue). This usually includes material applied to the belly of the core ("facing"; Kooi 1983).

In its full form the composite bow comprises the following materials [Fig. 2]:

- A wooden core, which gives the construction the necessary dimensional stability.
- A material bearing compressive loads; usually horn, with a maximal strength of 13 kg per mm^2 (which is twice to 3.5 times that of hardwood; Mc Ewen et al. 1991, Bergman and McEwen 1997). It also has a high coefficient of restitution (the ability to return to original shape after distortion). Most commonly water buffalo horn is used (Mc Ewen et al. 1991), though the use of horn of the fossil rhinoceros is not unheard of (*B. tichorhinas*; Balfour 1980). Another material with similar properties is baleen.
- A material handling tensile stress, usually sinew, which has a high tensile strength of 20 kg per mm^2 (four to five times that of wood; McEwen et al. 1991, Bergman and McEwen 1997). (Unspun) silk can also be used, replacing "a larger mass of wood than its own" and storing more energy per unit mass (Klopsteg 1943).
- Adhesives derived from hide, sinew, or fish-bladder (McEwen et al. 1991).
- A stiff material like bone or antler for reinforcement laths; other materials include hardwood and horn (Rudenko 1969). I would treat references to the latter with care as, especially in translated works, horn and antler are often confused.

By employing different materials for the parts most stressed, it is possible to maximize the benefits of having an easily handled short bow which nonetheless will be strong and very efficient in the transfer of energy. In the case of self-bows, made only of wood, shortening the bow-length results in a loss of draw-length, as the limbs can be bent only to a certain extent before damage occurs. A composite construction allows for a smaller bow-length while retaining the long draw without increasing the risk of breakage. The limbs in such a reinforced bow can be bent over a smaller radius, withstanding the stronger tension at the back and stronger compression of the belly. Additionally, shorter, lightweight limbs use less energy when moved forward with the release of the string and thus move over a shorter distance with greater speed. This results in higher arrow velocity (Bergman et al. 1988, McEwen et al. 1991, Alex and Menes 1995). Since the combination of the horn, sinew, glue and bone is roughly twice as heavy as an equivalent of hardwood, in the interest of building limbs and especially their ends as lightweight as possible, the amount of material used should be reduced to a minimum (Alex and Menes 1995). Another factor contributing to the recovery speed of the tips and thus to the velocity of the arrow is the backing of the bow — to connect the ends of a stave with a mass of elastic material running along its back makes the mass act like an elastic string. Drawing the bow will stretch this "ribbon"; release will lead to rapid contraction, which will "increase the speed with which the stave regains its state of rest, and thus the cast of the bow" (Rausing 1967, p.19).

The reinforcements used in a bow alter flexibility and stiffness, and their length affects efficiency. Stiffening the handle is crucial for

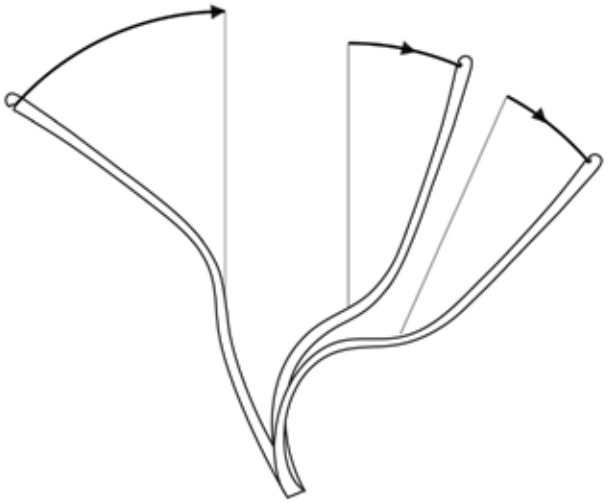


Fig. 3. Contribution of limb and rigid end pieces to movement of the tip. Bending of the limb moves the center point of the "large-diameter wheel" (shown in segments).

stability reasons. This is done using a (bone) rod for each side of the handle (*central side lamination*) and in some cases another item covering the belly side of the handle (*central belly lamination*). "Altering the relative zones of flexibility and stiffness" can alter considerably the strength of the bow (Khudiakov and Tseveendorzh 1990, p. 364). If the zones of stiffness are extended, when for example longer central side plates are applied on top of existing shorter ones, the radius over which the limb bends is smaller. Therefore the bow is heavier to draw. Stiffening the tips is not done so much for stability, but to make shooting more efficient. The stiffened ears, often set at a recurved angle, produce a lever at the end of each limb, acting like a "large-diameter wheel" (McEwen et al. 1991, p. 56), which "unrolls" when the bow is drawn [Fig. 3], thereby lengthening the string. Hence less effort is needed fully to draw the bow. As release shortens the string accordingly, the velocity of the arrow increases. The longer the stiffening plates the larger the diameter of the "wheel," which can result in unstable construction and loss of energy from moving the heavier weight of the limb ends.

The bow remains found at Shombuuziin-belchir

In situ position of the bows

In the largely undisturbed tombs SBR-12 and SBR-13, the bows were lying alongside the skeletal remains. It is notable that in SBR-12 the bow was placed to the left of the buried person and in SBR-13 to the right, which coincides with the muscular markings of the interred (Miller et. al. 2009). That is, the bow placement was at the side on which the bow would have been used.

The position of the stiffening rods in SBR-12 [Fig. 4] implies interment in an unstrung state (the belly facing upward with a tilt to the side;

Fig. 4. SBR-12. Image copyright © 2009 Mongol-American Khovd Archaeology Project.

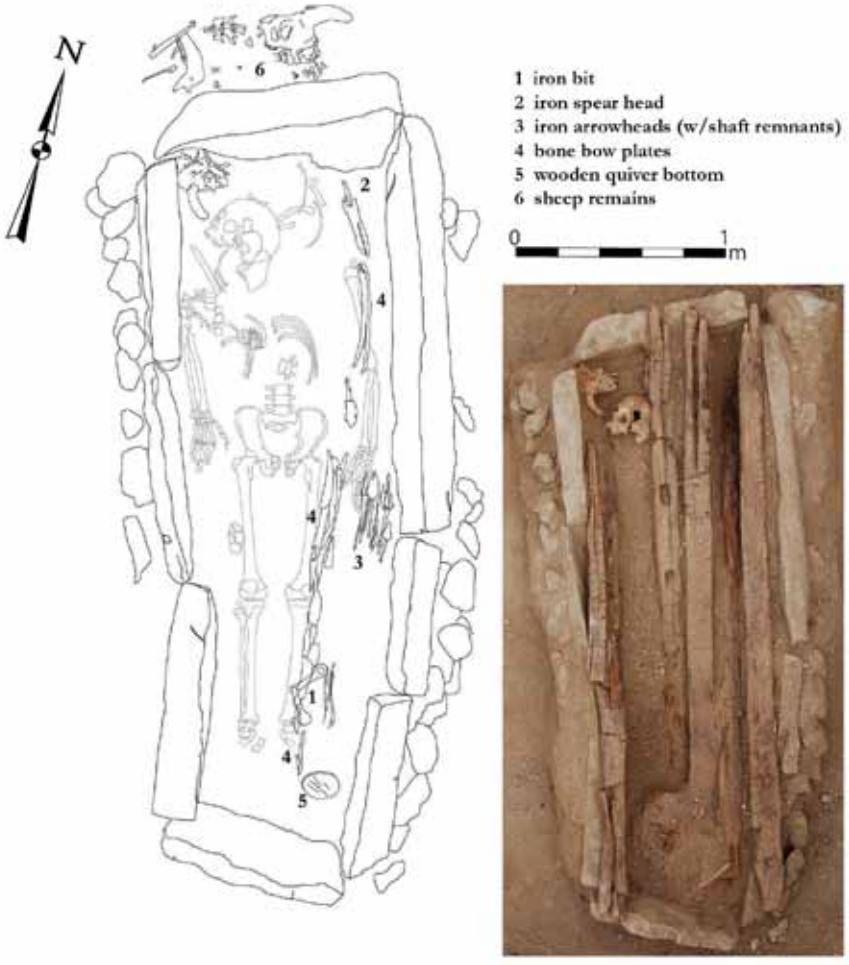


Fig. 5 (above). SBR-12 waist area with arrowheads and bow pieces in situ.

Fig. 6 (right). Wooden handle piece with wooden inset. Another, similar structure can be seen at 7 cm distance from the other inset.

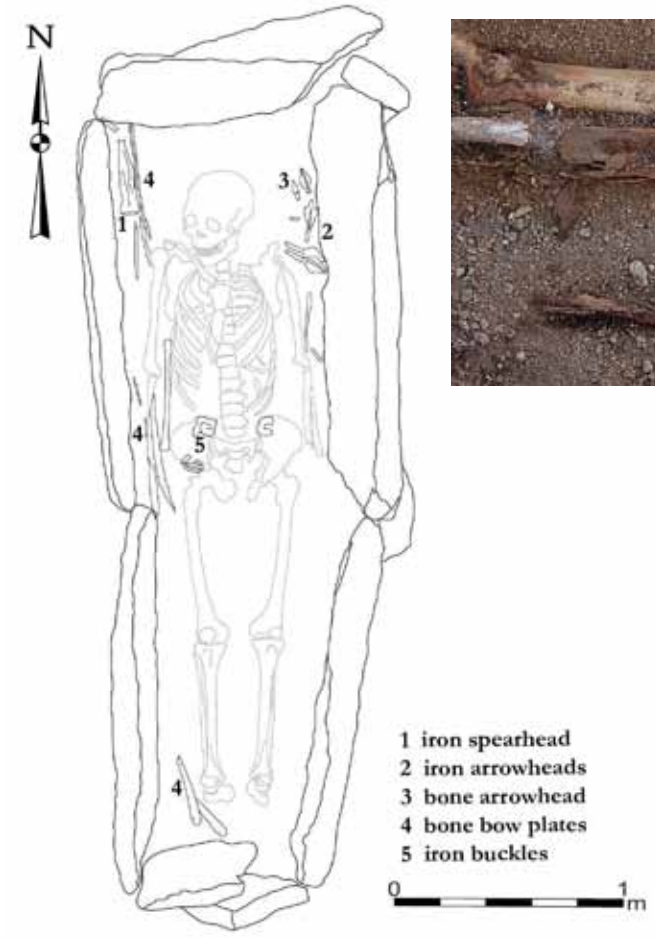


Fig. 7. SBR-12: Preserved wood from the lower limb.

Fig. 5) and a length of 30–40 cm for the working part of each limb. The distance between the endplates was about 150 cm. The remains of the wooden core feature at least a small hole with a wooden insert [Fig. 6]. This could indicate that the core was of two pieces, joined at the handle by pins on its side. Such limb splicing can be seen in examples such as the Yingpan bow no. M30 and makes sense especially in regions where good bow wood was not abundant. The limbs were at least 4 cm wide, as indicated by the preserved amount of wood of the lower limb [Fig. 7].[2]

The bow in SBR-13 [Fig. 8] was also interred unstrung and lying on its back. Since the lower section showed signs of disturbance (possibly by a rodent), the only indication for bow length was the upper half of the bow. Unless it was an asymmetrical bow it would have been at least 160 cm long, with a working limb of about 30 cm. The limb narrows towards the endplates to leave them only 0.1 cm apart [Fig. 9], showing that the bone rods probably reached beyond the wooden core.

Fig. 8. SBR-13.

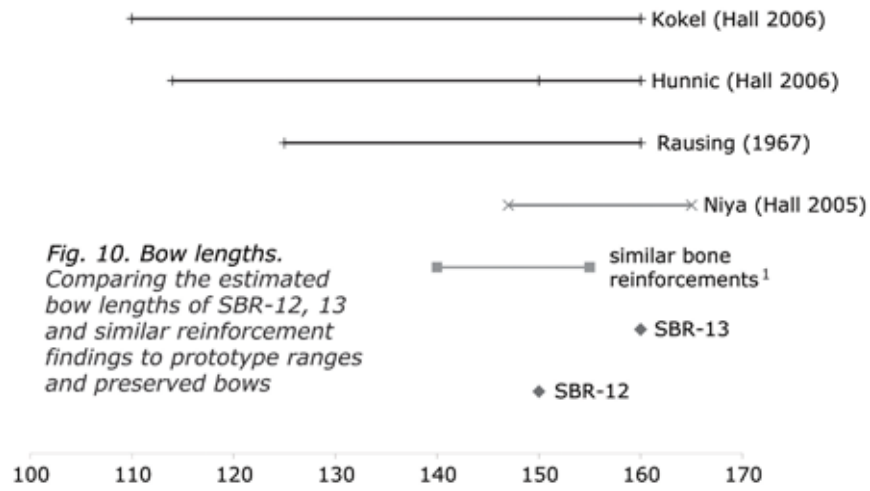


Fig. 10. Bow lengths. Comparing the estimated bow lengths of SBR-12, 13 and similar reinforcement findings to prototype ranges and preserved bows

Fig. 9. SBR-13: In situ positions of the upper end-plates.

Fig. 11 (right). SBR-12 central side piece with polished outside and hatching on the side and at one end. Tool impressions can be seen at the thinning end (detail).

Fig. 12 (above right). Composite construction of a SBR-12 side plate.

Fig. 13. SBR-12 endplate tip with U-shaped string incision.

Both bows, though not unusually long for their type, are the upper length range compared to similar findings [Fig. 10].

A description of the bow plates

Common features. The inside of the plates is completely hatched and roughened to facilitate gluing to the wooden core; the outsides are partly hatched, and otherwise highly polished [Fig. 11]. In the case of double central side plates the outer surface of the inner plate pair was roughened accordingly as well. In addition to the strongly incised hatching marks, much finer imprints could be discerned on the surface of some of the plates. The very thin, parallel lines resemble imprints made by pliers or a file [Fig. 11 above; Fig. 14 below].

Some of the plates were not made of a single bone piece but of two to three overlapping pieces, thinning out to match (composite plate construction; Fig. 12).

Fig. 14 (below). SBR-16 endplate with string furrow and tool markings.

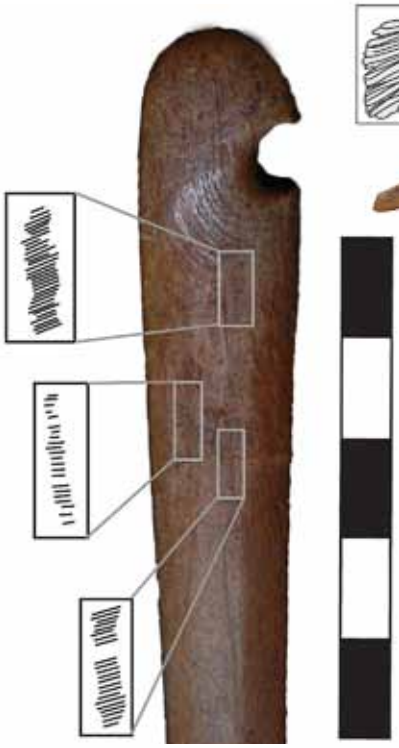
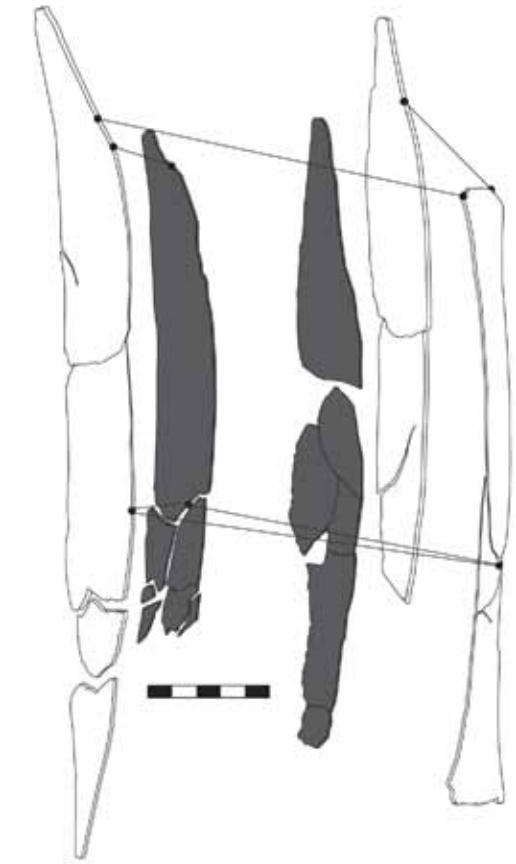


Fig. 15 (above). SBR-13 handle laminations featuring parallel incised lines on the edge and vertical hatching on the central belly piece.

Fig. 16 (below). SBR-12. Handle construction of five plates.



- The endplates are narrow, slightly to markedly curving laths, featuring rounded notch ends with U-shaped incisions for the string 0.8–1.2 cm from the end [Fig. 13, previous page]. They taper towards the lower part and have a plano-convex section. The backside was diagonally hatched and roughened. Some specimens exhibit a furrow near the notch, probably worn by the bow string [Fig. 14; Fig. 18 below].

- The handle consists of segment-shaped central side laminations and a slightly hourglass-shaped central belly lamination [Fig. 15]. The cross-section of the central laminations is convex with slight flattening at the ends (more marked in the belly application). There are shaping marks on the edges of the central side laminations (parallel incised lines, probably for gluing as well), and visible roughening (horizontal hatching) of the surface for lashing of both ends. The central belly lamination shows outside hatching only on the ends where they start flaring out from the body.

SBR-12. This bow featured at least nine bone plates: two pairs of endplates, two pairs of central sides and one central belly lamination.

- Endplates. The lower end lamination pair was highly fragmented, but one of them could be reconstructed, giving a total length of 31.5 cm. One fragment of the other lamination shows thinning, indicating a composite plate construction. The upper endplate pair was about as long as the lower pair and exhibits a string furrow.

- The handle consisted of two plates on each side, placed on top of each other and the belly piece [Fig. 16]. The central belly plate and outer central sides were made of two pieces each; the most complete central side had a length of 38.0 cm. The inner central side plates were in a more fragmented state, with considerable loss at the ends. They too exhibited shaped edges and lashing marks.

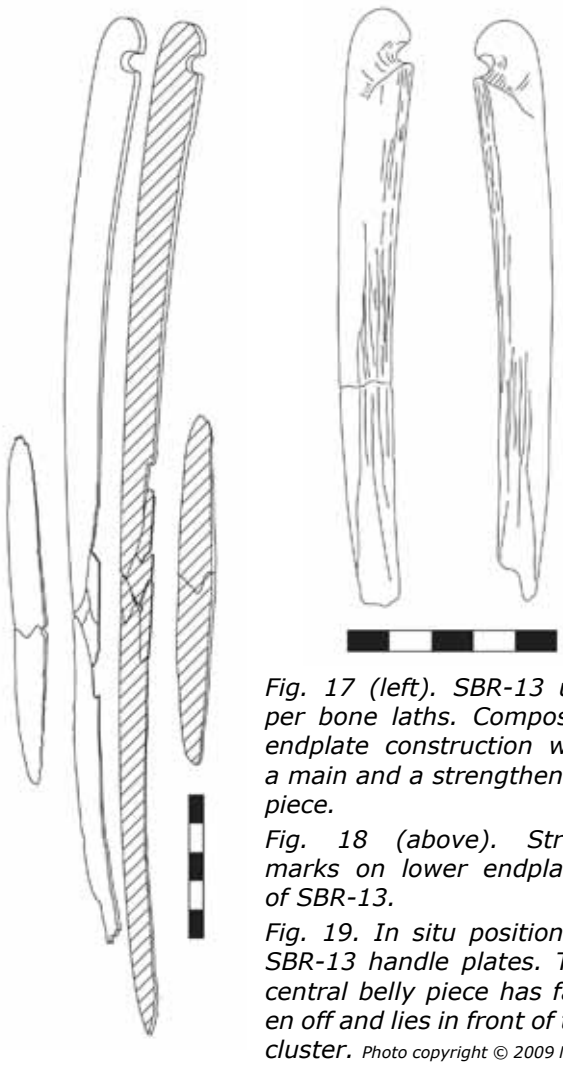


Fig. 17 (left). SBR-13 upper bone laths. Composite endplate construction with a main and a strengthening piece.

Fig. 18 (above). String marks on lower endplates of SBR-13.

Fig. 19. In situ position of SBR-13 handle plates. The central belly piece has fallen off and lies in front of the cluster. *Photo copyright © 2009 Mongol-American Khovd Archaeology Project.*

SBR-13.

• Endplates. The upper endplates of SBR-13 are each made of a main piece, thinning out in the middle (from 0.41 and 0.49 down to 0.11 and 0.19 cm respectively), to be strengthened by a second smaller, oval plate [Fig. 17]. The lower endplate pair was found in fragments, with parts missing from the mid-section. Presumably due to the loss, it is shorter than the upper pair (38 cm). The two main pieces both show string furrows [Fig. 18]. Some fragments show marks of thinning; both plates seem to have been strengthened with additional plates.

• The handle [Fig. 19] consisted of a central belly piece and several central side fragments constituting two central side plates. Reconstruction of the central side pieces indicates a handle length of slightly more than 35 cm. The surface is very aged; marks of use or crafting can only be seen at the edges. In addition to those central side plate fragments, three (fragmented) bone pieces, which by their shape can belong to neither of the mentioned plates, were found within the handle cluster, suggesting there had been additional reinforcement to the handle.

SBR-16. Due to looting, its plates were found in a random position.

• The endplate pair found north of the coffin had a length of 38 cm, the other pair being shorter (34 cm). Three of the four plates were without significant losses and exhibited a string furrow, the longer pair showing parallel cutting marks and dark staining.

Fig. 20. SBR-16. Composite side plate construction of three pieces.

• The handle remains consist of one central belly lamination and at least two central side laminations, one of which was thinning at both ends. This piece could match two other plate pieces (also showing thinning at their ends) for a segmented plate construction [Fig. 20]. There is another central side fragment present, as well as one similar to the end of a central belly lamination. A third fragment features a roughly circular perforation and horizontal cutting marks. Those pieces and especially the last cannot definitely be attributed to this bow, or any bow at all.

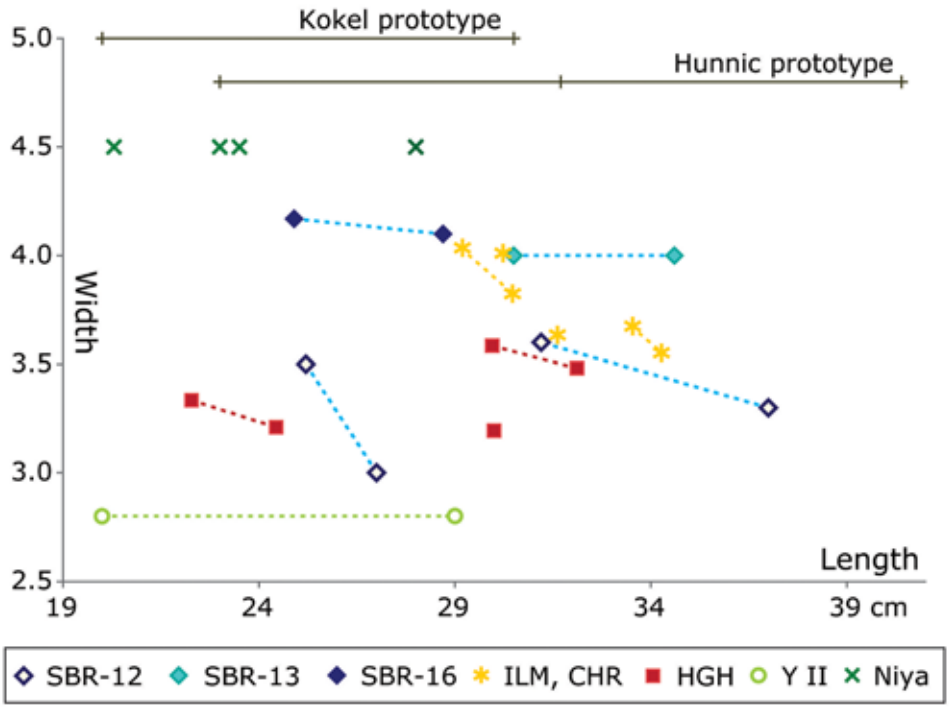


Fig. 21. Central side width-length ratios.

Connected dots indicate plates belonging to one set. Comparing the SBR-side plates shows handle length to be comparable to the "Hunnic" prototype while being longer than in the Kokel prototype (plates lie in range due to loss) and the findings of Y II and Niya.

For more information on the samples see Konovalov 1976 (ILM and CHR), Khudyakov and Tseveendorj 1990 (HGH), Gorbunov and Tishkin 2006 (Y II), and Hall 2005 (Niya). The Niya sample only recorded length measurements, like the prototypes (Hall 2006), they can not be compared to the other data points in width.

Comparisons. Compared to the range of lengths for bow-plates of this type (Hall 2006) the central side pieces of SBR-12 and 13 cluster around the average, while SBR-16 belongs to the lower range [Fig. 21]. The endplates of SBR-12 lie in the center of their range while SBR-13 and 16 are situated in the upper range [Fig. 22]. Interestingly, though of a greater overall length and with longer endplates, bow SBR-13 has a shorter handle than that in SBR-12 [Figs. 21, 23]. Another difference between the SBR bows and the prototype drawn up by Hall is the nearly symmetric design of the formers' endplates. A variation of his prototype is the Kokel design (Hall 2006), which though symmetric, differs from the SBR bows in having rather short side plates (only SBR-16 and the inner central sides

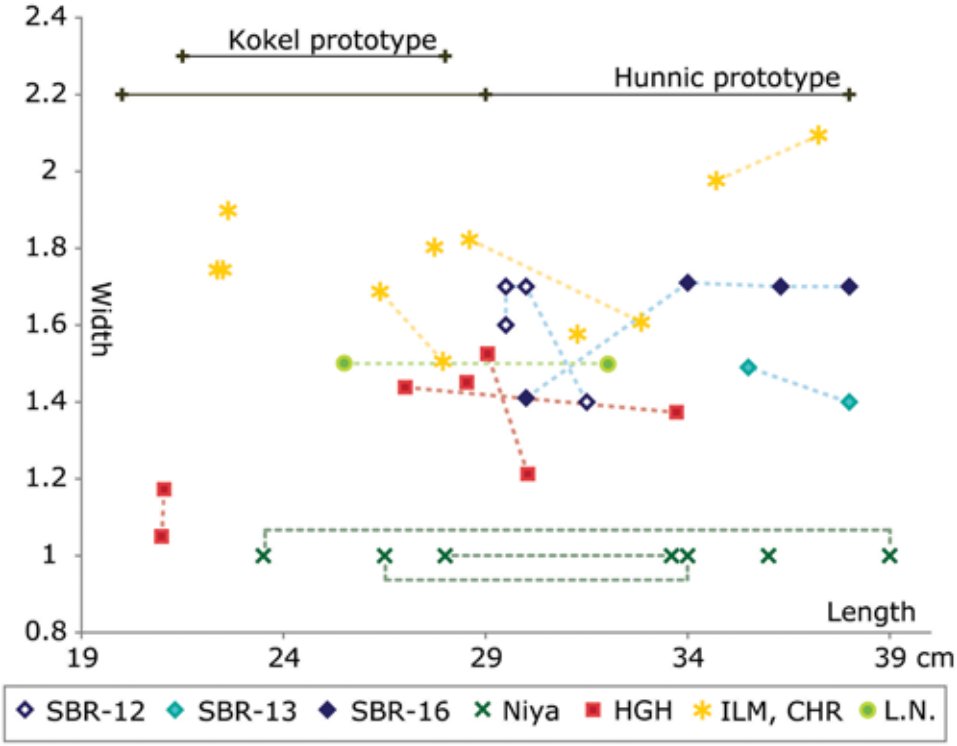


Fig. 22. Endplate width-length ratios.

Connected dots indicate plates belonging to one set. SBR-endplates are in the same range as those of ILM, CHR, Niya and the "Hunnic" prototype and far longer than in Kokel bows. Increase of endplate length amplifies their leverage-effect. Reference samples see Fig.21 and Bergmann 1939 (L.N.). Niya plates and prototypes are only valid for length comparisons.

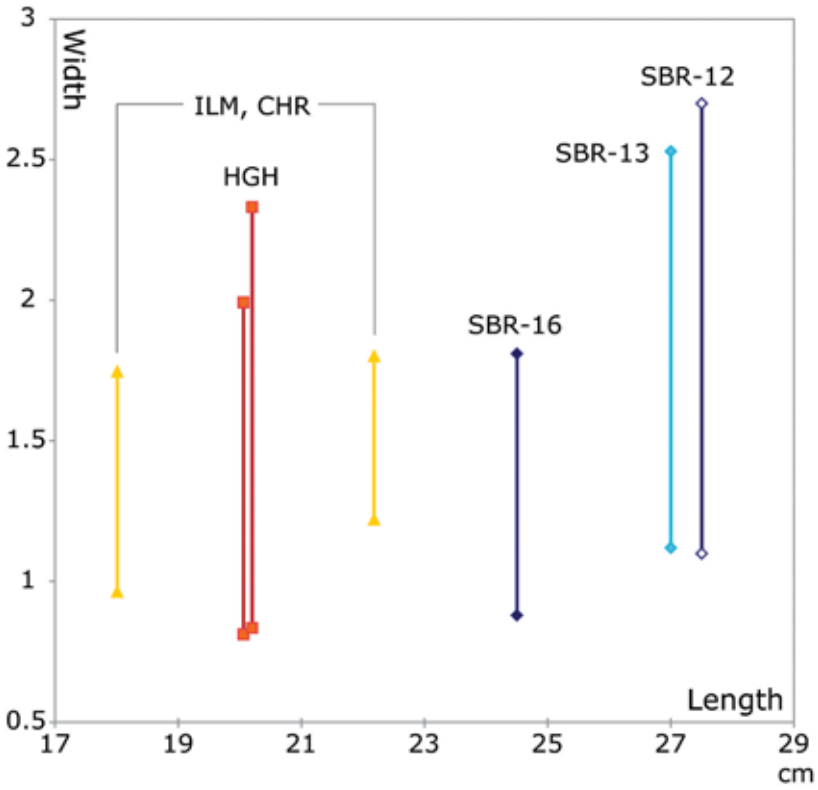


Fig. 23. Central belly width-length ratios. Connected dots represent the amount of tapering in one specimen. Wider tapering indicates a wider limb compared to the handle (smaller value represents handle width at its center, while the greater value reflects the width of the handle limb transition). SBR central belly pieces are longer than compared pieces of HGH, ILM and CHR (references see Fig. 21). They also taper more strongly than ILM and CHR specimens.

of SBR-12, which lack a fair amount of material, lie in the range). Bows found at Niya (Hall 2005) likewise have rather short side plates compared to those of SBR. However, the endplates of the SBR bows, while in the same range as those of Niya, are far longer than in Kokel bows.

Analysis of the SBR bows

Construction and materials

The construction technology employed in building the SBR composite bows was widespread throughout Eurasia. Evidence for its use is provided also by its appearance in a passage in the *Zhou li* which gives detailed instructions about which materials to use (what kind of wood, horn, glue, sinew), how to discern their quality, when to obtain them, how to work them and what effect they will have on the bow. "The bow stave is to give the bow distance. The horn is to give it speed. The sinew is to give it penetration. The glue is to bind it." (*Zhou li*, 6A1, Selby 2000, p. 91). This shows the internal construction to be uniform, though it also denotes a difference in finishing: "The silk is to give it strength. The lacquer is to proof it against moisture." Silk and lacquer could be substituted by available materials like sinew, leather or birch bark in other areas. The remains of some form of binding are preserved on the outer central side pieces of SBR-12, as can be seen in Fig. 24, which also indicates no full covering was used.

The SBR bows used bone and wood and some form of adhesive substance, even though the latter's presence cannot be proven. Even though horn is not often preserved, it has been documented for roughly contemporary bow findings of the Tarim basin (Miran — Hall and Farrell 2008; Niya — Hall 2005; Qum-Darya — Bergmann 1939; Subexi — Wieczorek and Lind 2007; Yingpan - Ma and Yue 1998; Hall 2005). Being readily available in a society of pastoralists it was probably used here too.

Fig. 24. SBR-12 central side plate with lashing remains. This residual band was matching the one on the other outer central side piece, indicating that it indeed was a form of wrapping around the handle.

The variation in the use of handle laminations (a possible absence of the central belly plate, and in our case the varying number of central sides) reflects general modification of bow design, the adoption of specific techniques to correct material weaknesses and the availability of materials (Khudiakov and Tseveendorzh 1990). Such considerations would explain the composite plate constructions we found and the different construction of Yingpan bow no. M30, which seems to feature short, slightly curved intermediate plates attached to the limbs in between handle and endplates (Ma and Yue 1998, Hall 2005). Similar intermediate plates are also mentioned by Tseveendorj (1989), but without detail on material or position. In the case of disturbed graves, we cannot always be certain whether there were stiffening rods, and it is important to recognize that laminations may be manufactured of horn or hardwood (an example is the Yrzi bow; Brown 1937), which survive rarely.

It is not possible to deduce whether the central side plates in SBR-12 were doubled to alter the strength of the bow or to smooth out material problems occurring with the inner central side plates. Nor can we be certain whether this construction of four central sides was planned initially or the result of later alteration. In either event, when the outer central sides were attached, the inner plates were manipulated (thinned and roughened) accordingly.

Shape

Bows having the same composition may vary considerably in shape and thus be difficult to reconstruct only on the basis of their remains (Brown 1937). For an approximation of true shape, it is critically important to know the positions of the stiffening rods. The shape of those reinforcements by themselves does allow some limited inference: In SBR-12 and 13 the endplates are gently curving over their whole length (moderate recurve), while in SBR-16 the upper parts of the laths are near to straight. The bases of the latter show a more marked curvature [Fig. 25], suggesting that the recurve must have been somewhat more pronounced than in the case of the other two bows.

The compressed semicircular shape of the central plates and the positions of the bows in graves SBR-12 and 13 — lying on the back, endplates and handle pieces about level — suggests that there was neither a strong reflex of the limbs, nor a definite set-back of the handle. In their unstrung state the bows resumed a gently curved, near-to-straight shape similar to the "Qum Darya bow" (Rausing 1967). This too would differentiate them from the bow type mentioned in the *Zhou li*, which when drawn back "[…] comes round in a circle, and when unstrung, […] does not lose this basic form [but] settles back into a circle" (6A15, Selby 2000, p.96). Were this the case with the bows found in SBR, the positioning of the plates would have to have been different.

Getting to the point — Choosing an arrow for that bow

The special mechanical requirements which must be addressed in constructing an arrow relate to the three stages of its flight: internal ballistics (acceleration by the bowstring), external ballistics (flight) and ballistics of impact (Kooi 1983, Sudhues 2004). For the arrow to be effective requires careful synchronization between its characteristics and that of the bow for the first stage of arrow flight.

To understand this, consider briefly what happens when the archer releases his shot. The bowstring moves forward in the median plane of the bow, yet the arrow is given a lateral impulse by the side of the bow, which makes the arrow curve around the handle.[3] It then continues to oscillate from side to side in flight. Where the characteristics of the bow and arrow have been properly matched, the tail of the arrow when released bends away from the bow

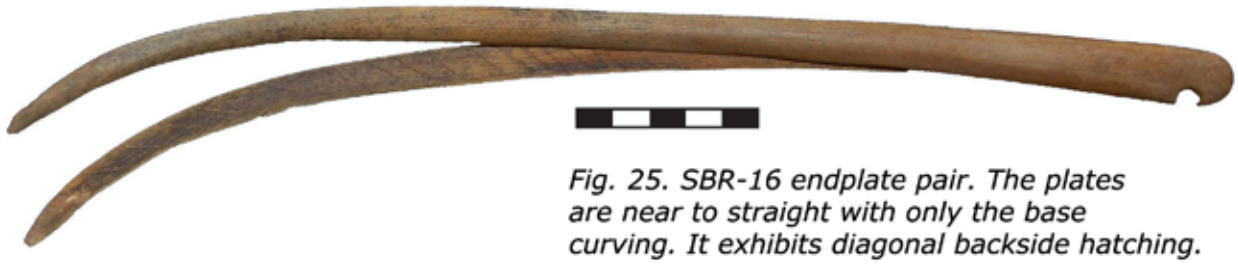


Fig. 25. SBR-16 endplate pair. The plates are near to straight with only the base curving. It exhibits diagonal backside hatching.

and never touches it, thus not deflecting the flight or damaging the arrow (Klopsteg 1943).

The rigidity and mass of the arrow are important characteristics which affect its flight and effectiveness. The stiffness, or *spine,* of the shaft depends on the properties of the wood and its overall dimensions — the shorter the shaft, the stiffer the arrow. If the arrow is too stiff (too much spine), it cannot bend correctly and deviates from the line of aim; if it is too soft the rear end might strike the handle (again causing deflection) and the flexing will continue too long, which takes energy out of the flight or even damages the shaft. As a more powerful bow induces greater flexion as well as more stress, the shaft of its arrow must be stiffer and thicker (Kooi and Sparenberg 1997); otherwise it is liable not to fly true or to break either on impact or even directly after releasing (Klopsteg 1943, Kooi 1983, Sudhues 2004).

Arrow mass is an important factor in matching bow and arrow: Energy transfer from the bow to the arrow is more effective using a heavy arrow than using a light one. A lighter arrow has the advantage of increased velocity with consequent flat trajectory, which is advantageous for precise aiming and enhances flight distance. However, due to the smaller energy input, the energy available both for overcoming air resistance and penetration on impact is reduced (Klopsteg 1943). To offset this, an archer may use a stronger bow, which consequently requires the use of a more massive shaft. Using a stronger bow to increase arrow velocity is limited by the fact that the exertion required to hold at full draw may be incompatible with accuracy. Arrow mass as well as mass distribution are affected most of all by the weight of the head. Increased mass at the tip introduces greater stress and effectively lowers the spine (Sudhues 2004). A heavier head therefore requires a more massive shaft.

Flight properties are affected by many other factors: Arrow length and diameter determine surface area and resistance (Rheingans 2001). Tapering/barreling the shaft may improve range. Fletching too has a significant impact: Longer vanes stabilize the arrow more quickly, yet they decrease its range by increasing air drag and lead to cross-wind susceptibility. Offset positioning of the vanes (rifling) and the natural properties of a feather (natural warp and rougher underside) make the arrow rotate in flight, thus smoothing out unbalances and compensating for some lack of straightness or symmetry (angular momentum stabilization) (Klopsteg 1943, Bergman et al. 1988, Sudhues 2004, Haywood 2006).

On impact the remaining energy is transferred to the target and the arrow is stopped. While the arrowhead is slowed down immediately, the shaft is moving forward a bit longer. Thus, it is compressed and bends (if excessively, damaging the shaft) with a shaking, jouncing motion. This induces a sideways, cutting movement if the arrow is equipped with a sharp blade. The spin of the arrow is greatly dampened on impact but can be partly retained depending on the target, leading to a spiral arrow channel. (Sudhues 2004). Certain arrowhead designs use this rotation to maximize tissue damage.

The arrow finds at Shombuuziin-belchir

Complete arrows are rarely found, since the wood may be preserved only in a special environment. Thus the heads are frequently the only surviving pieces. While this was largely true in the case in our findings, in SBR-12 considerable shaft remains were conserved by their proximity to the iron. The original arrow length can be deduced from our finding the bottom of a quiver (an oval wooden disk) about 75 cm from the cluster of arrowheads [Fig. 26]. Thus the arrows were placed in the quiver tips up. Arrow length is in most cases matched to the drawing length of the bow, so that the arrow can be drawn to the point, though exceptions exist (see Paterson 1984). As the drawing length is related to arm length this conveys some information on the archer.

All but one arrowhead had been manufactured of iron. Like the bone bow pieces they constitute such a small sample they can not be taken

Fig. 26. In situ position of the oval wooden disk.

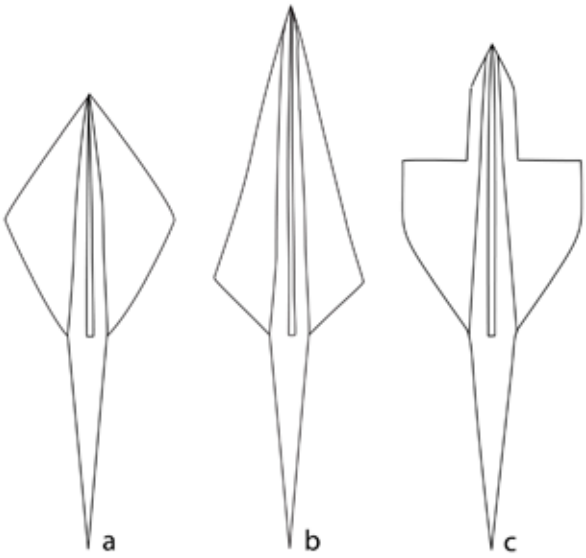


Fig. 27. Iron arrowhead types present at SBR. a) triangular blade shape with the widest point at the center, b) triangular blade shape with widest point near the base, c) tapering blade shape.

as representative. Yet they do give an idea of the variation in arrowheads. Most of them were strongly corroded, some additionally fragmented, which makes it difficult and in some instances impossible to determine their original shape. Thus, all measurements but especially those of thickness, have to be treated with care.

All the iron arrowheads which were in a state to be judged are tanged, trilobate arrowheads.[4] Other than the number of cutting edges and hafting method, several characteristics can be employed to differentiate arrowheads: the shape of the blade, including the curvature of the cutting edge and the presence or absence of barbs, the way the wings join with the tang/socket and the position of the widest point (or *point mésial*) of the blade (Mouton 1990, Delrue 2007).

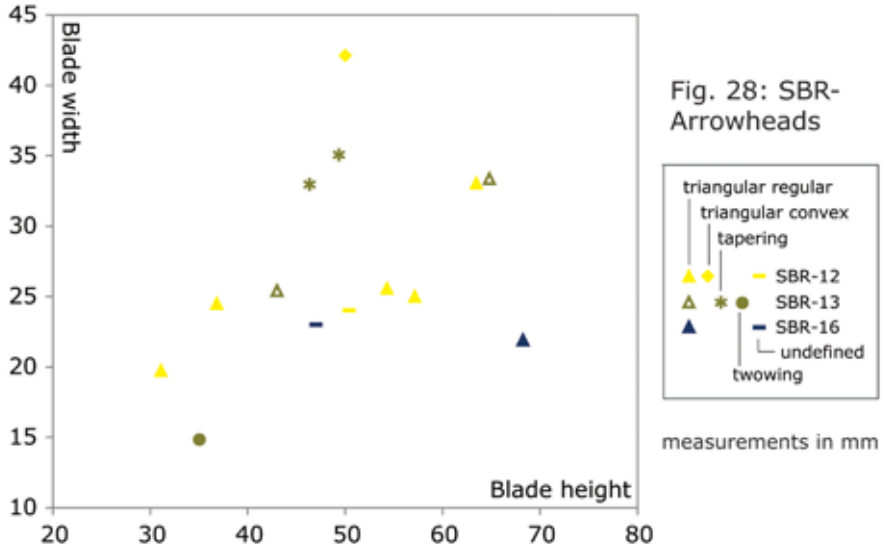


Fig. 28: SBR-Arrowheads

Fig. 28. Width-length ratios in SBR-arrowheads. Varieties in size can be seen in each set. Blade width is mostly proportional to blade length, only one triangular concave piece being exceptionally wide (12a) and one triangular specimen (16) being relatively long.

In the present sample the wings broaden from the tip either to a point after which they recede to form the base (Type A, triangular, Fig. 27a, b) or broaden slightly to a certain width only, subsequently running roughly parallel to the longitudinal axis to jut out sharply and reach the maximal width after which they recede into the base (Type B, tapering, Fig. 27c). The blades range from 3.1 to 6.8 cm in length and 1.4 to 4.2 cm in width [Fig. 28].

Most of the present arrowheads are of a triangular blade shape with a rather straight cutting edge and the widest part of the blade at its base or close to it (distance to the base is less than 1/3 of the arrowhead length). One other specimen (12a, Fig. 29), being more leaf-shaped, features a triangular blade shape with convex cutting edges and the widest part of the blade closer to its center (slightly more than 1/3). It also exhibits the widest blade compared to its length (5/6 as wide as it is long). The only distinct piece of SBR-16 meanwhile featured the longest blade [Fig. 30]. Most pieces of triangular shape were 3/5 to 4/5 as wide as they were long.

Only one definite example of a tapering blade shape was found, where the widest part of the blade is at its center (13c, Fig. 31). This often (though not always) seems to be the case with arrowheads of this shape (for comparison, see Fig. 34 below; Konovalov 1976). This specimen as well as one of either tapering or triangular-concave blade shape (13b) are nearly 3/4 as wide as they are long.

Aside from the iron pieces, a single bone

arrowhead was found in SBR-13 [Fig. 32]. It is an exceptional piece not only because of its material but also because of the hafting method used (equipped with a socket) and its shape (oval section, slim body with relatively parallel sides, the

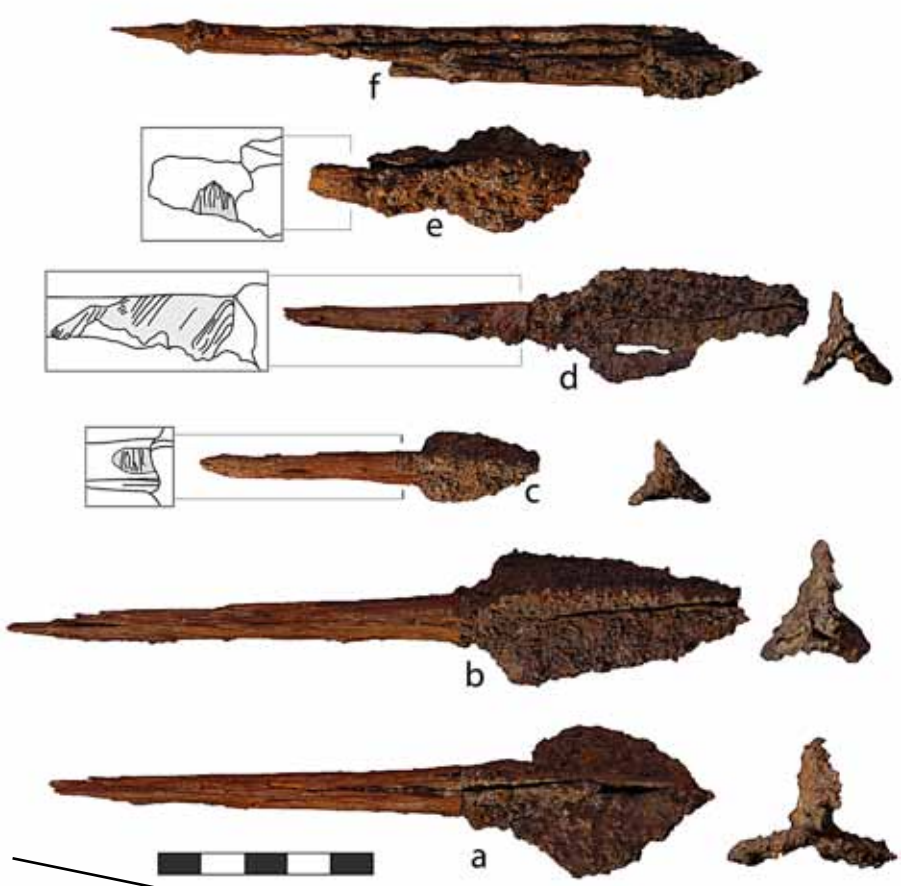


Fig. 29 (right). SBR-12 arrowheads. Lashing marks can be seen on c, d and e. Corrosion can be seen through cracks in the shafts.

Fig. 30 (below). SBR-16 arrowhead. While being the longest arrowhead from the SBR-sample it is rather slim.

Fig. 31 (lower right). SBR-13 arrowheads. Lashing marks can be seen on a and d.

Fig. 32. SBR-13 bone arrowhead. The outer socket diameter is oval while the inner is slightly squared.

Fig. 33. SBR-12 shaft remains with preserved lashing.

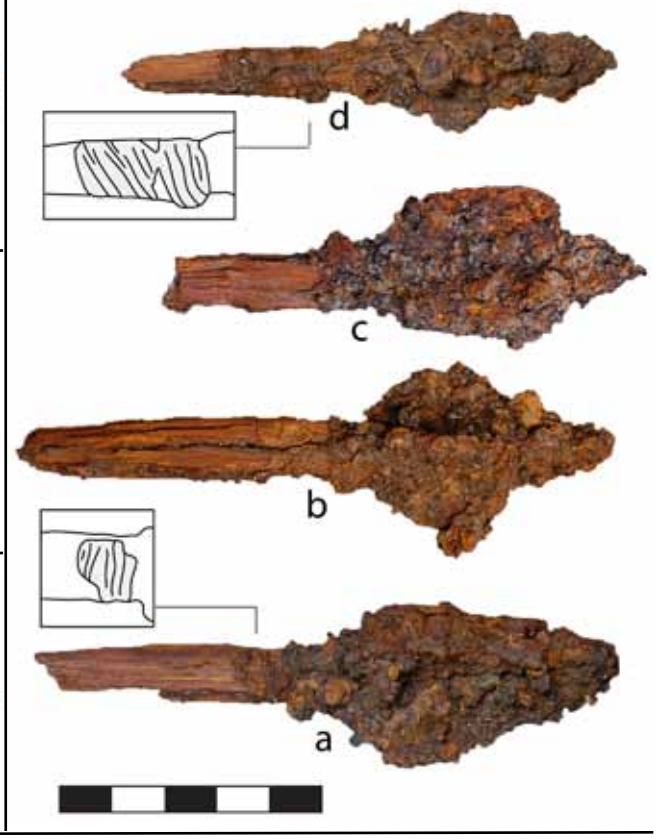


Fig. 32 (above) and Fig. 33 (below).

blades smoothly joining the socket). It is the slimmest arrowhead from this sample.

In four instances in SBR-13, and three instances in SBR-12 lashing marks have been preserved on the shaft fragments [Figs. 33, 29, 31, previous page]; the minimal extent of the lashing ranged from 2.3 to 4.0 cm measured from the base of the arrowhead. The minimum length of the tang varied from 3.8 to 9.3 cm.

Comparisons. Most of the pieces in the sample published by Konovalov (1976) have different width-length ratios, similar to the ones encountered within this sample. Yet the widest part of the blade is more uniformly positioned: There is a distinct cluster of arrowheads where the widest part of the blade was situated at a 3/5 position (with reference to total length) [Fig. 34]. Most of the SBR-specimens lay in range with arrowheads found at DRS, CHR and ILM (Konovalov 1976) though the latter also features arrowheads of greater size [Fig. 35]. 12a and 16 deviate from the more common width-length ratio and lie well outside the reference ranges efficient for hunting, which suggests use on larger and/or less vulnerable targets. Those reference numbers (Browne 1940; Paterson 1984) regarding the effectiveness of arrowhead sizes for hunting can be used as approximations only, since detailed information on the size, distance and nature of the game is lacking. It is evident that the arrows of the SBR-sample exceed the bronze findings of the Lop Nor region (Bergmann 1939) in size. The same holds true for the socketed trilobate arrowheads found at DRS. It is notable that the tapering design is produced with greater dimensions than the triangular design in the observed samples.[5]

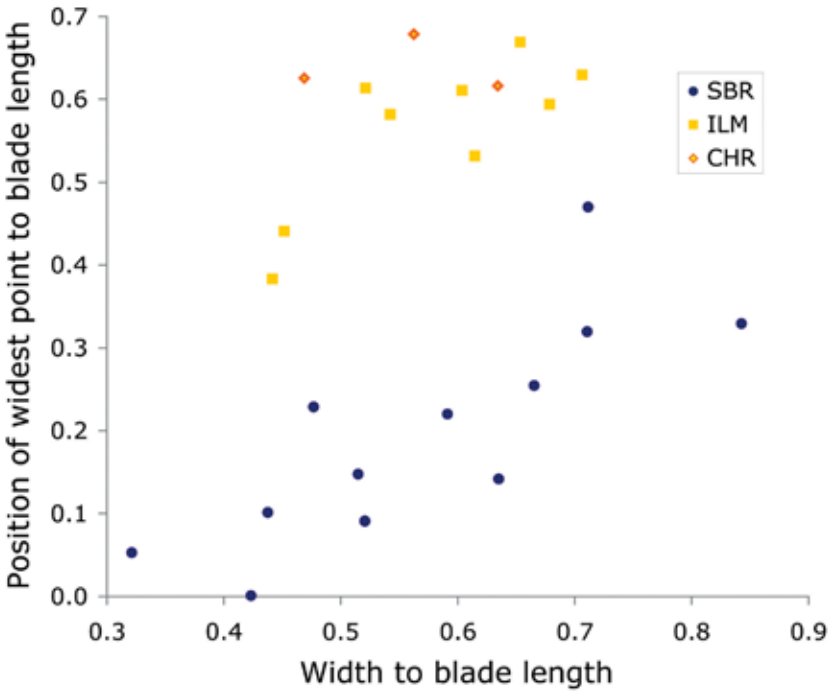


Fig. 34. Comparing the relative position of the widest point to width-length ratios.

This shows the ratios to be proportional in the SBR sample (featuring mostly triangular blade shapes). The tapered ILM and CHR arrowheads (Konovalov 1976) vary in their width-length ratio but are much more consistent in their position of the widest point. This position is much nearer at tip than in SBR arrowheads.

Arrow Material

There are undoubtedly several kinds of wood suitable for arrow-shaft manufacture; the actual use largely depends on availability, i.e. the local environment of the toolmaker. It is crucial for flight accuracy that the arrow be straight throughout its length. If whole branches or saplings are used, as opposed to shafts split from larger pieces of wood, they can be straightened by heating and bending but retain a tendency to warp. Reeds have the advantage being light and rigid, and though they naturally grow rather straight they sometimes have to be heat-treated as well. Being coreless they are suitable to take arrowheads with a long tang or a foreshaft. Strength, toughness and a high stiffness-density ratio are qualities valued in materials from which to manufacture shafts. The durability of shafts can be increased by nock reinforcement and splicing (Klopsteg 1943, Bergman et. al. 1988).

For fletching, feathers of both tail and wing can be used, and again there is a large variety of birds whose feathers would be suitable (Bergman et. al. 1988). Feathers of birds of prey are documented by Rudenko (1969), who also mentions the use birch (*Betula* sp.) for the shaft, which is in use for bow construction in today's Mongolia (Bergman and McEwen 1997). A footnote of the *Han shu* (94B: 3810) which also indicates the use of locally growing wood for making bows observes the use of falcon

feathers for fletching in this area.

Various materials have been used for arrowheads; it is not uncommon to find both bone and iron ones coexisting (Rudenko 1969). For use on unarmored targets, bone arrowheads have proven to be as effective as their counterparts of stone or metal (Ikäheimo et al. 2004, Luik 2006). Loosening from the shaft and being smashed or stuck in bones occurs less often with bone arrowheads due to their elasticity. That makes them suitable for recovery and reuse. Using a socket with a bone arrowhead is less common; usually the natural properties of a bone suggest the use of a clamp. Firmly encasing the shaft in a socket provides more constructional stability.

Fig. 35. The widest efficiency point stated is meant for use on "heavy game". The smaller socketed DRS type is a trilobate arrowhead equipped with a socket and cutouts above the blade-socket transition. Most of the SBR pieces lie well in range with the other samples. The bronze specimens of the Lop Nor region are overall smaller than iron specimens; one L.N. specimen matches the bone two-wing of SBR in size and shape. Twowings feature only two wings, the materials in these samples include iron and bone. Sample references see Gorbunov and Tishkin 2006 (Y II), Konovalov 1976 (ILM, CHR, DRS) and Bergmann 1939 (L.N.). Reference ranges efficient for hunting see Browne 1940, Paterson 1984, p.32).

Arrowhead design

Compared to two-winged arrowheads, the trilobate types such as the iron specimens we found are usually more accurate, the blades acting as aerodynamic surfaces stabilizing arrow flight. Instead of two cutting edges the trilobate arrowhead features three, and having the same mass it is more robust, smaller and thus less easily affected by crosswind. Yet due to its more complicated shape the manufacture requires a large toolset and a greater extent of technical expertise and precision (Delrue 2007).

The design of an arrowhead must consider characteristics such as accuracy, range, penetration force and durability. Optimization of one characteristic can diminish the performance of another; so generally some balance and compromise is sought (Klopsteg 1943, Cheshier 2006). An important consideration is the target and the toughness of its surface.

The penetration force of an arrow (i.e. kinetic energy stored in the arrow at moment of impact) is governed by the speed and weight of the arrow (Browne 1940, Cheshier and Kelly 2006). Of those, speed is dependent on the velocity of the cast, the head-on resistance and the weight of the arrow. Increased weight

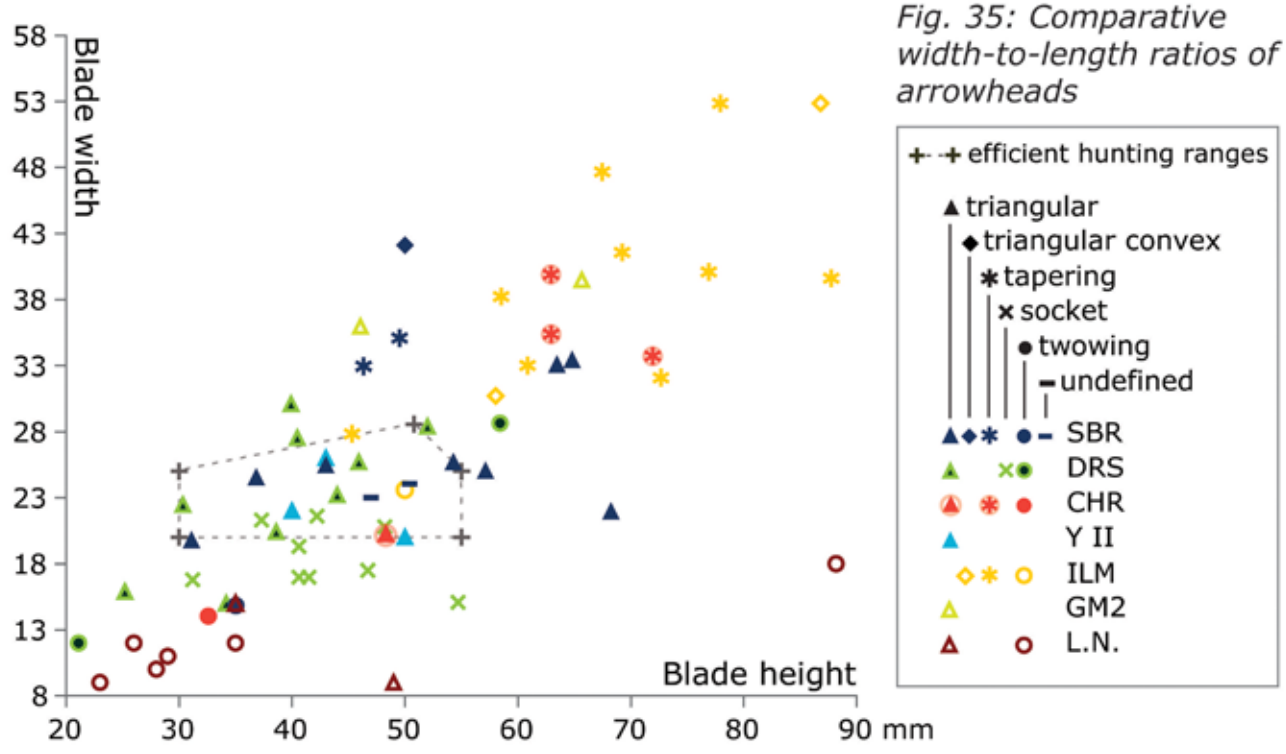


Fig. 35: Comparative width-to-length ratios of arrowheads

reduces the velocity of the arrow, leading to a shorter range but increased impact force. Both impact force and width of the point must be adjusted to the target (size, distance, vulnerability), so that a minimal penetration depth is reached and a hemorrhage sufficient to incapacitate or kill is produced. Penetration of the projectile into the target thus depends on the impact force, the vulnerability of the target and the shape of the head. If this head-on area is narrow, the projectile enters with greater ease, having greater penetrating power. If it is wide it creates a wider wound that bleeds more easily (Cheshier and Kelly 2006).

Application and usage of the tool set

In retrospect the role of this tool set of bows and arrows can be defined only by the possible range of usage, its construction purpose remaining open to speculation. With regard to the bows, the use for warfare *and* hunting is without doubt possible and suggested by the variety of arrowheads interred with them.[6] The overall heaviness of the found arrowheads suggests a heavy impact force. This matches the shaft remains, which consequently have to be rather thick (ranges 0.8–1.5 cm). A strong bow equipped with a heavy arrow has a relatively strong penetration force at a moderate distance.

In both hunting and warfare the best case scenario is to kill the target immediately. In hunting this might be effected by creating a large, severely bleeding wound (i.e. using an arrowhead with a wide cutting edge) that incapacitates the animal quickly (Holmberg 1994). A hunting arrow should also be durable to remain undamaged and to be reused. In warfare where the target is armored, the need of a greater penetration force restricts the use of wide blades. A shot might not be lethal by itself. If extraction was difficult however, it would extend the wound and lead to infection and sepsis (which in time will kill). Equipping an arrowhead with barbs is one way to achieve this.[7] Blades that jut out like the ones of 12a enlarge the wound; yet the penetration will probably not be as deep at the same distance as with slimmer specimens like 12b.

Even though those differences exist, they are insignificant as long as the development of body armor does not require an impact force greater than that needed for the largest, toughest skinned game that is hunted. As long as an arrowhead will suffice for use on both, there is no way to determine whether its use involved military conflict — it remains a multi-purpose tool. Even in the context of hunting, the variation is great, different sizes and shapes being used according to the game. Large game also requires deeper penetration and thus increased penetration force than does small game (Luik 2006).

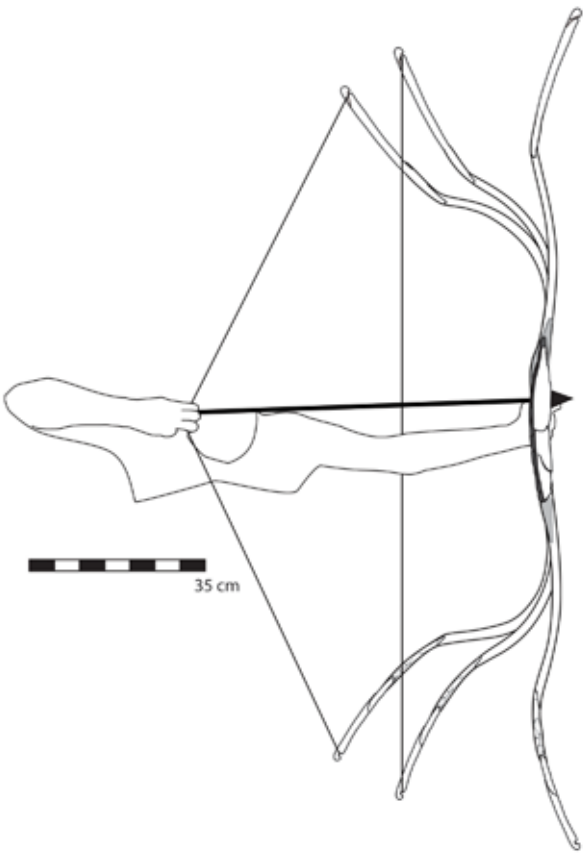


Fig. 36. Reconstruction of the approximate shape of the SBR-12 bow in unstrung, braced and drawn condition. The arrow is about 75 cm long.

Significance of the findings

The bow findings at Shombuuziin-belchir contribute to an improved understanding of the construction and development of this bow type and its variations in Inner Asia [Fig. 36]. Finding a complete set of arrowheads interred with one individual confirms the fact that different sizes and shapes, as well as different materials, might be used contemporaneously. The requirements for manufacturing the equipment and the marks on the bow plates provide some insights into the available technology in the Xiongnu

period. This includes competence in obtaining and processing very different materials, all of which have several preconditions which must have been fulfilled to manufacture this tool set (e.g. the boiling of glue). The findings also reflect manufacturing equipment by different marks left by it on the bone rods and identify the tool set as one specialized in construction to contextual demands while retaining the function of a multi-purpose tool.

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Notes

1. Among the sites are Il'movaya pad' in Transbaikalia (Mongait 1961), Qum-Darya in the Tarim Basin (Bergmann 1939) and Yaloman II in the Altai Mountains (Gorbunov et al. 2006). For additional evidence see Rudenko 1969, Sosnovskii 1946 and Davydova 1985.

2. The terms *upper* and *lower* relate to the positions of the bows relative to the interred person, which may or may not also correspond to the upper and lower bow limb as defined by function.

3. An exception, of course, is center-shot bows, not under consideration here, which have cut out handles to allow the arrow to pass in the vertical median plane of the bow.

For additional explanations, see especially Klopsteg 1943, Kooi 1983, Paterson 1984, Kooi and Sparenberg 1997, and Sudhues 2004. Among the technical details, note the following: Important contributions to lateral deflection come from the release of the string over finger/thumb causing the nock of the arrow to be moved sideways (Kooi and Sparenberg 1997), movement of the bow hand, motion of the string not being exactly in the median plane and by angular acceleration of the arrow out of the median plane (increase of the angle between median plane and arrow during release, related to handle width). Thus "the arrow has to be treated like a flexible beam, pushed at the rear end and hampered with respect to its sideways

movement at the grip" (Kooi 1983, p. 15).

The angle between arrow and median plane of the bow is 1.5° for the fully drawn bow (6° for one braced but not drawn); if the arrow could not flex it would deviate about 4.5° from the line of aim the moment it leaves the string (Kooi 1983). That this does not occur (the so-called "archer's paradox") is due to the fact that the oscillation started by the arrow takes place about the line of aim.

4. This shape is defined by Delrue (2007, p. 239) as "an arrowhead that has three wings or blades that are usually placed at equal angles (i.e., *c*a. 120°) around the imaginary longitudinal axis extending from the centre of the socket or tang."

5. After writing the present article, I learned of an arrowhead typology proposed by Khudiakov (1985) (my thanks to Prof. Daniel Waugh). His typology differentiates arrowheads on the basis of the used material, hafting method, cross section and blade shape. Of the trilobate group three types are comparable to the samples analyzed in this article: Type 1 — a triangular blade shape with widest point at the center or above, type 5 — triangular blade shape with the widest point near the base, and type 2 — a different variation of a tapering blade shape that widens from the tip to a point after which it recedes towards the longitudinal axis before jutting out perpendicular to reach the maximal width. According to Khudiakov, all three types had made their appearance by the 2nd century BCE, and while Type 1 and 5 remained in use until the 8th and 10th century CE, the tapering form disappeared in the 1st century CE. Newer findings of triangular forms with the widest point at the base extend the proposed size range for this type both in length and width. This is also the case with tapering blade shapes, which seem to retain a similar width to length ratio even though produced with a greater variation in size. Comparable instances of triangular blade shapes with the widest point at the center or above are considerably wider.

6. Of course it is possible that a person used more than one bow, and even more than one type, depending on the application (distance, target, training purposes). Yet even if more than one bow was in use but only one was interred with the archer, the arrows would probably be such as could be and were used with that bow. Evidence for the contemporary use of both the simple and the composite bow in Inner Asia has been collected by Rausing (1967).

7. While an arrowhead that detaches from the shaft easily or a shaft splintering on impact could complicate the extraction and inhibit reuse, it is also true that an arrow that is designed to fail is prone to fail before it creates enough damage or any damage at all. Thus, constructions that concentrate on failure are probably rare (personal communication with Bede Dwyer).

An Experiment in Studying the Felt Carpet from Noyon uul by the Method of Polypolarization

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E. Iu. Mednikova
Iu. I. Elikhina
S. S. Miniaev
St. Petersburg

The elite burials in the Noyon uul (Noyon-ula) mountains of northern Mongolia are among the best known archaeological monuments of the Xiongnu (the Asiatic Huns). The cemeteries located there were the object of work by the Mongolo-Tibetan Expedition of P. K. Kozlov in 1924-1925, when, under the supervision of S. A. Kondrat'ev (in the case of barrow no. 12/24, of S. A. Teploukhov) more than 2000 varied objects were exhumed, above all silk and wool fabrics, felt carpets and prestige gold and silver ornaments (*Kratkie otchety* 1925; Trever 1932; Umehara 1960; Rudenko 1962). The main collection of the finds, which date to the first century CE (Miniaev and Elikhina 2009) today are preserved in the Oriental Section of the State Hermitage Museum (Elikhina 2007; 2007a).

Various materials from the Noyon uul collection have undergone both technical and stylistic analysis (Voskresenskii and Tikhonov 1932; Lubo-Lesnichenko 1991, 1994; Miniaev 1981). In the first instance this involved the silk and wool fabrics and the felt carpets, which almost immediately after the discovery underwent chemical analysis in the Laboratory of Archaeological Technology of GAIMK (now IIMK RAN, the Institute for the History of Material Culture of the Russian Academy of Sciences). Particular attention in this was devoted to the felt carpet No. 14568 (Hermitage Inventory No. MR-2300) from barrow no. 6. It underwent chemical, microchemical and histological anayses; its coloring was studied, as were the techniques of its embroidery, etc. (Voskresenskii and Kononov 1932). In order to determine the species of animal from which the wool was obtained for making the felt, the wool fabrics and threads and samples of the wool of camels, wild and domesticated caprids, sheep, goats and oxen were examined. However, as the report noted, "in spite of the wide spectrum of comparative materials and detailed analysis, it was impossible to obtain data which would support a definite conclusion." The researchers themselves recognized that their several possible suppositions were paradoxical: the material of the carpet, they believed, was similar to the wool of the Sudanese sheep, which had been adapted in China in ancient times; or the high quality wool of this animal hand been imported from Egypt; or in Han Dynasty times a breed of sheep was raised which later disappeared; or this was the wild sheep of Mongolia subsequently wiped out by hunting (Voskresenskii and Kononov 1932, p. 81).

In recent years V. I. Kulikov and E. Iu. Mednikova of the Laboratory of Archaeological Technology of IIMK RAN have developed the method of polypolarization, applied there in a Image Recognition System (STZ), and used it to determine the specific nature of samples of wool, down, hair, plant fibers and other biological and archaeological objects (Kulikov et al. 2010).[1] The polypolarization method was so named because of the large quantity of polarized objects and their corresponding images.

The basic idea of the proposed method is to obtain qualitatively new information from the studied object by creating a new kind of electron optics system, in which a secondary Lambert-source of illumination operates allowing one to remove the background illumination of the studied sample (in classical microscopy that background illumination is always present and must be estimated due to optical aberration). In order to improve the quality of the images obtained, an apodizing filter developed specially for this system was introduced, making possible the even illumination of the sample. An important benefit of this method for archaeology is the small size of samples needed, which then barely alters the form and structure of the object under study.

The given method of polypolarization was used to study samples from fragments of the felt carpet from barrow no. 6 in the Noyon uul cemetery (one of four felt carpets found in

Fig. 1. Felt carpet from Noyon uul barrow no. 6 (State Hermitage Museum Inv. no. MR-1958; KP GAIMK Nos. 14377 and 14378).

that barrow). Two fragments of the carpet laid under the coffin [Fig. 1] were found behind a column outside the exterior wall of the northern corridor (State Hermitage inventory no. MR-1958; KP GAIMK Nos. 14377 and 14378) and then were sewn together during restoration of the finds.

The table below specifies the fragments selected for this study, which were compared with standard samples of animal wool (the numeration of carpet samples is given according to the general inventory, which includes as well material from the other cemeteries).

The photographs of the standard and test samples done by the polypolarization method with magnification of 350x are shown in Fig. 2 below. The juxtaposition of the standard samples of wool from various animals (sheep, horse, camel) and the carpet samples led to the conclusion that camel wool was used in the manufacture of all the elements of the tested fragment of carpet no. MR-1958/1959. This conclusion is supported both by the fineness (the size of the cross-section of the individual thread) as well as by the characteristic configuration for camel wool of the middle part of the hair (the cortex), which is clearly evident from the visual analysis of the macrophotographs.

No.	Sample
06	Felt backing of carpet
07	Beige wool cloth, covering for backing of carpet with spiral ornament.
08	Brown wool cloth, covering backing of carpet in its center
09	Thread for the mount of the ornamental band
10	Felt of the "shield-shaped" appliqué
11	Felt of the tree appliqué
11a	Thread used to attach the tree appliqué
12a	Felt of the yak appliqué
12b	Mount for the yak appliqué
12c	Thread used to attach the yak appliqué
13	Felt of the cross-shaped appliqué
14	Cherry-colored thread for the embroidery of the spiral ornament
15	Beige thread for embroidery of the backing of the carpet

Camel hair, apparently, was used in the manufacture of other felt and wool objects found at Noyon uul. Evidence of this was obtained from preliminary polypolarization analysis of samples of fur from barrow 6 and fragments of a rug from Kondrat'ev's barrow.

Thus the perspectives for applying the polypolarization method in archaeology generally and for the study of samples of fabric in particular are quite evident. For the materials from Noyon uul the analysis of other samples of felt and fabrics both from barrow no. 6 and from other burials is a task for the future.

In this article the authors have not touched on the question of the means by which coloring was applied to the various components of the carpet. Such as task will require separate study. We note only that macrophotography in the reflected light of the twisted thread of the spiral ornament (which has a cherry color) confirms the suggestion by A. A. Voskresenskii and V. N. Kononov that "coloring had been applied to already manufactured cloth, not its yarn" (Voskresenskii and Kononov 1932, p. 94). We can also add that one should not exclude the possibility that the wool of a newborn camel was colored (before the hair stiffened), and also the possibility of coloring as a result of the thermal treatment of the yarn or the application of clayey minerals — aquaeous silicates with manganese and chromium, which always, when alloyed, color objects a deep red.

About the authors

V. E. Kulikov received his degree from the Leningrad Institute of Precise Mechanics and Optics and is the holder of several patents on apodization methods. **E. Iu. Mednikova**, a graduate of the Leningrad Technology Institute developed the method of polypolarization. **S. S. Miniaev**, a senior staff member of IIMK, is one of the most prominent specialists on the archaeology of the Xiongnu. He and **Iu. I. Elikhina**, who is Curator of the Tibetan, Mongolian and Khotanese Collections of the State Hermitage Museum, are preparing a catalogue of the Noyon uul collection.

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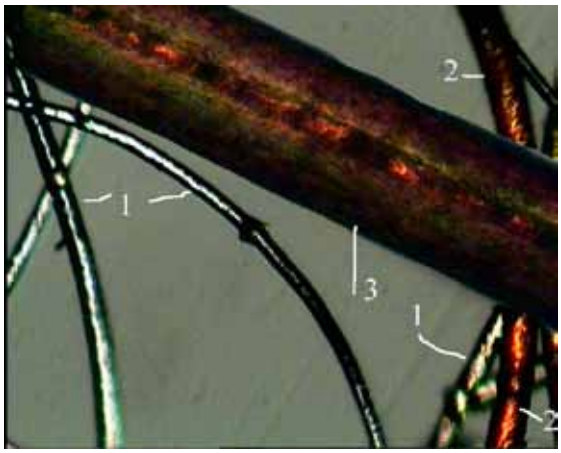
Note

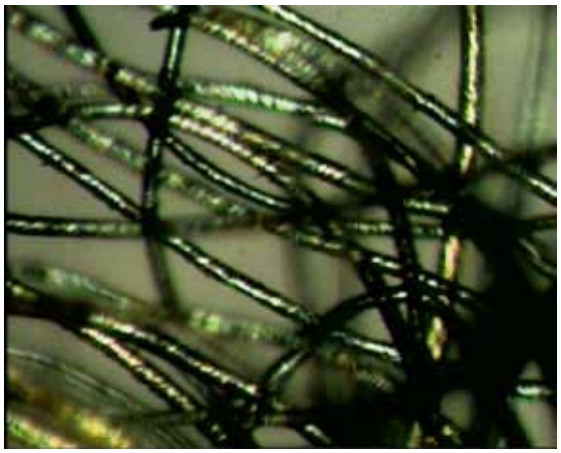
1. Using such a system of image recognition, a huge number of the most varied kinds of apparatus have been developed in the world, from navigation mechanisms of rockets and robotic sensing to the simple calculation of the available means of transport, security in the galleries of museums, etc. All of these entirely different systems have in common the function of recognizing an image (identification, composition, color, determination of its spectrographic profile, histograms, etc.).

Translated from Russian by Daniel C. Waugh

Fig. 2. Microphotographs of the samples.



Standard (control) sample: 1. camel; 2. sheep; 3. horse



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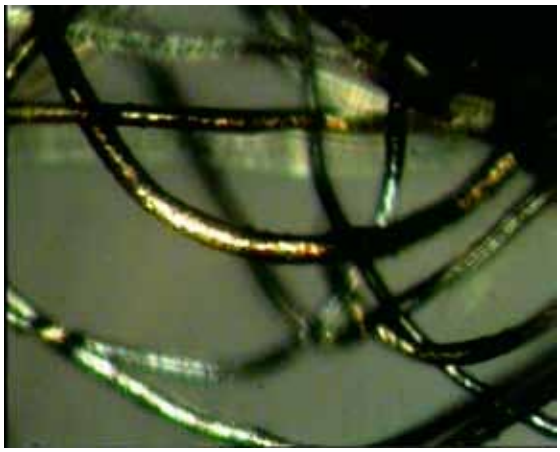

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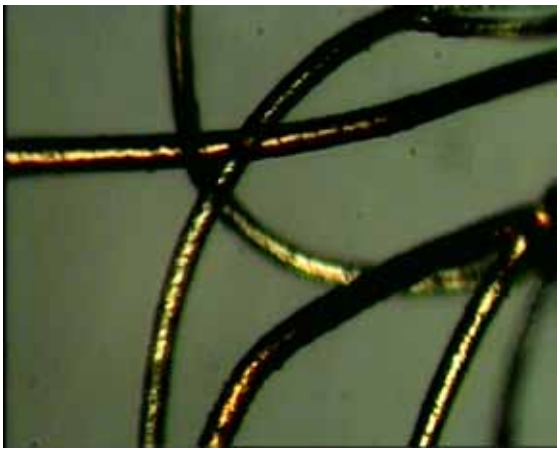

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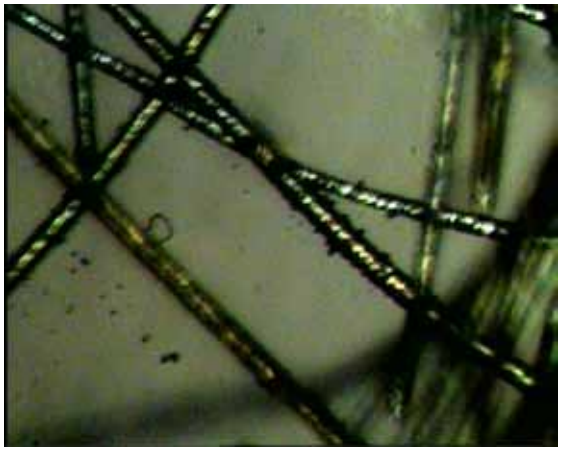

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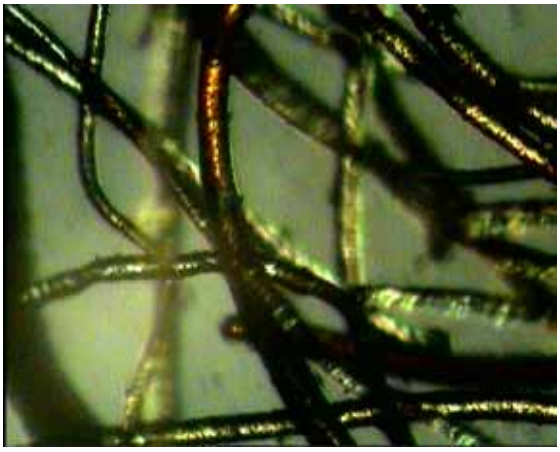

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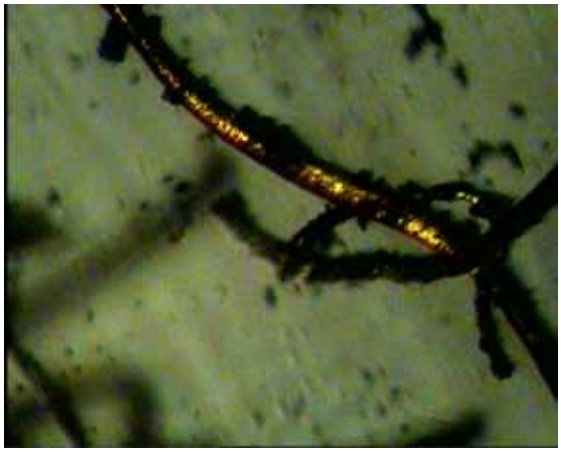
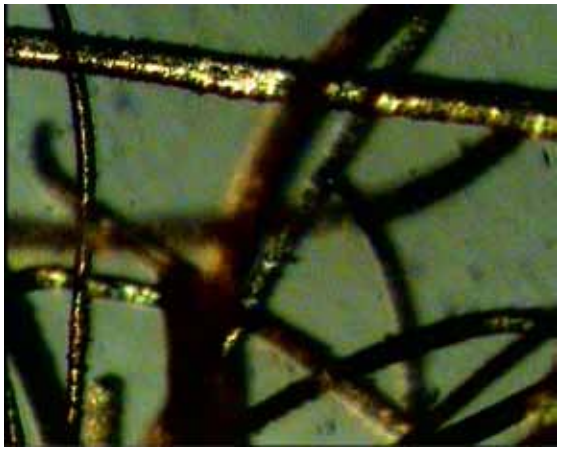


Sample no. 11

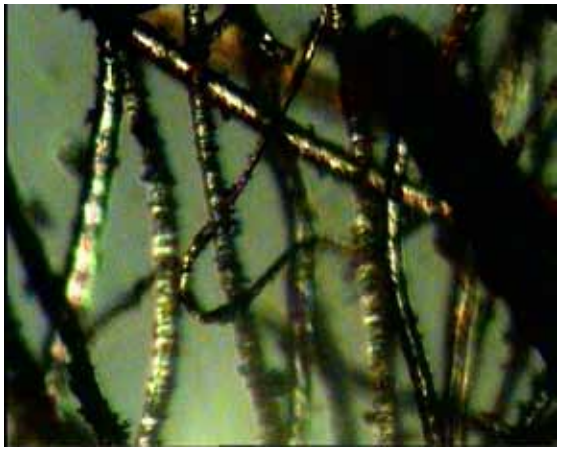
Sample no. 11a

Sample no. 12a



Sample no.12b

Sample no. 12c



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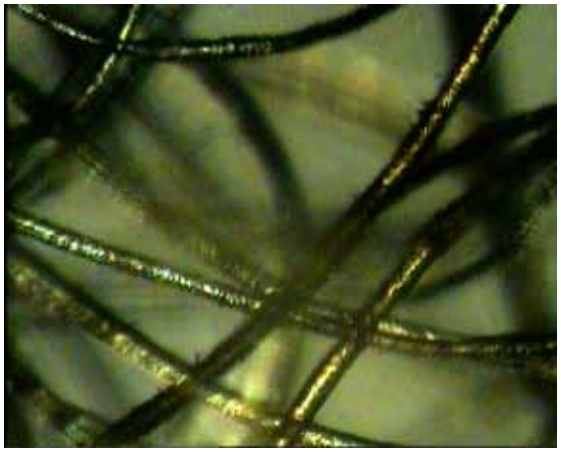
Sample no. 14



Sample no. 15

The Old Curiosity Shop in Khotan

Daniel C. Waugh
University of Washington, Seattle
Ursula Sims-Williams[1]
British Library, London

In July 1922, Clarmont Skrine of the Indian Civil Service arrived as the British Consul General in Kashgar where he remained until September 1924. Almost without fail, Skrine wrote home to his mother Helen in England often in considerable detail about life in Kashgar and his experiences while "on tour" to the various towns of western Xinjiang. On the first of those extended tours, on 26 November 1922, he wrote from Khotan:

> To collectors ... the place is a Paradise. ...There are Takla Makan antiquities. This is a great centre for the activities of the "Takla Makanchies" described by Stein, the men... who spend all their lives searching for treasure from the lost cities under the sand. Thanks to Stein, the people here realize that objects other than gold ornaments...have a value for mad Europeans, and so there are two or three people here who have got small collections of things from Yotkan, Domoko and other sites. I have examined one such collection and am seeing another tomorrow. The fragments of mural painting are particularly good, and I am going to photo a lot of them and send the prints to India to Sir A. Stein or to Sir John Marshall, the head of the Archaeological Dept. asking whether they would like me to send the paintings (which are on plaster and rather heavy) to India. There are also some wonderul Graeco-Buddhist plaster-cast heads, two or three simply exquisite, the rest rather archaic; large numbers of clay figurines and ornaments which used to be *appliqué* to vases, etc. and broke off; some are very quaint monkeys playing musical instruments etc. Then there are MSS. I have got hold of two practically complete books, in wonderful preservation, of exactly the same kind of script and material as some of the MSS described and pictured in *Serindia*. These I will send as soon as I can to India, as they may be extremely important... [BL IOLR MSS EurF 154/8, CPS to HSS, 26 November 1922, p. 2.]

Indeed, Skrine returned, "photoed a lot of them," acquired a few and eventually deposited them in the British Library and British Museum. The photographs, published here for the first time [Figs. 1, 2 next page] from his excellent glass negatives now kept in the Royal Geographical Society, reveal an impressive collection, a genuine Curiosity Shop of antiquities.[2] Among the questions the photos raise are: whose collection was it, what was the provenance of the objects, and what happened to them subsequently? Our article will provide answers and attempt to address more broadly important questions about the acquisition and provenance of Silk Road antiquties.

The antiquities trade in Xinjiang

The acquisition of antiquities in Xinjiang by European travelers, diplomats and scholars beginning in the late 19th century is well known in outline, if still rather unevenly studied in detail. European diplomats based in Kashgar contributed in important ways to this activity, not only by hosting the explorers when they passed through the city but by acquiring antiquities themselves, often on commission from individual scholars or institutions. Of particular interest would be a study of the collection acquired by the long-time Russian consul in Kashgar, Nikolai Petrovskii, which numbers several thousand items and today is in the Hermitage Museum and the Institute of Oriental Manuscripts of the Russian Academy of Sciences in St. Petersburg (Elikhina 2008, p. 29).[3] George Macartney, the first British resident (later consul) in Kashgar, while not as prolific a collector, played, if anything, a more important role in stimulating western interest in exploring the ancient history of Xinjiang. Beginning as early as 1893, Macartney had been acquiring antiquities and soon thereafter obtained manuscripts for the Indologist Rudolf Hoernle (Hoernle 1899; Stein 1904/2000, p. vii; 1907/1981, I, pp. 190, 266, 270; Sims-Williams 2000, pp. 111-12). This material in turn provided the impetus for Aurel Stein to undertake his first major Central Asian expedition in 1900.

Even if his interest in antiquities was incidental to his other concerns, Skrine took seriously

Fig. 1. Antiquities photographed in 1922 by Clarmont P. Skrine in Khotan. Collection of the Royal Geographical Society image no. S0005895. Copyright © Royal Geographical Society. All rights reserved. Reproduced with permission.

Fig. 1. Antiquities photographed in 1922 by Clarmont P. Skrine in Khotan. Collection of the Royal Geographical Society image no. S0005897. Copyright © Royal Geographical Society. All rights reserved. Reproduced with permission.

Fig. 3. Badruddin Khan in his garden in Khotan. Photograph by Clarmont P. Skrine taken in 1924. Collection of the Royal Geographical Society image no. S0005898.

the possibility that his time in Kashgar would provide opportunities to contribute to Stein's ongoing research. He received training in mapping techniques from the Survey of India staff and in fact then was able to fill in a few blank spots on the maps Stein's expeditions had drawn for the mountains south of Kashgar (Skrine 1925; Waugh 1999). As the letters to his mother indicate, he had consulted about acquisitions of new material with Stein and the Archaeological Department in India. On several occasions he notes writing to Stein and sending him photographs.[4] The consulate in Kashgar had a library that included Stein's books and those of other explorers of the region. Skrine understood that his photography, about which he was quite serious, might be useful to record how certain sites had changed since Stein had visited them (e.g, BL IOLR EurF 154/8, CPS to HSS, 4 December 1922, p. 4; see also Waugh 2004). He planned at one point to get himself into caves in the cliffs at Uch Merwan northwest of Kashgar (which had been studied by the Germans) in order to photograph the Buddhist murals there (BL IOLR EurF 154/9, CPS to HSS, 5 May 1923, p. 2).[5] He even hoped to visit sites Stein had not seen and wrote of "doing a little 'digging'" (disregarding Stein's advice not to), although he never found the time to do so (BL IOLR EurF 154/9, CPS to HSS, 22 November 1922, p. 4; Skrine 1926/1971, p. 170).

On his tours outside of Kashgar, Skrine would invariably meet with, and more often than not, be housed by the *aqsaqals* of the local British subject communities. These were the elders who represented their communities of Afghan or Indian merchants in dealings with the local officialdom and interfaced with the British consuls. The aqsaqals often provided intelligence information to the diplomats and carried our various commissions for them. In Khotan, it was the ex-aqsaqal of the Afghan and Indian merchants, Badruddin Khan, who hosted Skrine and his wife.[6] He and an Armenian carpet merchant there, Keraken Moldovack, were the main Khotanese purveyors of antiquities.

Of the two, Badruddin [Fig. 3] was by far the more important (Sims-Williams 2000, esp. pp. 112-13). His acquistion and sale of antiquities had a long history spanning more than three decades beginning early in the 1890s.[7] As Stein astutely observed, Badruddin had a great deal to do with spreading the word about European interest in antiquities. Clearly he saw in the antiquities business a good source of profit. Among the manuscripts Macartney sent to Hoernle between 1895 and 1898 were ones he had purchased from Badruddin, who in turn had acquired them from "treasure seekers" he had sent into the desert or, in one or two cases, from the famous forger Islam Akhun whom Stein later exposed. Badruddin also sold material to Captain S. H. Godfrey in Leh (Stein 1907/1981, I, p. 270). In 1899 Macartney

encouraged Stein to use the services of Badruddin (Macartney to Stein 22 March 1899, Bodleian Stein MSS 289, fols. 74-80). Stein then met him in Khotan in 1900 and employed one of his key suppliers, Turdi, as a guide for locating Dandan Uiliq, a site where Turdi seems to have found some of the manuscripts (Stein 1904/2000, pp. 180, 186, 229-30, 251, 258-59). Already on his first expedition Stein was coming to rely heavily on Badruddin for logistics and local knowledge, and as a direct source of antiquities to purchase. In his *Serindia* he referred to Badruddin as "my old friend and factotum" who would write Stein upon receipt of information about some previously unknown site which the treasure seekers had discovered (Stein 1921, II, p. 1238). While scholars tend to be interested above all in what Stein and his local informants found, the process by which sites were discovered and the activities of the "treasure-seekers" are subjects deserving of our attention.

When Carl Gustav Mannerheim was in Khotan in 1906, Badruddin introduced him to antiquities dealers at Yotkan, the ancient city site, concerning which and the antiquities trade Mannerheim provides an interesting description:[8]

> The remains consist chiefly of bones, fragments of glass and clay vessels, terracotta ornaments, old coins, glass and stone decorations, fragments of images of Buddha, gold either in the form of dust or small bits of ornaments, etc. The Lasku-üstang flows through the area and on its banks, as well as along the banks of the ariqs leading from it, there are masses of piecemeal relics and broken clay vessels etc. Not only the inhabitants of Yotkan, but others, too, carry on systematic excavations here in the hope of finding enough gold to cover the expense and leave a small profit. The objects found and sold to foreigners are regarded as a subsidiary source of income. [Mannerheim 1969, vol. 1, pp. 88-89]

It is impossible to know exactly how many of the antiquities Stein acquired passed through Badruddin's hands. In one consignment alone which he delivered to Stein in Kashgar in 1915, there were some 420 items, listed separately as having been acquired from him (Stein 1928, I, pp. 111-22). Where possible in cataloguing his acquisitions though, Stein labeled them under the sites from which he had some certainty they had come. A good deal of what Badruddin supplied seems to have been listed under sites (e.g., Yotkan) within striking distance of Khotan without any attribution to him.[9] Stein makes it clear that he systematically interrogated Badruddin (and others who brought him material), and he then carefully noted what he could determine about its provenance. He also warns his readers that the attributions of anything for which there was no explicit excavation record must be treated with caution (Stein 1921, I, p. 97; 1928, I, pp. 99–100). Anyone using the Stein material today must keep this warning in mind and not simply assume that an inventory number indicating a particular provenance guarantees that the object came from that location.

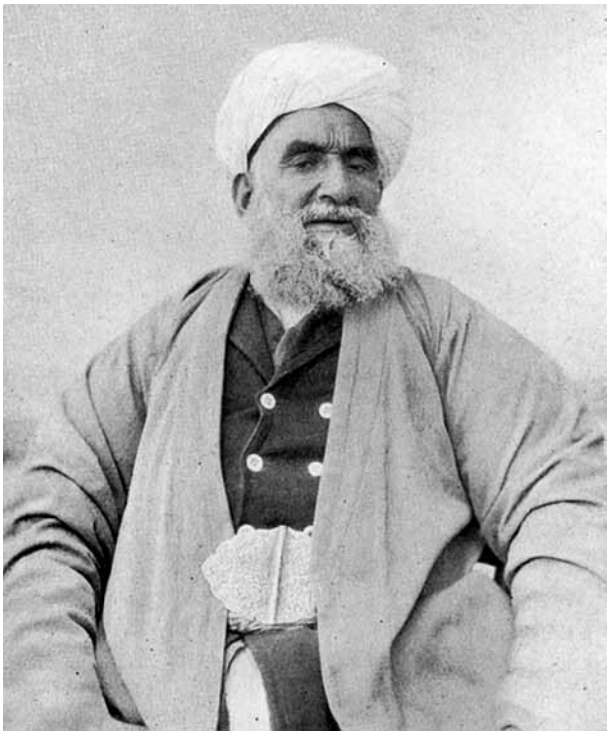


Fig. 4. Badruddin Khan in 1928.
After: Trinkler 1930, ill. 76, facing p. 137.

Badruddin's activity continued down into the 1930s, and he obviously was one of those regarding whom Skrine wrote: "The name of Stein is well remembered in these parts among Turkis and British subjects alike, and all antiquities other than gold brought in by the "Taklamakanchis" or treasure-seekers of the Takla Makan are regarded as his property and to be kept for him..." (Skrine 1926/1971, p. 115).[10] Skrine is explicit about his having obtained antiquities from both Badruddin and Moldovack, although he leaves unanswered the

Fig. 5. A Khotan carpet factory, probably Moldovack's, photographed in 1928.
After: Trinkler 1930, ill. 75, facing p. 136.

question as to whether they were collaborators in the business (Skrine 1926/1971, p. 170). The German expedition led by Emil Trinkler in the late 1920s not only stayed with Badruddin [Fig. 4, previous page] but obtained antiquities from him (more on this shortly). On Stein's unfortunately truncated fourth expedition in 1930-31, Badruddin again worked for him. At the same time, Major George Sherriff (British Vice-Consul, Kashgar, 1927–1930; Consul-General, 1930–31) obtained some manuscripts from Badruddin (Sims-Williams 2000, pp. 122–23). These seem to have been busy years in the twilight of Badruddin's career, since he also hosted Nils Ambolt of Hedin's Swedish expedition in 1931-32 (Ambolt 1939, pp. 112-14). Ambolt described the house and family and photographed Badruddin's grandsons with their father.

Information about the Armenian Moldovack is sparser. Historically Armenian merchants had been active in much of Central and South Asia. When in Khotan in 1900 and 1901, Stein had dealings with a "Russian Armenian from Kokand" who brought him a manuscript forgery for appraisal, but he does not name the man (Stein 1904/2000, p. 188). Whether this was Moldovack is not clear, although we know that his business contacts also were with Kokand. In 1915, Stein credited the Armenian with having given (or sold) him some valuable supplements to the more than 400 items acquired that same year from Badruddin: "Mr. K. Moldovack, an Armenian gentleman settled in Khotan, kindly added ... some metal seals, coins, and a colossal stucco head of Buddha (Kh. 0267, Pl. VIII) probably brought from some site like that of Ak-terek" (Stein 1928, I, p. 99).

Skrine tells us that by 1922 Moldovack was one of only a couple of Armenians left in Kashgaria, stranded there by the Bolshevik revolution. Moldovack ran a carpet factory [Fig. 5], sold other local craft objects, and obviously dealt to a degree in antiquities. Skrine was fond of the man and brought him various magazines and news publications when he returned to Khotan.

Fig. 6. Keraken Moldovack, second from right, standing between Clarmont P. Skrine and Li Amban of Khotan. The official on Skrine's right is Ma Tungling, the commanding officer of the local garrison. Collection of the Royal Geographical Society image no. S0005933.

In the Skrine photo [Fig. 6] taken on May 2, 1924, in the garden of the Nyang Nyang shrine in Khotan, Moldovack is the gentleman standing to Skrine's left "in his double breasted blue serge coat and Homburg hat and white side whiskers."[11] When Emil Trinkler met Moldovack in 1928, he was impressed by his urbanity and curiosity about world affairs (Trinkler 1930, p. 139). Ambolt celebrated Christmas and the New Year with Moldovack in 1931-32, noting that his host had been in Khotan some 30 years already (Ambolt 1939, pp. 114-16), and photographed him in his fine library. Moldovack was still alive in 1935 — well into his eighties, an "immaculate and courteous old man, with his tired but still bird-like gestures and his fund of strange knowledge and strange memories" — when Peter Fleming and Ella Maillart limped into Khotan after their harrowing journey through the wastes of northern Tibet. Fleming was undoubtedly right that Moldovack "would most probably never see a European face again" (Fleming 1936, pp. 296-98).

There is overwhelming evidence that Skrine's two photos of antiquities in 1922 were taken at the residence or business establishment of Badruddin Khan. He, not Moldovack, was the one who managed the network of treasure-seekers and seems to have been consistently the largest seller of antiquities in Khotan during several decades. Since Skrine was staying with Badruddin (and it was the latter's custom, it seems, to go out to meet his foreign visitors when they approached the city), very likely Badruddin's collection would have been the first one Skrine reported seeing and then photographed. We can assume from Skrine's letter that the photos date from November 27, 1922. An examination of their details provides no explicit indication they were taken at Badruddin's house, where Skrine photographed his host in the garden [Fig. 3 above]. Off to the right in the Badruddin photo some carpets seem to be hanging in an open building; since the residence was located near the center of the bazaar, most likely Badruddin's storehouse — his Old Curiosity Shop — was in fact located on the premises. Unequivocal proof that the antiquities had been in the possession of Badruddin was provided by F. H. Andrews, who included that information when he described for Stein's *Innermost Asia* the collection brought to India from Khotan in 1923 by Harold I. Harding, Skrine's vice-consul (see below) (Stein 1928, II, p. 1052).

Skrine's collection of antiquities

Skrine's unpublished letters and travel diary and his book, *Chinese Central Asia*, contain interesting fragments on the continuing discovery of antiquities in the 1920s and enable us to specify the provenance of at least some objects Skrine acquired. When he first visited Khotan in 1922, he learned that the continuing digging by farmers and erosion at Yotkan (the historic first city there) had led to the collapse of a cliff and the exposure of a new stratum of the old city site. On his return in 1924, he managed a brief visit to Yotkan in the early afternoon of May 2; at that time he took two good photographs of the new stratum, one of which was later published in the batch he provided Pavel Nazaroff for the latter's book.[12] He also acquired a few objects from the local farmers, one of them significant, a lovely carved agalomatolite plaque [Fig. 7] (BM

Fig. 7. Image of Kārttikeya on a peacock, ca. 8th century. BM 1925,0619.40, currently on display in Gallery 33, case 28.

1925,0619.40). On his return visit in 1924, he was disappointed to obtain only "a few terra-cotta figurines and appliqué ornaments of pottery, and one small vase, besides a couple of tiny intaglios" (BL IOLR EurF 154/10, CPS to HSS, 8 May 1924). He seems to have kept the

Fig. 8. Amphora obtained by Skrine in Yotkan. BM 1925,0619.37, currently on display in Gallery 33, case 67. Reproduced with permission of the Trustees of the British Museum. Photo copyright © 2009 Daniel C. Waugh.

intaglios (as he had done with ones acquired in 1922), but the vase apparently is that now in the BM (1925,0619.37) [Fig. 8].[13]

In one other instance we have information about Skrine's having obtained objects directly from their discoverers. In Keriya in 1924 he recorded in his diary a visit by one Abbas Khan:

> 14/4/24 New stupa found by Abbas Khan at Khadalik.
>
> Abbas Khan brought me today 2 heavy wooden weaving combs in remarkably good condition, a recumbent angel in stucco [Fig. 9 below] and a no. of small fragments of writing which he said he got last year out of a "house" he found 1 potai N. of Stein's Khadalik site. Loess hill "100 gaz high"; earth was perpetually falling in as he dug. Went about 12 ft. in, then falling in became so bad that he had to desist. Found a chamber with plaster frescoes on all 4 walls, roof supported by wooden beams & columns all of which collapsed destroying the frescoes on 3 sides at the same time. 4th fresco remains, circ. 3 ft. by 2, pictures of people on horses etc. Other finds were a huge stone flour mill, too big to be turned by hand, and a big earthenware pot, circular, with 2 handles, full of bones, some charred. This was found 3 ft. from outside of frescoed room. Conts [?=contents] were found embedded in firm loess; woodwork of structure was in sand & absolutely rotten. [BL IOLR EurF 154/43, p. 49; cf. the slightly different variant published in Skrine 1926/1971, p. 170].

There are three weavers' combs in Skrine's collection (BM 1925,0616.73-75), two of which must be those he obtained from Abbas Khan. The "recumbent angel" very likely is BM 1925,0619.5. See below regarding the "small

Fig. 9. Stucco flying Gandharvi, ca. 8th century. BM 1925,0619.5. Reproduced with permission of the Trustees of the British Museum. Photo copyright © 2009 Daniel C. Waugh.

fragments of writing" from the same site.

As Skrine himself seems to have appreciated, what he saw and photographed at Badruddin's was of greater interest than most of the odds and ends he was able to pick up in the field. After all, as he certainly knew from his perusal of Stein, the Khotanese terracotta plaques and appliqués were quite common; there were better-preserved examples of some of the other odds and ends such as keys, fire sticks, etc. So Skrine was happy to obtain on the spot at least some of what he had been shown by his host. Figs. 10 and 11 identify which items in his photos are ones he acquired. His choices may have reflected primarily considerations of what

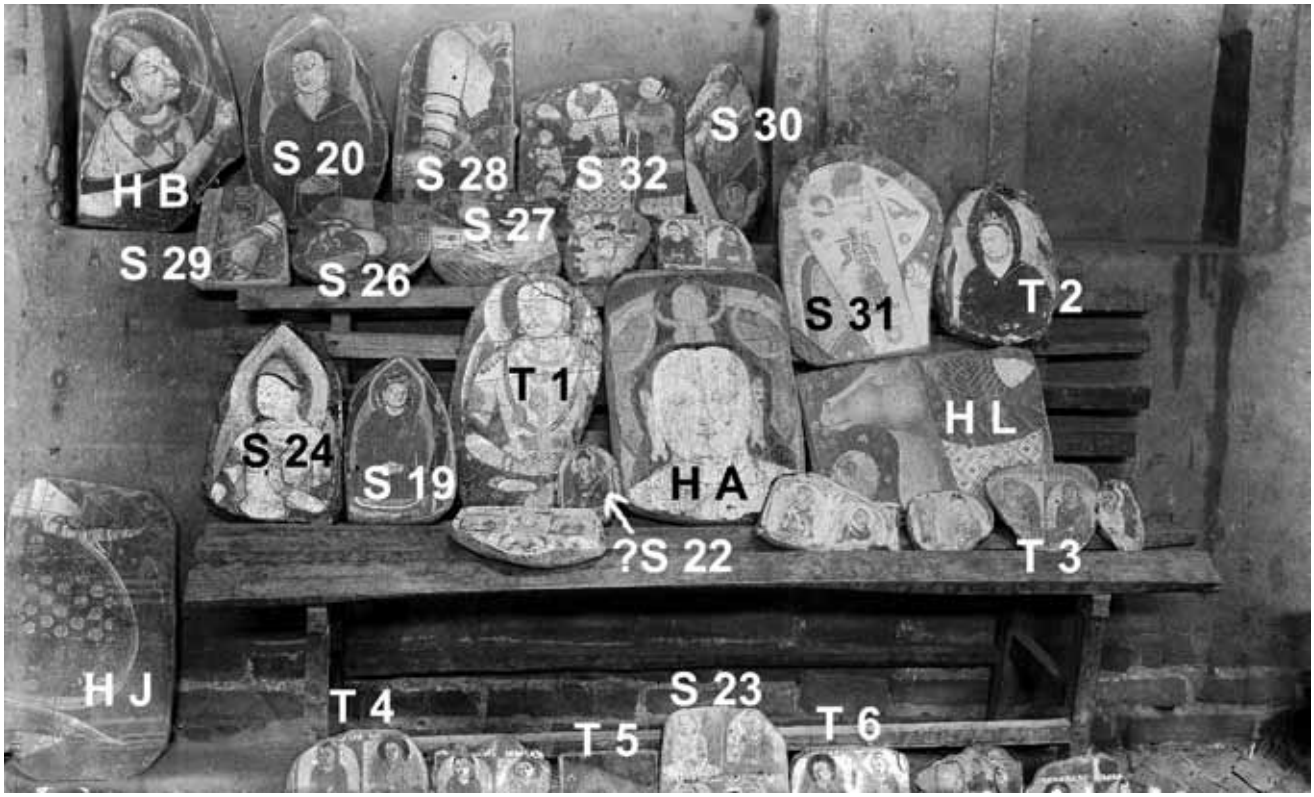


Fig. 10. Identifications and current locations of objects in Skrine photo no. S0005895.

ID	Current location	Reference (to Gropp 1974) and notes
	Delhi, Harding Collection	
H A	Harding A	pp. 142-145; figs. 53a, 53b
H B	Harding B	pp. 152-155; figs. 56a, 56b
H J	Harding J	pp. 122-123; figs. 44a, 44b
H L	Harding L	pp. 108-110; figs. 41a, 41d
	British Museum, Skrine Coll.	
S 19	1925,0619,0.19	p. 164, fig. 66 (drawing)
S 20	1925,0619,0.20	p. 164; fig. 67 (drawing)
?S 22	1925,0619,0.22	*de visu* comparison; probably the same.
S 23	1925,0619,0.23	p. 184; *de visu* confirmation this is correct
S 24	1925,0619,0.24	pp. 111-112, 113-119; figs. 42a, 42f
S 26	1925,0619,0.26	pp. 146-149; figs. 54a, 54c
S 27	1925.0619,0.27	pp. 129-130; fig. 48b
S 28	1925.0619,0.28	pp. 142-146; figs. 53a, 53c
S 29	1925.0619,0.29	pp. 142-146; figs. 53a, 53e
S 30	1925.0619,0.30	pp. 146-149; figs. 54a, 54b.
S 31	1925.0619,0.31	pp. 131-134; figs. 50a, 50c.
S 32	1925.0619,0.32	pp. 166-168; figs. 71a, 71b.
	Bremen, Trinkler Collection	
T 1	A 16149	pp. 157-158; figs. 58a, 58b. Head now missing, though shown in Skrine photo.
T 2	30.32.6	pp. 161-62; fig. 161 (drawing)
T 3	A 13896	pp. 175, 177; fig. 76, pl. XVI facing p. 321. In lower rt. corner of Gropp's reconstruction, but cannot fit next to adjoining piece on left, as fuller version of this piece in Skrine photo reveals.
T 4	A 13896	p. 175, 177; fig. 76, pl. XVI facing p. 321. The piece with four figures in center of Gropp's reconstruction.
T 5	A 16151	pp. 162-63; figs. 64a, 64b, pl. 14 facing p. 305
T 6	Gropp no. B.3.77	p. 179; fig. 77

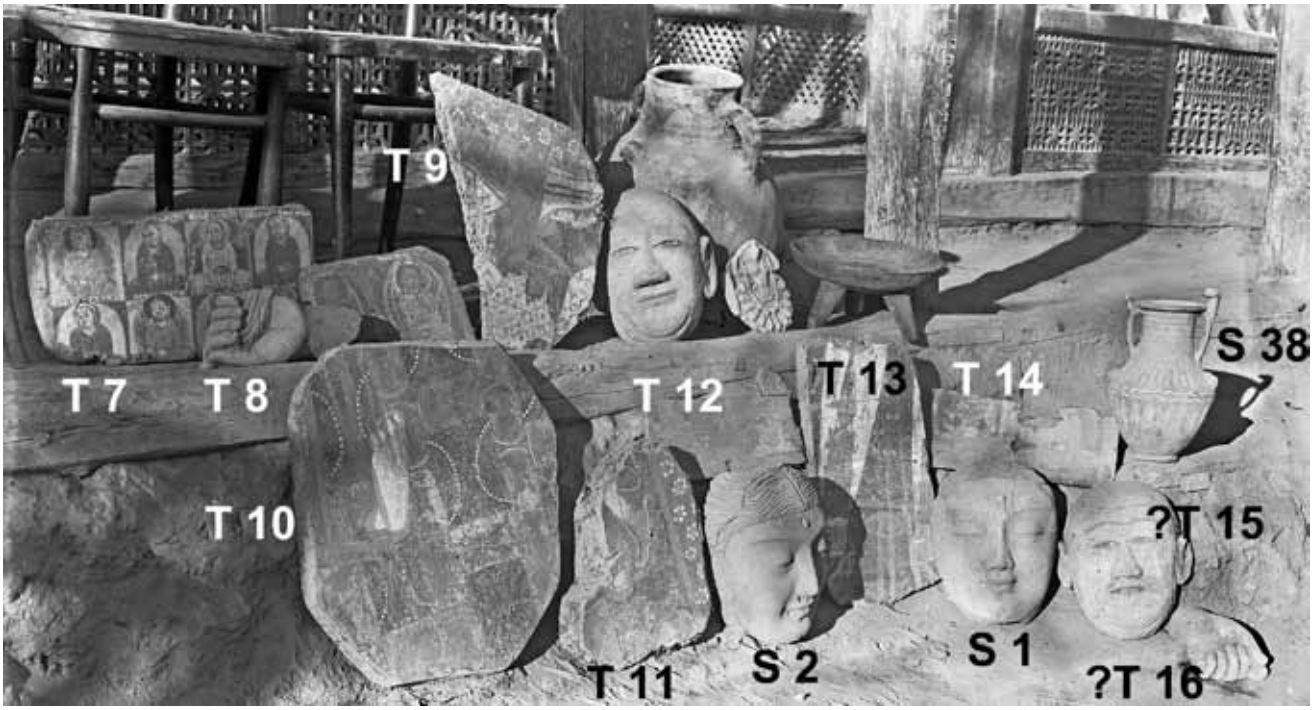


Fig. 11. Identifications and current locations of objects in Skrine photo no. S0005897.

ID	Current Location	Reference (to Gropp 1974, unless otherwise indicated); notes
	BM, Skrine Collection	
S 1	1925,0619.1	*de visu* identification
S 2	1925,0619.2	*de visu* identification; Skrine 1926, ill. facing p. 170
S 38	1925,0619.38	*de visu* identification; on display in BM, Gallery 33, case 20
	Bremen, Trinkler Coll.	
T 7	A 13896	pp. 175, 177; ill. 76, pl. XVI facing p. 321. This is top two rows (8 figures) of Gropp's reconstruction of the panel.
T 8	30.32.20	p. 254; ill. 128
T 9	A 16157	p. 107; fig. 40. Other half of this not shown in Skrine photo; so obviously it was broken prior to Trinkler purchase.
T 10	A 16150	pp. 119-22; ill. 43a, 43b, pl. V facing p. 112.
T 11	A 16159	p. 163; ill. 65 (drawing)
T 12	A 16116	pp. 195-96; identification based on Gropp's verbal description
T 13	A 16164	pp. 137-41; ill. 52b, 52e, pl. VII facing p. 128
T 14	A 16117	pp. 194-95; ill. 80a-b.
?T 15	A 15985	p. 250; verbal description, Gropp suggesting it is modern forgery
?T 16	A 13912 or 16004	p. 253; probably first of these, based on verbal description.

would have been easiest to pack. Hence he left some of the larger mural pieces behind. Skrine seems to have been particularly taken by two stucco Buddha heads though (BM 1925,0619.1 and .2). Presumably their "classical Greek style" appealed to him; so it is not surprising he selected them over the other two large stucco heads, which he termed "rather archaic" [Fig. 12].[14] While the mural fragments seem to have survived transport to London reasonably well, the two Buddha heads, already cracked, did not, as the accompanying comparison photos reveal [Fig. 13]. Of course it is possible that the selection to some extent was Badruddin's (in consultation with Moldovack?), since Skrine seems to imply that it was something of a concession that he be allowed to take anything, instead of its being held for future shipment to Stein.[15] A few objects Skrine mentions he obtained at the time cannot at present be identified with any in the Skrine collection.[16]

Fig. 12. Skrine's "classical" and "archaic" sculptured heads, the one on left now BM 1925,0619.1; that on right possibly Bremen A 15985. Photo copyright © Royal Geographical Society. All rights reserved. Reproduced with permission.

Fig. 13. Before (1922 in Khotan); after (2009 in London). BM 1925,0617.2. Photo on left copyright © Royal Geographical Society. All rights reserved. Reproduced with permission. Photo on right copyright © Daniel C. Waugh. Reproduced with permission of the Trustees of the British Museum.

The further distribution of Badruddin's inventory

Skrine's acquisitions from Badruddin seem in any event to have been only a small portion of the entire collection. Gerd Gropp's careful catalogue of the Trinkler Collection now housed in the Übersee-Museum in Bremen provides important leads as to what happened to the remaining items. Like so many western visitors before him, when Emil Trinkler arrived in Khotan in February 1928, he took up residence at Badruddin's, and he obtained both from Badruddin and Moldovack "eine grössere Sammlung Antiquitäten" (Gropp 1974, p. 14). Trinkler never gives specifics about what he obtained from Badruddin, except to describe the latter's enthusiasms during the transactions which took place in something of an Oriental bazaar atmosphere (Trinkler 1930, p. 135). Trinkler does say explicitly that Moldovack gave the Germans his extensive archaeological collection, and adds at another point that largest part of what they acquired had either been purchased by them or received as gifts (Ibid., pp. 139, 181). Although Trinkler's own excavation of desert sites was cut short when the Chinese authorities put a stop to the activity, he was able to send back to Germany a substantial collection, one that today is second in significance amongst collections of Central Asian antiquities in Germany, surpassed only by the Turfan Collection in the Museum of Asian Art in Berlin.

In studying the paintings and sculptures in the Trinkler Collection, Gropp cast his net widely to compare them with ones delivered to Stein, and those acquired by Skrine (this, apparently, being the first serious examination of the Skrine material in the British Museum). The Stein materials included a number of large painting fragments and wooden panels which had been brought from Khotan by Harold I. Harding in 1923. Gropp argued that many of the mural fragments in all three of these collections probably had come from a single location, Balawaste, and he provided imaginative sketches of how the surviving pieces might been placed on large wall panels of Buddhist scenes, even though most of each panel in fact has not survived.[17] It is not our purpose here to discuss whether these reconstructions of the original provenance of the paintings hold up under scrutiny. The important thing is that Gropp's groupings pointed to a common origin for items in all three collections, something that should hardly come as a surprise. Skrine's photos from Khotan now confirm that much of this material, now divided among Delhi, Bremen and London, had on 26-27 November 1922 indeed been together, on the shelves of Badruddin's shop in Khotan.

Details of Harding's role in this are not yet known. He was Skrine's vice-consul in Kashgar for most of a year.[18] At least from Skrine's vantage point, this was unfortunate, for he could not forgive Harding his braggadocio and eccentric tendency to dress in native fashion, and he suspected him of pro-Bolshevik

sympathies. When Harding was finally leaving in late July 1923, the Skrines breathed "Good riddance!" Harding then traveled from Kashgar to India carrying with him (perhaps he picked them up en route) some of the Khotan antiquities. Whether this was on instructions from Skrine (or Stein) or was something he simply undertook on his own, we do not yet know.[19] In any event, when the material was delivered in India and catalogued, it was recorded as a gift from Harding, and there was no mention that Skrine had any part in the matter (Stein 1928, II, pp. 1052-1056).[20] The material indeed included objects in Skrine's photos (and other items not in them); so Stein surely would have known something about the material in advance, assuming Skrine had in fact written and sent him copies of the photos. Stein added his own note to Andrews' inventory of the Harding collection: "No definite information is available as to the provenance of the antiques here described. But it appears probable that they were brought to Khotan as a result of digging which villagers carried on at some ruins in the desert area covered with tamarisk-cones NE. of Domoko" (p. 1052).

Thus a second consignment of Badruddin's collection had now left his shop. Doubtless he himself kept no inventories; so we cannot be sure what he had left. It seems likely that Trinkler then acquired the major portion of what remained in 1928, although Badruddin still had material to sell a few years later. We have marked on Skrine's photos the current location of the objects we have been able to identify in the three museum collections [Figs. 10, 11, above]. That still leaves some material unaccounted for — see the enlarged photos appended below — but it is likely that an examination of the Trinkler collection (Gropp's catalogue does not include photos of everything) will provide additional matches. Since some of the painting fragments Skrine photographed show only partially in one of the photos, matching of them may prove to be impossible in any event (especially insofar as they are "thousand Buddha" images, which are numerous in the Trinkler collection). It is important to remember, of course, that Skrine by no means had photographed everything in the shop, whose inventory probably included dozens, if not hundreds, more objects.

Skrine's photos thus have provided some new information on aspects of the antiquities trade in Khotan. The phenomenon of the scattering of Silk Road antiquties amongst various collections is certainly well known, but here we can see a good example of the role played by an important dealer in Xinjiang in that process. Probably the lesson to be drawn from all this is a simple one, best given in Stein's own words, following his indication as to why he had designated Yotkan as the provenance of many objects, including ones obtained through his "trustworthy local factotum Baddrudin khan": "...Even in the case of these objects the evidence as to their provenance can obviously not claim the same value as if they were finds resulting from systematic exploration on the spot. As regards antiques acquired through other channels there is still greater need for caution before making any individual piece a basis for antiquarian argument" (Stein 1921, I, p. 97). A closer examination of the Skrine collection manuscripts reinforces this message.

Skrine's Central Asian manuscripts

The Donation Reports for the Department of Oriental Printed Books and Manuscripts of the British Museum record for 1 June 1925 that "Mr. Barnett has the honour to report to the Trustees that Mr. Clarmont Percival Skrine, I. C. S., has presented to this Department a valuable collection of mss. etc. brought by him from Chinese Turkestan." (DH36/4 Department of Oriental Printed Books and Manuscripts: Donation Reports, 1921–1926). Unfortunately hardly any other information is available about Skrine's acquisitions, nor are we lucky enough, as we are in the case of the antiquities which he presented to the Museum (see earlier part of this article), to have any photographs displaying manuscripts for sale in Khotan.

A certain amount however can be gleaned from Skrine's diaries and his book (Skrine 1926/1971), together with notes on the wrappers in which the items were originally presented or, in some cases where these are no longer preserved, from information presumably transferred from them into the Reading Room's List of Oriental Manuscripts.

As mentioned in the earlier part of this article, Skrine had already by 26 November 1922 "got hold of two practically complete books, in wonderful preservation, of exactly the same kind of script and material as some of the MSS described and pictured in Serindia." These were most probably the *Saddharmapuṇḍarīkasūtra*

'Lotus Sutra' (Or.9613 — see below for individual descriptions and case histories), the Khotanese *Book of Zambasta* (Or. 9614), and possibly also the *Suvarṇabhāsottamasūtra* 'Sutra of the Golden Light' (Or.9609 and 9610/3). They were purchased apparently from Moldovack and Badruddin: "At Khotan our Armenian friend, Mr. Keraken Moldovack, and the ex-Aqsaqal Khan Sahib Badruddin Khan allowed me to take for presentation to the British Museum a selection of ancient Buddhist manuscripts" (Skrine 1926/1971, p. 170). Or.9610 was, according to the Reading Room List, "found with Or. 9609" — information probably taken from a discarded envelope. The wooden document Or. 9612, and presumably also the tallies forming Or.9611, came from Khadalik according to their wrapper. The label preserved with Or. 9615 reads: "Documents found by Abbas Khan near Khadalik site. Keriya 14/4/24." We learn additionally from Skrine's diary of 14 April 1924 (quoted in the earlier part of the article) that Abbas Khan found them in 1923 at a site one potai (two and a quarter miles) north of Stein's Khadalik site. Or.9616 was described, according to the Reading Room List, as a collection of "Miscellaneous fragments from Buddhist books, found at Domoko."

More can be learned from studying the individual case histories of each manuscript, and for this we can be grateful to the fact that individual treasure-seekers did not exhaustively 'excavate' any one site at a time, perhaps regarding potential finds as an investment for the future. Either that, or their agents, middle men such as Badruddin Khan, deliberately split up items to be able to satisfy more customers, thereby earning more money. The case of Mulla Khwaja who guided Stein to Khadalik at the end of September 1906 is well known:

> Since my former journey certain fragmentary manuscripts in Brāhmī writing had reached Badruddīn Khān and through him Mr. Macartney, and on my first return to Khotan I had traced these to diggings which Mullah Khwāja, a petty official of Domoko, was said to have carried on at some ruin situated in the desert not far to the north of that village. Through Badruddīn Khān I had myself secured some fairly well preserved leaves of Sanskrit 'Pōthīs', and on my return from the mountains I had managed to get the man himself brought to Khotan together with some further specimens. Mullah Khwāja proved to be no regular 'treasure-seeker' but a respectable village official whom Merghen Ahmad, my old guide to Dandān-oilik, had some five years previously urged to look out for old 'Khats' such as he had seen me excavate. Mullah Khwāja, being in great arrears to the Keriya Ya-mên with revenue due from the oil tax, hoped for a chance of getting out of his debts by such finds. So he induced villagers accustomed to collecting fuel in the desert jungle north and east of Domoko to guide him to some 'Kōne-shahrs' not far off. Scraping among the remains at one of these small sites, known to the woodmen as *Khādalik* ('the place with the sign stake'), he had come upon the hoped-for 'Khats'. Having realized some money by their sale to the Indian and Andijānī Ak-sakāls at Khotan, and having sought favour by presenting others as curios to the Keriya Amban, he had intermittently carried on his burrowings for the last three years or so. [Stein 1921, p. 154].

The result of sporadic "burrowings" led to parts of the same manuscript being sold to different buyers while leaving some remnants in situ to be discovered by Stein and other explorers. These are now preserved in different institutions all over the world — abundant material for potential jigsaw puzzles to be reconstructed digitally.

The famous "Kashgar" (so-called because it was first associated in the west with Kashgar) Sanskrit *Saddharmapuṇḍarīkasūtra* (Or.9613), is perhaps the best example of this. The manuscript was probably first discovered at Khadalik around 1893 and the greater part sold to Nikolai Petrovskii (Consul in Kashgar, 1882–1903) who sent it to the Asiatic Museum in St. Petersburg. We know that it came from Khadalik because the geographer Ellsworth Huntington was taken there in 1905 and found part of another leaf of the same manuscript [Fig. 13].

Fig. 13. MS Huntington F, Collection of Yale University Library. After Huntington 1907, pl. facing p. 204.

Meanwhile Macartney had been regularly purchasing manuscripts from Badruddin on behalf of the Government of India, many of which must have been discovered by Mulla Khwaja at Khadalik from about 1902 onwards. One consignment of wooden documents and manuscripts, no. 148, forwarded for decipherment to the Indologist Rudolf Hoernle in 1906, contained a further four leaves of this manuscript. Macartney reported:

> It seems to me improbable that only these four sheets were discovered; and, as they may have formed part of a book and have been detached therefrom after discovery, I have written to Badrud Din that he should seek out the person from whom he obtained the sheets and endeavour to get from him the entire book, if such be in existence. And for Badrud Din's trouble I have promised him a handsome payment, should the book be reported to be genuine by experts.
>
> Badrud Din has sent me no particulars as to how he came by the different objects. My own experience of him convinces me that, even if he was asked for information, he could never furnish any, sufficiently accurate to possess scientific value. It is certain that he did not find these things himself; and most likely he bought them in the town of Khotan from labourers or from "treasure seekers" who make it their business to go, after a storm, into the deserts, in the vicinity of the town, and gather anything which may have been laid bare by the drifting of the sand." [BL IOLR MSS EurF 302/14, G. Macartney, Kashgar, to the Resident of Kashmir, 17 January 1906].

Despite Stein's exhaustive excavations at Khadalik in 1906, no further leaves of this manuscript were discovered, and by the time he returned there in the Spring of 1908, he found that the site had been destroyed by irrigation and was under cultivation (Stein 1912 vol 1, p. 246; vol. 2, p. 414). Possibly Badruddin had taken heed of Macartney's instructions to purchase the rest of the manuscript, even if he did not pass it on to Hoernle, because subsequent sales took place, and today only 12 leaves are missing. Skrine purchased 40 leaves either from Badruddin or Moldovack probably in 1922, and Emil Trinkler another 9 in February 1928. By chance, the left side of folio 282, purchased by Skrine, fits perfectly with Huntington's "Fragment F," which he discovered in 1905 [Fig. 14], proving conclusively that they are parts of one and the same manuscript (Yuyama and Toda 1977). Six fragments were also found or purchased by Count Otani Kozui whose three expeditions to Central Asia took place between 1902 and 1914.

Fig. 14. Composite of the right side of folio 282 verso of the Saddharmapuṇḍarīkasūtra*, showing Skrine's part on the left and Huntington F on the right. Right side based on Yuyama and Toda 1977, plate II.*

British Library Oriental Manuscripts Or. 9609–9616

Or.9609 [Fig. 15]

11 leaves (folios 3–5, 24, 26, 36, 53–56, and 68) of the Khotanese *Suvarṇabhāsottamasūtra*[21] written in Early South Turkestan Brahmi script (Sander 2009), possibly dating from the 6th century.[22] Purchased probably in 1922 (see above) from Badruddin or Moldovack.

Fig. 15. Or.9609A1/1, folio 5v of the Khotanese Suvarṇabhāsottamasūtra *written in Early South Turkestan Brahmi script, possibly dating from the 6th century. Dimensions: 37.2 x 10.5 cm. Photo copyright © British Library. All rights reserved. Reproduced with permission.*

This manuscript originally consisted of a few more than 82 leaves of which 28 survive today. It was written for a patron Puñabuddha (colophons on ff. 26 and 55). If Skrine was correctly informed that this manuscript was found with Or.9610 (see below), then it probably originated from Khadalik.[23]

Fig. 17. Or.9610/3v. Folio 15v of the Sanskrit Suvarṇabhāsottamasūtra *written in Early Turkestan Brahmi script s, dating from the 5th-6th century. Dimensions: 41.4 x 9.3 cm.*

Other locations

Institute of Oriental Manuscripts of the Russian Academy of Sciences, St. Petersburg (IVR RAN): 12 leaves (ff. 6, 28, 37–40, 59 [numbered 57], 60 [58], 62 [60], 73, X, and 82).[24] Signature: SI M/13. They were acquired by S. E. Malov, probably from Badruddin or Moldovack, during his second expedition to Central Asia, 1913–15.[25]

Berlin-Brandenburgische Akademie der Wissenschaften: Five leaves (ff. 29, 30, 32, 64, and 65). Signatures: Mainz 644, 650, 643; KS01, KS02. They were acquired by Trinkler in February 1928 from Badruddin or Moldovack and were given with seven other leaves, now apparently lost, to the Prussian Academy in 1930 (Gropp 1974, pp. 362, 364).[26] Fortunately old photographs of all the Trinkler folios are preserved in the Khotanese manuscript photo collection in Hamburg (Skjærvø 2004, vol. 2, p. 11). Gropp also published facsimiles of fols. 33 and 34 (1974, pp. 365, 366) and Trinkler himself included a photograph of folio 66r in his published expedition account [Fig. 16].

Fig. 16. Folio 66r, now missing, of the Suvarṇabhāsottamasūtra *purchased by Trinkler in 1928. After: Trinkler 1930, ill. 90 facing p. 160.*

Or. 9610[27] [Fig. 17]

Folios 225 (Or.9610/1) and 8 (Or.9610/2) of two different manuscripts of the Sanskrit *Saddharmapuṇḍarīkasūtra*, written in South Turkestan Brahmi script v (Sander 1968; Sander 2009), probably dating from the 8th to 9th century. Or.9610/3 is folio 15 of a Sanskrit *Suvarṇabhāsottamasūtra* manuscript written in Early Turkestan Brahmi script s (Sander 1968; Sander 2009), possibly dating from the 5th or 6th century. Purchased probably in 1922 (see above) from Badruddin or Moldovack.

Or.9610/3 has been provisionally identified (Wille 1997, p. 720) as being part of the same manuscript as Kha.i.301 (IOL San 1489), excavated by Stein from Khadalik i, a large Buddhist temple which yielded an enormous quantity of manuscript leaves in addition to frescoes and fragments of painted panels. If this identification is correct, Khadalik would then be the find-spot for all three manuscripts in addition to Or.9609 with which they were apparently found.

Or.9611, **Or.9612**[28] [Figs. 18, 19, next page]

Nine wooden tallies (Or.9611) and a record tablet (Or.9612) recording amounts of wheat received by the monk Jīyapuña. According to the wrapper of Or.9612, they were found at Khadalik.

Known folios of Ms Or.9609 of the *Suvarṇabhāsottamasūtra*					
Malov	6	28	37-40	59[57], 60[58], 62[60]	73, X, 82
Skrine	3-5	24, 26	36	53-56	68
Trinkler		29-35		63-67	

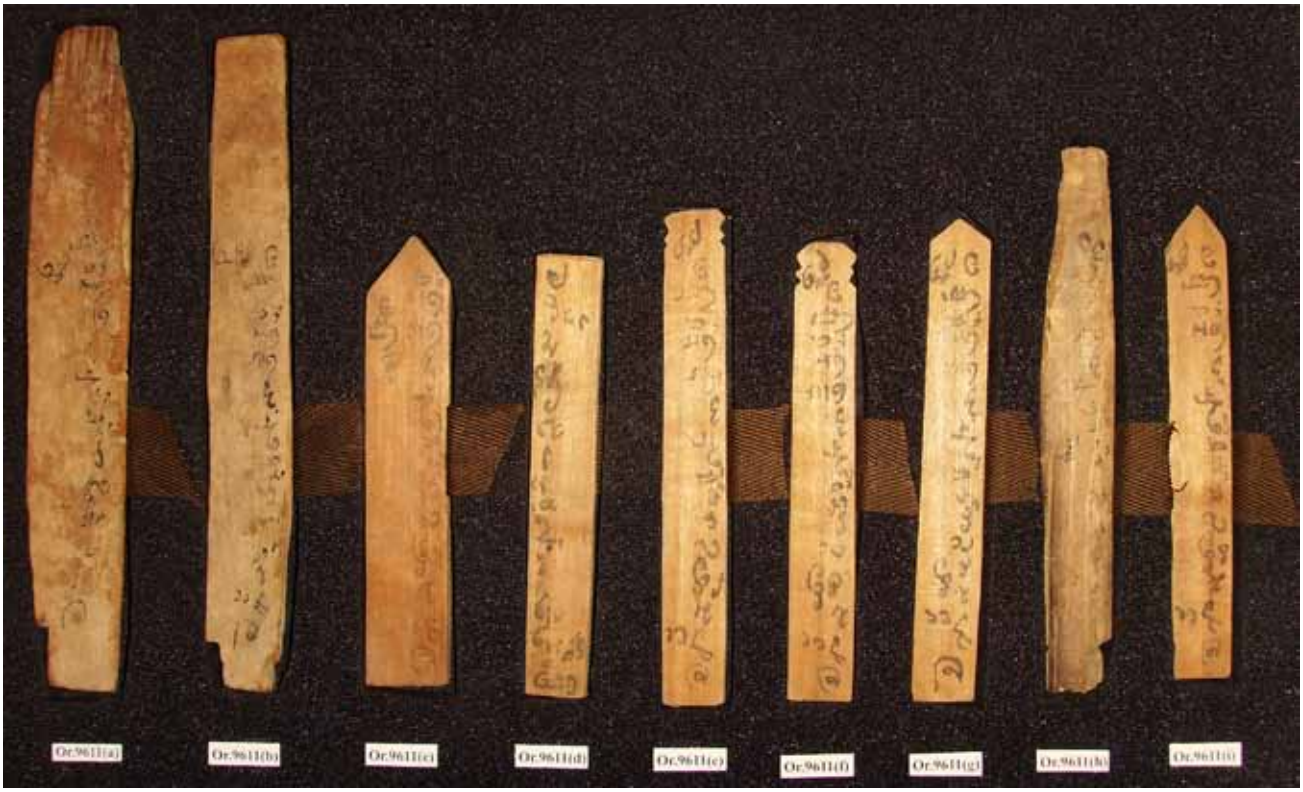


Fig. 18. Or.9611a-i, Khotanese wooden tally sticks recording receipts of wheat.

Fig. 19. Or.9612. Khotanese record of receipts of wheat, from Khadalik.

Or.9613[29] (see also above) [Fig. 20]

Folios 256-258, 282, 327-348, 360, and 13 fragments of other folios of the Sanskrit *Saddharmapuṇḍarīkasūtra*, written in South Turkestan Brahmi script v, dating from the 8th or early 9th century.[30] Purchased probably in 1922 (see above) from Badruddin or Moldovack.

This calligraphic large format manuscript originally consisted of 459[31] folios. It was written, according to the colophons (see Emmerick 1974; Lokesh Chandra 1976, p. 2), for the Lady Jalapuñānā, her husband Jalapuña, and their relatives. The manuscript came from Khadalik. The Skrine folios have been damaged by fire as have the similarly shaped preceding and following leaves, now in St. Petersburg, suggesting that the manuscript was split up

Fig. 20. Or.9613/1r. Folio 327r of the Sanskrit Saddharmapuṇḍarīkasūtra*, written in calligraphic South Turkestan Brahmi, dating from around the 8th or early 9th century. Dimensions: 56.1 x 18 cm.*

Extant folios of the "Kashgar" *Saddharmapuṇḍarīkasūtra* (after Toda 1981, pp. xii-xiii)														
Petrovskii	3-243	255	261-81	283-311, 321-326		349-59	361-66	369	374-78	380	385-446	448-59		
Trinkler	244-52													
Hoernle	253-54	259-60												
Skrine	256-58		282		327-48		360	367-73			380-84		447	
Huntington			282											
Otani								367-72						

after the damage had been incurred. An almost illegible note in Uigur, preserved with Or.9613, mentions the date 26 Zu'l-Hijja 1333 (November 1915), and some sellers(?): Muhammad Sharif and Muhammad Niyaz. A price of 'x' (illegible) tanga is also mentioned.[32]

Other locations

IVR RAN: 399 folios.[33] Purchased by Petrovskii ca. 1893 with further leaves presented by George Macartney in 1910 (Vorob'eva-Desiatovskaia 2008, p. 104). Signature: SI P/5.

Staatsbibliothek zu Berlin, Preußischer Kulturbesitz: nine leaves purchased by Trinkler from Badruddin or Moldovack in 1928 (Gropp 1974, pp. 362, 368). Signature: SHT 4439, formerly Mainz 685–689, 705, 706, 715, 717.

British Library (BL) Hoernle collection: four folios. Signature: Or.15011/28-31, formerly Hoernle H.148 SA 22-25.

Yale University Library, Manuscripts and Archives: one leaf. Signature: Huntington F.

Lüshun, Dalian: six fragments acquired by Count Otani. Signature: 20.1567/1-6, formerly P.23A-F.

Fig. 21. Or.9614/5. Folio 299 of the Khotanese Book of Zambasta*, written in South Turkestan Brahmi script v, probably dating from the 8th century. Dimensions: 41 x 12 cm.*

Or.9614 [Fig. 21]

Six fragments, forming folios 150, and 296–99 of the popular Khotanese verse manual of Buddhism, the *Book of Zambasta*,[34] written in South Turkestan Brahmi script v, probably dating from the 8th century. Purchased ca. 1922 (see above) from Badruddin or Moldovack.

Altogether 207 leaves survive of this manuscript extending from folio 146 to 440. Several colophons mention the patron, Zambasta, his son Zarkula and his other sons and daughters. As in the case of Or.9613 we know, because of Ellsworth Huntington's discovery of another leaf, that the manuscript came from Khadalik [Fig. 22]. It had also been partially damaged by fire.[35]

Fig. 22. Documents discovered by Ellsworth Huntington during his second expedition to Central Asia 1905-1906. Manuscript I is folio 214 of the Book of Zambasta*. After: Huntington 1907, ill. facing p. 206.*

Other locations

IVR RAN: 192 folios and two wooden covers (Emmerick and Vorob'eva-Desiatovskaia 1995, pp. 34-6. One is unfortunately now missing). Acquired by Petrovskii before 1903 (when he left Central Asia).[36] Signature: SI P/6.

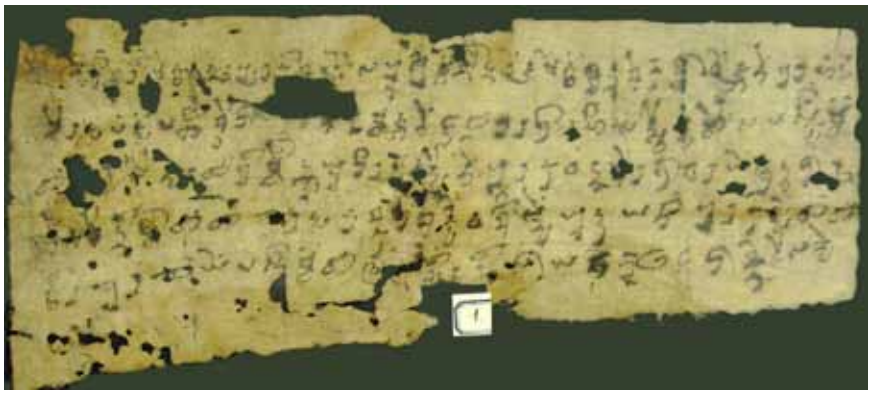


Fig. 23. Or.9615/1. Khotanese letter from a site near Khadalik, 8th century.

BL Hoernle collection: one leaf (f. 279). Part of a consignment of manuscript leaves sent to Rudolf Hoernle for decipherment in May 1903. They "were purchased from Badruddin, Aksakal at Khotan, and are believed to have been discovered in the Takla Makan Desert" (BL IOLR MSS EurF 302/14, R. Arbuthnot, Under-Secretary, Government of India, Archaeology and Epigraphy, Simla to A. F. R. Hoernle, c/o India Office, 25 May 1903). Signature: IOL Khot 154/8, formerly H. 142 NS 53 (see Emmerick 1968, pp. xiii-xiv; Skjærvø 2002, p. 345).

Yale University Library, Manuscripts and Archives: one leaf (f. 214). Found by Huntington in situ in 1905 at Khadalik. Signature: Huntington I

Asiatic Society of Bengal, Calcutta: six folios (ff. 269, 271, 334–5, 385, 389). In 1908, two leaves (ff. 269 and 335) were apparently offered for sale to Strassburg University Library by a Russian from Jerusalem (Leumann 1912, p. 11). These same leaves and four others (271, 334, 385, 389) were subsequently purchased by E. Denison Ross in Calcutta "from a Caucasian exile and Russian subject named Kara, who had, in his turn, acquired them from Caucasian Jews, who had gone to Khotan as carpet dealers and bought the leaves there" (Konow 1914, p. 13). Some of these references must surely refer to Keraken Moldovack the Armenian carpet and antiques dealer who lived in Khotan and collected antiquities for the Russians.[37] Additional information suggests that "Kara" might be a Russian officer who in May 1910 was offering Central Asian manuscripts for sale in Calcutta.[38]

Museum für Asiatische Kunst, Berlin: f. 270. Signature: MIK III 178.

Ryukoku University Library, Kyoto: f. 294, acquired by Zuicho Tachibana on one of Count Otani's Central Asian expeditions (Leumann 1963, p. 80). Tachibana was in Central Asia between 1908 and 1912 (Galambos 2008). Signature: Saiikibunkashiryo no. 11062, formerly Tachibana shiryo no. 41.[39]

Or.9615[40] [Fig. 23]

10 Khotanese documents, one Khotanese/Chinese, and one Tibetan, mostly in a very fragmentary state. Since two documents mention monks, it is possible that they originate from the archive of a Buddhist monastery. They were discovered in 1923 by Abbas Khan at a site two and a quarter miles north of Khadalik (see above).

Or.9616

17 fragments of a Prajñāpāramitā manuscript (Or. 9616/1–17),[41] written in South Turkestan Brahmi script v [Fig. 24]; 4 fragments of a second Prajñāpāramitā manuscrit (Or. 9616/18–20, 21); one fragment of a syllabary (Or. 9616/27) and over 100 further miscellaneous Sanskrit fragments. The collection is described in the Reading Room List as "Miscellaneous fragments from Buddhist books, found at Domoko," information presumably copied from a discarded wrapper.

Fig. 24. Or.9616/2. A Sanskrit Prajñāpāramitā *text, written in South Turkestani Brahmi script v, dating from the 8th or 9th century.*

Fig. 25. Or.9616/31-33. Forged documents supposedly from Domoko. Note the same four letters repeated in Or.9616/31 and 32.

This collection also includes three forgeries (Or.9616/31–33) [Fig. 25]. These are not unlike some of the forgeries, also apparently from Domoko, which Stein purchased from Badruddin in 1930 during his fourth expedition to Central Asia (Sims-Williams 2000, pp. 121–24).

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Ursula Sims-Williams is particularly grateful to Klaus Wille for his useful suggestions and help with identifications, also to Prods Oktor Skjærvø for his advice on various matters.

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154/9 Letters primarily to his mother, 1923

154/10 Letters primarily to his mother, 1924

154/43 Kashgar field diary (starting July 30, 1923; assuming there was a previous volume, it has not been preserved).

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Notes

1. Daniel Waugh is the principal author of the first part of the article; Ursula Sims-Williams is the author of the section dealing with the Skrine manuscripts.

2. The RGS collection has a third glass negative of Skrine's from Khotan showing the antiquities. At the time I ordered copies of the two images reproduced here, I passed it over, apparently either because I felt it duplicated material in one of them or was of inferior quality to reproduce. In response to my recent inquiry about the third negative, which has not yet been catalogued, the RGS photo library indicated that its current location cannot be determined, presumably because of the rearrangements involving the move of the collection since my visit several years ago. It is significant that the three negatives showing the antiquities were in an envelope inscribed (in Skrine's handwriting) "Yotkan antiquities" with the date May 5, 1925, when Skrine was back in London and shortly after his presentation to the RGS on "The Alps of

Qungur." That envelope also contained the negative showing Badruddin, reproduced in this article, and two images Skrine took showing the archaeological strata at the Yotkan site.

The major collections of Skrine photos (prints and negatives) now are in the RGS and the British Library; in both locations additional work is needed to identify exact locations and subjects depicted in them. I have examined most of this material, although, since it has been in the process or reorganization and cataloguing, possibly additional photos may turn up. One group of images I did not have access to from the RGS collection was the lantern slides Skrine prepared for a lecture he gave to the Society, although the subject for it was his explorations in the mountains. The BL (IOLR, Photo 920/1) has several prints of artefacts Skrine photographed in Khotan, one being of several appliqué terracotta ornaments, presumably ones acquired by Skrine and now in the British Museum. Two photographs of individual objects (BM 1925,0619.1 and 1925,0619.40) were published in Skrine 1926 facing p. 170. The other photos in the BL depict various craft items of more recent manufacture.

3. After Petrovskii had retired, the Russian consul Sokov continued to collect for Russian museums, as Albert von Le Coq learned in 1913 (Von le Coq 1928, pp. 29-30).

4. The Stein papers in the Bodleian Library, Oxford (MSS 107), which I have searched somewhat cursorily for material relating to Skrine, contain a certain amount of their correspondence when Skrine was in Kashgar, but apparently not any of Skrine's letters regarding antiquities. At various points, Skrine thanks Stein for sending copies of publications (including *Serindia*), and they do discuss Skrine's explorations in the mountains south of Kashgar. Skrine sent "Sir Aurel's last letter to me" to his mother for safe-keeping on February 16, 1923; perhaps this was the reply to Skrine's communication about the antiquities in Khotan (BL IOLR EurF 154/9, CPS to HSS, 16 February 1923). In the same letter home, Skrine noted that he had just sent Stein some 20 enlargements to look at and then forward to Mrs. Skrine in London. I have not found any letters from Stein to Skrine in the Skrine papers at the BL.

5. Skrine did at least photograph the cliff facade and the caves from below, probably on his visit there May 5, 1923, when he wrote his mother from Uch Merwan (BL IOLR EurF 154/9, CPS to HSS. 5 May 1923). He lists the photo in a typed set of captions he provided a literary agent, J. E. Pryde-Hughes, 22 July 1927 (Skrine papers, document temporarily held by DCW with permission of the late John Stewart); its negative, unnumbered, is in the RGS collection.

6. In his book, under the guise of citing a letter or diary entry (neither of which have turned up in his unpublished papers), Skrine describes how he and his wife Doris stayed at Badruddin's in 1922 (Skrine 1926/1971, pp. 118-119). On his return to Khotan in 1924 he was writing his mother from Badruddin's garden (BL IOLR EurF 154/10, CPS to HSS, 20 April 1924). The photo he took of his host must date to the second visit, as we learn from Skrine's typed caption list of 1927: "A leading British Subject of Khotan, Khan Sahib Badruddin Khan, in the garden of his town house. (Note the masses of peach-blossoms on the trees and the windows of the guest-rooms decorated with silks and embroideries)." The photo was published in Nazaroff 1935, facing p. 152; the print is from a glass negative in the RGS collection.

Skrine's published book and his letters and diary complement one another but do not always overlap, even though Skrine clearly drew heavily on the unpublished material and quotes extensively from it. As I have shown (Waugh 2007), some of the purported quotes undoubtedly were in fact composed when Skrine sat down to write the book after leaving Kashgar. This does not mean, however, that the information in them is wrong. Clearly he added many details to the book that were not in his and his wife's contemporary writings from Kashgaria.

7. One may assume that his becoming the aqsaqal of the Afghan community in Khotan helped him establish connections with his European customers. Badruddin's assumption of this position must have been recent, since in 1891 one Akram Khan was still aqsaqal of the Afghan community (Dutreuil de Rhins 1897-1898, I, p. 46). Macartney, recommending Badruddin's services to Stein, writes that his father had also been an aqsaqal (see Macartney to Stein, 22 March 1899, Bodleian Library Stein Collection 289, fols. 74-8). Capt. Godfrey in Srinagar told Stein that Badruddin's father Khairuddin had transmitted antiquities via his son, but it is not clear whether the son succeeded his father in the position (see Godfrey to Stein, 17 October 1899, Bodleian Library Stein Collection 289, fols. 121-122).

8. Mannerheim has a photo of Badruddin (whom he calls Badsuddin and terms "the former Indian aksakal of Khotan") on p. 89. Badruddin and his nephew accompanied Mannerheim to several locations in the vicinity of Khotan but apparently did not provide the visitor with much of anything in the way of antiquities himself. Mannerheim notes that in fact there was little of value to be had, since Stein had probably obtained most of the good material on his recent visit, and there also had been purchases by Japanese a couple years earlier. Badruddin did help him negotiate purchases of some "täzkirs," written accounts of legends about local Sufi shrines. Mannerheim then noted that the only way he could pay was for Badruddin to transmit the money to the local mullahs, although it was uncertain how much of it they then would receive. And indeed, once back in Kashgar Mannerheim received a letter in English from Badruddin in which the latter wondered when the payment [which in fact had already been made] would be forthcoming. Mannerheim used this

incident as the excuse for a diatribe about the perfidy of "the Sart who sucks in treachery and deceit at his mother's breast" (Mannerheim 1940/1969, I, pp. 113-114; also p. 104). So in the end he appears not to have been very grateful for all the assistance Badruddin had provided.

9. In his catalogue of the Stein materials in what was then the Central Asian Antiquities Museum in Delhi, Fred Andrews (1935) listed the items specifically obtained from Badruddin under the sites from which it was presumed they had come.

10. Von le Coq in 1913 reported a small triumph in managing to talk Badruddin out of material reserved for Stein (Sims-Williams 2000, p. 126n12, citing Klaus Wille).

11. The identification of the individuals in this photo is taken from captioning on its print in BL IOLR Photo 920/1. The RGS has the original nitrate negative.

12. For the visits to Yotkan, see Skrine 1926/1971, p. 171; BL IOLR EurF 154/43, p. 59, diary entry for 2 May 1924; BL IOLR EurF 154/10, CPS to HSS, 8 May 1924. A small print of one of the two photos is in BL IOLR Photo 120/1; the photo was printed in Nazaroff 1935, facing p. 56, one of a good many photos Skrine allowed Nazaroff to use. Two glass negatives of the Yotkan strata are in the RGS collection; see above n. 2.

13. The Skrine collection is listed, almost in its entirety, in the British Museum's online database and illustrated with photographs, many the ones taken by me in November 2009. A selection of these photos has been appended below.

14. While it is difficult to be certain without seeing a photograph of the object in question (Bremen Museum A 15935), Gropp 1974, p. 250, describes what may be one of these heads and reasonably suggests that it may be a modern fabrication.

15. Perhaps significant in this regard is the fact that Skrine was given only parts of manuscripts, other leaves of which were sold on separate occasions both earlier and later and are scattered in various collections around the world (see below). At present it is impossible to say whether they may first have passed through Badruddin's shop before they were dispersed. It seems that Badruddin did not always keep very careful track of the manuscripts in his possession. When staying with him in 1914, August Francke and Hans Körber reported stumbling across some manuscript fragments in the "writing room" and Baddruddin's remembering where he had another packet of such material, which the Germans then purchased (Francke 1921, pp. 92ff.).

16. These include "small intaglios from rings, two square metal seals, one with a classical winged bull intaglio, the other with Chinese lapidary characters similar to the impression of the Chinese offical's seal shown in "Ruins of Desert Cathay," Vol. I, plate 95 (6)...copper coins of the Han and Tang dynasties" (Skrine 1926/1971, p. 171n1). There are a few gaps in the online inventory numbering for the Skrine collection; likewise a few items did not turn up when examining *de visu* the objects in storage. It may be some of this material is to be found under those numbers. Unfortunately, the original inventory listing for his donation in 1925 could not be located, although it seems unlikely that it contains any additional information about the provenance of items in Skrine's collection. The Museum's Report of Donations and Standing Committee reports do not contain any detailed listing of the material.

Items such as the coins likely have been catalogued elsewhere in the Museum's records. It is possible, of course, that, despite his statement in his book, they never went to the Museum. The continuation of his letter to his mother, quoted above p. 57 is this: "The above are all Museum things, and I don't want to buy them for myself, only for the Archaeological Dept. whose authority I have to spend money on their behalf. What I do propose to acquire, if I can at a reasonable price, on my own be half are two or three delicious little corullian and garnet intaglios and a copper seal or two, all dating from the early centuries of our era, and in two cases at least bearing exquisite little works of art carved on them. One is a rectangular bit of corullian with a most lifelike wild boar cut into it; the other a copper seal of a Pegasus-like winged horse, a beautiful piece of work. There is also, if you please, a pair of dice, just like modern dice but larger and with the dots rather uneven and the whole very worn, which were unearthed from a site 15 days journey into the desert from Domoko!"

17. The proposed Balawaste connection for the Harding material had already been made by Fred H. Andrews (Stein 1928, II, 1052-1053; Andrews 1933/1981).

18. Mr. Leonard Pepper of Oxford has been studying Harding's career and kindly provided me several years ago with his annotated transcription of Harding's travel diary from his journey up to Kashgar in 1922 (Harding managed to get the Swedish Mission Press in Kashgar to publish it) and an unpublished essay on aspects of Harding's career. There is nothing in this material which sheds light on Harding's involvement with the antiquities, although that is not to say evidence regarding that subject may not be located.

19. Harding had gone on "tour" in April, returning to Kashgar in early June from Khotan. So he could have negotiated the matter of the antiquities on that trip. Skrine was so busy in his letters home explaining his frictions with Harding that he never commented on any details of what exactly Harding was supposed to be doing on that tour. The letters are in BL IOLR EurF 154/9.

20. An interesting fragment of wood sculpture obtained by Harding (National Museum, New Delhi, Har. 028) with the other material discussed here is the focus of a recent article by Sampa Biswas, "The

Iconography of Buddha on a Wooden Panel from Khotan," *IDP News* No. 34 (2009-10): 1-3.

21. For an edition, translation and comprehensive introduction and commentary see Skjærvø 2004. For details of this manuscript (Or.) see vol. 2, pp. 16-39.

22. For a 7th or 8th-century date see Sander 2009, p. 138, but Skjærvø (2004, vol. 1, p. lxii) places it in the 5th or 6th century on linguistic and textual grounds.

23. Gropp (1974, p. 31) suggests that the manuscript may come from one of the great stupas in Rawak, though he does not give any reason.

24. Emmerick and Vorob'eva-Desiatovskaia 1995, pp. 179–80, suggest that because some text is repeated twice, the Malov leaves may in fact be from two similar manuscripts. Skjærvø (2004, vol. 1, pp. lxvi–lxvii), however, attributes this to a scribal error.

25. The Malov mss. were rediscovered in 1990 in a box containing a label indicating only that they had been brought by Malov from Khotan and were collected between 1913 and 1915. The contents were "crumpled and torn manuscript folios and fragments mixed with dirt and sand," on the basis of which Emmerick and Vorob'eva-Desiatovskaia concluded that "Malov had evidently taken the material directly from archaeological sites that had been abandoned by the excavators" (Emmerick and Vorob'eva-Desiatovskaia 1995, p. 8). However this evidence alone does not seem sufficient justification for such a view.

26. Gropp (1974, p. 362) specifies that Trinkler acquired his manuscripts from Badruddin, but without citing any references. However, as mentioned above, Trinker himself (Trinkler 1930, pp. 135, 139) did not say exactly what he got from either of his Khotan contacts.

27. Edition: Wille 1997.

28. Edition: Skjærvø 2002, pp. 77–8.

29. Facsimile of the whole manuscript: Lokesh Chandra 1976; romanized text and edition: Toda 1981.

30. Toda 1981, p. xii, suggests a 9th or even 10th-century date. However there is no evidence to suggest Khadalik was inhabited after the 8th or early 9th century (Stein 1921, pp. 159, 164), and the language of the colophon seems to agree with other Middle Khotanese (7th–8th century) inscriptions (P. O. Skjærvø, personal communication).

31. So Toda 1981, pp. xii–xiii, but 467 according to Vorob'eva-Desiatovskaia 2008, p. 104.

32. I am grateful to Dr. Abdurishid Yakup of the Berlin-Brandenburgische Akademie der Wissenschaften for deciphering this for me.

33. However Toda 1981 lists a total of only 396 leaves.

34. Edition and translation: Emmerick 1968. See also Skjærvø 2002, pp. 78–80.

35. Fire-damaged leaves are: ff. 146-50 and ff. 267-99 at St. Petersburg and the British Library which to judge from their appearance were together in a bundle. However ff. 269–71 in Berlin and Calcutta are in perfect condition. The manuscript must have been split up at least twice: before the fire and again after it, but before it was sold off to different buyers.

36. But apparently presented to the Asiatic Museum in 1909 (Vorob'eva-Desiatovskaia 2008, p. 103), which was after Petrovskii's death.

37. Francke 1921, pp. 93–94, writing on the relationship of Moldovack and Badruddin: "Es wurde uns nun klar, daß wir zwischen zwei Feuer geraten waren. Der Aksakal hatte klaren Auftrag bekommen, für die englische Regierung, zuhänden des wieder im Innern Asiens reisenden Sir Aurel Stein zu sammeln; Herr Moldowack dagegen war Sammelagent für die russische Regierung."

38. I thank my BL colleague Imre Galambos for this. He tells me that in a letter preserved in the National Széchényi Library, Budapest, dated 5 May 1910, a Hungarian, Emanuel Maurice Löffler, wrote (Galambos' translation): "A few days ago a Russian officer from Central Asia arrived here from the Taklamakan region, and brought with him five documents on parchment that had been found near Khotan…We have not been able to determine the language of the writing, linguists here are of different opinion. But they are thought to be in the same language as the 3–4 fragments acquired in the same location by our eminent Dr Stein. The parchment has writing on both sides. Dr. Ross believes that it is very old, thousands of years old, and extremely rare. Of the five pieces, Dr Ross obtained two, while I held on to the remaining three, in order to give the Academy an opportunity to consider purchasing it. Said Russian officer has been asking 350 rupees per document but I think that it would be possible to get them for 275 a piece." Löffler offered to procure them for the Hungarian Academy if they were interested, promising to do his best "to keep their owner in check, lest these rare copies are bought by a foreign society."

39. I thank Giuliana Martini and Yutaka Yoshida for ferreting out this information.

40. See Skjærvø 2002, pp. 80–82.

41. Identified by Klaus Wille (personal communication).

Details of Skrine's photos showing objects whose identification has not yet been firmly established

Objects shown in RGS photo no. S0008595

(left) Gropp 1974, Inv. no. A 16149 (now missing its head). Below it is an unidentified panel and to its right apparently BM 1925,0619.22.

(right) fragment from bottom row.

(above) two fragments from bottom row.

(below) two fragments from upper row.

The second fragment from right is Gropp 1974, Inv. no. A 13896; the others are unidentified but most likely are in the Bremen collection and listed by Gropp.

Objects shown in RGS photo no. S0008597

(right) probably Gropp 1974, Inv. no. A 13912

(below) almost certainly Gropp 1974, Inv. no. A 16116

(left to right): Gropp Inv. no. A 13896; 30.32.20 (the hand); unidentified.

(right) BM 1925,0619.21 (Gropp 1974, p. 160, ill. 61).

(below) BM 1925, 0619.19 (Gropp 1974, p. 164, ill. 66).

BM 1925, 0619.20 (Gropp 1974, p. 164, ill. 67).

BM 1925,0619.26 (Gropp 1974, pp. 146–49, ill. 54c).

BM 1925,0619.30 (detail) (Gropp 1974, pp. 146-49, ill. 54b). In Gropp's reconstruction, the fragment here was above the hand holding the bowl in BM 1925,619.26. See his ill. 54a.

The upper half of a painted wooden panel, BM 1925,619.36.

(below, top) National Museum, New Delhi, Harding D (Gropp, pp. 131-34, ill. 50b). The photo is somewhat streaked because of reflections on the glass. This image is well known from various publications.

(below, bottom) BM 1925,0619.31 (ibid., fig. 50c). As Gropp indicates, the Skrine fragment is the right leg of the seated Dhyani Buddha (see his reconstruction, ill. 50a).

Nomads and Settlement: New Perspectives in the Archaeology of Mongolia

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The "archaeology of mobility" in recent years has moved quite far from traditional approaches to the study of "nomadic" societies (*Archaeology* 2008, reviewed in Waugh 2009; *Social Complexity* 2009; Houle and Erdenebaatar 2009). Instead of the seemingly antithetical poles of the "steppe and the sown," most work nowadays emphasizes a continuum where mobility and settlement and the economies of the populations involved in them may be mixed in varying degrees. We no longer think of "pure nomadism" of the type that most of the earliest written sources, produced in sedentary societies, describe with reference to the "barbarian" other. The methodologies underlying some of the new interpretive approaches are still very much in the process of development, which may be one reason that the newer perspectives on "nomadism" have not yet had the broad impact they deserve on the more general treatments of pre-modern Eurasian history. While I cannot encompass all of the methodologies, I hope that a selective review of this literature will be of some value both to specialists and the general reader. Such a review reveals how much information there is on settlements in the pre-modern steppe regions, at the same time that it reminds us how slim the foundations of that knowledge yet are and how rapidly our understanding of it is changing. At very least we might conclude that sweeping generalizations, based on older perceptions about the nature of nomadic societies, should be abandoned, even if it is premature to arrive at a new synthesis.

My focus is what I shall term "greater Mongolia" [Fig. 1], that is, not just the territory of the independent country but including as well Southern Siberia (Tuva, Transbaikalia), and the Inner Mongolian Autonomous Region in China.[1] This inclusiveness reflects historical realities in which various peoples occupied territories other than those defined by modern political boundaries. My chronological scope is also a very broad one, what we might call the *longue durée*, starting at least as early as the Bronze Age and extending down through the Mongol Empire.[2] To encompass this long span of several millennia allows one to raise questions (though probably at best only begin to suggest answers) regarding long-term historical change in settlement patterns. That is, we begin in a period when settlments were arguably small, perhaps only seasonal, and we end in a period when we find urban centers in the steppe. While some types of settlement presumably had a long life, others emerged for which there may not have been any precedent within this large territory and whose form was very much influenced by external models.

Whether we now can develop a methodology to understand processes involved in settlement as a framework for future study is a subject of intense current interest. It is clear that even very specific new research into particular settlements (the existence of some of which has been known for a long time) may leave us with more questions than answers. An excellent

Fig. 1. "Greater Mongolia." Base map from < http://www.lib.utexas.edu/maps/middle_east_and_asia/mongolia_rel96.jpg>.

illustration is that of Karakorum, which was for a time the capital of the Mongol Empire in the 13th century, and which has tended to serve as a reference point for other considerations of "urban" entities in Mongolia, even as what we thought we knew about Karakorum is very much in a process of reassessment. A broader comparative perspective on the material from Mongolia is desirable, but for practical reasons cannot be attempted here.

Bronze and Early Iron Ages

Some of the most innovative new work in Inner Asian archaeology relates to the Bronze and early Iron Ages, a time when, it has been argued, changes in climate may be correlated at least in specific regions with the emergence of conditions suited to nomadic pastoralism. Analytical approaches are being developed which attempt to interpret archaeological evidence with reference to landscape and ecology (Frachetti 2008). Even if older studies of the early pastoralists detected few traces of their habitations, there is in fact evidence which now is making it possible to identify sites of even seasonal settlement and begin to connect them with paths of likely movement, e.g., between summer and winter camps which often are not very remote from one another. Integrated into this analysis are burials and cemeteries and other evidence concerning what reasonably may be interpreted as ritual sites. To a considerable degree the advances in our understanding of the societies in certain regions are due to the employment of several different kinds of methodologies including settlement study, bioarchaeology and regional survey (Nelson et al 2009, p. 577). The results should eventually transform the archaeologically-based understanding of the early history and culture of Mongolia.

One of the most ambitious and successful survey projects has been the joint Mongolian-American-Russian one, carried out over a decade and encompassing parts of far western Mongolia and some of the adjoining areas just across the border in southern Siberia.[3] The surveys have documented major assemblages of petroglyphs, standing stones, *khirigsuurs* (large ritual stone mounds with surrounding features) and other surface monuments which reflect millennia of human activity. The richness of the archaeological landscapes of Mongolia is truly astonishing and, until projects such as this one, has been insufficiently appreciated.

While modern ethnographic observations can be of some help in trying to interpret the archaeological data, as those who invoke such extrapolation from the present generally recognize, one must be very cautious not to assume identity between what we now see and the cultures of the distant past. That said, in particular the rich visual material in the petroglyphs in areas such as the Mongolian Altai, to the extent that it can be dated even approximately, does allow one to reconstruct some basic aspects of social and economic life and their changes over time. We can identify animals that were hunted, see the hunts in progress, see the use of wheeled vehicles, the advent of mounted horsemanship, the processions of loaded caravans, the use of settled enclosures or buildings [Fig. 2], possible ritual dances, social conflict and more. It is pretty certain that some of the major concentrations of petroglyphs are in the vicinity of what were undoubtedly the winter camps of pastoralists; major ritual sites marked by standing stones

Fig. 2. Horses being led to an enclosure. Bronze Age petroglyph, Baga Oigor III site, Mongolian Altai.

or khirigsuurs must have been ones which were visited on a regular basis. The pastoralists did not simply move through an area and never return; some part of their annual cycle involved a settled existence; one can certainly speak of central places in their lives (Houle 2009, p. 365). How the peoples who left these surface monuments viewed their surroundings can be conjectured on the basis of the imagery, the positioning of the monuments in the surrounding landscape, and other kinds of data. The rich surface documentation extends at least down through the Turkic and Uighur periods of the 6th–9th centuries, at which time image stones with depictions of people become a common feature (and can be found later as well).

Fig. 3. The khirigsuur at Urt Bulagyn (KYR 1) from the southwest.

In the area of this major survey project, excavation of ritual sites or graves is still at an early stage. Thus our knowledge of the material culture of the peoples and clues about their identities is still limited. However, there is good reason to believe that those who inhabited the Mongolian Altai are related to those who lived in some of the archaeologically better documented areas across the mountains in, say, southern Siberia. Moreover, identification of settlement sites has proved to be difficult, even if some of the ritual features include what may be characterized as "dwellings" at least in the symbolic sense of space delineated by stones which might be understood to resemble an enclosure or house.

In another region where extensive archaeological survey has been undertaken, the Khanuy River valley, there is impressive evidence of activity that would have required marshalling of considerable human resources to construct ritual centers and their monuments (Houle and Erdenebaatar 2009; Houle 2009). Of particular interest here has been the study of khirigsuurs, mounds of often monumental size, many of them surrounded by very complex structures.[4] The most striking example investigated to date is at Urt Bulagyn, which has over 1700 satellite mounds [Fig. 3]. A debatable question is whether the orientation of it and neighboring monuments can be connected with construction at a particular season with reference to yet unspecified celestial phenomena (Allard and Erdenebaatar 2005; Allard et al. 2002 [2006]). The age of the sacrificied horses in the satellite mounds suggests a probable connection with autumn rituals. Absolute dating is as yet imprecise, but it seems that the khirigsuur complexes in the region fall between the late second millennium BCE and about 700 BCE. Another controversial issue is whether such structures were constructed in a relatively short period of time or whether satellite features were added over a period of centuries, indicating the repetition of ritual events at the site. While no remains of permanent settlements have yet been found in the area, careful survey work suggests "a much more 'settled' pattern of mobility than hitherto thought," with clustering around the monumental structures (Houle and Erdenebaatar 2009, pp. 127–28). Thus there is good reason to think that there was some regular cycle of habitation, even if the society that produced them was basically mobile. It has been suggested that such structures were built by relatively localized groups whose leaders could marshal significant resources even in a period when there were no larger political entities that controlled the region.

Work in the Egiin gol on Bronze Age sites is also opening up new interpretive possibilities for understanding change over time in the

societies that constructed them (Honeychurch et al. 2009). The evidence about chronology is still limited, and the excavations are so few as to leave open questions about the statistical sample. Yet it does seem possible to suggest correlations between the nature and distribution of the sites and social change and the possible relationship of these changes to the development of interactions over long distances, facilitated by the introduction of horse riding.

The Xiongnu

We first encounter walled settlement sites in our larger Mongolia in the period of the Xiongnu, who emerged as a major polity around 200 BCE and continued to play an important role in Eurasia at least into the middle of the second century CE. Xiongnu archaeology has attracted a great deal of attention. Apart from a range of cemetery excavations encompassing both elite and ordinary burials, there have been excavations at a few settlements. The first of these to be thoroughly studied are in Buriatia, south of Lake Baikal. Best known is Ivolga, a settlement which had a quadruple wall and may have housed as many as 3000 inhabitants (Davydova 1988, 1995, 1996).[5] At least some of the population lived in semi-dugout houses (a kind of construction found in other areas of Siberia down into modern times), ones which are distinctive in their having heating flues under benches around the inside of the building. Such heating systems, known from the Bohai Culture of northern Korea and Manchuria but possibly of Han Dynasty Chinese inspiration, are also to be found centuries later in some of the urban sites in Mongolia. The Ivolga site has yielded many artifacts, including evidence that at least part of the local diet consisted of grains, possibly some of them grown locally. The abundance of iron artifacts and pottery of often impressive dimensions and solidity in Xiongnu sites surely points to there having been possibilities for significant local production, which would of itself suggest that at least portions of Xiongnu society were settled during part of the year. Thus, the picture in the Chinese annals of a largely nomadic society cannot be entirely accurate. Yes, as abundant archaeological evidence indicates, horse breeding was important in the society, the Xiongnu were mobile (we even have a sketch of one of their camps with several trellis tents in it), but we cannot be certain exactly what the role of a settlement like Ivolga was (see, e.g., Kradin 2001, esp. p. 80).

Another Xiongnu settlement, at Boroo Gol, within 25 km of the Noyon uul cemeteries in the mountains of north-central Mongolia, has strikingly similar features to those at Ivolga (Ramseyer et al. 2009; Pousaz and Turbat 2008). Possibly Boroo Gol is to be connected with gold-working in its adjoining region, but yet uncertain is whether it "was a permanent or a seasonal" village. Another of the unresolved questions concerns chronology, since preliminary data for one house dates it between 320 and 200 BCE, whereas for another house, the date range is 80–250 CE. One can only speculate on the possible relationship of the site to the cemeteries at Noyon uul.

Other, purportedly Xiongnu, settlement sites have been identified, but are as yet poorly known.[6] Preliminary excavation at Terelzhiin Dörvölzhin in the Kherlen Valley has focussed on a single central building where some "Han type" roof finials have been found (Danilov 2009). The nearly square walled enclosure measuring some 220 m. on a side bears at least a superficial resemblance to the three large square enclosures at Tamiryn Ulaan Khoshuu, [Fig. 4] west of the intersection of the Tamir

Fig. 4. Settlement site at Tamiryn Ulaan Khoshuu, view from NE showing Structure A and part of Structure B.

and Orkhon rivers (Purcell and Spurr 2006, esp. pp. 27–31). Yet to date we cannot even be certain those are from the Xiongnu period. To study properly such large sites (and for that matter, any other sizeable settlements) will be a major undertaking, especially where there may be relatively few structural remains beyond the walls themselves.

Where there are cemeteries adjoining the settlements (the one substantially studied example is at Ivolga), we might hope to establish something about the identity of their populations. Yet to date there seems to be little unequivocal evidence. At present, it seems safest to propose that the Xiongnu polity encompassed a mixed population, with some Mongoloid (northeast Asian) and some Caucasoid members. Too much of what has been written on this subject is based on cranial metrics; there is so far little DNA testing. As Christine Lee notes, "both of these methodologies have serious issues" (Lee 2009).

Not the least of the challenges in learning about the Xiongnu is to establish a clear chronology of sites across the whole area of what at one or another time was considered to be part of the Xiongnu polity.[7] As yet we know little about Xiongnu sites in what is now Inner Mongolia, some of which might be presumed to be "early" given what some posit concerning Xiongnu origins. Xiongu-period burials at the Baga Gazaryn Chuluu site in the Mongolian Gobi may be as early as the 2nd century BCE (the period of the presumed greatest flourishing of the Xiongnu polity) (Nelson et al. 2009). We still have no clear sense of the impact of the Han Dynasty's aggressive moves against the Xiongnu and reestablishment of some control over its northern frontiers, which may have shifted the center of the Xiongnu polity and possibly then changed the nature of its built environment. As Ursula Brosseder has recently suggested, such monumental structures as the Xiongnu terrace tombs may be a "late" phenomenon, from a period when the Xiongnu polity was under considerable stress (Brosseder 2009).

Of particular interest if we are to understand better the evidence from various periods regarding settlements in pre-modern Mongolia is the project which has been underway in the Egiin Gol Valley of north-central Mongolia. As its authors state, the study emphasizes "the importance of a long-term perspective on mobile pastoralism that allows us to see shifts in strategy and in productive scale from local networks to those involving expanded territories, larger groups, and urban centers." (Honeychurch and Amartüvshin 2007, p. 56; also idem (2002) 2006; Honeychurch et al. 2009). The methodologies applied here might well be applied to other areas where to date the focus has been on localized excavation without sufficient study of surrounding landscapes and their resource potential for supporting human habitation. The survey work in the Egiin gol in effect worked from two chronological directions. For assessing the productive potential of the area's varied ecology for pastoralism and agriculture, it was necessary to study contemporary practices and recent historic data. This then provided the basis, granted, on a still rather hypothetical level, for correlating productive potential with the location of archaeological sites dating from the Bronze Age (or even earlier) down through the Xiongnu and Uighur periods. Of particular interest here is evidence suggesting a growing emphasis on agriculture in the Xiongnu period, possibly to be understood as reflecting resource management in the time of the developing centralized Xiongnu polity, but then the apparent decline in the interest in agriculture in the Egiin gol in the Uighur period. This decline might be related to the emergence of true urban centers amongst the Uighurs in the valleys to the west of the Egiin gol, where towns were surrounded by extensive agriculture and seem to have served as focal points around which the Uighur elite courts and retinue moved on a regular basis. While the focus of the Egiin gol study is not to analyze this urban development, its authors conclude with stimulating suggestions about the relationship between nomadic pastoralists and urban centers: "The nature of the steppe city and its relationship to a mobile hinterland was an entirely novel form of 'central place' innovated by steppe nomads specifically for negotiating a mobile sociopolitical and economic context" (Honeychurch and Amartüvshin 2007, p. 58). If we accept this view, we may in fact arrive at a much better understanding of the functions of the urban centers than we have had to date.

One of the larger issues here concerns the mechanisms for the emergence of "nomadic empires" and the degree to which they

may or may not have depended on external stimuli for their development. While possibly the differences in the interpretive stances here have been exaggerated, in a somewhat simplified form, the conflicting interpretations are represented by Thomas Barfield, who emphasizes the external factors and persistent patterns, and Nicola Di Cosmo, who emphasizes internal ones and evolutionary change. The work on Egiin gol supports the position of Di Cosmo, as does a recent attempt to survey and classify the types of urban settlements in Mongolia from the Uighur through the Mongol period.[8]

One of the major gaps in our knowledge of settlements in greater Mongolia is for the period between the Xiongnu and the Uighurs, that is from about the second to about the eighth centuries CE. Of particular significance is the fact that we still have such limited archaeological knowledge of groups such as the Xianbei, who replaced the Xiongnu in certain areas.[9] One can at best hypothesize regarding their socio-economic transformation accompanying their presumed movement west and south from a homeland in northeast Asia into the steppe region. It would be dangerous to attempt to read back from the better documented history of the Northern Wei, their successors who established an important state in Northern China in the late 4th century. Written sources suggest that there were large migrations and substantial settlements at, for example, Shengle (in today's Inner Mongolia just south of Hohhot). The Northern Wei seem to have had a number of fortified centers (protecting themselves against incursions by newly emergent threats on their northern frontiers). Yet even a site as important as Shengle is little known, despite its long history of settlement both antedating and postdating its brief existence as the Northern Wei capital. Very quickly the Northern Wei moved their capital over the mountains to the south, where their orientation was no longer in the first instance to the steppe world but rather to sedentary China (Dien 2007, esp. pp. 15–32; Steinhardt 1990, pp. 91, 78–87). While this is a period when we can see the spread northwards of a Chinese imperial model of city planning, how we might best interpret the processes of its assimilation remains an open question. Given the complicated patterns of interactions across "borders" in this frontier zone, and in the absence of major excavation of important urban centers, there probably is little that can be established with certainty about the earliest layers of settlements along the northern frontiers, now overbuilt by the fortifications and buildings of later eras.

The Türks and the Uighurs

Of more immediate relevance to developments in Mongolia is the question of whether there are "urban" remains for the early Türk empire, which emerged in the second half of the sixth century CE, disintegrated about a century later, and then revived for some decades beginning in the late 7th century.[10] Improbable as it may seem, what follows in the Uighur period, for which there is substantial evidence of urban development, would seem to have no precedent in the Turkic period. There are several very important Türk ritual sites commemorating various kaghans.[11] These involved the building of platforms and pavilions, the carving of statues and the erection of large stele with inscriptions. There can be no question but that the 8th–century ritual site at Khöshöö–Tsaidam in the Orkhon River Valley was seen to be very significant, placed in the heart of what the Türks considered to be their ancestral homeland. The texts on the stele at this and other sites provide for the first time what we might consider to be the authentic "voice" of pastoralists in the Mongolian steppes. And what we find in those texts is an explicit warning of the dangers of adopting sedentary ways and establishing urban centers. Yet there is as well evidence in the Chinese sources that the Türk ruler at one point requested from China resources to support agricultural development (Kiselev 1957, p. 93; Perlee 1957, p. 45). It would be an oversimplification to conclude from this textual evidence that a process of "sedentarization" was already underway which should have left us more material evidence.

Apart from these dramatic and important ritual sites for the Turkic kaghans, there are numerous other Turkic memorial complexes involving carved statues, and arrays of stone fences and lines of standing stones scattered across the Eurasian steppes. Some of the best known concentrations are found in the Altai, but there is also important evidence of a Turkic presence on the northern edge of the Gobi (Jacobson-Tepfer et al. 2010 passim; Wright and Amartüvshin 2009). One can at

least surmise that, as with the Bronze Age ritual sites, these were ones which involved some kind of repeated visitation, perhaps on a regular basis. As Wright and Amartüvshin remind us, ceramic assemblages, such as those found at Baga Gazaryn Chuluu, "are equivalent to settlements" and they tend to cluster in the sheltered areas where modern observations confirm pastoralists tend to establish their winter campsites. So there is in fact a rather broad range of data which can be brought to bear to establish mobility and settlement patterns for the early Türks.

The only sizeable walled enclosure of which I am aware which might be dated to the Türk period in Mongolia is Khukh Ordung on the eastern edge of the Khangai mountains, which border the Orkhon valley on the west. That is, this site is located to the southwest but across the valley and at some remove from the Khöshöö–Tsaidam site of the major Türk memorial complex. On the slimmest of grounds, Khukh Ordung, has been dated to the mid–7th century CE (at a time when the first Turk empire had been destroyed), even though that date might well be merely a terminus post quem (cf. Kolbas 2005).[12] There are structural features of Khukh Ordung which seem similar to those of the citadel at the later Uighur capital, Khar Balgas, but even if the site seems to be a Uighur one, to date it a century earlier than other Uighur sites seems premature, absent any serious excavation. That said, neither is there any reason to associate it with the revival of the Türk Empire in the area in the 8th century.

The roughly century-long period of Uighur power in Mongolia starting in the mid-8th century witnessed significant construction of walled structures, some of which are only now being detected using sophisticated techniques of aerial photography and remote sensing (Bemmann and Ankhbayar 2010; Oczipka et al. 2009).[13] At least one of these, a major city, has long been known, the Uighur capital Khar Balgas, whose ruins north of Karakorum on the flood plain of the Orkhon Valley can be seen from kilometers away [Fig. 5]. While we now have a fairly good surface plan of Khar Balgas, and excavations have been undertaken there off and on for more than a century, we know precious little about the site beyond the fortified "palace complex."[14] The walls of the latter are of tamped earth; however, at least in the crumbling "citadel" in the southeast corner, there are very substantial grey fired bricks. Outside the large walled enclosure of the "palace," which can be seen from afar across the valley, are lower walled enclosures and the remains of an extensive settlement, which, allegedly, is to be dated to the same time as the walled palace complex. We cannot be certain whether the Uighurs built atop a previous settlement here or what, exactly, followed on their being driven out by the Kyrgyz in the middle of the 9th century. There seems to be good reason to think that the Kyrgyz did not themselves occupy the Orkhon but rather went back to their homelands in the upper Enisei River basin (Drompp 1999). When the Mongol successors of Chingis Khan built Karakorum, they studied the Khar Balgas site, even if they were apparently mystified as to what it had been.

Khar Balgas is the rare case of a "city in the steppe" for which in the period prior to the Mongol Empire we have a contemporary description by a foreign visitor. Tamim ibn-Bahr, the representative of the Abbassid Caliph in 821, described a huge city surrounded by extensive settlements and agriculture, all of which seems to correspond to what we so far know based on archaeology (Minorsky 1948, esp. 283). However, his description really is quite limited and problematic, given the fact that his written account compresses so much of the journey. One cannot be entirely confident that his descriptions of productive agriculture, whose existence is entirely probable, really relate to the Orkhon valley or to some place much further to the west.

Fig. 5. Khar Balgas, view of citadel from south.

The Orkhon Valley is also the location of a number of Uighur burial and ritual sites (*durvuljin*) employing some of the same techniques of construction found at Khar Balgas, which may have served as a source of building materials. Several of these durvuljin have been excavated (see Ochir et al. 2010, published above, pp. 16–26). Their builders used fired brick to create vaulted entrance passages and domed burial chambers, and in one instance so far uncovered, painted murals on plaster to decorate the tomb. One important finding of these excavations is that such sites may contain layers extending back as far as the Xiongnu period and then going down into the period of the Mongol Empire. When the Uighurs built one of their tombs, they must have known that the site previously had been used, even if they could not have been aware that the earlier burial was a Xiongnu one.

There are also Uighur sites farther north. Baibalyk is located on the Selenga River into which the Orkhon flows. There is written evidence that Chinese and Sogdians participated in its building.[15] Whether the walled enclosures there served functions other than purely military and defensive is not clear, although stone lion sculptures have been excavated. Some of the most extensive evidence about Uighur settlements has been found across the borders from Mongolia in neighboring Tuva, where there are as many as a dozen fortified enclosures, one as large as 230 m on a side and one a double-walled structure with an inner citadel.[16] Both the architectural features and ceramic finds connect these sites with the Uighurs, whose effort to consolidate control in the upper Enisei valley beginning in the middle of the 8th century (soon after the time when Khar-Balgas was being built) is documented in written sources. In the first instance, the Tuvan sites are forts, where probably the Uighur garrisons lived in their yurts; only one of the sites has remains of some structures in addition to the walls.

One of the most striking of the Tuvan sites is that at Por Bazhin, first noticed by scholars in the late 19th century, excavated in 1957–63, and then beginning in 2007 the subject of renewed serious study in conjunction with efforts to preserve the site (*Por Bazhin* [2007]). It is a fortified enclosure measuring 215 x 162 m. located on an island. The dating of the site to the Uighur period is based so far mainly on its architectural analogies to Khar Balgas and from remains including roof tiles which are analogous to ones known from Tang China. It contains a number of structures, including what seems to have been a central ritual hall. As with a number of the other sites starting in the Uighur period, there is good reason to posit substantial Chinese "influence" on the architecture of the buildings at Por Bazhin — they included columned timber halls on platforms with ceramic tile roofs — but whether we should go so far as to agree they were the work of Chinese architects is a moot point. While it seems as though the construction materials were drawn from local sources, so far no evidence has been found of workshops, kilns, etc. which might be related to the work.

Not the least of the as yet unresolved puzzles about this site is what its function was. Apparently it was occupied for only a relatively short period of time, may have been used only in summer (there is no evidence suggesting there was a heating system), and may have served some religious or ritual purpose. There is, however, no direct evidence to suggest it was, say, a Buddhist temple or monastery. Its abandonment may have been connected with collapse of the short-lived first Uighur empire, although at some perhaps later stage there is reason to think the site was severely damaged in an earthquake.

As with so much of the evidence about settlements and cities in Mongolia, we are left with more questions than answers about many of the Uighur sites, where not the least of the interpretive challenges involves the matter of agency. That is, what might we reasonably attribute to local initiative, or to what degree should we emphasize influence, simply because there is evidence of "cultural borrowing?" Annemarie von Gabain suggested that, given the close relationship between the Uighurs and the Tang Dynasty (which they saved from the An Lushan rebellion in the 8th century), Chinese wives of the Uighur rulers may have influenced the decision to build cities. This, in apparent contrast to the policies of the Turk kaghans, who were perhaps trying to hold Chinese influence at arm's length. At the same time though, this is not to say that the Uighurs had made a full transition to settled urban life, something von Gabain posits occurred only later when the center of their state had moved

west to the Turfan region and they took over the major oasis cities that already existed there (Gabain 1950, p. 48). If we assume that the Uighur rulers followed the pattern of other nomadic leaders in establishing regular routes of movement to seasonal camps, we still need to learn more about what those routes may have been and whether the locations of sites identified as being from the Uighur period in fact may be the remains of such seasonally occupied camps.

The Khitans

A further complication in studying the Uighur sites is that some of them seem to have been taken over subsequently by the Khitans. Given the complexity of the stratigraphy and the sometimes ambivalent nature of the evidence, there may be considerable dispute as to what should be dated to which period. A case in point is Chintolgoi, located in the Tuul River basin, where there are the remains of an impressive wall with towers, whose long dimension is some 1.2 km (Kradin et al. 2005; Ochir and Erdenebold 2009).[17] There was considerable disagreement by earlier scholars about the identification of the site with one mentioned in historical texts, although now there seems to be consensus that it is the same as what in the Uighur period was known as Khedun. While excavations there have concentrated on relatively small areas, they have turned up an array of ceramics ranging from Uighur period ones to some of the Song wares of a type also found in the excavations at Karakorum. There is evidence of various local crafts. The youngest coins found are Northern Song ones from the 11th century. The site has the tortoise-shaped bases for erecting stele such as we find later at Karakorum. While there is much here to reinforce what we know from other Khitan sites about Chinese influences in city construction, there also is evidence in the ceramics of connections with the Bohai culture of Manchuria, something which we might expect in Khitan culture. It appears that Chintolgoi is where the Khitan ruler Yelü Dahsi briefly located his capital when he fled the Jürchen in 1124, before he moved further west to establish the Kara-Khitai state in Central Asia (Biran 2005, pp. 26–33).[18]

While the built environment of the Uighurs in the eastern Inner Asian steppes was extensive, the Khitan period in the north of China seems to have been one of a much more systematic and impressive commitment to urban centers and serious architectural undertakings.[19] As many as 200 cities established by the Khitan have been documented in today's Inner Mongolia. Having established their imperial claims as the Liao Dynasty (907–1125), the Khitans ruled from several capitals, whose planning, while incorporating many features of Chinese imperial cities, also embodied what may be seen as distinctive Khitan traditions.[20] The size of these major cities is truly impressive, as are surviving Khitan buildings (primarily temples and pagodas) and numerous Khitan elite tombs. We are not in a position to quantify the evidence, but it is plausible to suggest that under the Khitan/Liao for the first time the population of steppe area of Inner Mongolia came to have a significant urban component.

Since the Khitans' pretensions included extending their territory to the north, and, when their dynasty fell to the Jürchen in the 12th century the Khitan leaders fled first into outer Mongolia before eventually migrating to Central Asia, there is considerable evidence of Khitan urban settlement north of the Gobi (Perlee 1962; Kiselev 1957, pp. 95–7; idem 1958; Kyzlasov 1959, pp. 75–80; Scott 1975, which includes a map on p. 28; Danilov 2004, pp. 67–72). As early as the beginning of the 11th century the Khitan undertook to fortify a northern frontier on a line from east on the Kherlen River to the Orkhon River basin in the west. There are three so-called "walls of Chingis Khan," one in southwestern Mongolia (apparently connected with the Tanguts), one in southeastern Mongolia along the border with China (apparently built by the Jürchen in the late 11th or 12th centuries), and the third stretching some 746 km. from the Khangai Mountains across northern Mongolia, part of Transbaikalia and into the northern tip of the Inner Mongolian Autonomous region.[21] A recent study of this northern wall, which dates to the Khitan period, estimates that it would have taken nearly a million man-days to construct — in other words, it was an undertaking that required the marshalling of substantial labor forces over a long period. It is the more impressive for the fact that along it is a network of paired forts, some round and some square. Russian scholars who have worked on the wall and these forts posit that the constructions may have been undertaken not necessarily for their defensive

value so much as for their symbolic value as markers of Khitan pretensions in the far north.

Apart from the smaller forts built by the Khitans along the northern wall, there were more significant settlements. Kharbukhyn (Kharukhain) Balgas was one of three centers founded (or revived) by the Khitans [Fig. 6]; Chintolgoi, discussed above, was another. Archaeological evidence attests to the Khitan towns having a range of functions that we would associate with urban society. There were various local crafts and locally based agriculture. There are still unanswered questions regarding religious affiliations — at Bars Khot I there is evidence apparently of an early Buddhist temple (Scott 1975, pp. 20-21), and the site of Kharbukhyn Balgas was much later (in the 17th century) home to a substantial Buddhist monastery with impressive stone architecture.[22]

The Mongol Empire

While the still rather slim evidence regarding at least some of the Khitan towns in Mongolia points to their being located on earlier settlement sites, we still are a long way from being able to say much of anything about a possible genetic relationship between existing town sites and the towns that began to appear in the early decades of the Mongol Empire.[23] Identifying the remains of Mongol Empire settlements has been a slow process, accompanied by a good many misunderstandings, not the least of which involve the Mongol capital, Karakorum. Karakorum will occupy a major part of the discussion which follows here, but we need to beware of letting a focus on it unduly influence our perceptions about other sites, as I think has been the case in studies of Mongol cities to date. That is, there has been a tendency to draw comparisons with "what we know" about Karakorum, even if, as it turns out, some of "what we know" may be erroneous. With these considerations in mind, let us begin our examination of Mongol Empire "cities" not with Karakorum but with others, located outside the Orkhon Valley "circuit."[24]

Possibly the earliest of these sites, Avraga, known for some time but only recently excavated, is in the east-central part of Mongolia, on a tributary of the Kherlen River (Shiraishi 2006, 2009; esp. Shiraishi and Tsogtbaatar 2009). The site features a good many structures, including a very substantial building interpreted as a palace. The Japanese-Mongolian team excavating there has found some evidence suggesting occupation as early as the late 12th century, which then supports the interesting hypothesis that the site could be associated with the early stages of the rise of Chingis Khan, since the region is considered to have been his "homeland." As Shiraishi Noriyuki puts it, "At the Avraga ruins we find one of the first and earliest indications of the organizational investment made by the Mongols in subjugating the peoples of the vast eastern steppe" (Shiraishi 2009, p. 135), and in fact it may have been Chingis' initial capital. Even after Karakorum became the capital in the 1230s, Avraga continued to be used, possibly serving under the later Yuan as a ritual site commemorating the Chingisid founders of the dynasty. As is the case for Karakorum, workshops have been uncovered (here, in particular, smitheries), and there is evidence about the consumption of cereals in the local diet.

A good many Mongol Empire settlement sites are located in Transbaikalia. One of the earliest, Khirkhira (on a tributary of the River Argun), was excavated by Kiselev's Russian expedition in 1957–59 and again in recent years by the Amur expedition of the Russian Academy of Sciences from Ulan-Ude.[25] This walled town (what the Russian archaeologists term a Chingisid royal "estate") extends some 1.5 km and contains over 100 structures, including buildings considered to be the "palaces" of the Mongol elite. The tile remnants from the buildings are

Fig. 6. Kharbukhyn Balgas, approximately 270° panorama looking south taken from north wall of 17th-century monastic complex. Photo copyright © 2007 Daniel C. Waugh

similar to those found at other Mongol Empire sites but in particular most closely resemble those produced at sites in the Russian Far East. It is possible that there was an earlier (Uighur period) settlement at Khirkhira, although the structures which remain today suggest a date of the early 13th century (this is supported by a few radiocarbon dates), and then a short-lived period of occupation. Since the famous "Chingis Khan stone," dated to around 1325 and with an inscription honoring Isunke, a nephew of Chingis Khan's, was found near the Khirkhira site, the settlement has been associated with Isunke or his father Jöchi-Kosar and has been assigned the same date.

If Khirkhira and Avraga document Mongol control to the east, Dën-Terek documents Mongol power to the west in Tuva. The archaeologist and historian of Tuva, Leonid R. Kyzlasov (1965, esp. p. 60) emphasized that at the very beginning of the 13th century, extensive efforts at colonization followed the Mongol conquests there. As a result, at least five major urban settlements were established, the earliest of which was Dën-Terek on the Elegest River, the administrative center for Tuva under the Mongols at the beginning of the 13th century. The site is a large one, some 1.2 km in length and occupying about 30 hectares, with over 120 structures. Like many of the Mongol Empire cities, it is unfortified. The construction of the buildings so far excavated is substantial, with massive granite bases for wooden columns, and in the case of the "administrative" building, probably brick walls. There are many fragments of glazed roof tiles and pieces of sculpted dragons and phoenixes which probably decorated the roofs. At least some of the stuctures have underground heating ducts; it is probable that coal from a nearby mine served as the fuel. The occupants of the city engaged in a full range of economic undertakings, including the manufacture of ceramics and the processing of locally grown agricultural products.

Kyzlasov's proposed dating of the site to the Mongol Empire period in part is made with reference to the material the Russian expeditions unearthed at Karakorum (where the dating might well now be questioned). He relies rather heavily on conclusions about the style of the sculpted dragon heads, which he feels was typical for the late 12th and early 13th century, but differs from those found in the Yuan Dynasty period. There are no Yuan-period glazed ceramics at Dën-Terek. If these conclusions about the date of Dën-Terek are accurate, then the city either slightly antedates the founding of Karakorum or is roughly contemporaneous with it.

Karakorum

Naturally the goal of identifying the ruins of the Mongol capital, known from 13th-century written sources, guided the thinking of many early scholars who took an interest in Mongolian history.[26] Even though for Karakorum we are far better served with written primary sources than we are for any previous city in Mongolia, relating the textual evidence to specific archaeological evidence is by no means easy. As Eva Becker has exhaustively demonstrated, the evidence in those written sources is largely quite equivocal, and too often unwarranted assumptions have been made on the basis of a misreading of them. Moreover, evidence from one of the most significant early excavations at the site, by Dmitrii D. Bukinich in the 1930s, remained unpublished and tended to be ignored for political reasons. The result was that Sergei V. Kiselev's excavations there in 1948–49 dominated much of what came to be known about the site for the remainder of the

20th century. The largest part of what has been arguably one of the most influential books on medieval Mongolian history, his co-authored *Ancient Mongolian Cities* (1965), concerns Karakorum. The book contains essays on the city's history, the "palace," mural fragments, the commercial and craft section of the city, coins, iron objects, ceramics, beads, leather objects, construction materials and miscellaneous crafts. Yet, even though much of this material retains its value, the archaeology on which all this was based was fundamentally flawed.

While Kiselev deserves considerable praise precisely for emphasizing the importance of cities in pre-modern Mongolia, two important aspects of the presentation in the book are particularly troubling. For one, the interpretive framework is guided by a belief (which happens to be Marxist) in stages of historical development through which the Mongols inevitably must have passed. There is a concept here of "feudalism" which then requires that certain social and economic developments be found in the archaeological evidence, even if in a number of cases, Kiselev and his collaborators probably should have stopped short of generalizing conclusions.[27] One can, of course, easily read through the interpretive verbiage, but then, if one does that, the second problem is much less easy to solve short of doing the kind of analysis Becker and the other German archaeologists have recently done. The fact is that Kiselev's excavation methods were extremely sloppy and he seems deliberately to have ignored the import of some of the evidence. Thus we cannot rely on his observations about stratigraphy, which led him to conclude that the Karakorum he excavated was built on a previously existing site. This is as true for the commercial center of the city (at the "crossroads") as it is for the so-called "palace" site. In general, observations about chronology in the Kiselev book need to be taken with caution, although this should hardly surprise us given the period in which his work was done and the significant advances which have been made in dating techniques since then. While Kiselev insisted he had found evidence of an early layer of settlement at Karakorum, the careful stratigraphic analysis of the recent Mongolian–German expedition has shown that such was not the case.[28] Assuming that there was an earlier Uighur fort on the site, it most likely encompassed the area of the current Erdene Zuu monastery and extended to its east, not to the north in the area which was the subject of Kiselev's excavations (Pohl 2009, pp. 527–30).

Karakorum is situated on a grassy plain a short distance from the Orkhon River where it emerges from the gorges of the Khantai Mountains and flows northward to meet the Tuul (on whose upper reaches the current capital of Mongolia, Ulaanbaatar, is located). A favorable micro-climate makes the location ideal for pasturage, and a Chinese traveler in 1247 remarked on the cultivation of grain and vegetables.[29] Ata-Malik Juvayni, an important historian and official under the Mongols, who spent time in Karakorum in the early 1250s, relates how hail destroyed the grain crop in one year, but the following one saw a bumper harvest (Juvayni 1958, I, pp. 226-227). Karakorum also is strategically located on the intersection of the important east-west and north-south routes across Mongolia. As we have seen above, this central part of the Orkhon River valley was considered a sacred homeland by steppe peoples such as the Turks and Uighurs who earlier had laid claim to universal dominion and had placed their capitals there. So the choice of the location for Karakorum was no accident: ecology, political considerations, steppe tradition and and local beliefs all came together there (Allsen 1996; Honeychurch and Amartüvshin 2006). We can be certain that the Mongols, having received the submission of the heirs to the earlier Uighurs, were highly conscious of the earlier history of the region, even if in some mythologized form, and, as Juvayni relates, must have been impressed by the still substantial remains of the Uighur capital of Khar Balgas.

Ironically, the physical remains of Karakorum itself would fare less well than those of Uighur Khar Balgas. There are few surface traces of the Mongol capital. One sees today a stone tortoise, cut in a local quarry, which served as the base for a plinth with an inscription on it. It stands near a mound, which, it turns out, is the foundation for a building whose identification has attracted a great deal of attention (more on that shortly). Careful ground survey (even as early as the first Russian expeditions of the 1890s) and now aerial photography and remote sensing have made possible mapping the outlines of an approximately rectangular city wall measuring about 1.5 x 2.5 km extending to the north of the current walls of the Erdene Zuu monastery, and

within it the shapes of a good many buildings (see Pohl 2009, esp. pp. 516–26). The walls were sufficient for controlling access to the town but would not have protected it against a major attack. It was in the center of this area (the "crossroads") that Kiselev focussed some of his attention and where, as it turned out, there is indeed evidence that this might have been the heart of a craftsman section of the town. The recent Mongolian–German excavations have determined that the oldest stratum here is from the early 13th century; the evidence in general seems to support a conclusion based on written sources that the serious development of the town really began under Khan Ögedei in the 1230s and 1240s, even if, perhaps, Chingis Khan was interested in the site somewhat earlier.

While it is difficult to match specifics with details in the written sources, the archaeological evidence fleshes out their picture of the town's economic life, with particularly rich material continuing to be found in the Chinese commercial section of the city, which has been the focus of both the Russian and the Mongolian–German excavations. Karakorum was a center of metallurgy where water power from a canal connecting the town with the Orkhon River ran the bellows for the forges. There are iron cauldrons (used, among other things, as heating braziers), abundant quantities of arrowheads, and various decorative metal objects. One workshop seems to have specialized in bronze casting; in another the excavations turned up a mould that was used to make a gold bracelet. Of particular interest are a substantial number of iron axle rings for carts, some of which must have been quite sizeable and presumably were used both for the transport of goods and at times to move gers without their being dismantled.[30] Analogous carts are still used today in Mongolia. Local industry produced glass beads for jewelry and other decorative purposes; their forms are of a type that was widespread across all of the Mongol Empire. Spindle weights tell us that yarn was being produced — presumably in the first instance from the wool of the Mongols' own flocks. We know that rich silk fabrics were highly valued by the Mongol elite; some fragments of imported Chinese silk have been found.

Of particular interest is the production and importation of ceramics. One of the most striking discoveries of the recent Mongolian–German excavations was well preserved ceramic kilns, which produced such objects as roof tiles and finials for the Chinese-style buildings, ceramic sculptures, and a variety of table ware.[31] The evidence suggests that the kiln technology came from China. At the same time, the demand of the elite for high quality ceramic wares was met by imports, including good Chinese porcelain. When the famous blue-and-white porcelains began to be produced in large quantities in the first half of the 14th century, they almost immediately found a market in Karakorum.

Evidence concerning commerce includes coinage. For all the fact that the written sources emphasize the significant role of Muslim merchants connecting Karakorum with Central Asia, most of the coins which have been discovered are of Chinese origin and range in date from a few Tang Dynasty examples up through the Yuan (Mongol) coinage we would expect. However, the earliest "documentary" evidence which has survived from Karakorum is a coin with an islamic inscription minted there in 1237–38.[32] Excavations have also yielded a great many metal weights.

For all of this abundant detail which has emerged from the excavations at the "crossroads" of the city, as Ernst Pohl pointedly reminds us, "So far, the opened window into the history of the city is quite small. Just a few metres off of our trenches the sequence of building layers can differ from our results. Moreover, questions about founding activities, duration of settlement and the end of occupation of the entire town are far from being answered only by our excavations in the city centre" (Pohl 2009, p. 513). He goes on to discuss what we learn from the written sources, which include, the oft-quoted descriptions by the Franciscan William of Rubruck and Ata-Malik Juvayni, both of which can be fleshed out with material from the Rashid al-Din's anecdotes illustrating the wise policies of the Mongol rulers as evidenced in their interaction with the city population.

Apart from issues of bias and questions we might raise about the accuracy of these 13th-century authors though, the fact is they do not always answer for us important questions. Rubruck, for example, compares the city unfavorably with Saint Denis and its monastery, a suburb of Paris but an important ones, the burial place of the first bishop of Paris. If St. Denis had in the century after Rubruck some 10,000 inhabitants (Paris at that time may have

Fig. 7. The center of Karakorum in the 13th century, with Mongol gers in the upper right. Model in the National Museum of Mongolia. Photo copyright © 2007 Daniel C. Waugh.

numbered some 200,000), what does this tell us about Karakorum's population? We might assume that it rose and ebbed with the seasons and to some extent depended on whether the Mongol court was actually in residence. Indeed, so far, the excavations have yielded practically nothing we might associate firmly with Karakorum's *Mongol* population, which likely lived in gers (trellis tents) [Fig. 7].

Rubruck's description of buildings in the Mongol capital leaves us with many puzzles, since most, if not all of them, have yet to be documented archaeologically. He writes about "large palaces belonging to the court secretaries," "twelve idol [i.e., Buddhist] temples," "two mosques" and "one Christian church." Perhaps best known of Rubruck's observations is what he tells us about the khan's palace, with its wondrous fountain in the courtyard built for the Khan by the captive Parisian goldsmith Guillaume Boucher (ibid., pp. 209–11). An imaginative 18th–century European image of this palace, which originally illustrated a published version of Rubruck's account (*Dschingis* 2005, p. 154), graces some of today's Mongol currency.

Kiselev was convinced he had identified the remains of the palace in the mound northwest of the walls of Erdene Zuu [Fig. 8], and the results of his excavation there have, unfortunately, had a significant influence on a great many subsequent discussions of Mongol architecture.[33] What he uncovered was the remains of a platform on which were very substantial granite bases for rows of columns, floor tiles, and glazed ceramic roof tiles suggesting that the building was a "Chinese style" one. The site is littered with evidence suggesting at some point it was a Buddhist temple. Among other finds are thousands of small votive clay stupas and images, to which Kiselev paid little attention, even though they had been noted in 1933 when the site was studied by Bukinich, whose unpublished results were available to Kiselev. As the re-examination of the site by the Mongolian-German expedition has now demonstrated beyond any doubt, Bukinich was correct in concluding the building was a Buddhist temple from its beginnings in the second quarter of the 13th century (Hüttel 2005, 2009a, 2009b). Very likely the building is the one whose later history of patronage and renovation was recorded in an inscription dated 1346.

If this was not the palace, then where did the khans receive important visitors? Both Rubruck and Juvayni provide detailed descriptions of the khan's various residences; it is clear from the latter that the court moved with the seasons. Assuming that there was indeed a palace in Karakorum, it is almost certain that it was

Fig. 8. Looking across the remains of the temple which Kiselev had determined was the palace at Karakorum. The Erdene Zuu Monastery is in the background. Photo copyright © 2005 Daniel C. Waugh.

located on the site now occupied by the Erdene Zuu monastery, where the recent excavations have begun to uncover very substantial masonry foundations of an important structure. There is as yet though no archaeological evidence to correlate with Rubruck's description of the wondrous fountain in the palace courtyard. Even if we may never identify for certain that building, there is considerable evidence about what seem to have been royal residences in what Moses and Greer (1998) have termed the "peri-urban environment" of Karakorum.[34] That is, we can document from written sources and are now in a position to confirm this from archaeological evidence (if correlating the two is still somewhat problematic) that there was a network of elite sites, with substantial buildings, which constituted the seasonal orbit of the khan when he was not off on more distant campaigns. This pattern of seasonal movement is similar to what we are fairly certain was observed by the earlier nomadic courts in the Xiongnu and Uighur periods.

For all the fact that substantial Chinese-style buildings may have been common enough in Karakorum, our knowledge of its architecture is still surprisingly limited. Apart from the "palace" site, the detailed excavations have focussed on what most agree was the Chinese quarter in the town. While a Muslim cemetery has been excavated, we still have no evidence of the mosque or mosques which the city is supposed to have contained or the residences the arguably substantial Muslim merchant population may have occupied.[35] The model of Karakorum now in the National Museum of Mongolia depicts, inter alia, a caravan-sarai, but there is no physical evidence concerning such a structure. Nor has anything been discovered of the Eastern Christian church reported by Rubruck. Most scholars would agree that the relatively small permanent core of the city was surrounded by a large area where the Mongols would pitch their tents or gers, a pattern which persists even today, where ger suburbs are part of the urban landscape even in the Mongol capital Ulaanbaatar. Understandably, as yet we have no concrete evidence to document such structures, given their temporary nature and the flooding which occurred over the centuries.

Juvayni's description of a palace complex north of Karakorum in the Orkhon valley, one built by Muslim architects, may well be accurate, although it is not entirely clear whether we should accept Shiraishi's identification of the site with the archaeologically documented one of Doityn Balgas. While the construction and decoration of the main building seems not to be "Chinese," its layout and dimensions resemble those of the Buddhist temple in Karakorum formerly considered to have been the khan's palace. There is still much to be done in studying Doityn Balgas and the other outlying "palace" sites surrounding Karakorum.

We might conclude this overview of Mongol Empire settlements in Mongolia with a brief review of the evidence concerning Kondui, one of the most impressive "urban" sites, assumed to have been built by the Mongol elite, probably members of the Chingisid clan.[36] It is located to the north of Khirkhira in Transbaikalia (southeast of the city of Chita). While there are several buildings, the one which underestandably has attracted the most attention is the large cruciform "palace," which embodies many features of Chinese architecture. The lower terrace of this impressive structure extends some 250 m. There are abundant remains of the tiled roof (whose yellow and red glaze suggests that the structure was for a member of the royal family), a lacquered railing, dozens of carved stone dragon heads which decorated the perimeter of the terrace, and much more. The Russian excavations also studied what Kiselev terms a pavilion near the palace and the remains of an entrance gate. The date of Kondui is uncertain, though Kiselev asserts (for reasons that are not entirely clear) that it must post-date the "palace" at Karakorum. He also suggests that Kondui was destroyed in the period of unrest following the collapse of the Yuan Dynasty in the late 14th century which also witnessed the destruction of Karakorum by a Ming army in 1388.

A good many major sites in China or Inner Mongolia date from the period after Khubilai Khan moved his capital to the present-day location of Beijing in the 1260s and began to conquer the rest of the country (see Steinhardt 1988). We are talking here of very large walled areas whose layout reflects the by then standard model of Chinese Imperial city planning, usually with a palace and temple complex centered in the northern sector and facing south along the main axis of the city. For my purposes here, perhaps the most interesting of these sites is Shangdu, built as the summer palace for Khubilai way out in the sparsely populated

Fig. 9. 180° panorama of Shangdu, looking south from the mound of the "palace" on the north side of the inner city. Excavation is underway on the building, whose remains are on the right. In the distance left of center is a newly constructed wind farm; right of center, a newly constructed coal fired power plant. Photo copyright © 2009 Daniel C. Waugh.

grasslands of Inner Mongolia [Fig. 9]. If we are to believe Marco Polo, the large territory within the outermost walls was a hunting park. There was an inner, palace city, with buildings of some substance that still are being excavated.[37] Their foundations are of carefully fitted granite blocks. What we think was the palace indeed is in the northern sector of the inner city and faces directly south toward the axial gate. In front of it was a pavilion that possibly is the one used for the conduct of imperial business when the khan was in residence. A chain of palace settlements were along the road between Shangdu and the winter capital of Dadu (Beijing).

While on the one hand Shangdu may be seen as a clear expression of imperial ideology and the assumption of the visual and monumental aspects of Chinese rulership, on the other hand, the location of the palace and what we think we know about the court culture of the Khan suggest that even at this period of the peak of Mongol power, the degree of sinicization was limited. We probably still need to be thinking here of an imperial regime that was not fixed in one location. The khan and his entourage and administrators traveled on a regular schedule; the capital in fact was in one location only for a certain part of the year. If this is true for Khubilai, it was even more certainly the case under his predecessors when the ostensible capital was at Karakorum. And they, in turn, may well have been following steppe traditions which can be documented for the earlier rulers in the same region, not necessarily because of any conscious imitation but simply because that was the pattern for certain types of socio-economic and political formations in these particular landscapes.

Conclusion

What might we conclude from this review about tasks for the ongoing study of "cities on the steppe" beyond the obvious recommendation that we need more and increasingly careful and sophisticated excavation and more precise maps of all the known sites?[38] As far as excavation itself is concerned, of course a major challenge is the size of many of the sites, where work might need to extend over decades before we could begin to think they had been "thoroughly" investigated. Since to consider "settlement" means to consider, inter alia, mortuary evidence, much more needs to be done with excavation of graves. Some of the most suggestive new interpretive work, which combines survey archaeology with the results of excavation, is admittedly based on a very small statistical sampling of burials. Furthermore, excavations to date have provided all too little data to develop reliable chronologies, without which, of course, we are seriously hampered in assessing historical change.

I incline to the view that for many settlement sites, there may be a lengthy "vertical" history — that is, sites suitable for settlement in one period very likely were the ones that retained their value in another period. But so far the evidence of continuous or at least continual habitation of sites is at best very uneven, and there seem to be many cases which would contradict the idea of long-term site usage. As Honeychurch and Armatüvshin will suggest in a forthcoming article, where we can talk of "re-use" it may not be site-specific but rather region-specific.

Another desideratum is to undertake a thorough critical re-evaluation of the results of earlier archaeological work, so that we run less danger of falling into the pattern of supporting conclusions based on methodologically flawed work (the obvious example here being that of Kiselev on Karakorum). Granted, for many

fields it is true that what at one time may have been a major contribution casts far too long a shadow because of its perceived authority, even if a field methodologically has made substantial advances since that work was done.

Part of this reassessment of the impact of earlier work has to involve re-thinking how we may best determine the possible relationship between material of one period or region and another — that is, among other things, concepts of what constitutes "influence" and "borrowing" need to be re-examined. Assertions have been made about Central Asian, East Asian or Chinese influences in Mongolia; furthermore, efforts have been made to delineate what might be considered distinctive Mongolian features of, say, architecture. But too much of the literature bases such views (at least tacitly) on outdated concepts of "ethnicity" or "identity" and may reflect the long-ingrained biases of the "sedentary civilizations" about the "nomads." We find plenty of evidence about cultural and economic interactions, where the archaeology reinforces what the written sources sometimes relate through their biased lenses. Yet much of the newer archaeological work in various parts of the world emphasizes how we need to be very cautious about interpreting the significance of finding similar objects of material culture in what are otherwise presumed to be culturally or ethnically distinct areas (see, e.g., Curta 2001).

Moreover, we need to keep in mind that within any larger cultural sphere, there can be a considerable degree of regional variation. While on the one hand we would be well served to see a better integration and comparison of specific site analysis from, say, Inner Mongolia, with that of, say, Buriatia, on the other hand we need to be sensitive to the fact that even if sites in areas as far removed as those are ones that may be attributed to the same polity or ethnic grouping, they may have quite distinct features. Learning about "peripheries" and not just important locations at "the center" is important here (see Miller et al. 2009a, 2009b).

We need to think carefully about where the concentrations of settlements are for different periods. I am struck, for example, by what seems to be a concentration of important Xiongnu sites relatively far to the north and by the fact that some of the most dramatic evidence of Mongol Empire settlements is from southern Siberia. Of course this impression may simply reflect which areas have received to date the most extensive investigation, not the actual focal points of human activity in earlier periods. In this connection, among the most promising of the new ideas regarding Mongolia's early history and its archaeology are those which are attempting to relate particular archaeological assemblages to surrounding and even more distant landscapes and to develop analytical methods that may permit diachronic comparisons over possibly extended periods. It seems as though one can in fact provide convincing hypotheses regarding changes in resource exploitation and the possible relationship of those not only to changes in climate but to evolution of political and social forms.

It should not surprise us that the evidence about settlements in Mongolia shows considerable change over time. Not only did they change substantially in size (which is not to say that there was a steady progression from small seasonal camps to genuine cities), but there were also were many variants in their functions and the length of time for which they were occupied. So far we have stimulating, if yet tentative explanations of some of these changes. We know too little though about whether certain resources were exploited by those living in close proximity or perhaps only from more distant locations. And insofar as nomadic polities and their leaders moved around, we likewise know too little about the different locations of, say, summer and winter camps, and how settlements of some consequence may have been linked to some

kind of "central authority." In all this, of course, we must anticipate that analytical models with may work well for one period may not be applicable to another one, even if at their base are quite generalized theories of social interaction.

While the terminologies employed in some of the most interesting recent interpretive studies of the archaeological material from "greater Mongolia" may be different, I think the concept of "non-uniform complexity" recently enunciated by Michael Frachetti (2009) provides a promising analytical approach. His re-assessment of the evidence from various studies of the western Eurasian Bronze Age steppe cultures finds that older "progressive models of social and political evolution" simply are inadequate to explain the archaeolgical data. Those same "progressive models" have been used in much of the older literature on settlements in Mongolia. Given the diversity of settlement in Mongolia and the unevenness of its development over time and space, we might well agree with Frachetti that "complexity among steppe communities is better evaluated in terms of institutional integration or fragmentation at the interstices of diverse populations whose economic and political interests co-exist geographically but are not necessarily bound by a shared sense of society." Moreover, there is an important issue of scale of human institutional development, where we must be looking at "regional ecological settings" which may then explain the distinctiveness of many of the archaeological assemblages. Whether Frachetti's ideas can be applied to periods and societies more recent than those of the Bronze Age (that is, when we can document, for example, a strikingly different configuration of political institutions encompassing much larger territories) remains to be tested. Maybe, in fact, "settlements" and "cities" should not be discussed in the same breath as I have tried to do here.

Learning more about the complexities of pre-modern societies in "greater Mongolia" can contribute significantly to reassessments of developments in other parts of Eurasia. After all, this region, remote as it may seem from a modern perspective, was hardly a "periphery" historically. Not the least of the results of such research may be to lay to rest once and for all the stereotypes about "nomads" which have too long dominated the thinking about Inner Asia.[39]

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Notes

1. Since I do not read Japanese, Mongolian, Chinese or Korean, and space here in any event is limited, I can use that literature at best only indirectly. In particular my discussion of sites in Inner Mongolia will therefore be limited. While one might date the recognition by scholars of the importance of settlement sites in Mongolia to the Russian expeditions of the end of the 19th century, the emphasis on sedentary centers as a significant component of pre-modern societies there came to be fully articulated with the Russian-Mongolian expeditions of the late 1940s and 1950s as summarized in, e.g., Kiselev 1957 and Perlee 1957. Perlee (p. 43, n. 2) indicates that as of 1956, some 220 settlement sites of various kinds had been registered by Mongol scholars for the territory of what is now the Mongolian republic, but he does not indicate clearly to what historical periods they date. As of 1981 the documented number of "ancient towns, settlements and fortresses" had risen to more than 300. See Minert 1985, p. 185, citing D. Maidar. For the a recent illustrated overview (a kind of encyclopedic dictionary) published in Mongolia, see *Mongol nutag* 1999, esp. pp. 173-200. Danilov 2004 is also useful, since it covers what in effect is my "greater Mongolia," with the virtue of summarizing some of the recent Russian excavations in Tuva and Transbaikalia. In many respects, however, it is heavily dependent on now very dated earlier surveys (Perlee 1961 and *Mongol nutag* 1999) and what are increasingly obsolete interpretive approaches. An even more recent quick survey (Kradin 2008), excellent for what it covers, is, however, also set within a traditional interpretive framework of inexorable progress toward modern urban forms.

2. One might extend this survey into the Manchu

period, as the current Mongolian–German survey project in the Orkhon Valley is doing, where significant sites such as Chantz-Choto have been documented from aerial photos and in recent geomagnetic survey. Given the fact that this was a period of foreign domination in Mongolia, it has perhaps understandably attracted little attention to date in archaeological work. See Bemmann and Munkhbayar 2010.

3. For a summary of some of the results of the project, see Jacobson-Tepfer 2008. For an overview of the sites with an introduction to the analytical approaches for situating specific monuments in their surrounding landscapes, see the magnificent volume by Jacobson-Tepfer et al. 2010. The most important publications of petroglyphs from two of the major sites are Jacobson et al. 2001, 2006. The first of these has also appeared in a somewhat revised Russian edition (Jacobson et al. 2005). The project also now has a very sophisticated website "Archaeology and Landscape in the Altai Mountains of Mongolia" (http://img.uoregon.edu/mongolian/index.php).

4. There is a considerable literature on khirigsuurs. Many have been documented by the Altai project mentioned above and by the Smithsonian Institution–National Museum of Mongolia survey in northwestern Mongolia. For the latter, see the various reports which may be downloaded in pdf format from <http://www.mnh.si.edu/arctic/ html/publications.html>, especially Bruno Frohlich et al. 2004, 2005. For an overview of investigation of khirigsuurs in Khövsgöl aimag, see Frohlich et al. 2009, which emphasizes that they are burials. Cf. the classification scheme proposed by Wright 2007, who argues few khirigsuurs are burials. Excavations of a khirigsuur by a Mongolian–Japanese team are reported in Permanent Mission 2003, 2004. It may well be that there is a regional differentiation where only in certain areas were the khirigsuurs burials (Honeychurch et al. 2009, p. 332). Houle 2009, esp. pp. 359–63, and Fitzhugh 2009, esp. pp. 381–85, summarize effectively some of evidence and key interpretive issues about khirigsuurs. Fitzhugh focuses on "deer stones," standing stones with carved images, often found at khirigsuur sites and a key part of the monumental complexes. His article is of considerable interest for its discussion of new evidence concerning chronology and ideas regarding the cosmology of those who were responsible for the constructions.

5. For another excavation of a Xiongnu settlement (Dureny) in Buriatia, see Davydova and Miniaev 2003.

6. There is a Xiongnu walled site (EGS 131) in the Egiin gol (see Honeychurch and Amartuvshin (2002) 2006, p. 194). For information about as many as ten additional Xiongnu sites (including plans of three of them), see Perlee 1957, pp. 43–5. Perlee cites ceramic evidence for the identification of these sites as Xiongnu. A recent overview of some 15 Xiongnu settlements, but one heavily dependent on Perlee 1961, is Danilov 2004, pp. 34–56.

Certainly one needs to spread the net widely in trying to identify urban sites that might be connected with the Xiongnu and their descendants. There is, for example, some enthusiasm for the idea that Tongwan, in the Ordos region (the Yellow River bend), founded apparently in the early 5th century by one of the "Southern Huns," can tell us about Xiongnu settlements (Obrusanszky 2009), but in the absence of serious excavation there, nothing much can be said about the relationship between this site and earlier and later fortified centers that had been established by the various dynasties ruling northern China. Efforts to associate Tongwan with some broader pattern of "Hun" culture across Eurasia are pure speculation; it is very likely that the extensive remains of buildings and walls found there today have absolutely nothing to do with the Xiongnu. For a brief and sensible description of the site, with a plan, see Dien 2007, pp. 17-19. One might reasonably suppose that Xiongnu settlements would be found in the vicinity of the modern Hohhot, capital of the Inner Mongolian Autonomous Region in China, which has been termed a "staging area for Hsiung-nu incursions into China" (Hyer 1982, pp. 58–9). The region has a long and complex history of settlement by the northern peoples and by the Chinese. In the 12th century, the capital of the last Khitan/Liao emperor Tianzuo was at Hohhot.

7. Even for a site as "well known" as the cemetery complex at Noyon uul, we are only beginning to get an accurate estimate of its date, which turns out to be later than what had commonly been assumed. See Miniaev and Elikhina 2009.

8. For the first, see Honeychurch and Amartüvshin 2006; for the second, see Rogers et al. 2005. The latter article may exaggerate the degree to which some kind of central planning of urban sites was involved, although as Honeychurch has reminded me in private communication, "If a walled site appears with no underlying precedent — the presumption is that it was built by command and therefore not a long term organic growth process as many cities were." Rogers 2009 is a summary overview of early urban centers in Mongolia.

9. There is a nicely illustrated overview in Kessler et al. 1994, Ch. 3, but it should be used with caution. While I am not in a postion to critique the arguments regarding ethnogenesis, there is a lot of interesting material in Dashibalov 2005 on settlements in southeastern Siberia which may be relevant here and worth close examination.

10. There is one sweeping (and rather thin) monograph-length overview of "Turkic cities,"

Nagrodzka-Majchrzyk 1978, where Chapter II covers the Eastern Turks and Uighurs but adduces no archaeological evidence for settlement sites prior to the Uighur period and does little to help in any understanding of the processes by which urban entities emerged. See the review by Peter Golden in *American Historical Review* 84/4 (1979): 1133–34. I have found no indication of Türk Empire settlement sites in more recent works (e.g., see Danilov 2004, p. 147), but then the study of Turkic monuments in Mongolia (beyond the sites of the famous inscriptions) is still at a very early stage.

11. For an good, illustrated summary of what we know about these complexes, see Stark 2008, esp. pp. 109–41. For additional information on archaeology of Turkic sites in Mongolia, including an interesting article on the Czech archaeologist Lumír Jisl's excavations at Khöshöö-Tsaidam, see *Current Research* 2007, pp. 325ff. The important Kazakh website (in Kazakh, English and Russian) Türik Bitig <http://irq.kaznpu.kz/?lang=e>, accessed 12 February, 2010, has good descriptions of all the major memorial sites with inscriptions and pdf files of many of the relevant publications. See also Moriyasu and Ochir 1999, based on field work at the sites, where the focus is on the inscriptions.

12. Two additional ^{14}C dates from the site (which is also known as Tsagaan Sümiin Balgas) have been obtained, indicating a range from the late 7th through the 8th centuries. See Pohl 2009, p. 527.

13. One of the first attempts to explain the "urbanization" of the Uighurs was by Gabain 1950, who explores the antecedents in the Türk empire period when there seem to have been well-defined locations of winter and summer camps in the Orkhon River region. The ongoing survey project led by Prof. Jan Bemmann is providing data that reinforces our perception of the central Orkhon region as an important center of human activity over the *longue durée*, since some of the sites which are being documented apparently date from pre-historic times, and the most recent ones are from the Manchu period. Of course dating of some of the walled enclosures must await their proper excavation. For an overview of the project, see Bemmann et al. 2010. I have not seen an earlier article discussing it: Birte Ahrens et al., "Geoarchaeology in the Steppe — A new multidisciplinary project investigating the interaction of man and environment in the Orkhon valley," *Archeologiin Sudlal* VI (XXVI), Fasc. 16 (2008): 311–27.

14. The first serious effort to map the site and undertake excavation there was by the Russian expedition led by Wilhelm Radloff in the 1890s. While some additional survey and more accurate mapping has been done since (notably by Japanese archaeologists and by members of the German-Mongolian Karakorum expedition), excavations have been limited. The Russian-Mongolian expedition of the late 1940s under Sergei Kiselev determined that the "settlement" site (the larger urban area) to the west of the fortified "palace" and the palace site itself date to the same, Uighur period, but the Russians confined themselves to excavating one structure in the city, which appears to have been a blacksmith's residence and shop. See Kiselev 1957, esp. pp. 94-95. Another Russian-Mongolian expedition a few years later did little more, it seems, than pick up ceramic sherds, which litter the surface even today. See Khudiakov and Tseveendorzh 1982. Proper analysis and classification of Uighur ceramics is essential for dating and identification of the numerous Uighur sites in Mongolia and elsewhere.

Just as Karakorum serves as the reference point for discussing other Mongol Empire sites, Khar Balgas is the *point d'appui* for conclusions about Uighur sites. On the basis of similarities of the architecture to that of Khar-Balgas, Kiselev attributes other sites (Taidzhin-Chulo and Toiten-Tologoi) to the Uighur period and mentions that several other Uighur sites were studied along the Selenga and Orkhon by Dmitrii D. Bukinich (Kiselev 1957, p. 95). All of these, according to Kiselev, show that agriculture was practiced around the settlements and there were developed crafts producing, among other things ceramics similar to those found at Khar-Balgas.

I have not seen Hans–Georg Hüttel and Ulambayar Erdenebat. *Karabalgasun und Karakorum – Zwei spätnomadische Stadtsiedlungen im Orchon-tal*. Ulaanbaatar, 2009 [in Mongolian and German].

15. See Gabain 1950: 44–5. There are three walled sites at Baibalyk, where recent excavation and measurement were undertaken by the Mongolian-Japanese expeditions of the 1990s. For a map and a detailed site plan of Fortress No. 1 there, see Moriyasu and Ochir 1999, plates 12a, 12b. There is an article in Mongolian by one of the participants in this recent study, D. Baiar, "Uiguryn Baibalyk khotyn tukhai temdeglel," *Archeologiin Sudlal* I (XXI), Fasc. 10 (2003): 93–109.

16. See Kyzlasov 1959, where there are several site plans and one reconstruction drawing (of the double-walled III Shagonarskoe gorodishche). The Tuvan sites were first documented by Dmitrii A. Klements, during the Orkhon expeditions of the late 19th century.

17. I have not seen the monographic publication of the results of the recent Mongolian-Russian excavations at Chintolgoi: Ayudai Ochir et al., *Arkheologicheskie issledovaniia na gorodishche Chintolgoi* (Ulaanbaatar, 2008).

18. As Biran (2005: 46) points out, the eastern borders of the Kara-Khitai are difficult to determine. Leonid Kyzlasov had initially attributed two urban sites in the upper Enisei basin in Tuva to the Kara-Khitai, but subsequently revised that assertion and

decided they are among the earliest urban sites to be associated with the Mongol Empire. Cf. Kyzlasov 1959: 75–80; idem 1965, esp. pp. 113–17.

19. Even though the Khitan/Liao tend to be slighted in the larger accounts of Chinese history, there has been considerable attention given their cities. For an introduction to the Khitan/Liao, see Kessler et al.1994, Ch. 4 and the recent, lavishly illustrated exhibition catalogue, *Gilded* 2006. The basic book on Liao architecture is Steinhardt 1997. Her *Chinese Imperial Cities* (1990) also contains valuable sections on Liao city planning and its likely sources. A useful overview, based mainly on written sources, is Jagchid 1981. I have not seen what is undoubtedly a very useful recent survey for Mongolia: Ayudai Ochir et al., "Iz issledovaniia kidanskikh gorodov, gorodishch i drugikh sooruzhenii v Mongolii" [From the study of Khitan towns, forts and other constructions in Mongolia], in *Movement in Medieval North-East Asia: People, Material Goods, Technology*, Vol. 1 (Vladivostok, 2005), pp. 101–10.

20. The cultural mixing which was a feature of Liao administration has been documented primarily from written sources by Standen 2007.

21. Lun'kov et al. 2009 provides an excellent overview of the studies of the northern wall and its network of forts. Their article has maps, descriptions of each of the forts, and plans of many of them. The other sections of the "Wall of Chingis Khan" merit attention which I cannot provide here. Baasan 2006 summarizes rather indiscriminately what is known or imagined about those walls.

22. Kharbukhyn Balgas was first studied by the Russians' Orkhon expeditions in the late 19th century. Kiselev's expedition there in the late 1940s determined that the stone buildings and stupa bear no relationship to the earliest construction preserved in the walls and on other parts of the site (see Kiselev 1957: 95–6). In 1970, another Mongolian-Russian expedition discovered there a number of Buddhist birchbark manuscripts (probably from the late 16th and early 17th centuries), but as Elisabetta Chiodo puts it, the site is still "little known" (Chiodo 2005, p.112).

23. In this regard, note the valuable, if now somewhat dated, article by Steinhardt 1988, which argues forcefully and probably rather too one-sidedly for direct Chinese models having influenced all Mongolian imperial architecture regardless of what may have been the local sources on which the architects and city planners in the larger Mongolia could have drawn. That said, her article is still the best overview of Mongol imperial cities and palaces and is especially valuable for its citation of Chinese archaeological research which otherwise might be inaccessible to the linguistically challenged (the present author included). There is no need for me to repeat the details she provides for the sites outside of northern Mongolia.

24. As of 2004, A. R. Artem'ev (2004, p. 93) provided the following statistics for Mongol imperial cities in the north: three for the 13th century, 17 for the 14th century in Mongolia proper; five in Transbaikalia. It is not clear to me whether we need add to these numbers the site on the Temnik River in Buriatia, where Sergei Danilov (2002) thinks there is evidence of possible settlement by Central Asian craftsmen conscripted by the Mongols. See also Danilov's descriptive cataloguing of 25 Mongol Empire sites (2004, pp. 72–117), much dated for some such as Karakorum, but useful to introduce others that are less widely known. I have not consulted the important study by Shiraishi Noriyuki on the archaeology of Chingis Khan (*Chingisu kan no kôkogaku* [Tokyo: Doseisha: 2001]).

25. See Kiselev et al. 1965, 23–59. Details of the excavations in 1997 and 1999–2002, with a new plan of the main part of the site, may be found in Artem'ev 2004, esp. 88–92. Artem'ev's map (p. 84) is useful for showing the locations of sites all the way from the northwest of Lake Baikal to the mouth of the Amur River which have been investigated by the Amur Archaeological Expedition. One near the mouth of the Amur is associated with Yuan efforts to consolidate control there. Several other Chingisid sites with remains analogous to those at Khirkhira have been found to the north of it (for brief descriptions, ibid., p. 93).

26. See Becker 2007. Not the least of Becker's contributions here is her publication for the first time of Dmitrii D. Bukinich's notes from his 1933 excavations. Since Bukinich fell victim to Stalin's repressions, his contributions had remained largely unacknowledged. See her discussion pp. 85–96 and his notes in Appendix 2, pp. 359–78. The best overview of some of the problems which have affected the archaeological study of Karakorum is now Pohl 2009.

27. An additional matter, according to Nancy Steinhardt (1988), is that the Russians have tended to search a bit too hard for possible Central Asian sources of the architecture in Mongolia rather than sufficiently emphasize the Chinese influences. That said, one should, of course, be careful not to over-emphasize Chinese influence.

28. For a summary of the recent excavations in the city center, see Erdenebat and Pohl 2009 and Pohl 2009. The lavishly illustrated exhibition catalogue *Dschingis* 2005, devotes pp. 126–95 to various aspects of the city and its environs and contains additional material about the Mongolian-German excavations. It is important to stress that Pohl affirms the existence of an earlier (probably Uighur) settlement somewhere in the vicinity of what

became the Mongol Empire Karakorum, even if its remains are not below the "city center" the Germans excavated.

29. On the favorable geography of the Orkhon, see Walther 2005. An essay by W. Schwanghart et al. (in *Mongolian–German* forthcoming), will discuss environmental characteristics of the Upper and Middle Orkhon Valley; also in that volume, the brief concluding essay by Jan Bemmann et al. places some of the other archaeolgical sites in the region in their geographical setting. For the first time we will have detailed analysis of plant remains from Karakorum by M. Rösch et al., whose essay is in the same volume. They provide a statistical breakdown of the various species documented from the excavations and show how the mix of cultivated grains changed over time.

30. An essay by Gonchigsüren Nomguunsüren (in *Mongolian–German* forthcoming), provides a very interesting detailed analysis and classification of the axle rings and raises broader issues about the "technologies of communication" in the Mongol Empire.

31. On the kilns, see Franken 2005, where the accompanying images in the catalogue illustrate well the range of ceramics which have been excavated. A detailed study of two major ceramics deposits, by Ulambayar Erdenebat et al. will appear in *Mongolian–German* forthcoming.

32. On coinage in the Mongol Empire, see Heidemann 2005, where the illustrations are from collections other than the Karakorum excavations. Heidemann is in the process of cataloguing the Karakorum material though. The coin of 1237–38 is depicted in *Ghengis* 2009, p. 145, and *Current Research* 2009, p. 511; concerning it see Heidemann et al. 2006.

33. As an example of the dangers of accepting Kiselev's views about the "palace," see Steinhardt 1988, where at several points she refers to Kiselev's plan of Karakorum and its palace as yet another example of the standard Chinese model for an imperial city. Reconstructions of what that building may have looked like have been based on Kiselev's work. See, for example, the two drawings reproduced in *Dschingis* 2005, pp. 152-153 and the discussion there. L. K. Minert's attempt (1985) to reconstruct and trace the architectural genealogy of the Chingisid palaces starts with the structure Kiselev determined was the palace. Minert sees it as the prototype for what Khubilai later would build in Beijing. It is possible, of course, that if the real palace at Karakorum is eventually unearthed, its architecture will not be vastly different from that of the Kiselev "palace"; furthermore, the position of the real palace in the larger scheme of the layout of Karakorum might well reinforce Steinhardt's conclusions about the impact of Chinese models.

34. For some very specific updating and correction of their comments about the sites in the Orkhon valley, see Shiraishi 2004. Shiraishi provides plans and discusses the sites of the several seasonal camps and maps the route connecting them. Note, however, that he still relies on Kiselev's arguments about the "palace" site in Karakorum. According to Shiraishi (p. 108), the concept of Karakorum's "peri-urban" environment was first enunciated by Sugiyama Maasaki in the 1980s. The ongoing project reported in Bemmann et al. 2010 will surely advance our understanding of these patterns of movement and settlement in the Orkhon Valley.

35. The evidence from the Muslim cemetery, excavated in 1978–80, is discussed in Dovdoin Bayar and Vladimir E. Voitov, "Excavation of the Islamic Cemetery in Karakorum" (*Mongolian–German* forthcoming). The authors are vague about the cemetery's date.

36. For details, see S. V. Kiselev, "Konduiskii gorodok," in Kiselev et al. 1965, pp. 325–68, summarized in Steinhardt 1988, 70–71, where she mistakenly places the site within the borders of the Mongolian republic. Further study of the site has been done recently by the Russian Amur Expedition. For a reconstruction of what the Kondui palace may have looked like and a discussion of its relationship to Mongol Imperial architecture elsewhere, see Minert 1985, esp. pp. 199–203. Minert leans toward interpretations of the Chingisid imperial architecture which emphasize aspects of its distinctiveness from purely Chinese architectural models.

37. A major work based on the recent archaeology at Shangdu is Wei 2008 (I owe this reference to Nancy Steinhardt). As I witnessed in the summer of 2009, archaeological work was proceeding apace, with testing being done to determine the location of remains of the temples east of the "palace" and excavation of the foundations of the latter. Given the huge size of the site as a whole, to date only the surface has been scratched in its study.

38. In what follows here, I am most influenced by Rogers et al. 2005; Rogers 2009; Honeychurch and Amartüvshin (2002) 2006, 2007; Honeychurch et al. 2009.

39. Note here the polemical, ambitious but seriously flawed recent book by Christopher Beckwith (2009), which I review at length in the forthcoming volume of *Mongolian Studies*. He lays out in no uncertain terms a case for the key contribution of Inner Asians to the development of "civilization," even as he displays limited awareness of the now substantial literature on early Eurasian pastoralists.

Book notices

The University of Bonn's *Contributions to Asian Archaeology*

P. B. Konovalov. *The Burial Vault of a Xiongnu Prince at Sudzha (Il'movaia pad', Transbaikalia).* Bonn Contributions to Asian Archaeology, 3. Bonn: Vor- und Frühgeschichtliche Archäologie, Rheinische Friedrich-Wilhelms-Universität, 2008. 60 pp. + 40 plates. ISBN 978-3-936490-29-5.

Current Archaeological Research in Mongolia. Papers from the First International Conference on "Archaeological Research in Mongolia" held in Ulaanbaatar, August 19th-23rd, 2007. Bonn Contributions to Asian Archaeology, 4. Ed. Jan Bemmann et al. Bonn: Vor- und Frühgeschichtliche Archäologie, Rheinische Friedrich-Wilhelms-Universität, 2009. 616 pp., including 361 figures and 21 tables. ISBN 978-3-936490-31-2.

The Bonn series on Asian archaeology, edited by Prof. Jan Bemmann, has already established itself as one of the most important scholarly resources for the archaeology of Mongolia, and presumably will eventually encompass archaeological research in other regions of Asia. The series is beautifully produced in large format, with excellent illustrations, many in color, and does a great service in making the material available in English to those who might not read any of the several other languages in which specialists on Mongolia's archaeology publish. The first volume in the series, published in 2002 and now out of print, provided preliminary results from the German-Mongolian excavations at the Mongol Empire capital of Karakorum.[1] Series volume 2, which should soon appear, will contain the first installment of detailed reports from the Karakorum excavations.[2] In the interest of full disclosure, the first of the two volumes highlighted in what follows is one which the author of this review note helped to produce.

Prokopii B. Konovalov is a senior achaeologist in the Buriat Republic of the Russian Federation. Over several years in the 1970s, he supervised the excavation of an elite Xiongnu terrace tomb (numbered 54) at Il'movaia pad', Sudzha, in Transbaikalia. This excavation was the first one to record closely the structural features of such tombs and pay attention to the complex of features which accompany them. However, but for brief published summaries, this methodologically pioneering work remained largely unknown until the appearance of Konovalov's Russian monograph on the excavation in 2008.[3]

The publication of Dr. Konovalov's important work in the Bonn series is a somewhat revised translation (by Daniel Waugh) of the Russian original, with a brief forward by him and Ursula Brosseder, who was the individual largely responsible for the editorial preparation of the publication. The English edition also adds Dr. Brosseder's descriptive analysis of the pottery found in the tomb and an essay by her and Dr. Konovalov on the dating of the tomb and its significance, with reference to a single ^{14}C date (around the beginning of the Common Era) obtained from one of the excavated animal bones. Roughly one third of this relatively slim volume is high quality illustrations — drawings and photographs — which were reprocessed for this edition and not simply copied from the ones in the Russian original.

Given the great interest in and potential for future discovery in the archaeology of Mongolia, the convening in 2007 of the first international conference devoted to the subject was a major event, made possible by funding from the Gerda-Henkel Stiftung. More than 40 papers were given and in their revised and in some cases significantly expanded versions have now been published as Volume 4 of the Bonn series. They have been grouped under several headings: Stone Age, Rock Art, Bronze and Early Iron Age, Late Iron Age/Xiongnu Period, Turkic and Uighur Period, Kitan Period, Mongolian Middle Age, and Natural Sciences. Some of the articles provide retrospective overviews of research to date (accompanied by rather extensive bibliographies); others report on very recent excavations and discoveries and are particularly interesting for the results obtained by newer analytical methods. Rather than attempt to list all of the articles here, I shall comment on a few which I personally found to be of great interest and which give a sense of the breadth of coverage.

From the methodological standpoint, the "geoarchaeological" investigation of the Khanzat-1 site in Eastern Mongolia by a Japanese–Mongolian team opens new perspectives on how to interpret artefact scatters from Palaeolithic sites.[4] One of the important questions for any archaeological investigation is to determine to what degree artefacts may have been disturbed from their original position after their deposition. As one can imagine, where the interval between that date and the present may be tens of thousands of years, there may be particular challenges. The techniques involved sophisticated plotting of the artefacts and the surface material and "fabric analysis," which provided data on the degree to which the artefacts may have shifted their original position over time. The goal eventually is to create "detailed pictures of the emergence of modern humans in Mongolia and of the adaptation processes of modern human groups in the Far East Asia" (p. 43).

The study of Bronze Age burial mounds (slab burials and *khirigsuurs*, mounds surrounded by wall structures) has attracted considerable attention in recent years, which lends particular interest to the article by Bruno Frohlich et al. on work in Khövsgöl Aimag.[5] The results of this very extensive survey and the excavation of some three dozen of the monuments include observations on their relationship to surrounding landscape and proof that (contrary to some earlier opinions) khirigsuurs contain burials. The dates for the khirigsuurs that were studied range from roughly the middle of the second millennium BCE to the 9th century BCE. Among the topics addressed is robbery of burials, leading to a perhaps unexpected conclusion that the absence of artefacts in them was not a result of robbery. Rather, there simply were no artefacts included when the mounds were built.

The following article here, by Jean-Luc Houle and Diimaazhav Erdenebaatar, offers important methodological insights on how to investigate Bronze Age mobility, settlement and societal complexity.[6] The article provides a basis for questioning incautious generalizations about the movement of peoples in Mongolia historically and the relationship of that movement to ecology. The study of the rich Bronze Age monuments in the Khanui Gol valley of Central Mongolia revealed significant complexity that might be related to local environmental conditions. Among other things, the survey data provided the means to map occupation or settlement areas and led to the tentative conclusion that there was a "more 'settled' pattern of mobility" than had hitherto been assumed, and that there was some "centralizing principle" of occupation around clusters of khirigsuurs (p. 128).

Among the specific excavations reported in this volume, one of the more striking is that of what turned out to be an unlooted warrior grave of the Pazyryk Culture in the Mongolian Altai at Olon-Güüriin-Gol 10.[7] Since the burial was preserved in the permafrost, significant organic material was found including textiles and the first completely preserved composite bow from a Pazyryk site. The artefacts are very similar to those found in the previously known Pazyryk burials on the Ukok Plateau in southern Siberia made famous with the excavation of the "ice princess" by Nataliia Polos'mak in 1993.[8] The excavation reported here, conducted by a Russian-German-Mongolian expedition in 2006, was the first to uncover Pazyryk materials in Mongolia; the particular grave is one of the youngest Pazyryk tombs to have been examined so far, dating to the early 3rd century BCE.

A number of contributions here concern Xiongnu burials. The report by Bryan Miller et al. on the excavation at Takhiltyn Khotgor (supported by the Silkroad Foundation) will be familiar to readers of *The Silk Road* from the slightly different version published there.[9] Of particular significance is the long and thought-provoking article by Ursula Brosseder on the interpretation of Xiongnu terrace tombs as elite burials.[10] Not only does she provide a well-illustrated review of the features of many of them, but she also suggests that the ideas of archaeologist Georg Kossack about "ostentatious graves" may help in explaining why, possibly, the Xiongnu terrace tombs were constructed during only a relatively narrow period in the long history of the Xiongnu in conjunction with particular social and political circumstances.

Among the contributions here on the period of the Mongol Empire, Ildikó Oka's article on three coats found in the 13th–14th century grave at Bukhiin Koshuu is of interest for her detailed analysis of the fabrics and decoration.[11] Her conclusion contextualizes them in the larger body of information we have about the clothing and textiles of the Mongolian Empire. The valuable illustrations include photographs of

a replica of one of the coats being modeled, showing details of its construction and how it actually would have been worn.

Several of the contributions in this volume present results of excavations of settlements from different periods of Mongolia's early history. That there even were settlements in what has long been considered a country inhabited mainly by nomads historically is not well known to the general public. These reports concern Boroo Gol and Terelzhiin Dörvölzhin (both Xiongnu sites), Chintolgoi Balgas (Khitan), Khedun (Uighur), Karakorum (the first capital of the Mongol Empire in the 13th century), and Avraga (apparently the residence of Chingis Khan in the Kherlen River basin). I discuss all these articles in my separate review of studies concerning "cities in the steppe" published above in this issue of *The Silk Road*.

Much more could be said about this imposing volume which offers so much previously little known information and is presented in a way that is for the most part accessible to general readers. The editors and their supporting institutions deserve accolades for its appearance.

— Daniel C. Waugh

Notes

1. *Qara Qorum-City (Mongolia). I. Preliminary Report of the Excavations 2000/2001*, ed. Helmut Roth et al. (Bonn, 2002), ISBN 3-936490-01-5. The table of contents is listed at <http://www.vfgarch.uni-bonn.de/ veroeffentlichungen/bonn-bonn-contributions-to-asian-archaeology/band-1-qara-qorum-city-mongolia-i>. For information on obtaining volumes 3-4 in the series, contact <sekretariat.vfgarch@uni-bonn.de>. Libraries wishing to obtain the volumes by exchange should inquire of Susanne Reichert <bibliothek.vfgarch@uni-bonn.de>.

2. *Mongolian-German Karakorum-Expedition, Vol. 1. Excavations in the Craftsmen-Quarter at the Main Road*, ed. Jan Bemmann et al. (Wiesbaden: Reichert Verlag, forthcoming 2010), ISBN 978-3-89500-697-5. Inquiries about obtaining the book should be sent to <info@reichert-verlag.de>. While a final decision is pending, it is likely that Vol. 5 in the Bonn series will be the papers from the first international conference on Xiongnu Archaeology held in Ulaanbaatar in 2008 with the support of funding from the Silkroad Foundation.

3. *Usypal'nitsa khunnskogo kniazia v Sudzhi (Il'movaia pad', Zabaikal'e)* (Ulan-Ude: Izd-vo. Buriatskogo nauchnogo tsentra SO RAN, 2008).

4. Masami Izuho et al., "Preliminary Report of Geoarchaeological Investigation at Khanzat-1, Eastern Mongolia," pp. 32–52.

5. Bruno Frohlich et al., "Bronze Age Burial Mounds in the Khövsgöl Aimag, Mongolia," pp. 99–115.

6. Jean-Luc Houle and Diimaazhav Erdenebaatar, "Investigating Mobility, Territoriality and Complexity in the Late Bronze Age: an Initial Perspective from Monuments and Settlements," pp. 117–134.

7. Hermann Parzinger et al., "New Discoveries in Mongolian Altai: The Warrior Grave of the Pazyryk Culture at Olon-Güüriin-Gol 10," pp. 203–230.

8. This discovery became widely known thanks to her article "A Mummy Unearthed from the Pastures of Heaven," *National Geographic* 186/4 (October 1994): 80-103, and a 1998 NOVA video, "Ice Mummies: Siberian Ice Maiden," whose transcript may be found at: <http://www.pbs.org/wgbh/nova/transcripts/2517siberian.html>.

9. Bryan K. Miller et al., "Xiongnu Elite Tomb Complexes in the Mongolian Altai. Results of the Mongol-American Hovd Archaeology Project, 2007," *The Silk Road* 5/2 (2008): 27–36; Jessieca Jones and Veronica Joseph, "Excavation of a Xiongnu Satellite Burial, loc. cit.: 36-41; in the Bonn volume, Miller et al., "Elite Xiongnu Burials at the Periphery: Tomb Complexes at Takhiltyn Khotgor, Mongolian Altai, pp. 301–314.

10. Ursula Brosseder, "Xiongnu Terrace Tombs and Their Interpretation as Elite Burials," pp. 247–280.

11. Ildikó Oka, "Three Mongolian Coats from the 13th–14th century Grave at Bukhiin Khoshuu," pp. 486-503. The grave itself is described in the preceding article by Zhamsranzhav Baiarsaikhan, "A 13th–14th Century Mongolian Grave at Bukhiin Khoshuu," pp. 477–486.

John E. Hill. *Through the Jade Gate to Rome: A Study of the Silk Routes during the Later Han Dynasty 1st to 2nd Centuries CE. An Annotated Translation of the Chronicle on the "Western Regions" in the* Hou Hanshu*.* N.p., Booksurge.com, 2009. xxii + 691 pp. ISBN 1-4392-2134-0. Orders may be placed through the publisher and on-line booksellers. (Discount priced under $30.00.)

This remarkable volume offers on the first 59 pp. Hill's new and complete English translation of the *Hou Hanshu*'s section on the Western Regions and on facing pages the Chinese text. Over a century ago, this very valuable account of Chinese relations with the

"West" in the Later Han Dynasty (25-220 CE) had been translated almost in its entirety into French and copiously annotated by Édouard Chavannes. The sections on the Roman Empire have long been available in English in Friedrich Hirth's now very old translation (1875) and the more recent annotated compendium of texts produced by D. D. Leslie and K. H. J. Gardiner (1996).

Apart from the completeness and care of Hill's edition and translation, the most impressive part of this book is the more than 600 pages of annotations, appendices and notes, culminating in a 56 page bibliography. Hill's style is to quote previous scholarship *in extenso*, which means that the annotation is an encyclopedia of the literature on the texts and their interpretation. The appendices are small monographs on everything from the introduction of silk cultivation to Khotan, sea silk and wild silk, to the date of Yuezhi migrations and that chestnut of scholarly controversy, the date of the early Kushans.

All this erudition and judicious incorporation of the most recent scholarship is particularly noteworthy in that Hill is an independent scholar, living far distant from any academic library. His book is a tribute in part to the power of modern electronic communications, since the first publication of it (which went through two editions) was on the website of Silk Road Seattle. This then made it possible for the larger scholarly community to access the work and provide him with feedback. For a good many years now, Hill's home in the rainforest paradise of northeastern Australia, has been the center for a network of vigorous scholarly exchange. As Hill makes clear, he is indebted to many for their expertise and advice.

We can hope that his annotated edition of the sections on the *Weilue* on the peoples of the Western Regions, currently also available on Silk Road Seattle (http://depts.washington.edu/silkroad/texts/weilue/weilue.html), will ultimately move from draft form to polished final edition in similar fashion.

— Daniel C. Waugh

Elfriede Regina Knauer. *Coats, Queens, and Cormorants. Selected Studies in Cultural Contacts between East and West.* Zürich: Akanthus, 2009. 502 pp. ISBN 978-3-905083-27-2. CHF 130.-; ca. € 85.-; ca. $ 125.-

Students of Silk Road history should be familiar with Dr. Knauer's prize-winning monograph *The Camel's Load in Life and Death. Iconography and Ideology of Chinese Pottery Figurines from Han to Tang and their Relevance to the Trade along the Silk Routes* published in 1998 (a new edition is forthcoming). That volume and the essays contained in her imposing new collection impress the reader with the unusual range of her knowledge. As she relates in a brief autobiographical preface (accompanied by a bibliography of her publications), her early training was that of a Classicist, but through a series of life-changing experiences she developed serious interests in the Middle East and East Asia. It is hard to imagine in our day and age how art historians now being trained in graduate programs could ever expect to acquire the breadth of perspective and knowledge which informs all her work. She is currently a consulting scholar at the University of Pennsylvania Museum of Archaeology and Anthropology.

The fifteen essays in this volume (three in German, the rest in English) have been previously published, but in a good many cases in books or journals that would not be readily accessible to many readers. So there is some real value to having them in one place, even if the large format, elegantly produced book perforce has to carry a somewhat lofty price tag and may not make its way into more than a few academic libraries. Since in every case Dr. Knauer has revisited the material of the articles and updated it with supplementary notes and bibliography, the versions of the work here are the ones which should be consulted. I shall single out only a few of the essays in order to show the range of interesting material the book contains.

The opening essay on "Marble Jar-Stands from Egypt" may initially strike some readers as focussing on a rather esoteric topic. It shows, however, the way in which close attention to detail and a broad comparative perspective can illuminate much larger topics of cultural exchange. In this case the material provides

Fig. 1. The "Baptistère of St. Louis," dated by the Louvre to 1320-1340. Photo copyright © 2007 Daniel C. Waugh

an entry point into the subject of potable water supplies and the apparatus which supplied daily water needs, since jars placed on the stands filtered through their porous fabric the water they contained. Such devices can be found from many places around the Mediterranean world and beyond; not the least of the interest of the ones produced in the "Islamic" world is decorative imagery that draws on other cultural traditions.

Even though much has been published in the quarter century since the article first appeared, Dr. Knauer's essay reproduced here on the Western connections of the art of the fifth-century Yungang Cave temples in China can still serve as a valuable introduction to their history. The article brings to bear material she draws upon for several of the other essays, including notably Sasanian rock reliefs in Iran and Kushan sculpture.

Several of the essays deal with clothing and fabrics, subjects that often have been explored to show possible cultural connections across Eurasia. Depictions of unbelievers in Giotto murals seem to draw upon an acquaintance with Mongol attire.[1] She argues that supporting evidence can be seen in certain of the images on the Louvre's exquisite "Baptistère of St. Louis," a superb example of inlaid Mamluk metalwork from Egypt also dating from the era of the Mongol Empire [Fig. 1]. An inquiry into the dating of the famous equestrian statue of Marcus Aurelius in Rome leads into a discussion of Persian saddle-blankets and the ways in which the artists of official portraiture incorporated such motifs as a powerful reminder of imperial victories over enemies in the Middle East. Helmets and caps on figures portrayed on Attic kraters (vases) similarly may derive from cultural interactions with the peoples of the Pontic steppes, where the particular attire was then adapted by Greek artists to serve other symbolic purposes. Borrowings could move from west to east, as an examination of objects depicting body armor shows. That evidence takes us through Sogdiana and all the way to China.

In much of this, the role of Inner Asian steppe peoples in cultural exchange looms large, as is abundantly clear when the subject turns to horse harness decorations in the very stimulating essay dealing with the "'Barbarian' Custom of Suspending the Head of Vanquished Enemies from the Necks of Horses." There the evidence embraces objects excavated from the Dian culture in Yunnan, Kushan sculpture from Kalchayan in Bactria, and eventually brings us back to European painting of the Baroque.

One of the most valuable essays for the range of material it brings together concerns various depictions of "draping" parts of the body (the German term here is *Verhüllung*, which can refer to veiling), including especially hands, face and head. Having recently had the privilege of seeing the reliefs at Bishapur [Fig. 2], Persepolis and Taq-e Bostan in Iran, I can

Fig. 2. Rock relief depicting victory of Sasanian king Shapur I, Bishapur, Iran. Photo © 2010 Daniel C. Waugh.

particularly appreciate the discussion of that material along with what may be somewhat more familiar to students of the Silk Roads in the imagery of Zoroastrian rituals where faces of the celebrants are masked.

A particular aspect of the head covering in Chinese images of Xiwangmu (the Queen Mother of the West) is one of the key details in Dr. Knauer's widely ranging (and, as she readily admits, speculative) essay showing interesting parallels in the depiction of goddesses all across Eurasia. She suggests that the origins of the iconography of Xiwangmu may in fact derive from such imagery transmitted across Asia from the West. The "coats" of the book's title (explored in the essay entitled "Quisquiliae Sinicae") refer to a particular style of sleeved coat, often just draped over the shoulders, which seems to have spread from the steppe peoples to their neighbors, among them the Chinese.

Finally, for the curious, why the "cormorants" in the title? The subject here is a Venetian painting of the late 15th century by Carpaccio showing what previous analysts identified as "Hunting in the Lagoon." In fact, what is shown, it turns out, is probably not hunting but rather a rare early European depiction of fishing with cormorants, here indulged in as recreation by the Venetian elite. Dr. Knauer's suggestion is plausible that knowledge of this practice arrived in Europe via the connections with East Asia which flourished in the time of the Mongols.

In this kind of analysis emphasizing the vast range of certain motifs, objects and practices in the cultures across Eurasia, there is always the danger of simplifying the possible genealogies of borrowing. However, the author is really quite careful to leave open the many possibilities both as to whether motifs really were borrowed, and, if they were, exactly how they were transmitted. Furthermore, one of the reassuring aspects of her work is that she takes great care to emphasize how what was borrowed might not always have been understood by artists trained in different traditions, and in any event may have re-emerged in its new environment in contexts where the function of the imagery was quite different from its function where it originated.

— Daniel C. Waugh

1. On the subject of Eastern motifs in Renaissance art in the Mongol period, there is stimulating material in Lauren Arnold, *Princely Gifts and Papal Treasures: The Franciscan Mission to China and its Influence on the Art of the West 1250-1350* (San Francisco: Desiderata Press, 1999).

Yuka Kadoi. *Islamic Chinoiserie: The Art of Mongol Iran*. Edinburgh Studies in Islamic Art. Edinburgh: Edinburgh Univeristy Press, 2009. xvii + 286 pp. ISBN 978-0-7486-3582-5.

For students of the Silk Roads, Dr. Kadoi's subject should be a familiar one. After all, who has not savored the Chinese-inspired lustre-ware tiles which once decorated the famous Ilkhanid palace at Takht-i Suleyman [Fig. 1] or seen the obvious connections between Blue-and-White porcelain and its post-Ilkhanid Middle-Eastern imitations? Why do we need this book then? As the author explains, much of what has been written on the subject of Chinese-Iranian artistic interactions focusses on the Timurid period, when the evidence is the most striking [Fig. 2]. The Ilkhanid period of Mongol rule in Iran (mid-13th to mid-14th centuries) was particularly important as a formative one during which a new wave of Chinese influences entered the Middle East.

Fig. 1. Lustreware tile with Chinese dragon design, probably from Ilkhanid palace at Takht-i Suleyman, northwestern Iran, ca. 1270. Collection of the Victoria and Albert Museum, London, Inv. no. 541-1900.

Fig. 2. A magnificent silver basin, once gilded, juxtaposing images of Bahram Gur from the Shahnama *with Chinese-inspired dragons. Western Iran, early 14th century. Collection of the Victoria and Albert Museum, London, Inv. no. 546-1905.*

Even though much has been done to explore the subject for the pre-Timurid period, the studies have been largely narrowly focussed on a single medium, rather than attempting to contextualize the material broadly across all the arts. To do this is particularly important, as her study demonstrates, because one cannot in fact always be certain what the sources of inspiration were. Hence here we have chapters on textiles, ceramics, metalwork and other media, and three chapters on manuscript painting. As she suggests, the possibilities of transmitting designs by drawings on paper were undoubtedly important. Furthermore, for models of Chinese painting, it may well be that prints, rather than the painted scrolls themselves were the more common examples to be had in the Middle East.

Careful stylistic analysis demonstrates that the artists in Iran may not always have understood their models. (Whether it was important that they *should* have is a question not really posed here.) To some extent this lack of understanding might be the result of borrowing from one medium while working in another. Or, perhaps they were copying from examples which themselves were at some remove from Chinese originals. Maybe, of course, they were simply indifferent to the subtleties, even if they recognized them. While a few other art historians such as Basil Gray have brought to this comparative task expertise in both Islamic and Chinese art, one of the strengths of Dr. Kadoi's work is precisely her equal facility in both, including a better appreciation of the nuances of Chinese painting than most of her predecessors have had. It is tempting for the non-specialist to point to the somewhat superficial and obvious motifs (e.g., cloud or wave patterns, dragon motifs), but to limit a discussion of cultural interactions to such observations deprives us of any real understanding of the mechanisms of artistic exchange. It is essential to look at the details.

We are continually reminded here of the difficulties in pinpointing "borrowings" of techiques, styles and motifs and the subtleties involved in their transmission. While an exhibit in, say, the Museum of Islamic Art in Berlin, might provide a superficial impression that early Islamic splash ware ceramics (the examples are usually those found at Samarra) drew their inspiration from Tang Dynasty ceramics, it is possible that the inspiration lay not in China but in earlier traditions in the Middle East. It makes a great deal of sense to look to Central Asia and/or Northern China (especially in the Liao and Jin Dynasties) as the sources for some of the art which surely must have had an impact under the Ilkhanids. An excursus in the book on the motif of the lotus, which is particularly illustrative for demonstrating the migration of an artistic motif, shows how the understanding

of it changed substantially over time and space, Its ubiquitousness makes pinpointing the sources of inspiration almost impossible.

While the book is generously illustrated, largely in quality color photographs, the pictures often are too small. And time and again a comparison that really invites visual support is not illustrated — this is a particular problem in the discussion of manuscript painting. One has to imagine the economics of publishing art history books was a consideration here, since often obtaining permissions for illustrations can be far too expensive. Therein lies a good argument for free and open access to images of historic art, something that in theory museums and libraries should support if they are true to their missions as non-profit educational institutions. How much do they really balance their budgets by selling image rights??

As with many art historical monographs (and more broadly, recent dissertations turned into first books), chunks of this admirable volume will be indigestible for the general reader. For an introduction, lavish some attention on the catalogue for the stunning exhibition a few years ago on the courtly arts of Ilkhanid Iran.[1] To develop a deeper understanding of the important east-west artistic exchanges in the period of arguably the greatest flourishing of the Silk Roads, it will be essential then to graduate to Yuka Kadoi's book, which opens many avenues for further discovery.

— Daniel C. Waugh

1. Linda Komaroff and Stefano Carboni, eds. *The Legacy of Genghis Khan: Courtly Art and Culture in Western Asia, 1256-1353*. New York: Metropolitan Museum of Art; New Haven and London: Yale University Press, 2002.

Susan Whitfield, ed. *La Route de la Soie: une voyage à travers la vie et la mort*. Bruxelles: Europalia International/Fonds Mercator, 2009. 206 pp. ISBN 978-90-6153-892-9; ISBN 978-90-6153-891-2 (Flemish edition).

The exhibition illustrated in this catalogue was held in Brussels between October 2009 and February 2010, in conjunction with other events celebrating the sixtieth anniversary of the People's Republic of China. Since Silk Road exhibitions spring up like flowers in the desert after a rain, one might well ask what the particular merits of this one were.

There are many old friends here: "Yingpan Man" (who has surely traveled farther and earned more money in death than he did in life), one of the "ancient Sogdian letters" found by Aurel Stein, the bronze statuette of the dancer in the pointed hat doing the Sogdian whirl, the cute lady with her pearl-roundel blouse and striped skirt excavated from Astana tomb 206, Byzantine solidi and their imitations found in Ningxia and Gansu, the wonderful gilt-silver ewer depicting the legend of Paris and Helen which was found in the tomb of Li Xian [Fig. 1]... Yet there are also a good many items less widely known, not having previously (or at least recently) been exhibited on tour. Among them are Tangut items from the Kharakhoto collection of the Hermitage Museum and from Dulan, Wuwei and Yingchuan, mural fragments found at Dandan-Uiliq in 2005 and a gilt-silver 7th–8th-century plate from the collection of the Cologne Museum.

The too short essays on the objects are all by leading specialists (mainly British, Russian, French and Chinese); in general the volume is nicely designed, with good maps and historic and evocative modern photographs interspersed with the art. While there is a kind of common theme of what we learn about life from funerary objects (not surprisingly, that forms the core of so many Silk Road exhibitions), the organization of the book may challenge the reader. It is loosely geographical, meandering westward across "China," but chronologically chaotic. Having a good chronological chart for reference would have been very useful.

Every new Silk Road exhibition seems to have its unexpected rewards; the one presented in this volume is no exception. Would that I had taken a day when in London last autumn to make the quick trip to Brussels to see this widely ranging selection of treasures.

— Daniel C. Waugh

Fig. 9. The white glove treatment for the Li Xian ewer at the Guyuan Museum. Photo © 2009 Daniel C. Waugh.

Johan Elverskog. *Buddhism and Islam on the Silk Road*. Philadelphia: University of Pennsylvania Press, 2010. ISBN 978-0-8122-4237-9.

A book as thought–provoking as this one deserves a long and careful review, something I cannot attempt here. It challenges deeply ingrained misperceptions about the historical relationship between Buddhism and Islam, and more importantly challenges us to re-think more broadly many of our assumptions about cultural encounters across Eurasia and the basis on which they rest. This is "world history" at its best, avoiding the oversimplifications of model building that have sometimes framed that subject.

Let the author explain the themes he explores:

> The first of these, and indeed the essential thread that runs throughout what follows, is the question of what happened when Buddhists and Muslims actually came into contact with one another. In particular, how were both of these traditions transformed as a result of this encounter?...It is also the aim of this work to challenge some of the conventional divisions that shape our understanding of the world — such as the notion of East–West, and Middle East–East Asia, as well as the modern phenomenon of the nation–state — all with the aim of exploring how these conceptualizations potentially distort historical realities. And finally, by situating the history of Buddhist–Muslim interaction in terms of everyday activities, such as making money and cooking, I hope to generate new insights about not only the fraught intersection between religious thought and human life, but also the actual possibilities of cross-cultural understanding within such a meeting [pp. 7-8].

To find out what really happened in the Buddhist–Muslim encounter is no easy task, since so many of the historical sources invent stories of hostility and destruction and suggest that the two cultures are antithetical. Such misleading depictions of the "other" are an essential component in the creation of self-images that likewise may correspond little to historical reality. All such representations and misrepresentations can be understood only through a careful examination of the specific historical contexts in which they emerged.

Prof. Elverskog's exposition of those realities may be something of a challenge for readers, since the material requires excurses into fundamentals of belief and into the complexities of Inner Asian politics. The book's many clear maps will certainly help navigation through the geography, but the focus shifts rapidly across space and time and back again, running the risk of leaving even those somewhat familiar with the history gasping to keep up. That said, the writing is clear and much of the time refreshing, in that it eschews academic jargon and at times is delightfully colloquial and blunt.

We learn here about the dangers of assuming that Islam or Buddhism were monolithic. In fact their internal fractures help a great deal to explain why the history of the interactions are so complex, and why, despite the negative rhetoric, it turns out that practitioners of the faiths often saw mutual benefit and had some real tolerance (if not understanding) of each other. As so often is the case in history, treatment of co-religionists with whom one disagrees may be more vicious than treatment of those who profess an entirely different faith.

The degree to which there was meaningful interaction between Buddhists and Muslims fluctuated considerably over time. In the early Islamic period there were real opportunities for Muslims to learn first-hand about Buddhism and there often was a shared interest in commerce (Buddhists historically are not simply otherworldly, Elverskog reminds us). In the early Abbasid period (late 8th century), when the Barmakid viziers (a family of Buddhist origin) held sway in Baghdad, the eyewitness account of one Yahya ibn Khalid, sent to India to collect medical knowledge, provided some detail about Buddhism. The rather curious example of amulets offers evidence of shared cultural practices, where it is very likely the Buddhist examples (and their physical form) influenced the examples known from the Islamic world. Yet the two religious spheres drifted apart subsequently; for a long period little new knowledge of "the East," much less of Buddhism, entered Islamic writings.

Yet Buddhism would eventually revive in the Middle East under the Mongols. While the author takes pains to emphasize the cultural implications of the "pax mongolica," he may surprise some readers by his salutary insistence that "the Mongol Empire as it is often conceived is largely imaginary" (188). By this, of course,

he means that, theories of empire aside, political realities were largely those of conflict and competition starting before the boundaries of Mongol expansion ever reached their limits.

I found his most compelling chapter to be that on the Mongol period, in which he explores the religious diversity of the empire and the circumstances whereby the Mongol rulers in the Middle East, the Ilkhanids, first cultivated and then turned against Buddhism and converted to Islam. This context helps us to understand how the vizier and world-historian Rashid al-Din came to write such a detailed account of Buddhism (whose illustrations also reflect eastern influences in the visual arts). He could witness Buddhist devotions and had access to Buddhist experts and their writings, including ones just compiled in Tibet. Some tolerance for Buddhism seems to have survived Rashid al-Din's execution in 1318 and the destruction of his center of enlightened inquiry on the outskirts of Tabriz in northwestern Iran [Fig. 1].

While we might wish an even more detailed discussion here, we must be impressed by Elverskog's discussion of how it was precisely in this context of intensive cultural exchange that a revolution occurred in Islamic art, which allowed, at least for a time, even depictions of Muhammed. As the author points out, the art historians who have explored in some detail the cross-cultural underpinnings of Islamic painting beginning in the Ilkhanid period have tended to underplay the contributions from Buddhist religious art. Yet clearly there were some direct borrowings, and perhaps more significantly, the Muslim artists came to appreciate how image could be used in the service of religious polemic.

The book's emphasis on the development and spread of Tantric Buddhism in Tibet and then further north and east in Asia is essential to our understanding of the complex history of the faith's fate under the Mongols and their successors. Drawing on strengths of his earlier research, Elverskog carefully unravels the complex political situation in east Turkestan and post-Mongol Empire Mongolia and the relations between the Ming and Qing rulers and their neighbors to the north. One of the key moments in this history was the meeting in 1578 between the Altan Khan and Sönam Gyatso, to whom the khan gave the title Dalai Lama (the third one, his predecessors so designated retroactively at the time). A great deal of the mythologies of self-identification of Tibetans and Mongols have been built upon this event. Why the meeting occurred had little to do with faith, but much to do with political and economic realities. It may come as a shock to readers to learn how ruthlessly the Fifth Dalai Lama (Ngawang Lobsang Gyatso, 1617–82) went about consolidating his power in Tibet, employing in the process "his fundamentalist Gelukpa death squad" (p. 223). This consolidation of a theocratic state followed in short order upon the consolidation of an Islamic one in East Turkestan under the Naqshbandi Sufis. Taken together then, these events help us to understand how "a sharp divide between the Buddhists and Muslims of Inner Asia" emerged (p. 216).

The final chapter entitled "Halal," looking at the Muslim-Buddhist relationship through the lens of dietary restrictions, summarizes the complexities of cultural understanding and misunderstanding over the period beginning back in the 13th century and moving down to the 19th. As so often was the case, it was in specific political contexts that discussion and polemic about cultural norms came to the fore. An exception among the polemicists on the Mongol side was one Injannashi (1837-1892) whose suprisingly "modern" and balanced views of religious differences led him to conclude that "all [religions] seek the best according to their own custom. The outer aspects may differ but the thoughts behind them are the same" (p. 260). This expresses very well Elverskog's own hope that there might yet again be a "new age of Buddhist–Muslim cultural exchange" such as he has so successfully demonstrated existed at least at certain moments in the past.

— Daniel C. Waugh

Fig. 1. The location of the Rab'i Rashidi, Rashid al-Din's house of learning, now buried under Safavid ruins on the outskirts of Tabriz.

Khotan is Hot

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Bulletin of the Asia Institute 19 (2005 [2009]): Iranian and Zoroastrian Studies in Honor of Prods Oktor Skjærvø. Ed. Carol Altman Bromberg, Nicholas Sims-Williams and Ursula Sims-Williams. <http://www.bulletinasiainstitute.org/>.

Readers can be grateful to the editors of these two important series and individual volumes for their dedication in producing work that meets the highest scholarly standards and presents considerable technical and linguistic demands. In both cases here, credit is also due to the Neil Kreitman Foundation for its subsidy, which made possible in the case of *JIAA*, for example, the inclusion of excellent color photographs.

While *BAI* now has a long and distinguished record as one of the most significant serial publications focussing on what we may lump under the term the "Silk Road," *JIAA* is a newer (but no less distinguished) enterprise which may as yet be unfamiliar to some. Its first two volumes were primarily Festchriften honoring prominent scholars, A.D.H. Bivar and Roderick Whitfield. While I confess to not having examined Vol. 1, I find in Vol. 2 a good many articles with the kind of breadth of interest which should make it required reading for many with a general curiosity about the Silk Roads.

The focus of Vol. 3 is no less important, even if (perhaps we should say, because?) so much of the material is narrowly specialized. Ursula Sims-Williams, the guest editor for this volume, tells us why we should pay attention to it: "Recent 'Silk Road' studies have tended to focus on Dunhuang in the east and Turfan in the north. It is to be hoped that this volume will contribute to a re-evaluation of Khotan [Hetian—DW] on the southern edge of the Taklamakan desert and stimulate further research into this diverse and culturally important area" (p. 63). Much of the material came out of the symposium held in 2004, "The Kingdom of Khotan to AD 1000: A Meeting of Cultures" (briefly reported in *The Silk Road* 2/1 [2004]: 38–39), convened in conjunction with the British Library's Silk Road exhibition.

Among the articles deserving special comment here are the following. Rong Xinjiang and Wen Xin translate and discuss some newly discovered Khotaniese bilingual tallies, whose significance lies in their being "the oldest dated Chinese doucments discovered in the Khotan area" written in the early 8th century. They provide important insights into the Chinese administration in the region. Another of the contributions is by Rong Xinjiang and Zhang Guangda, "On the Dating of the Khotanese Documents from the Area of Khotan," a seminal article which first appeared in 1997 and now for the first time is available here in English with some supplementary notes regarding newer research. The thorny issue of dating is the focus of the long and very valuable contribution by Harvard's Prods Oktor Skjærvø on "The End of Eight-Century Khotan in its Texts." Included here are translations of a connected series of letters from the turn of end of the 8th and beginning of the 9th century reflecting the administrative responses to the crisis in which Khotanese territory was invaded from the north by the "Hunas," whoever exactly they were. Other articles of note in this number of JIAA include one on newly discovered mural fragments from a temple at Dandan-Uiliq in the desert northeast of Khotan and another on textiles found in three burials at Buzak southwest of Khotan.

That Khotanese studies are now a hot commodity is further in evidence in BAI 19, a Festschrift for Prof. Skjærvø, who has over the years been one of the most prolific contributors to the study and publication of Khotanese texts and to Zoroastrian studies. To read the interesting saga of how he went from "hanging out freshly caught fish on the traditional drying frames" (p. 1) in the Norwegian port town of Steinkjer to acquiring a staggering range and depth of languages is inspiring; one has to wonder whether in the future such a story can ever be repeated when it becomes necessary to replenish the ranks of the rarified elite of Early Iranists. We can feel fortunate that Prof. Skjærvø is also celebrated as a mentor in the field.

Much in this volume is, as we might anticipate, focussed on what may seem to be rather small subjects. But often the small subjects pry open rather large doors. For example, Duan Qing's contribution on "'Mulberry' in Khotanese: A New Khotanese Loan Deed in the Hetian Museum" fills in a key piece in a much larger puzzle about silk production. Several documents he translates here relate to leasing of mulberry trees by a well-known General Sidaka.

For students of the Silk Roads, the article most likely to be of value is also one of the more general ones, by Valerie Hansen, who discusses "The Tribute Trade with Khotan in LIght of Materials Found at the Dunhuang Library Cave." Here we learn about objects of trade, about the role of ostensibly diplomatic missions which as much as anything were trade missions, about theories concerning the real nature of the repository in the famous Mogao Cave 17. While Hansen notes "how envoys and monks have left far more traces in the documentary record than have merchants" (p. 41), the explanation may lie less in the particular circumstances of preservation and more in the issue of whether we can or should in fact be defining anyone as a "merchant" in the strict sense. This is apparently another installment from her work on her long-awaited book on the Silk Roads.

Highly speculative suggestion, such as what we find in Prudence Harper's comparison of an Achaemenid censer (depicted, inter alia, in Persepolis reliefs) and examples from Han China, leaves us here with no real conclusion, but of course might stimulate further enquiry that eventually could demonstrate a definite east-west connection. The intriguing thing is not merely the similarities in physical form, but the possibility that exchange could have involved theories about immortality which are symbolized by the physical objects. Judith Lerner's contribution on a unique Sasanian-style seal with a Middle Persian inscription of its owner "Asay, Prince of the Alan," is similarly speculative in that we cannot really know what Asay thought beyond the possibility that his choice of a stag emblem says something about his steppe heritage and the wider world of "Scythian" imagery.

This volume provides those who do not know Chinese with yet another of Rong Xinjiang's valuable contributions now translated into English, an article originally published in 1991 laying out evidence for a distinctive "Tumshuqesque" identity, and sketching out the historical context in which it is to be found in one of the many small polities of the oasis towns of what is today Xinjiang.

While the several contributions to this volume on Zoroastrianism are far beyond my competence to discuss, I note the interest of Yuhan Sohrab and Dinshaw Yevaina's article "Resurrecting the Resurrection: Eschatology and Exegesis in Late Antique Zoroastrianism." The important issue here is whether there was a "universal eschatology" in Zoroastrianism which might have contributed to both Jewish and Christian belief, or whether the direction of the possible line of influence should be reversed. The authors present evidence, granted, based on a relatively small example, to question Ian Bremmer's late dating for developed eschatology in Zorastrianism. At very least this discussion should remind us in a most general way that proving the fact, if not more specifically the direction of cultural "borrowings" is a risky undertaking.

Finally, it is fun to speculate with Yutaka Yoshida about the significance of "the only [Khotanese] text of the tenth century...which was actually discovered in Khotan," "one short line" on a piece of cloth found in a grave at the village of Buzak (p. 233). The author leads us through a reconstruction of how that cloth might have made its way into the grave, whence it came, and ultimately who the deceased was. Perhaps none other than the Khotanese Prince Visa Sura, son of Khotanese king Li Shengtian (Visa Sambhata) and his wife, a daughter of Cao Yijin, who ruled in Dunhuang from 914-935. The material draws on some of the same sources discussed by Valerie Hansen in her article mentioned above. It is nice to see such a distinguished scholar as Prof. Yoshida sticking his neck out to put some flesh on the bare bones of the few and cryptic texts.

— Daniel C. Waugh

John Becker, in collaboration with Donald B. Wagner. *Pattern and Loom. A Practical Study of the Development of Weaving Techniques in China, Western Asia, and Europe*. 2nd ed. 2009 (1st ed. Copenhagen: Rhodos International Publishers, 1986). 400 pp. Downloadable from the Internet in pdf format, free of charge, at: <http://www.staff.hum.ku.dk/dbwagner/Pattern-and-Loom.html>.

Pattern and Loom was originally published in 1986 in a very limited edition. After John Becker's death, Donald Wagner, who had collaborated on the original research, experimentation and writing, reformatted the book and has now published it on the Internet. This book is a valuable resource, on various levels, for the serious textile student and/or collector. Becker and Wagner diagramed important historic textiles from various cultures and periods and then set about duplicating the selected textiles by what is referred to in other fields as backward engineering. Each design is graphed and the loom and loom configuration then recreated. The book is a labor of love, but requires some basic knowledge of weaving and an interest in the specifics of weaving techniques to enjoy.

The book has a dual purpose, to provide: 1) a detailed account of preserved ancient textiles and classification of the weaving types, and 2) an inspiration for weavers by reason of its practical description of each weaving technique. It covers the weaving techniques of China, Western Asia and Europe. Since the original publication, a plethora of Chinese textiles have been discovered and a great deal of research done on their reproduction. Since much more is now known, there is less speculation as to the weaving techniques employed in historic Chinese textiles. Even though images of these recent discoveries have been published and widely disseminated, most of the current research on the types of looms employed and conclusions regarding weaving technique is either available only in Chinese or as yet unpublished. Hence, while *Pattern and Loom*'s content has not been updated and with each passing year the value of the history it presents diminishes, the book retains significant value.

This is a serious technical book. Over a period of 20 years, the authors, who are professional weavers, experimented with looms (generally identified in archeological material, paintings or historic texts) and weaving techniques to ascertain the type of loom and techniques employed to create each weave. In a number of instances the precise technique used is speculative. The book goes well beyond the usual glossary of applicable textile weaves included (or, as often, not) in the books reproducing historic textiles. The value in this publication lies in its detailed analysis and illustration of each significant weave. Drawings and photographs illustrate the type of loom, the heddles and tie ups used, pattern bars, and other parapheralia; graphs show in color the pattern, the warps and wefts. Each weave is diagramed with explanatory text so that, if one were so inclined, he could reproduce each of these textiles. There is no other book in English which provides such complete technical analysis and explanation of the weave exemplars. Regardless of the discovery and publication of additional textiles and amplification of historic loom techniques the diagramed weaves will not change. The technical information provided will remain valuable.

The textiles reproduced and diagramed are Chinese 16th–11th centuries BCE, the patterned weaves of the Han period, textiles from Western Asia from the first century CE through 1000, and weaves of Tang China (regarding which there is a discussion here of Western influences). The book concludes with an essay reconstructing the development of the draw loom, a discussion of weaving implements, and practical suggestions and guidance for setting up looms.

A casual reading of the book will provide the reader with a clear sense of the sophistication of the weavers who produced these early textiles. When studied in conjunction with a textile survey, such as Feng Zhao's *Treasures in Silk*, this book will give the reader a real and tactile sense of the art form and the importance that the textile held in that culture. One does not need to absorb every detail of the technique to grasp the essential differences in weave

structure in a visceral way. This will permit deeper understanding and ready identification of the weave in the future. Textiles analyzed of particular interest to Silk Road scholars include: monochrome patterned silks (i.e., tabby patterned with twill), gauze weaves, polychrome silks, pile warp pattern, weft-faced compound tabby (taquete), weft-faced compound twills (samite), incised weaves, various weft- faced weaves, damasks, and warp-faced compound twill. Later developments such as velvet are beyond the scope of the book.

One cannot overstate the importance of textiles in the transmission of technical and esthetic information. In *Chinese Ornament: The Lotus and the Dragon*, Jessica Rawson documented the transmission of esthetics and style along the Silk Road. John Becker analyses textile weaves and tracks the transmission of the technique and loom development along the Silk Road. The section on Chinese textiles includes a chart of the modern Chinese word for each of the major weaves in English and Chinese characters and a companion chart of older form and simplified form alternative words for the weaves with Wades Giles, Pin-Yin, EFEO, BK and Japanese pronunciation. A research project to standardize these terms and to amplify them has been underway at the Metropolitan Museum, but its status is unknown. Until it is completed and published, this graph is a useful tool.

Pattern and Loom is not a casual read. It is also not an overview of the history of textiles, a subject addressed in numerous other books. It is instead an excellent and thoughtful exploration and explanation of the technique required to produce historic textiles. For that alone it is a valuable addition to any textile library devoted to Chinese or Central Asian textiles.

— reviewed by Sandra Whitman

Sandra Whitman is a specialist in antique and old Chinese and Tibetan rugs. Her gallery in San Francisco features rugs from Ningxia, Baotou, and East Turkestan. For more information visit: <http://www.sandrawhitman.com/>.

In memoriam

It is with great sadness that, after the print version of this issue of our journal had gone to press, of the passing of Dr. Elfriede Regina Knauer on June 7, 2010. The review notice above (pp. 128-130) on her recent collection of essays provides a sense of the scope and interest of her work.