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ON IRON METALLURGY AND RELATED QUESTIONS IN ANCIENT XINJIANG DURING THE XIONG-NU AND TURKS PERIODS

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Xinjiang, China is an important region for the history of ancient metallurgy in Inner Eurasia. In this article, the author discusses iron metallurgy in ancient Xinjiang from the Han to Tang Periods, from the third century BCE to the tenth century CE, i.e., the Xiong-nu and Turks periods. Some records in Chinese historical documents and among archaeological discoveries indicate that the Xiong-nu made great efforts to control the Tarim Basin, especially the Qiuzi, taxing resources, including iron. The historical record and archaeological discoveries also indicate that the early Turks originated in the south Altay Mountains and developed into a powerful regime by relying on the local iron reserves.

Keywords: Altay Mountains, iron metallurgy, Kucha, Tarim Basin, Tianshan Mountains, Turks, Qiuzi, Xinjiang, Xiong-nu

The mountains of Tianshan, Altay and Kunlun in Xinjiang are rich in iron ore reserves. According to archaeological discoveries, local people in the oasis along the Tianshan Mountains have used the ironware as their implements since the early years of the 1st millennium BCE. These are the finds of iron objects in the tombs in the Yanbulak Cemetery, near Hami, a region of eastern Tianshan [3, p.325–362]. More discoveries of iron objects and iron-making sites dating to middle to late periods of the 1st millennium BCE have been reported [8, p.42–49]. Some historical records concerning iron and iron metallurgy in ancient Xinjiang, called the Western Regions (西域) in Chinese, reveal the source of iron ore and technology and possible cultural exchange. As we know from history, for nomadic tribes or states in the Iron Age, iron was one of the most important resources. From this perspective, it is interesting to discuss the question of iron metallurgy in ancient Xinjiang, and how the Xiong-nu and the Turks took advantage of iron reserves in Xinjiang for their own development. As background, these two strong powers in the Eurasian Steppes, the Xiong-nu and the Turks, appeared precisely at the same period in history.

I. The Relevant Records in Chinese Historical Documents and the Research Questions

1. The Xiong-nu, the Turks and Ancient Xinjiang

(1) The Xiong-nu

According to the history of the Xiong-nu 匈奴列传 in Shiji 史记, the records of the Grand Historian, it was Mok-duk Chanyu 冒顿单于 who in 176 BCE defeated the Yue-shi 月氏, also read Rou-zhi in ancient Chinese; and during the reign of his son Laoshang Chanyu 老上单于, Yueshi was defeated again. The Xiong-nu started to control the Loulan 楼兰, i.e., Coraina, and the Wusun 乌孙, the Hujie 呼揭, or Wujie 乌揭, and the nearby thirty-six states, in ancient Xinjiang [14, p.2889–2890, 2896; 15, p.3161–3162].

The Han Dynasty, 206 BCE to 220 CE, developed into the Tarim Basin from the time of the reign of the Emperor Wudi 武帝, which was during 140–87 BCE. In 60 BCE, the protectorate general of the Western Regions 西域都护府 was set up in Xinjiang [21, p.57].

During that period in Xinjiang, the border between the Han and the Xiong-nu was generally along the Tianshan Mountains. The struggle for the control of power over the Tarim Basin between the Han and the Xiong-nu was unceasing and resulted in wars. The last war recorded in Houhanshu 后汉书, the historical records of the later Han Dynasty, happened in 151 CE.

The key place that the Xiong-nu did its utmost to control in the Tarim Basin was the Qiuzi 龟兹, today's Kucha, on the northern margin of the basin.

(2) The Turks

According to the history of the Turks 突厥传 in Zhoushu 周书, the historical records of the Northern Zhou Dynasty, the Turks were the vassal of the Ruru, i.e., the Rouran Khanate 柔然, and lived in south or southeast of the Golden Mountain 金山之阳. They were the ironworkers of the Ruru. In 552 CE, Bumīn qayan defeated the Ruru and established the Turk Khanate, which controlled the four tribes living in the southwestern Altay Mountains and ten tribes in the Tianshan Mountain valleys from Hami to Yanqi 焉耆, Agni [7, p.907–912].

Around 556 CE, Yabgu İstemī 莫贺咄叶护室点密, the brother of Bumīn qayan, captured the Tarim Basin and settled his ordu in the Yulduz Valley north of Kucha. In 648 CE, the Western Turk Khanate was conquered by Tang Dynasty and southern Xinjiang was administrated by the Anxi Protectorate General 安西都护府 [13, p.6055–6060; 21, p.143–152].

2. The records Concerning to Iron and Iron Metallurgy in Xinjiang

In the history of the Western Regions 西域传 in Hanshu 汉书, the records of the former Han Dynasty, it was recorded that:

- the pastoral tribe Ruoqiang 婼羌 held a mine in mountains and smelted ore to manufacture weapons;

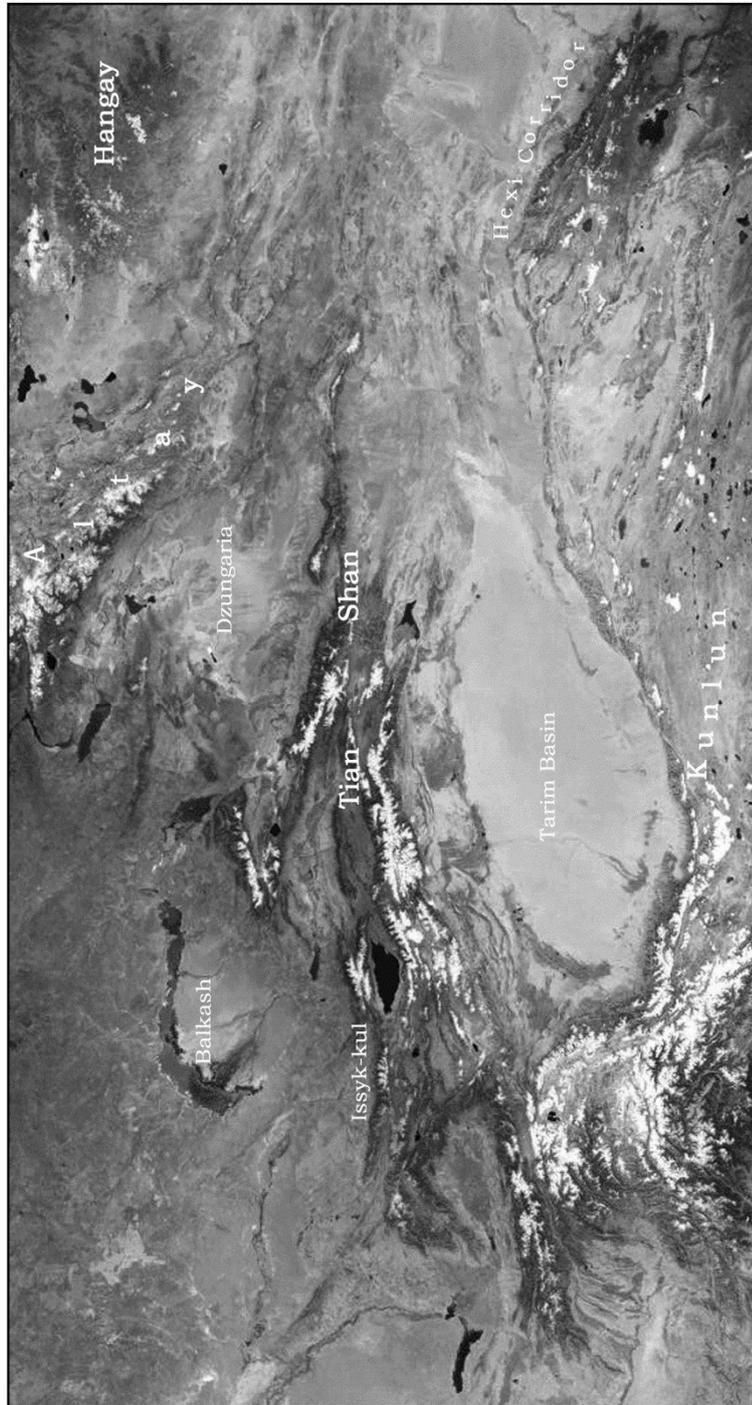


Figure 1: The Topographic Map of Xinjiang and Its Surroundings

- in the kingdom of Shache 莎车 there were ferrous mountains;
- the kingdom Gumo 姑墨 had the capacity to produce copper, iron, and auripigment;
- the kingdom of Qiuzi had the capacity to smelt and cast metal;
- the kingdom of Moshan 山国 produced ironware in the mountains (Figure 2) [1, p.3875, 3897, 3910, 3911, 3921].

In the book *Shishi Xiyu Ji* 释氏西域记, which are Buddhist records of the Western Regions, written in the mid-4th century CE, it is recorded that: there is a mountain 200 li to the north of Qiuzi, where there is flame in the night and smoke in the day. People take the coal and smelt this mountain's iron to be usable by the thirty-six states» [6, p.38–39].

In the history of the Western Region in *Suishu* 隋书, the records of the Sui Dynasty, it recorded that Qiuzi is rich in copper, iron, and lead. The land of Sule 疏勒, i.e., Kashgar, is plentiful with copper and iron, and every year it makes contributions of them to the Turks [19, p.1852].

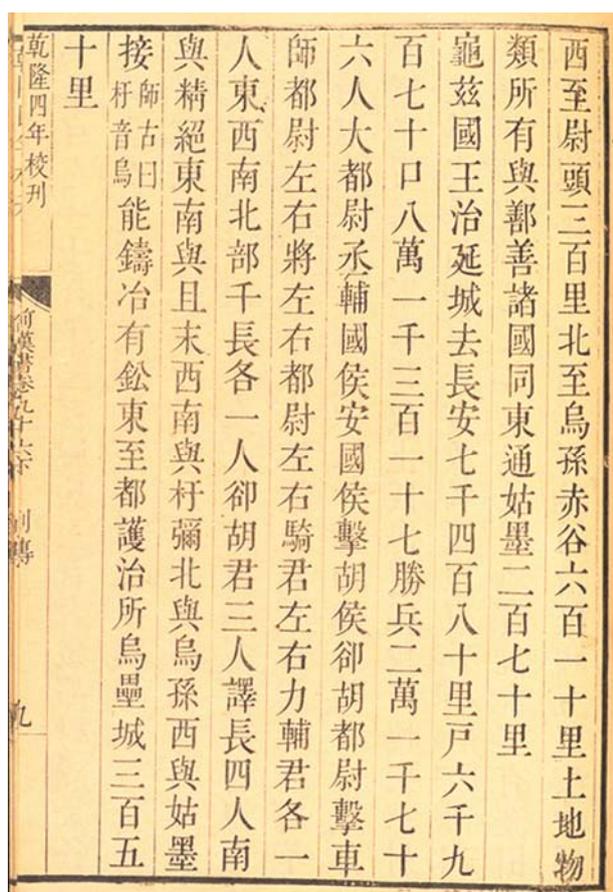


Figure 2: Page of *Hanshu* about Qiuzi, Printed in 1740

In *Datang Xiyu Ji* 大唐西域记, The Great Tang's Records of the Western Regions, Qiuzi is noted to be productive in gold, copper, iron, lead and tin [20, p.54].

Some Chinese documents unearthed from the ancient city of Croraina of the Wei and Jin Dynasties (LA.VI.ii.186, LA.III.i.x) also referred to a kind of «Hu's iron» 胡铁, i.e., not Chinese iron [2, p.168; 12, p.161], which was probably the local iron in Croraina.

3. The Questions Proposed

Based on the historical records mentioned above relating to iron reserves in the mountains around the Tarim Basin and ferrous metallurgy of the tribes or states in the oasis during the periods of 2nd century BCE to 7th century CE, we can propose such two questions:

(1) what was the state of iron metallurgy in ancient Xinjiang during the periods of Qin and Han Dynasties (= Xiong-nu period) and of Sui and Tang Dynasties (= Turks period)?

(2) how did the Xiong-nu Empire and the Turks Khanate, especially the Western Turks Khanate took advantages of the reserves of iron ore and iron metallurgy of the Western Regions?

We know that the Xiong-nu fought with the Han Dynasty for the power to control the Tarim Basin and the Lop-nur for a long time. But it is worth noting that the most important locations where they fought were Loulan, then Shanshan, and Qiuzi [21, p.52–57]. The former was located in the portal between China's inland with the Western Regions and the Silk Road's traffic, and the latter was powerful and rich in iron reserves in the Tarim Basin. Thus, one could speculate that the Tarim Basin and especially Qiuzi was the region from which the Xiong-nu acquired iron. As circumstantial evidence, a record in the history of the Western Regions 西域传 in *Hanshu* 汉书 notes that the Rizhu Wang (日逐王 Rizhu King) of the western territory of Xiong-nu had appointed an official named Tongpu Duwei 僮仆都尉, the Commandant of the Servants, to govern the Western Regions, and he frequently stationed himself in a place between the Agni, Weixu 危须 and Yuli 尉犁, i.e., between Loulan and Qiuzi, and was in charge of collecting taxes from the states in the Tarim Basin [1, p.3872].

II. Archaeological Findings of Iron Metallurgy in Xinjiang

1. Iron Metallurgical Sites

(1) Ferrous metallurgical sites along the upper Kucha Valley

A site situated in an area 120 km north of the Kucha County town center, probably dating from the time of the Hans, 206 BCE to 220 CE, was first discovered in 1958. Nearby is an iron mine. Some metallurgical instruments and pottery shards from the jar were found in situ [16, p.22–31].

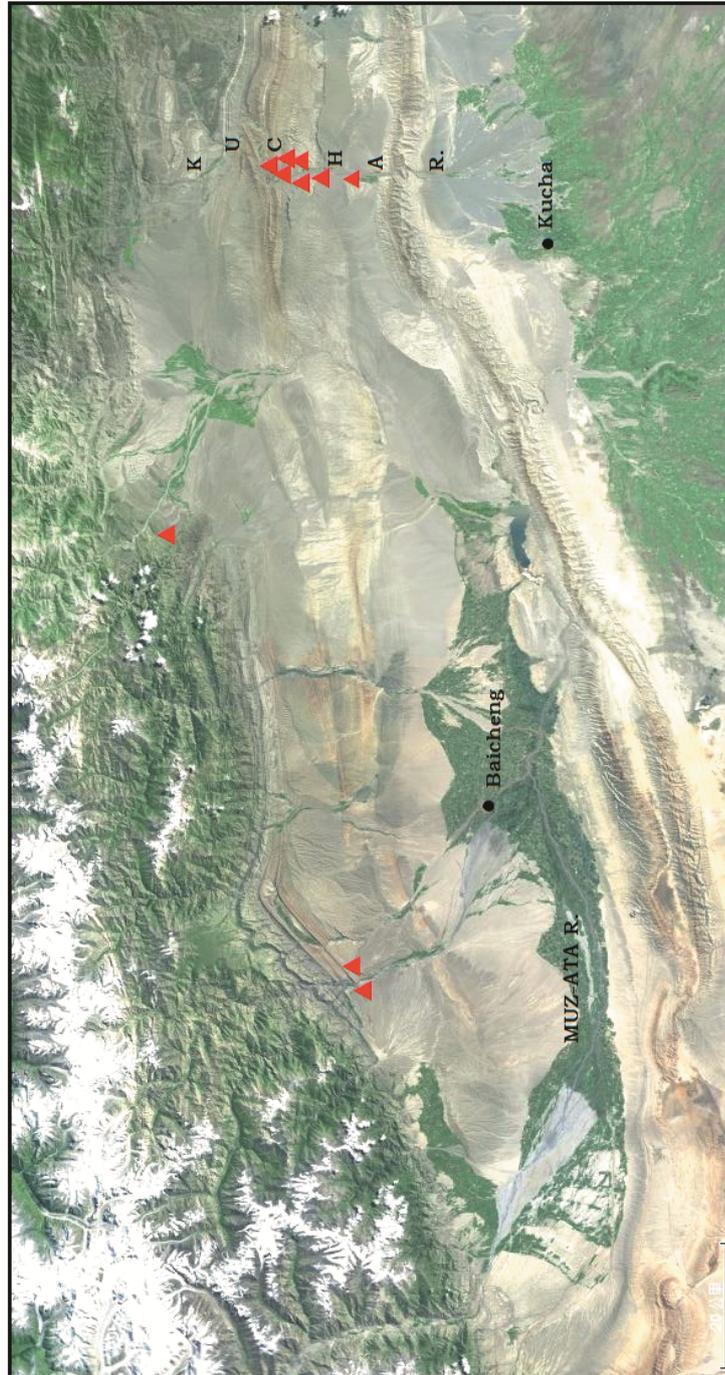


Figure 3: The Distribution of Iron Metallurgical Sites in Kucha Valley and Baicheng Basin

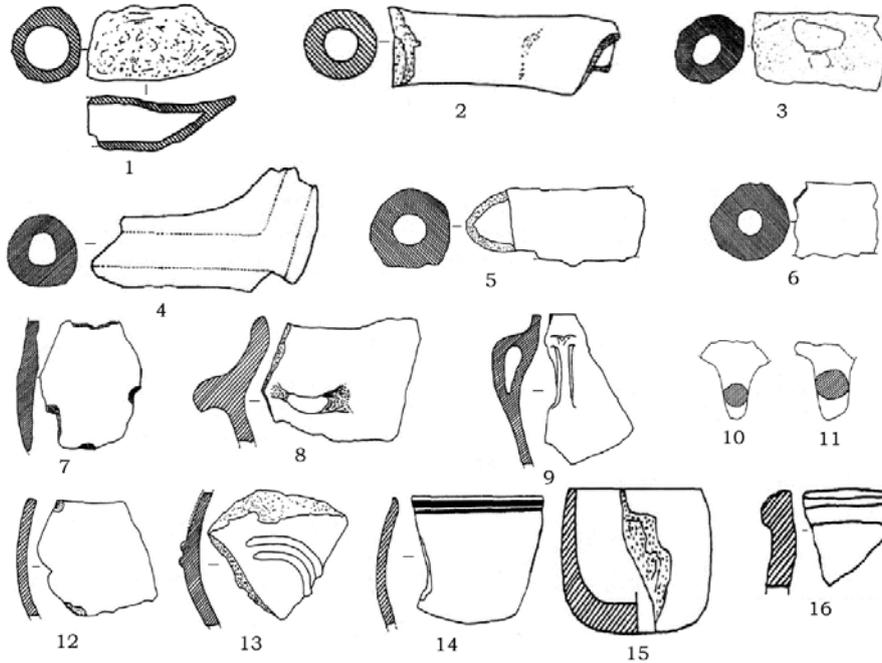


Figure 4: Objects Found in Sites Along the Upper Kucha Valley.

1–6 terra-cotta air-pipe; 7 stone hammer; 8–16 pottery shard

(source: «A Survey and Study to the Metallurgical Sites in Ancient Qiuzi Land»)

In 2001, an archaeological survey for ancient metallurgical remains was specifically carried out in Aksu, Kucha and Baicheng, i.e., the land of ancient Qiuzi, and 13 iron metallurgical sites were discovered, together with 21 copper metallurgical sites. The sites are concentrated along the upper Kucha Valley and Baicheng Basin. Ferrous ore is very plentiful in the mountain near the sites and this was a center of iron smelting during 1950s to 1960s. There is one site called Mazar-jilga where a furnace remains. Many ancient artifacts such as terracotta pipes, iron-making slags, grinding stones, stone hammers, and pottery shards are commonly found in the sites. The date of the sites is suggested to be around the Han period, i.e., Xiong-nu period [10, p.75–91] (Figure 3, 4).

(2) Ferrous metallurgical assemblies in the Baicheng Basin

A group of sites in Baicheng Basin is near the group Kucha Valley. Three sites have been reported [10, p.75–91] (Figure 3).

(3) Site on Achik Mountain, Luopu County

Found in 1958, this site is situated on the slope of the Achik Mountain, a branch of the Kunlun Mountains. Near the site was found ferrous ore. A number of ancient artifacts, including pipes and iron-making slags and many stone chisels and hammers covered in ferrous ore powder were discovered hidden in a nearby cave [10, p.75–91].

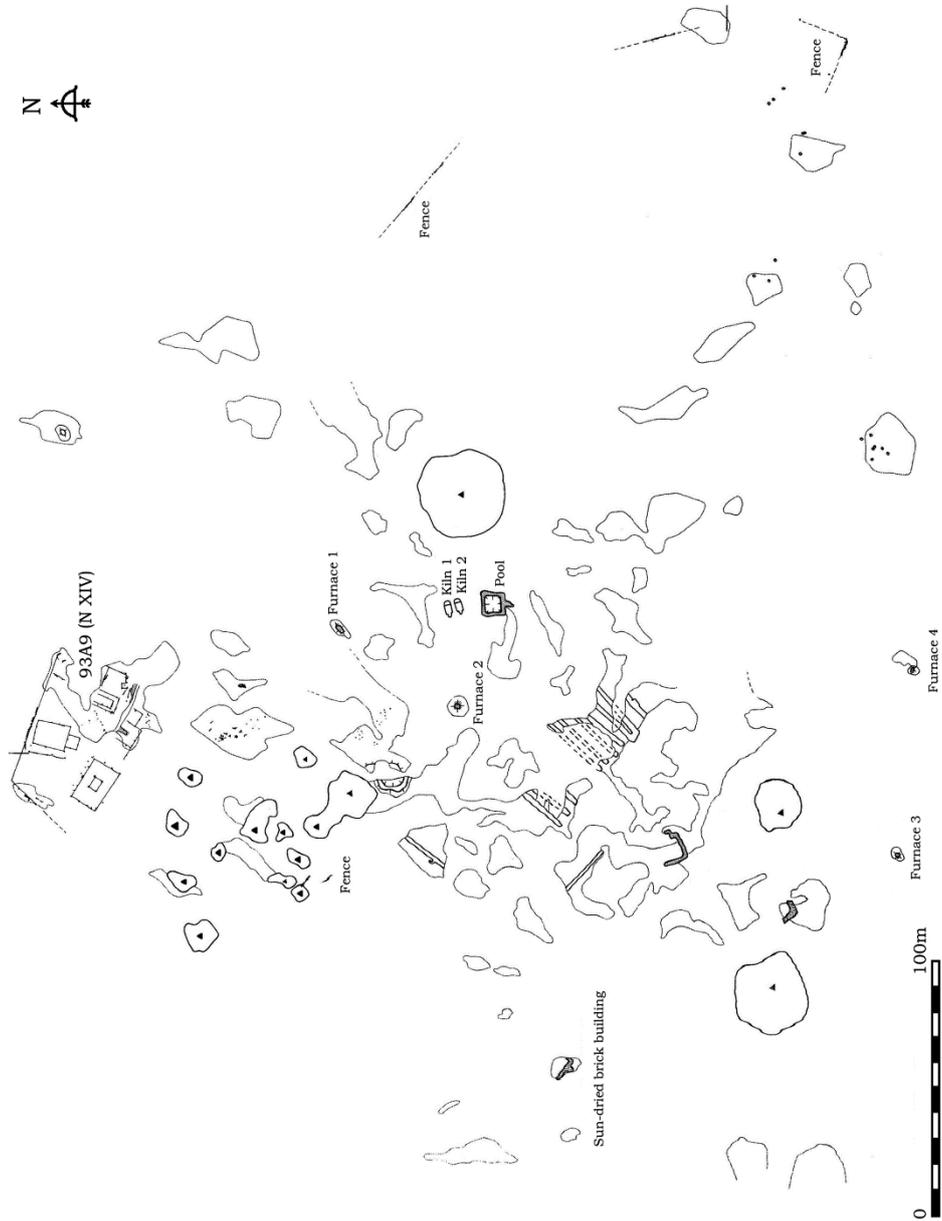
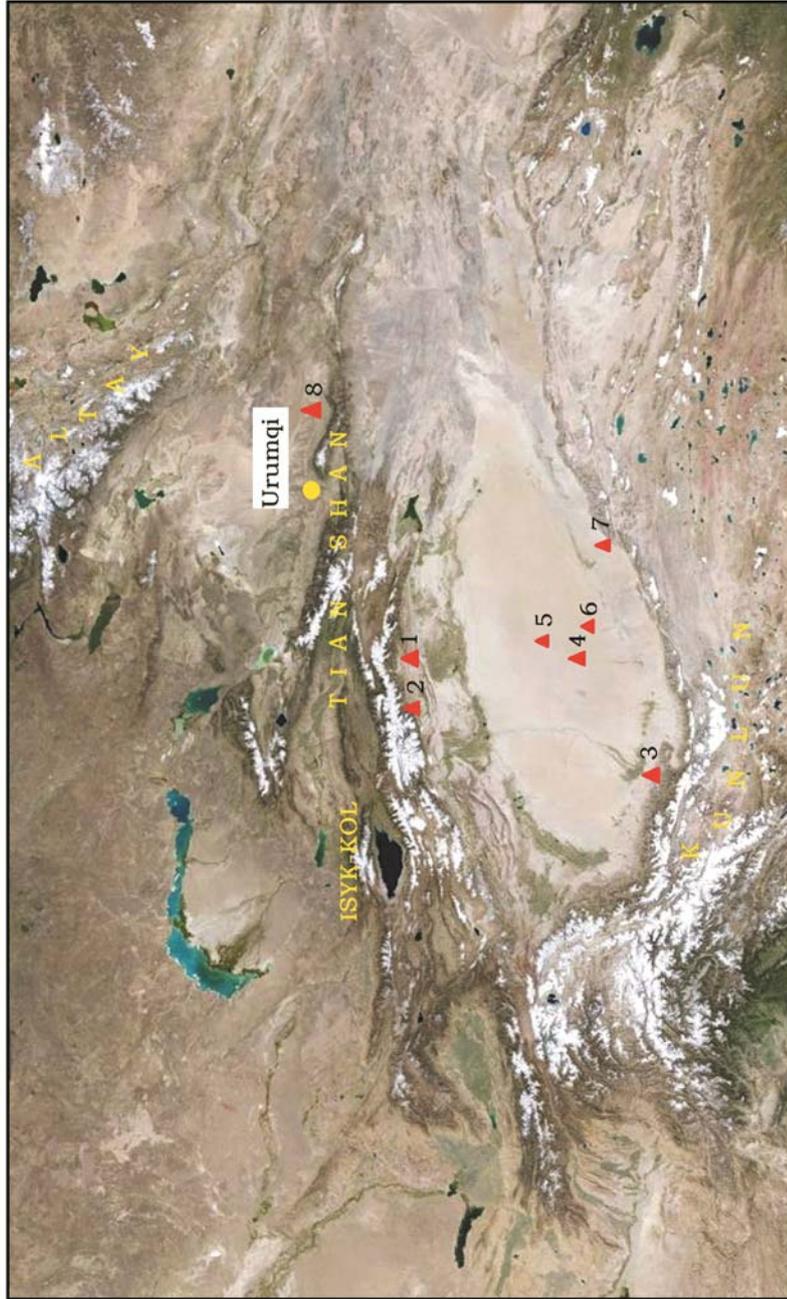


Figure 5: Plan of Manufactory in the southern part of the Niya Site
(source: The Report of Sino-Japanese Joint Academic Survey
of the Niya Site, Vol. 2 [4, p.Pl.17])



Iron Metallurgical Sites Localities: 1. Kucha; 2. Baicheng; 3. Luopu; 4. Karadong in ancient Keriya Valley; 5. Dzumlak-kum in ancient Keriya Valley; 6. Niya; 7. Qiemo; 8. Jimusar.

Figure 6: The Distribution of the Iron Metallurgical Sites Found in Xinjiang

(4) The Karadon Site

It was reported in 1990 that there was an iron-making site with remains of a building and slag and ironwares at the Karadon Site in ancient delta of the Keriya River [22, p.333–334].

(5) The Dzunmlak-kum Site

This is situated on another ancient delta of the Keriya River and dates 2000 to 2500 BP. Fourteen samples of ironware were found in 1996 and have been analyzed. It is concluded that they are mainly evidence of the casting of pig iron nearby, and this metallurgical technique, i.e., casting pig iron, is different from the others found in Xinjiang [5, p.1–11].

(6) The Niya Site

There are 17 manufactory sites found in the Niya Site [17, p.3–4], among which several are regarded as iron-making ones (Figure 5).

(7) The Iron-Making Site in Qiemo County

It was reported that the site was found in 1983 near a coal mine, and some pipes and slags remained [18, p.179–180].

(8) The Iron-Making Sites in Jimusar County

According to a survey, three sites were discovered in Jimusar County, in the north of the Tianshan Mountains, dating from Han to Tang periods, i.e., 206 BC to 907 AD [11, p.56].

2. The Iron Artifacts Discovered

Some varieties of iron artifacts, including horse equipment like stirrups and helmets, knives and farm implements, such as ploughs and sickles, were unearthed from tombs or collected from sites dating to around the 3rd century BCE to 9th century CE. The weapons and farm implements perhaps were made locally. An archaeological study indicates that the iron ploughs were made in the inner lands of the Han Dynasty (Figure 7).



Figure 7: The Iron Artifacts Found in Xinjiang

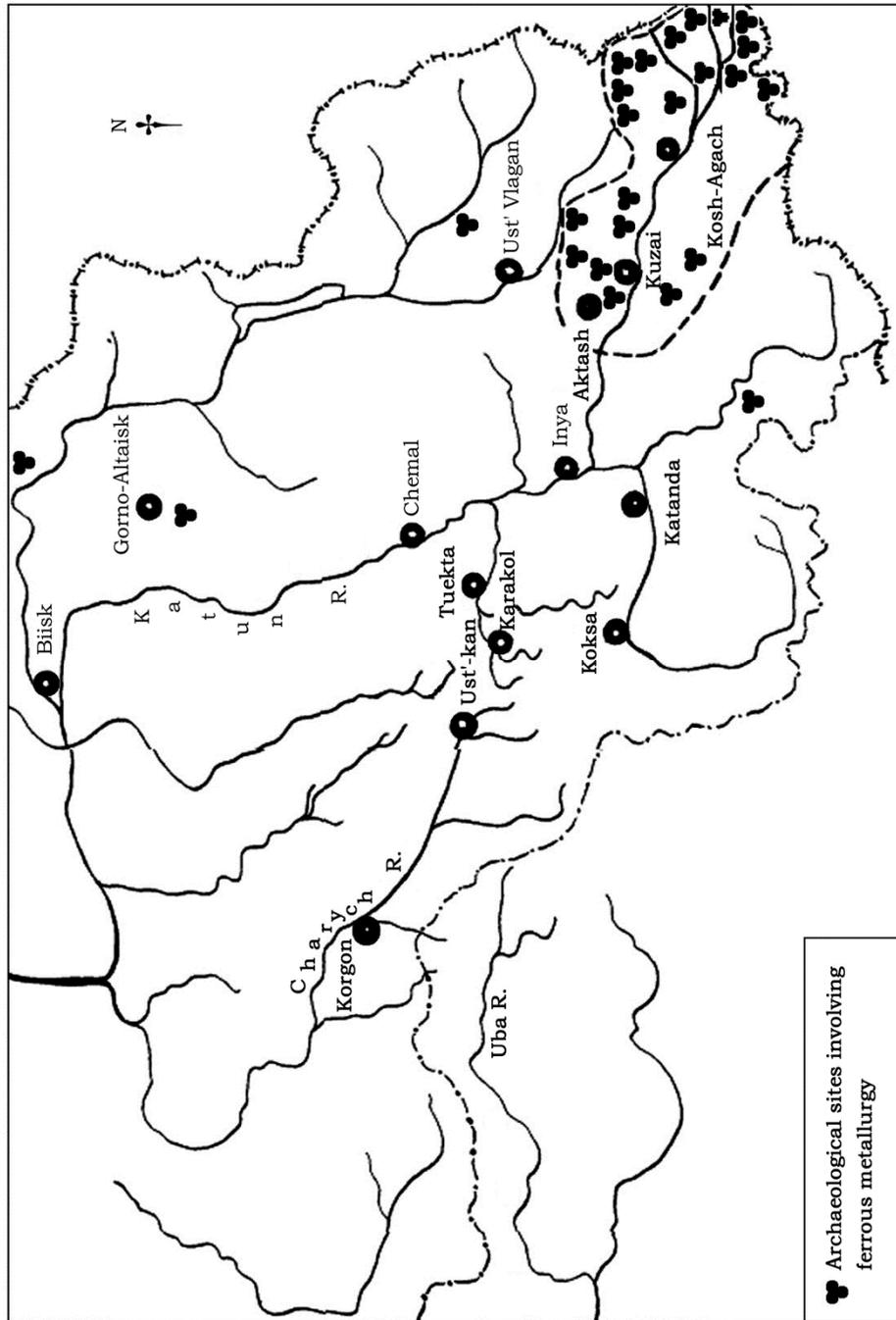


Figure 8: Ferrous Mining and Metallurgical Areas in the Altay Region
(source: «Ferrous Metallurgy and Blacksmith Production
of the Altay Turks in the Sixth to Tenth Centuries A.D.»)

III. The Turks and Their Ferrous Metallurgy in the Altay Region

It is worth referring to the Chinese historical records on the history of Turks in *Zhoushu* 周书, *Suisu* 隋书, *Beishi* 北史, and *Xin Tangshu* 新唐书. These purport that, in earlier times, the Turks lived south or southeast of the Golden Mountain and were the vassals and ironworkers of the Ruru, i.e., the Rouran Khanate. The Golden Mountain was shaped like a helmet. The following questions could be proposed:

1. What were the possibilities and the conditions for the early Turkic tribes to be ironworkers on the Golden Mountain?

2. Where is the so-called Golden Mountain in the shape of a helmet?

First, we believe that the so-called Golden Mountain 金山 in Chinese historical annals is the Altun Mountain, i.e., the Altay Mountains in Turkic and in Mongolian languages. It worth remarking that iron reserves are very rich around the southeastern, western and northeastern Altay Mountains. Many ancient sites where ferrous metallurgy was practiced have been discovered in the southeastern Altay Mountains. According to Nikolai M. Ziniakov:

The distribution and character of the deposits show that those most accessible in antiquity for exploitation were in the southeastern region of the Altay. As a result of a special exploitation by the author, more than 30 ferrous metallurgical sites have been discovered. Almost all were concentrated in southeast Altay.

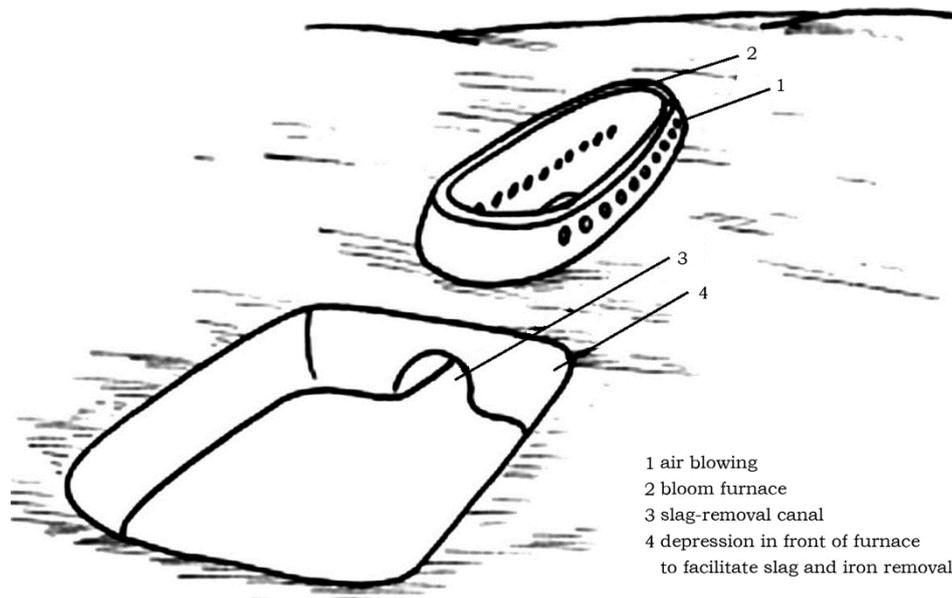


Figure 9: Illustration of An Ancient Furnace in Altay
Displaying Its Installations for Metal Production
(source: «Ferrous Metallurgy and Blacksmith Production
of the Altay Turks in the Sixth to Tenth Centuries A.D.»)

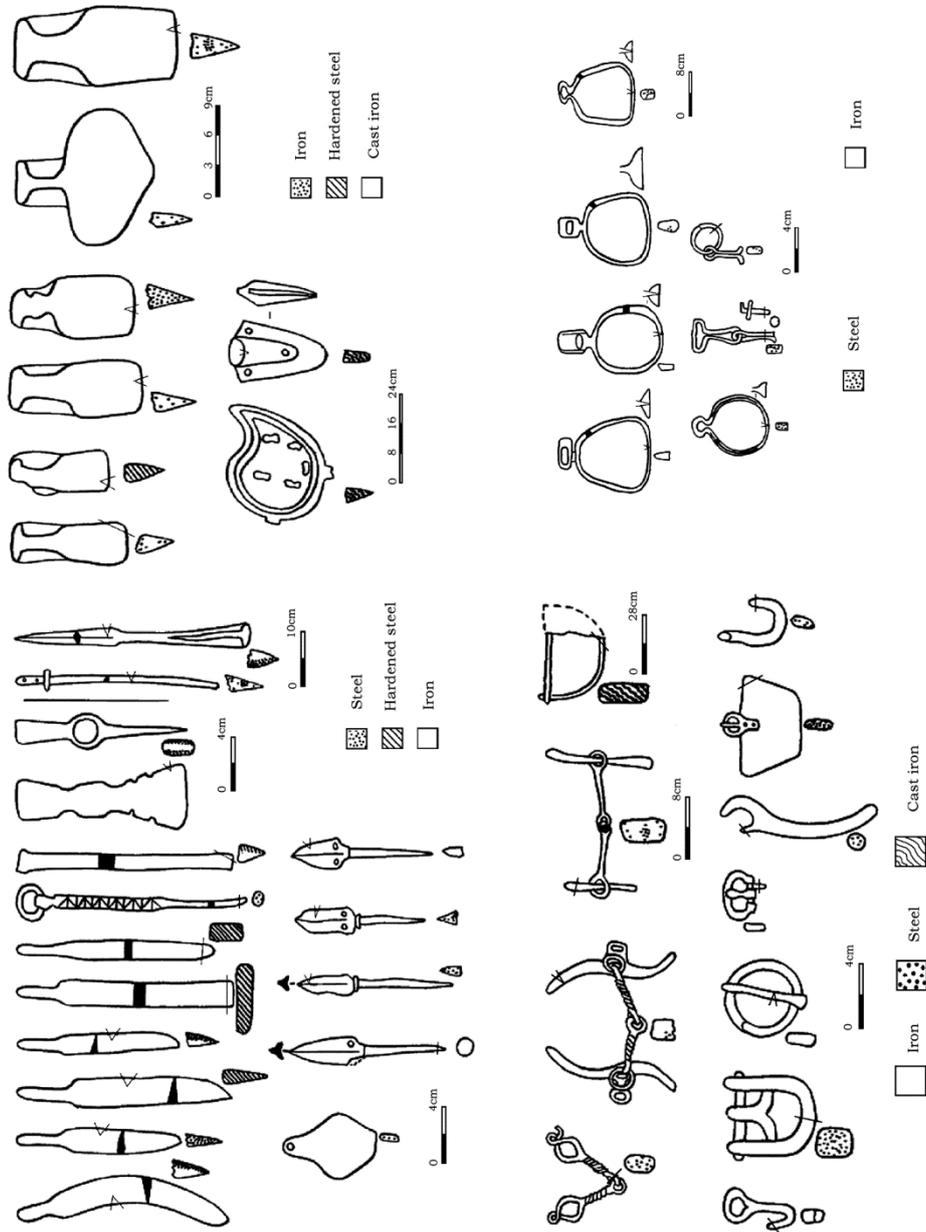


Figure 10: Iron Weapons, Tools and Horse Tack with Composite Materials
 (source: «Ferrous Metallurgy and Blacksmith Production of the Altay Turks
 in the Sixth to Tenth Centuries A.D.»)

Associating iron deposits with ferrous metallurgical sites permits delineation of a large Chuiya-Kuray Region of mining and metallurgy. [Located on

the uppermost branches of the Ob' adjacent to Mongolia at an elevation of 1500–1800 m above sea level, this region included the Kuray, Chuiya, and Sailyugem Steppes, an area of about 500 km²]» [23, p.84–100] (Figure 8–10).

The iron reserves and archaeological remains of the ferrous metallurgy in the Altay Mountains are significant for understanding the statements in Chinese historical records about the early Turks as iron makers and the geographical location of the so-called the Golden Mountain, and furthermore the question about the earlier habitat of the Turks. Although remains of ferrous metallurgy have not yet been discovered in the Altay Mountains in Xinjiang, it can be proposed that the southeastern Altay Region with the Irtish Valley as the center was the Turks' core area before they defeated the Ruru and became an empire in 552 CE; and for the Turks it was by using the local rich reserves of iron that they had access to that they achieved rapid development and became powerful.

Another related question is the fact that history books state that the Golden Mountain was in the shape of a helmet. It is suggested that the Golden Mountain was a sacred hill and the holy place worshiped by the early Turkic people, who maintained a belief system of nature worship of heaven and earth, as well as ancestor worship, and worship of the peculiar mountain and the lake which was the source of rivers, similar to other nomadic groups in the Eurasian Steppes at the time [9, p.25–29]. In southeastern Altay, where the main source of the Irtish River is, we know that there is a hill locally called the Holy Bell Hill 神钟山 that is in the shape of a helmet, near hot springs and a rock cave. If we consider this together with the early habitat of the Turks in southeastern Altay, we could postulate that the Golden Mountain could be this Holy Bell Hill and the source of the Irtish Valley, which was regarded by early Turks as a holy place related to their ancestral lan. Then afterwards the name Altun, Altay, was expanded to encompass all the mountains in the region (Figure 11).

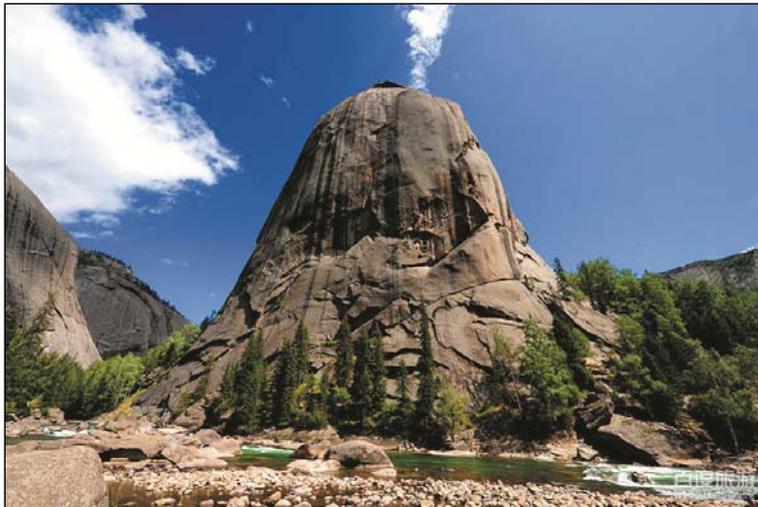


Figure 11:
The Holy
Bell Hill at
the Source
of the Irtish
River

IV. Conclusion

1. Chinese historical records and archaeological discoveries suggest that the Xiong-nu's struggle with the Han Dynasty for control over the Tarim Basin concerned obtaining taxes, including tributes of iron, iron being particularly important to the ancient nomadic powers. Among ferrous metallurgical places, Qiuzi was the most important and developed and would have been considered by the Xiong-nu as their key source of iron. This could explain why the Han Dynasty settled the headquarters of the Protectorate General of the Western Regions at Wulei 乌垒, a location very near Qiuzi.

2. In earlier times, the Turks lived in the upper Irtish Valley and took advantage of iron reserves in the southeastern Altay Mountains to develop into a strong tribe and finally a great khanate. The source of the Irtish River, rich in iron reserves, was then regarded by them as their holy place and ancestral land. During the Western Turk Khanate period, tribes like the Sule in Tarim Basin were also forced to contribute iron to the khanate until the Tang Dynasty's conquest in 648 CE.

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W. Liu. On Iron Metallurgy and Related Questions in Ancient Xinjiang...

**ЖЕЛЕЗНАЯ МЕТАЛЛУРГИЯ И СМЕЖНЫЕ ВОПРОСЫ
В ДРЕВНЕМ СИНЬЦЗЯНЕ В ПЕРИОДЫ ХУННУ И ТЮРКОВ**

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Синьцзян (Китай) был важным регионом в истории древней металлургии во Внутренней Евразии. Автор рассмотрел развитие железной металлургии в древнем Синьцзяне во время Хань периода Тан, 3-й г. до н.э. до 10 в. н.э., то есть в периоды Сюн-ну и Тюрков. Некоторые связанные записи в китайских исторических документах и археологические открытия показывают, что Сюн-ну приложили большие усилия по контролю над Таримской впадиной, особенно Qiuzi, для налогообложения, включая железо в качестве ресурса развития. Исторические записи и археологические открытия выявили, что ранние Тюрки проникли с юга Алтая и превратились в мощный режим, опираясь на местные ресурсы железа.

Ключевые слова: железная металлургия, Синьцзян, Сюн-ну, Тюрки, Тянь-Шань, Алтайские горы

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