

## **Prehistoric Metallurgy of Xinjiang**

### **Paper Abstracts**

**Workshop, March 29, 2014**

**Institute for the Study of the Ancient World, New York University**

Vincent C. Pigott (ISAW/NYU Research Associate)

Title: The Eurasian Appearance of Tin-Bronze Metallurgy: Piecing Together the Big Picture

Abstract: Archaeological research, in tandem with programs of laboratory analysis of excavated ancient metals, has in recent decades offered a markedly improved understanding of the origins and development of metallurgy in the Asian Old World. However, only recently have archaeologists begun piecing together the larger picture of the rapid development of tin-bronze technology across the Eurasia. This presentation overviews this significant technological development that current evidence suggests began in greater Southwest Asia ca. 3000 BCE and then apparently spread eastward overtime. During the 3<sup>rd</sup> millennium BCE in the Aegean, Anatolia, Mesopotamia, the Caucasus, the southern Gulf and Turkmenia, where the earliest tin-bronzes are currently known, this binary alloy increasingly became the metal of choice. By the early centuries of the 2<sup>nd</sup> millennium BCE, tin-bronze technology had not only appeared in Iran via probable Steppe contact with loosely-linked Andronovo cultural groups from the north (and with the Bactrian-Margiana Archaeological Complex), but also various other bronze-using Steppe cultures (including the enigmatic Seima-Turbino cultural phenomenon) were involved in spreading the technology across much of the Eurasian Steppe and into China's western (and northwestern) peripheries. Among the critical questions is where might Eurasian tin have been sourced by regional metalworkers. Afghanistan has significant reserves and Central Asia (Turan) has now offered strong evidence from Asia's only excavated prehistoric tin mines. Further to the east tin sources exploited in antiquity remain a matter of some conjecture.

While in East Asia, questions continue to surround the arrival of tin-bronze in China in this same period. The weight of current evidence suggests that contact with Steppe and Forest-Steppe cultures played an influential role in bronze's appearance on the Chinese Central Plain and perhaps even in its subsequent transmission southward into Southeast Asia where it appears ca. 1000 BC. The date of tin-bronze's arrival in Southeast Asia (e.g., Thailand) has been the source of much controversy and evidence suggests this technology may be ultimately linked to earlier developments on the Steppe. If, overtime, this proves demonstrable, we can then speak of the coming of tin-bronze as a true pan-Asian technological phenomenon.

Katheryn M. Linduff (University of Pittsburgh)

Title: Ancient Technoscapes: Metallurgical Technology in Eastern Eurasia and East Asia

Abstract: Early societies that began to use metals have been thought to appear in places where we can see increased social stratification accompanied by a coalescence of geographically extensive shared artifact inventories including ones of metal. In the case of the beginnings of metallurgy in China, for instance, its study has been particularistic and evolutionary, tied to traditional Chinese historiography and modern Marxist model of social development. This reasoning has led to, not unsurprisingly, a contest over primacy of one 'culture' over another. I will argue that it is time to reconsider to shift emphasis away from 'cultural' interaction to sharing regionally within 'ancient technoscapes,' and discuss this in relation to the emergence of metallurgy in western and northern China and southern Mongolia.

Michael Frachetti (Washington University in St. Louis)

Title: Mining and exchange in Bronze Age Semirech'ye: implications for regional technology transfer

Abstract: Recent discoveries of both mining instruments and metallurgical remains at the Bronze Age site of "Dali" - located in the Dzhungar Mts. of Kazakhstan, have implications for understanding the geography and chronology of ore processing and exchange in the early 2nd millennium BC (and likely earlier). This paper will illustrate new findings from the site and situate these discoveries within the broader context of "institutional formations" between metallurgists living along the Inner Asian Mountain Corridor (from Central Asia to Xinjiang).

Liangren Zhang (Northwest University, ISAW Visiting Research Scholar)

Title: Prehistoric Metallurgy of Eastern Xinjiang

Abstract: In the past decades, the Hami region in eastern Xinjiang has witnessed several major excavations of Bronze Age and Early Iron Age cemeteries, among which Tianshanbeilu, Heigouliang, Yanbulake, and Dongheigou are well known in archaeological literature yet poorly reported. Located at the intersection of the east-west route, i.e. Gansu Corridor -Central Asia, the Hami region has played a notable role in ancient cultural traffic. The metal artifacts from these cemeteries, however, have not been well studied in this regard. During the past few years, the author has been conducting a major research project on these information-rich artifacts from Hami as well as other regions, taking digital images, testing their composition mainly with portable X-ray Fluorescence equipment but also with stationary equipment in labs. This paper will present some results of this project, highlighting the Tianshanbeilu cemetery and the development of metallurgy in the Hami region, and its connection with neighboring regions.

Ursula Brosseder (IAS Princeton & Bonn University)

Title: Metallurgical analyses and its potential understanding of Late Iron Age Inner Asia.

Abstract: Many narratives of Late Iron Age Eurasia are characterized by the agency and accomplishments of China with the Steppe people being the recipients. This does not only account for political achievements, like empire- or state building but concerns also the economic sector and especially the production of iron, bronze and high value crafted goods. Earlier Russian scholarship has demonstrated by metallurgical analyses a greater variability in the bronze composition of openwork belt plaques which can be explained by local steppe production. However, these insights are not taken into account in discourses on agency of local steppe production environments. The recent results of production in Inner Asian Steppe will be discussed in relationship with the potential of insights one can gain from metallurgical analyses.

Li Zhang (Wissenschaft Kolleg zu Berlin)

Title: How China Became Part of the Bronze Age Eurasian Network: Technological Choice and the Creation of Value

Abstract: Research has shown that a network of interactions spanning the Eurasian continent from its eastern reaches well into its western regions existed in the Bronze Age. The pastoralists of the Eurasian Steppe played a crucial role in knitting together the Eurasian network by transmitting innovations as well as technologies to various civilizations, from China to the Near East and Europe. However, if we conceive of the Steppe as a “highway,” one must wonder: What role did those civilizations play in their own integration into the arena of interactions? To what extent did those civilizations, which were transformed economically and politically by interactions with the Steppe, welcome and cultivate ties with the Steppe? To answer those questions, this talk, through an examination of the landscape of the participation of different societies in China in the Eurasian network, will show that it was the localized choices made within societies beyond the Steppe that fundamentally shaped their adoption of new technology and participation in the Eurasian network.

Ernst Pernicka (Universität Heidelberg)

Title: Tin sources in Central Asia and their exploitation in the Bronze Age.

Abstract: In the 1990s two prehistoric tin mines were investigated in Uzbekistan and Tadjikistan by a team of archaeologists and scientist from the German Archaeological Institute, Berlin, the German Mining Museum, Bochum, and the University of Technology, Freiberg. Recently, tin occurrences were studied archaeologically in eastern Kazakhstan by the German Mining Museum. The paper will provide a summary of these investigations as well as some recent findings on the composition of metal finds from third millennium BC Gonur Depe in Turkmenistan. Furthermore, a new method based on tin isotope ratios to search for relationships between tin containing artefacts and geological sources will be introduced.

Jianjun Mei (The Needham Research Institute, London)

Title: Metallurgical INternation between China and Central Asia during the First Millennium BCE

Abstract: There is an increasing body of evidence demonstrating China actively interacted with Central Asia through various channels, especially the Silk Road, during the first millennium BCE. Such interactions played a crucial role in stimulating cultural innovations in both China and Central Asia. This paper offers some observations on metallurgical interactions between China and Central Asia during the first millennium BC, with a focus on the following issues: the early uses of metal cauldrons in Xinjiang – the spread of piece-moulds technology; the appearance of tinning technique in Gansu and Ningxia – the introduction of innovative metallurgical technology; the emergence of Chinese mirror tradition and its westward spread into Xinjiang and further west. It is argued that cultural interactions have never been operated in one direction and metallurgical interactions along the Silk Road during the first millennium BC have considerable impact on the transformation of material cultures in both China and Central Asia.