

古代歐亞冶金發展的主要趨勢和中國的觀點

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來自歐亞大陸北部和歐洲考古遺址的金屬和礦渣分析使我們可以確定我的古代冶金學家使用的初始礦石與所生產的合金類型之間的相關性：1) 冶煉天然銅和氧化礦石—純銅，2) 用砷礦物合金冶煉超鹼性岩石中的氧化礦石，3) 冶煉黝銅礦，4) 硫化銅鐵硫化物—銅錫合金。由於溫度和化學反應的關係，這樣的分布在歐亞大陸是常態。這些技術變化和另一個過程：金屬消耗量的增加密切相關。此過程需要更豐沛，更廣泛的礦石，並且這些礦石可以在更高的溫度下冶煉。

最初，中國的情況被認為是完全不同的，因為使用稀少的純銅的階段已被銅錫合金取代。它引發起了關於中國古代冶金是獨立起源的想法。在甘肅發掘的早於商代的砷合金早期遺址，形成了現在的主流思想：即中國冶金和歐亞大陸的冶金發展是相對應的，其起源和發展受到了草原歐亞大陸的影響。對這些發現的分析顯示，這種主流想法是錯誤的。在西方能有限度的影響之前，中國冶金業便已存在。它起源於舊石器時代（公元前5至3世紀）中國的多個地區的，最有可能的位置是揚子盆地中部。

The main trends in the development of ancient Eurasian metallurgy and Chinese perspective

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Metal and slag analysis from archaeological sites in Northern Eurasia and Europe made it possible to identify dependence between initial ore used by ancient metallurgists and produced types of alloys: 1) smelting of native copper and oxidized ores – pure copper; 2) smelting of oxidized ores from ultrabasic rocks with arsenic

minerals – Cu+As alloys; 3) smelting of fahlores – Cu+As+Sb and Cu+Sb alloys; 4) smelting of copper-iron sulphides – Cu+Sn alloys. This is a common pattern for Northern Eurasia and Europe, caused by temperature and chemical processes. These technological changes strictly correspond to another process – the growth of metal consumption. It demanded richer and more widespread ores and these ores could be smelted at higher temperature.

Initially the situation in China was understood as absolutely different, because the stage of rare use of pure copper was replaced by Cu+Sn alloys. It provoked ideas about independent origins of ancient Chinese metallurgy. Then discovery of early sites in Gansu with arsenic alloys dated to the period before Shang dynasty resulted in the dominated now idea about the correspondence of development of Chinese metallurgy to the main Eurasian trends and its origin and development was influenced from steppe Eurasia.

Analysis of these finds shows that the idea is wrong; and before some limited western influences the Chinese metallurgy already existed. It originated in the Eneolithic period (5th-3rd millennia BC) in different locations in China, but most probably in the Middle Yangzi Basin.

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葛仕達 (Stanislav Grigoriev)，俄羅斯籍，現任俄羅斯科學院歷史及考古研究所教授。葛教授係俄羅斯科學院考古學博士，研究領域為古代冶金學。葛教授具有考古學和史學的訓練，調查過數千筆礦物樣本，足跡遍布歐亞大陸。本年獲得漢學中心獎助，來臺研究主題為「中國與北亞地區青銅時代冶煉技術比較研究」。