Experiment: Early Bronze Age metal production in Turkey and the Levante
Mathias Mehofer

In the late 4th mill. and the first half of the 3rd millennium BC important changes in metalworking technology took place in Anatolia. On the one hand, it is described that the smelting of copper ore became more professional and organised and on the other hand this was the first time that bronze (as intentional copper-tin alloy) began to displace the arsenical copper used before. Several excavated sites in Turkey have yielded fragments of crucibles, metal remnants, kilns, ore finds, slag, moulds and tools. Finds from Arslantepe, Çamlibel Tarlası, Murgul or Norşuntepe were particularly impressive.

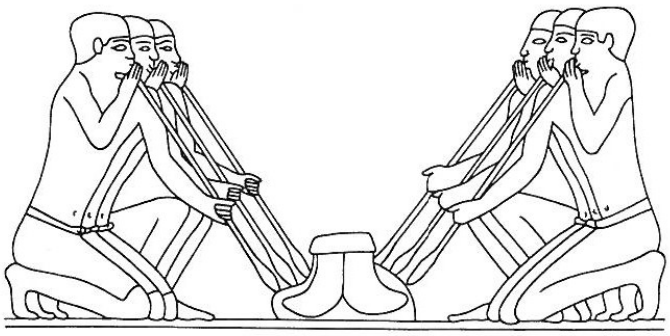
The excavations carried out at the tell Çukuriçi Höyük, Western Anatolia uncovered a settlement area composed of two phases dating in Early Bronze Age 1, or from 2900–2750 calBC in absolute terms. Both settlement phases included complex buildings for mainly domestic use. Besides ordinary household activities, intensive metallurgical activities were identified. Metallurgical workshops with many metallurgical ovens and associated finds indicated that metal processing took place in the EBA settlements. The large amount of tools allowed us to identify all the production stages of various metal objects. Especially the smelting debris examinated provided useful clues with regard to the production of arsenical copper during the first half of the 3rd mill. BC. The presence of specific chemical phases in the smelting debris attested to complex smelting processes going far beyond "normal" copperworking and led to the question of arsenical copper production. So far, 25 clay hearths have been excavated in the domestic area, which represents simultaneous metal crafts conducted there. For instance oven 2 represents a typical horseshoe-shaped example built into the corner of a room and persevered to a height of 0,45 m. Numerous moulds for rod ingots provide evidence, that metal was collected, melted and casted into different standard sizes on the tell.

The experiments will focus on the reconstruction of these metallurgical activities. They will be inspired by the excavation results and an aegyptian grave painting from Saqqara, Egyt, dating to the middle of the 3rd millennium BC. (see fig. 1), which show metal smelting activities. The construction of the oven and the use of blowpipes to heat the metal will be examinated.

Questions:
How many people are necessary to conduct one smelting process?
How long does it take? How much copper can be smelted?
How much charcoal is necessary? How long does it take to produce a rod ingot or a copper axe etc.?

The smelting experiments will be carried out on Friday, 28th June and Saturday the 29th June 2013, between 13h and 16h. For that purpose I need the help of 4-6 students to run the furnace process.

If you are interested, please write me an email: mathias.mehofer@univie.ac.at or contact me in Asparn directly.



Eine ungefähr zeitgleiche Darstellung auf einer ägyptischen Grabmalerei aus Sakkara, die um die Mitte des 3. Jds v. Chr. datiert, zeigt die Benützung der Düsen und den Aufbau eines metallurgischen Werkbereiches zu dieser Zeit.

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