

Odler, Martin 2020: *The social context of copper in Ancient Egypt down to the end of Middle Kingdom*. PhD thesis. Prague: Charles University, Faculty of Arts. Supervisor: Prof. Mgr. Miroslav Bárta, Dr.

Abstract

The subject of the doctoral thesis is a reconstruction of the *chaîne opératoire* of copper in ancient Egypt from its earliest occurrence in the fourth millennium BC until the end of the Middle Kingdom. As copper was the metal most widely used in ancient Egyptian society, its study can offer statistical “big data” otherwise rarely available for ancient cultures. Three large groups of sources are discussed successively: written and iconographic sources, archaeological sources (material culture, i.e. artefacts), and archaeometallurgical sources, divided into several consecutive stages of the *chaîne opératoire*.

Copper was named *bj3* and read [byr] in the periods under study, while an interpretation as arsenical copper with a low and high content of arsenic, respectively, is proposed for so-called Asian copper and *ḥsmn*. In the Middle Kingdom, the term *ḥsmn* begun to be used also for tin bronze. The word for crucible was *bd(.t)* and the word for metalworker (incorporating both metallurgists and smiths) was *bd.ty*. There is no substantial Egyptian evidence from the periods under study for the current Egyptological reading of copper as *ḥm.t* and metalworker as *ḥm.ty*, which are both mistaken.

Copper artefacts are treated as a source of a serial nature in the thesis, demonstrating regularization of their shapes. 2,253 archaeological contexts were included in the study. Some of the artefact categories are quite numerous: 1,597 chisel blades; 1,231 axe blades; 1,097 vessels; 1,025 adze blades, 611 mirror discs. A comparison of the dimensions of the artefacts to known ancient Egyptian measures of length shows an unexpected regularization of these measures, with dimensions being usually shorter than the expected ancient Egyptian value. This is true not only of artefacts that were practically used and gradually shortened by use (chisels, adzes, axes, saws) but also of artefacts that presumably retained their original size from the moment of production (mirrors, vessels). Although 962 artefacts and ore pieces have been analysed from the periods under study, some of them repeatedly, it is shown that this is only a fraction of the total counts of the objects. Yet even this fraction gives a statistically significant sample of the analyses, establishing the use of arsenical copper as the main alloy for practically used tools and weapons in the periods under study, with the gradual advent of tin bronze, used side by side with arsenical copper, during the Middle Kingdom (although ancient Egyptians had known tin bronze before and used it for the production of vessels). The

material was coming predominantly from Eastern Desert and Sinaitic mining regions, and seldom from elsewhere (Feynan, Anatolia). The so-called “Hyksos” are not solely responsible for the introduction of tin bronze in Egypt; it seems that Cypriot sources played an important role already in the Middle Bronze Age. The lack of a significant number of lead isotope analyses of ores and artefacts and the lack of a significant number of analyses of the artefacts themselves going beyond the present-day focus solely on the provenance and chemical composition are identified as the main problems of the current state of research.