SACRIFICING TUYÈRES. ARCHAEOLOGICAL AND ARCHAEOMETRIC INTERPRETATION OF TECHNICAL CERAMICS IN THE FIRST IRON SMELTING (TELL HAMMEH, JORDAN; 930 CALBC) AND IRON SMITHING (TEL BETH-SHEMESH; 900 CALBC) IN THE LEVANT

Harald Alexander Veldhuijzen

Institute of Archaeology, University College London, 31-34 Gordon Square, London WC1H 0PY United Kingdom (h.veldhuijzen@ucl.ac.uk)

Use of iron in the Near East is first attested by sporadic occurrence of (prestige, meteoric) iron artefacts during the Bronze Age. By the end of the LBA, however, iron use increases to such a level that one can assume regular production of iron metal from terrestrial ores by smelting. Unfortunately, hardly any iron metallurgical installations are published dating before the Classical period, and very few if any of these concern iron smelting.

A major iron smelting operation was found at Tell Hammeh in Jordan (Yarmouk University; Leiden University), dating 930 CalBC. A large smithing workshop was found at Tel Beth-Shemesh, Israel (Tel Aviv University, Indiana University), dating 900 CalBC. Both were excavated by the author using especially developed techniques and feature significant quantities of various types of slag and a diversity of technical ceramics. These ceramics range from contamination of slag with molten furnace wall material through vitrified furnace wall to a large amount of tuyères.

This paper discusses the two reconstructed early technologies, examining the peculiar nature of Hammeh slag, implications of ore-slag-ceramic mass balance calculations for reconstruction of the techniques, comparison between the two technological stages, and especially the sacrificial use of tuyères. Not only do these ceramics serve as tools to the technological processes proper, but they also play an important role in the technology itself. The high temperatures involved cause them to melt; this ‘sacrifice’ of tuyère ceramic contributes actively to the formation of the slag, thereby enhancing and/or facilitating the production of the metal.

It furthermore explores the role of the tuyères at both Hammeh and Beth-Shemesh within the framework of technological choice and craft production in an urban context. They are characterised by a uniform and distinct

appearance, with a very uncommon square section that likely results from a local metallurgical tradition or technological choice. The quantity of tuyères and standardisation of their shape and size points to regular or even mass production, as opposed to just an ‘experimental stage’ of metallurgy.

The unique iron smelting and smithing material found at Tell Hammeh is not only important as a source of information for a very early iron smelting process, but allows an unprecedented insight into the intimate relationship between developments in metallurgy and ceramic technology as well.