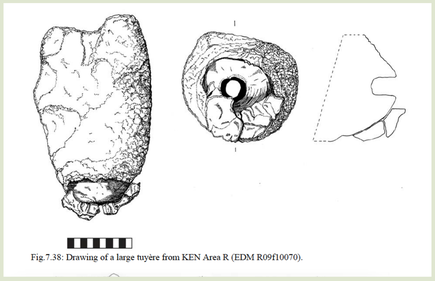
Fig.7.38: Drawing of a large tuyère from KEN Area R (EDM R09f10070).

Preserved in the Smelt:

Fabric Impressions on Iron Age technological ceramics from Faynan's copper district

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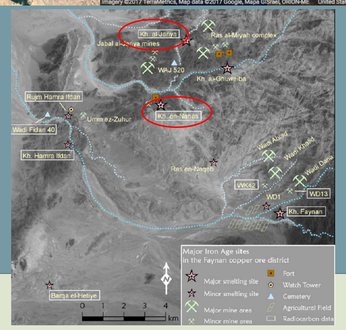
Excavations in Faynan: ELRAP

The Faynan copper district in the northern Arabah Valley is home to the archaeological sites Khirbat en-Nahas (KEN) and Khirbat al-Jariyeh (KAJ). Excavations there conducted by the Edom Lowlands Regional Archaeology Project (ELRAP), revealed extensive exploitation of the area's natural copper resource between the 11th and 9th centuries BCE.

In excavations of copper working contexts at the 2 sites, a multitude of technological ceramics, tuyères (clay nozzles used to direct air into the smelting furnace for oxygen/temperature regulation) and furnace fragments, were uncovered. Many of these ceramics bear textile impressions on the inner and outer surfaces which testify to the use of textiles as part of the manufacturing process of copper smelting paraphernalia during the wet clay stage; this practice left behind an indirect record of the fabrics utilized in the early Iron Age within the Faynan copper district. As a limited collection of textile materials were found preserved in this environment, this study analyzed the impressions as a proxy to generate empirical data on the realities of fabrics during the height of copper exploitation in the region. These data can be compared especially to the fabrics found at Faynan's sister copper smelting site, Timna, to the south. Here the textile objects come from a late 11th/early 10th century BCE context.

Furthermore, the tuyères found at Iron Age copper working sites in the Timna Valley do not bear impressions, suggesting that the formation processes for technological ceramics differ between the two major copper exploitation sites in the southern Levant.



MATERIALS & METHODS

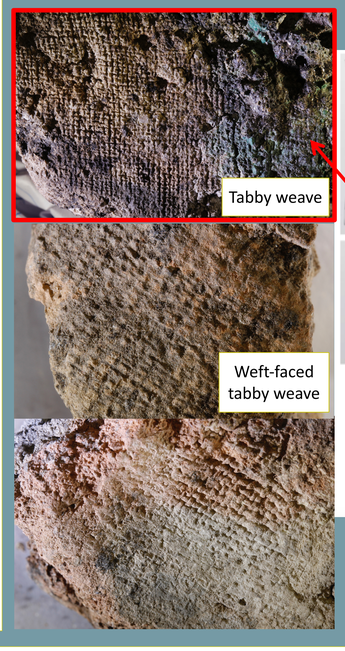
35 tuyères (16 from Khirbat en-Nahas and 19 from Khirbat al-Jariyeh) were analyzed and documented for the study using magnification via a scaled magnifying lens and lighted optical microscopy. Photographs were taken in a laboratory of the Scripps Institution of Oceanography using a microscope with a digital imaging attachment.

The inner and outer surfaces were documented in all 35 samples and measurements and images were taken of the impressions.

Documented characteristics:

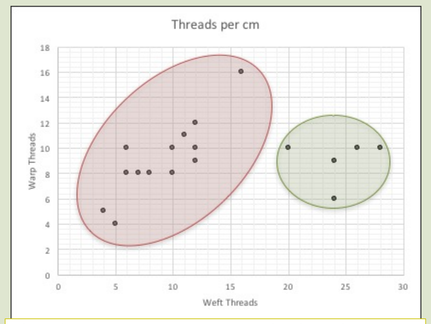
1. Number of threads per centimeter in the vertical (warp) and horizontal (weft) directions. This was possible in 19 total samples. Density of threads and thickness were also characterized.
2. Weave type. This is apparent from the sequence and pattern of impressed threads.

Preservation quality challenged our ability to informedly classify fiber type. In this category, comparative analysis with the other documented characteristics in archaeological textiles from the same chronological period allows us to use the data from the impressions to come to interpretive conclusions.

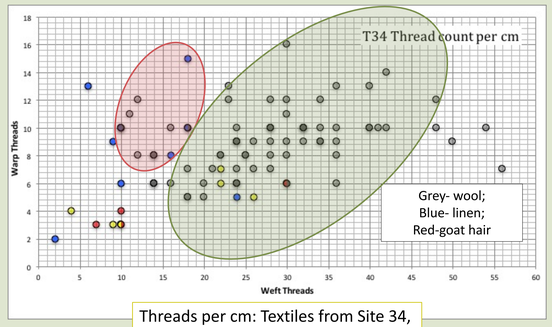


Tuyère fragments from excavations at Khirbat en- Nahas and Khirbat al-Jariyah

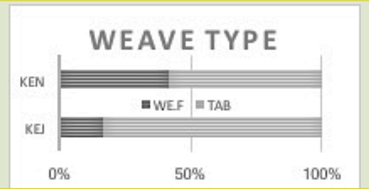
RESULTS



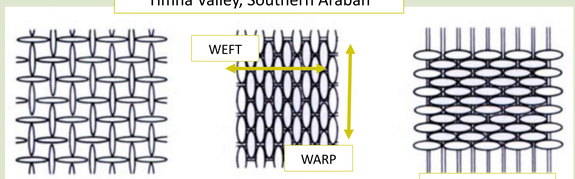
Threads per cm: Impressions on technological ceramics, Faynan, Northern Arabah



Threads per cm: Textiles from Site 34, Timna Valley, Southern Arabah



Weaving types: Impressions on technological ceramics, Faynan, Northern Arabah



Tabby Weave

Warp-Faced Tabby Weave

Weft-Faced Tabby Weave

DISCUSSION

Tabby weave from linen (plant fibers) fibers, Site 34, Timna Valley

Weft-faced tabby weave from wool fibers, Site 34, Timna Valley

The impressions from Faynan provide valuable data to expose realities of the textile materials in the Faynan area. The ability to identify textile weaving techniques and the skills of the weavers also allow us to assess the extent of the craft during the early Iron Age.

Several conclusions may be extrapolated from the data:

1. The textiles consumed by the Iron Age Faynan community appear stylistically and technologically consistent with archaeological textiles known from the Timna Valley in the southern Arabah. While the sample size of the impressions is rather small, it may be noted that the majority of imprints were made using textiles in tabby weave with low warp/weft counts. This suggests that craftspeople employed low grade textiles for technological ceramic production. Textiles in the weft-faced tabby style generally have much higher thread counts in the weft axis, used to visually cover the warp threads in the final product. This weaving style required a higher skill level and a longer duration of labor, ultimately resulting in a higher grade of textile product. The finest textiles uncovered at Site 34 in Timna have no parallels in the Faynan impression corpus.
2. Conversely, the range of weaving styles and fineness of the textiles seen in the imprints suggest that the process used to manufacture technological ceramics did not include special-made textiles for this purpose, rather the reuse or secondary [tertiary, etc.] use, probably of scraps of textiles no longer in circulation for clothing, storage, housing, etc. were employed.

Impressions are generally deeply pressed onto the ceramic surface, suggesting the cloth was used in the formation of the shape of the tools. This is especially the case on the inner surfaces of tuyères.

Above are the results of analysis performed on the impressions on Faynan technological ceramics. These results are juxtaposed with those from the analysis of recently excavated archaeological textiles found at Site 34 in the Timna Valley. Documenting threads per centimeter in the vertical (warp) and horizontal (weft) directions helps us to determine the weaving technique used to create a fabric, the quality of the craft, and the visual affect that was intended from the final product (i.e. gauze versus thick coverings). The impressions also allow us to classify the weave technique the craftsperson utilized.

Two clusters are apparent in the thread per cm data. Red cluster: an even number of warp and weft threads, implying tabby weave with low thread count; Green cluster: a higher number of weft than warp threads, suggesting the weft-faced technique that required a great number of threads in the horizontal axis to mask the vertical threads.

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