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The Salt Mummies of Zanzan:

Textile research in Iran in a conservation and exhibition project

At the salt mine Douzlahk near Chehrābād in Iran, the remains of mummified miners from between 400 BCE and 400 AD were discovered. They died due to repeated collapse of the mine. However, these catastrophes present an extraordinary opportunity for



Fig. 1: Work on salt man 4 in Museum Zanzan, October 2015 (Image: DBM/RUB/MFZ)

scientific research, which has resulted in international cooperation projects.

Owing to favourable preservation conditions, Chehrābād (for a site overview see: Aali et al. 2012; Aali & Stöllner 2015) is a rich source of organic finds: for example, in 1994 salt man 1 was found, and later rescue excavations by Abolfazl Aali in 2004-2005, brought the discovery of further mummies.

Under the leadership of the Cultural Heritage Management (ICHTO) Zanzan in Iran and German-Mining Museum Bochum/Ruhr-University Bochum in Germany, several excavation campaigns have taken place as part of the *International Chehrabad Salt Mummy & Salt mine Exploration Project* from 2009 to 2018. During the excavations, remains of six human mummies and also large numbers of organic materials (for example, wood, botanical remains, human faeces, textiles and ropes) have been found. More than 1,000 textiles are known so far, most of them covering roughly a time-span between the fifth century BC to the sixth century AD, encompassing the Achaemenid and Sassanid Period of the Persian Empires. The salt mine was also used during the Islamic period, relating to the Safavid and Qajar periods (between the late 14th and early 20th centuries AD).

The most impressive textiles from the Achaemenid period (fifth/fourth centuries BC) are the more or less complete garments associated with salt man 3, 4 and 5 (e.g. Aali & Stöllner 2015, fig. 56; Grömer & Aali 2016). Among the other textile fragments found in Achaemenid layers are some textiles in tabby and its variants. There are also textiles with various patterning techniques such as stripes and textiles with weft-floating patterning. Remarkable among the Achaemenid textiles are the marks of repair. The main

part of the dated textiles are from the Sassanid Period (third to sixth century AD). There is one complete upper garment and fragments of trousers (from salt man 2 and one further find) described by Krug-Ochmann (2014). Among the patterned and dyed textiles (see also Mouri et al. 2014) we can find fragments decorated with tapestry techniques, striped items, some items made in compound-weave techniques (Hadian et al. 2012), and warp-based patterning.

The Patrimonies Project

In 2017, the German Gerda Henkel Foundation approved support for a heritage project (2018-2020),

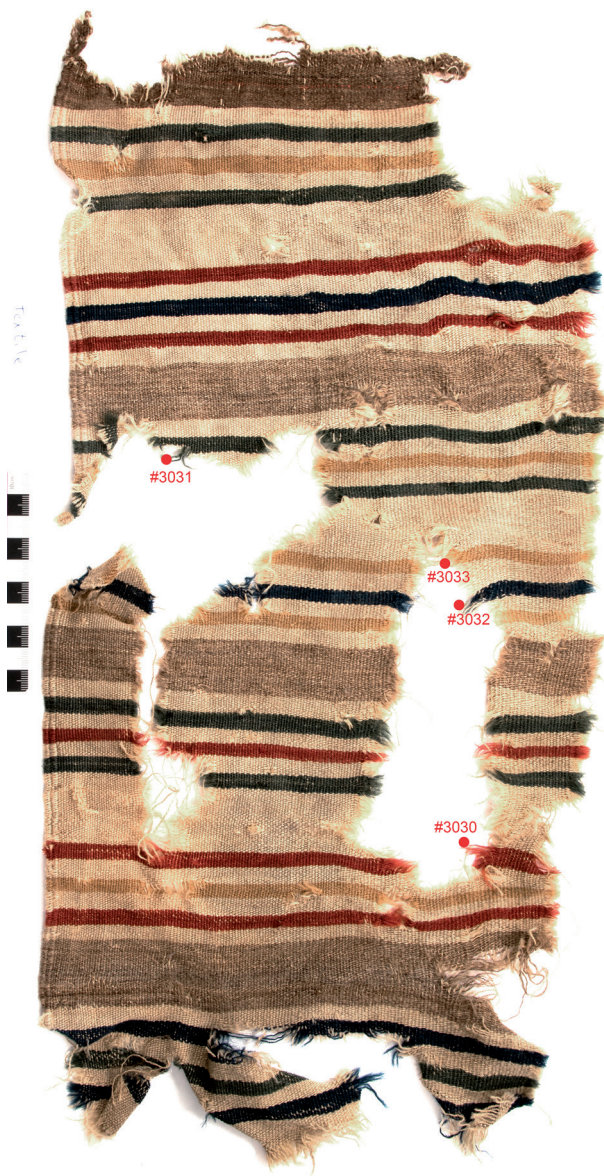


Fig. 2: Sassanid textile with spots for dyestuff sampling marked (Image: DBM/RUB/MFZ, F. Schapals)



Fig. 3: Textile research by the Iranian-Austrian team, February/ March 2018 (Image: DBM/RUB/MFZ, K. Grömer)

which builds on the knowledge and results of long-term excavations and research at Chehrābād salt mine. Within the foundation's Patrimonies-programme the new project *The Saltmen of Zanjan. Heritage of the Salt Mummy-Museum Zanjan* deals with conservation and restoration of the mummies and of the numerous organic finds from Chehrābād salt mine. They are exhibited and stored in Zanjan, north-western Iran. There are also plans to bring finds to Mainz, Germany, for restoration and for special exhibitions in other parts of Germany, Austria and Teheran, the capital of Iran. The last, but not the least challenge is to rework the permanent exhibition of the Zolfaghari-Museum Zanjan within the exhibition planning and corresponding conservation measures.

Under the leadership of the German Mining-Museum and the Ruhr-University Bochum, the following institutions recently signed a contract with the Iranian Cultural Heritage and Tourism Organisation Zanjan, the Zolfagari-Museum Zanjan and the National Museum Tehran: the Natural History Museum Vienna, the Romano-Germanic Central Museum in Mainz and the Archaeological Museum Frankfurt: www.iran.ir/en/News/82854609. All partners are going to support the heritage project in different areas. The Natural History Museum Vienna is participating with its expertise on "salt textiles".



Fig. 4: Conservation treatments by the Iranian-Austrian team, March 2018 (Image: DBM/RUB/MFZ, K. Grömer)

Textile research within the Patrimonies Project

Scientific research on salt mines has been part of the Prehistoric Department, Natural History Museum Vienna since the 19th century, as finds from the prehistoric salt mine at Hallstatt in Austria form an important aspect of its collections. Next to excavation and research of finds both from the salt mine as well as the Iron Age cemetery Hallstatt, textile research is also an important task in research activities at the Natural History Museum Vienna. With international cooperation and research projects about the salt mine in Chehrābād in Iran, trainee agreements and knowledge-transfer between scholars from Europe and the Near East are underway.

As part of this project, a research visit to Zanjan in Iran was carried out in February/March 2018, in order to collect data about Achaemenid and Sassanid textiles from Chehrābād that have been selected for restoration and exhibition. From the site, as well

textiles of the period between the 17th and 20th century AD have been found. Also new data about the garments of the salt mummies has been obtained or re-accessed from previous studies (e.g. Hadian et al. 2012; Krug-Ochmann 2014). Further scientific analyses are planned with dyestuff analysis, fibre analysis and wool fibre measurements.

An important aspect of the activities within the Patrimonies Project is the cooperation with Iranian textile researchers and conservators. Together with S. Amin Shirazi (Textile Conservation Department, Research Centre for Conservation of Cultural Relics in Tehran, Iran) and S. Borhan, some fragmented garments and other textiles have been assessed for conservation treatment, and also the shape of the garments and a large wool sack have been identified. The local scholars S. Borhan and N. Kanani have been trained in common analytical tools for textile research, including measurement of technical data using a digital microscope. The textiles from Chehrābād are an important source for our understanding of textile technology of the Near East and the Persian Empires. In a long term perspective, the activities within the Patrimonies Project are an important contribution to research in this area, and to get a complete catalogue of the textiles from the salt mine. Important research questions in focus for the following years are:

- * Raw materials and dyestuffs: Fibre analysis, wool fibre measurements and dyestuff analysis are to be carried out in cooperation with specialised laboratories.
- * Context and function: What function did the textiles from the salt mines have: garments, textile bags, do they represent primary or secondary use?
- * Reconstruction of garments, also in a chronological perspective: Are there different design concepts of how to make a garment? Use of different stitch and seam types.
- * Reconstruction of weaving techniques: To understand them, methods of experimental archaeology in combination with research on Iranian traditional hand craft will be applied.
- * Development of textile technology, especially from Achaemenid to Sassanid period: How does the use of raw materials, weave types, qualities, patterns, and dyes change? Is a cross-fertilisation with the Roman world visible?
- * Typology and iconographic studies on patterns and garment types: What general observations of garment types can be made, how do they reflect the social hierarchy? Can we observe the garments from the salt men from those pictures? What is similar, what is different?

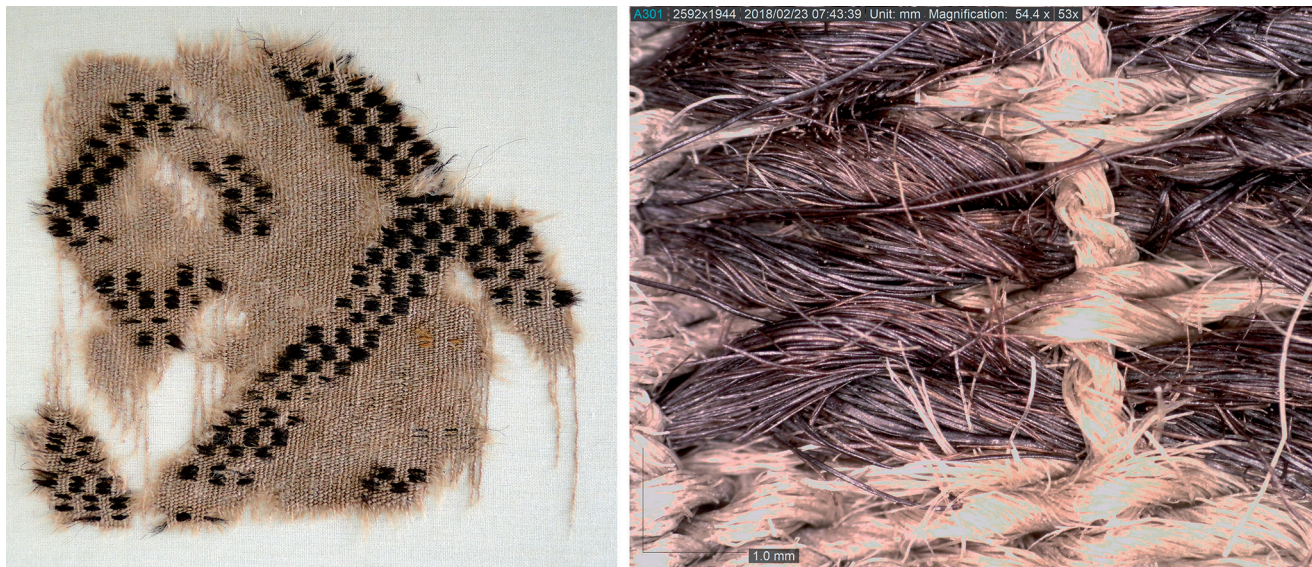
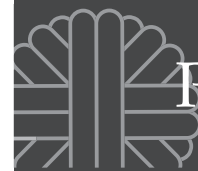


Fig. 5: Achaemenid textile with embroidered pattern, previously mentioned in Aali & Stöllner (2015, fig. 55), re-assessed in March 2018 (Images: DBM/RUB/MFZ, K. Grömer)

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