



RESEARCH PROJECT

THE EARLY BRONZE AGE ROYAL TOMBS OF UR IN MESOPOTAMIA: ARCHAEOLOGICAL AND ANALYTICAL INVESTIGATIONS OF GOLD, COPPER AND BRONZE OBJECTS, COLOR PIGMENTS AND LAPISLAZULI BEADS

Mesopotamia, the region of the earliest advanced civilizations on the Euphrates and Tigris, is very poor in metal deposits. For the large number of metal finds from the 3rd and 2nd millennium BCE from cities like Ur, Uruk, Kish, Susa and others, the raw materials must therefore have been imported from other, more metal rich countries. The Pennsylvania University Museum for Archeology and Anthropology in Philadelphia (Penn Museum) has a large collection of gold, silver, copper and bronze objects, (semi-)precious stones such as lapis lazuli or carnelian, and colored pigments that Sir Leonard Woolley had discovered and excavated in the Royal Tombs of Ur between 1922 and 1934. A selection of objects from the 3rd millennium BC from Ur is being investigated in a continuous research project.

The First work carried out by researchers of the Archaeometallurgy at Deutsches Bergbau-Museum Bochum on the Penn Museum's finds from Ur began in 2009. The Penn Museum had approved a request to conduct analytical research on the metal finds from the Royal Tombs. First, a selection of the most beautiful and well-known gold objects was non-destructively analyzed for their elemental composition using a portable X-ray fluorescence spectrometer directly in the exhibition of the Penn Museum.

The measurements yielded highly interesting results, including above all the evidence of gilding using a tumbaga alloy: In order to imitate gold, i.e. to produce a gold-rich surface layer, the original copper-silver-gold alloy was treated with acids. This ingenious process was therefore not first invented in South America in the 15th century AD, as previously assumed, but was already in use around 2500 BCE in the Old World. The earliest tin bronzes also appear in Ur. After initial positive results on the gold finds from the Penn Museum, other collections in the US (Field Museum, Chicago) and Great Britain (British Museum, Birmingham Museum) were included.

Two dissertations (E. Salzmann, M. Jansen) emerged from the project at the German Mining Museum Bochum/Ruhr University Bochum. The most modern analytical methods are used to measure trace element patterns and isotopic compositions (isotopy of lead, copper and osmium). Investigations have since been extended to green, blue, white and black pigments found in the Royal Tombs and preserved in shell halves, as well as lapis lazuli beads. With the project we are following the prehistoric trading systems as well as the knowledge of early alloying and manufacturing techniques.

Project Information

Contact

Prof. Dr. Sabine Klein



Project investigators	Prof. Dr. Andreas Hauptmann Prof. Dr. Sabine Klein
Team	Prof. Dr. Sabine Klein, Prof. Dr. Andreas Hauptmann, Dr. Moritz Jansen , Dr. Eveline Salzmänn, Fraunhofer IEG, Mitarbeiterinnen und Mitarbeiter des Forschungslabores
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