

# Analyzing Slipper Coffins from Nippur

BY MARIE-CLAUDE BOILEAU

The opportunity to analyze, with my students, amazing glazed ceramic coffins from Nippur—some of the iconic objects featured in the Middle East Galleries—was an offer I could not pass up. This type of “slipper” coffin—named for its distinctive shape that tapers toward the foot like a slipper—dates to the Parthian period and was introduced to Nippur in the 1st century BCE. The Penn Museum has three complete slipper coffins from the 1890s excavations at Nippur, along with about 30 fragments of other coffins.



ABOVE: Student Travis Lumpkin provides a “human scale” to PM object B9220 before it is moved to its permanent location in the Middle East Galleries.

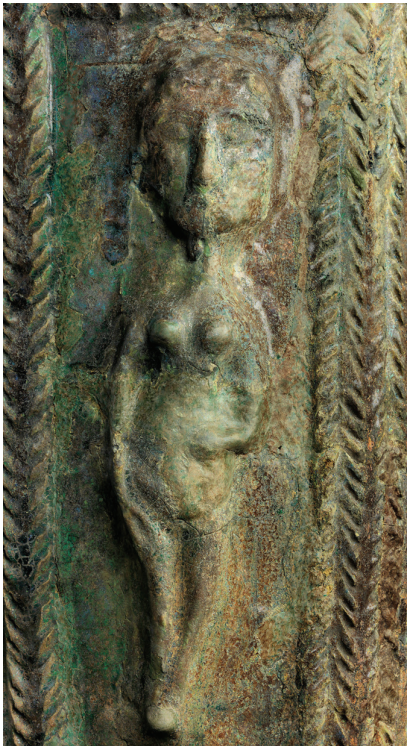
SUCH LARGE CERAMIC OBJECTS are fairly complex to build and require specific skills and know-how, which can be demonstrated by a detailed reconstruction of the production sequence. As a class project, undergraduate and graduate students at the Center for the Analysis of Archaeological Materials (CAAM) conducted the technological analysis of the coffins. Students focused their efforts on acquiring macro-, micro- and nano-scale data on raw materials, forming techniques, glazing, and firing processes.



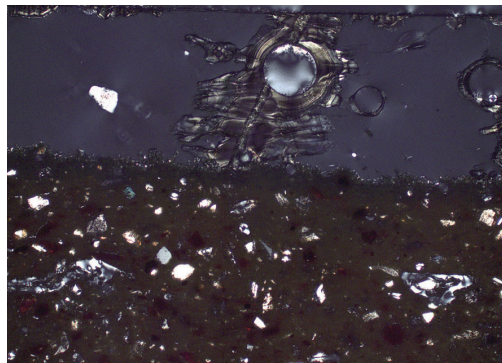
As an introduction to the coffins, the students undertook detailed macroscopic observations of their assigned coffin piece: measuring the thickness of the fragment, color-coding the clay body and glazed surface, describing the applied decoration (i.e. molded female figures and a rope pattern), and identifying surface features of manufacture.

Then they looked at coffin samples under a microscope. They gathered data on the mineralogy of inclusions, assessed the amount of chaff that was added as temper, and provided insights on the temperature range used to fire the ceramic body. In addition, students assessed the degree of alteration of the glaze. For the glaze composition, the class turned to elemental analysis using energy-dispersive spectrometry (SEM-EDS), confirming that the Nippur glazes, in line with Parthian tradition, are of a soda-lime-silica composition, with copper as the colorant.

LEFT: Students Aylar Abdolazadeh, Zhenia Bemko, and Claudia Epley examine fragments of slipper coffins. OPPOSITE: A radiographic image of coffin fragment PM object 29-56-1 shows a seam between two slabs, which runs under the applied decoration. The porosity of the clay body is evident by the numerous elongated voids (black in the x-ray).



FAR LEFT: This close-up photograph of one of the molded female figures from a slipper coffin (PM object B9220) indicates how the glaze is weathered. It is slightly iridescent and shows color alteration from green to brownish yellow. The weathering was further observed under the microscope.



LEFT, TOP: A digital image of cross-section (50x) showing the green glaze, the buff colored ceramic body, and the impressions left by the burnt out organic temper.

LEFT, BOTTOM: Under the polarizing microscope (50x), the glaze at the top of the image shows relict minerals, well-rounded bubbles, and yellow alteration layers.

Analysis of the forming techniques and the sequence of construction was conducted by detailed observations of the interior and exterior surfaces to identify seams, luting (an extra layer of clay), and areas

where the molded decoration was applied. Further data on manufacturing was acquired with x-ray radiography, a non-invasive technique. The students determined that the coffins were assembled using large slabs. The seams, which show up on x-ray images, are not visible macroscopically as some

are located under the decoration while others are covered up by luting or by the glaze.

In the end, this scientifically based case study allowed the CAAM students to integrate and apply archaeological science to complex



THE SLIPPER COFFIN PROJECT was initiated by Richard L. Zettler, Ph.D., and Katherine Blanchard, respectively Associate Curator-in-Charge and Fowler/Van Santvoord Keeper in the Near East Section. CAAM's Marie-Claude Boileau and Moritz Jansen guided students through the analytical study, helped by conservators Julia Lawson and Tessa de Alarcon. Special thanks go to the Fall 2016 students enrolled in ANTH 221/521 *Material World in Archaeological Science* who applied their newly acquired analytical skills to the study of the Nippur coffins, and to Evan Oxland, a graduate student who pursued the mineralogical analysis of these coffins in CLST 512 *Petrography of Cultural Materials* in Spring 2017.

research questions. The knowledge gained through the project has prompted the completion of the analysis and continuance of research into how the production of slipper coffins was organized at Nippur. ●

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