Carrie Roberts tests a stela's surface stability.

Terenouthis stela, KM 21179, which retains much of its original paint.

TERENOUTHIS FUNERARY STELAE: DEVELOPMENT OF A TREATMENT PROTOCOL

In September 2011 I began a one-year fellowship with conservators Suzanne Davis and Claudia Chemello in the Kelsey Museum conservation laboratory. My focus project, supported by the Samuel H. Kress Foundation, has been the development of a treatment protocol for the Museum's collection of limestone funerary stelae from Terenouthis, Egypt. As part of this project I have researched the stelae collection's archaeological context, examined and documented a selection of stelae in the lab, tested a variety of conservation treatment materials, and coordinated with scientists to learn more about the objects' physical makeup and deterioration.

Excavations at Terenouthis took place during one six-week dig season in 1935 under the supervision of University of Michigan professor Enoch Peterson. The necropolis of Terenouthis contained hundreds of tombs built for members of the city's middle class, who were of Graeco-Egyptian heritage. Niches were cut into the east-facing end of each tomb, and in each niche was placed a carved slab of limestone, or stela. The stelae feature iconography that is a hybrid of Greek and Egyptian symbolism and religious practice. Previous studies of the stelae include Finlay Hooper's graduate thesis and 1961 catalogue, and Roger McCleary's 1987 exhibition catalogue *Portals to Eternity*.

Deterioration had been documented on the stelae as early as 1961, in Hooper's detailed catalogue. Hooper provides a short comment on each stela's state of preservation, with descriptions ranging from "excellent condition" to "surface worn and powdery" to "much salt encrustation," reflecting many of the stelae's current condition problems. Enoch Peterson made note of similar problems during a 1941 lecture, where he describes the systematic treatment of the stelae with a material known as Duco cement. Today this coating can be observed peeling off many of the stelae, leaving behind a powdery, weathered stone surface, eliminating details of inscription and carving in some areas. Salt efflorescences and fungal growths are also present.

My first task was to examine these condition problems up close, so I selected a group of five stelae that would present a representative sample. I used microscopic examination and chemical spot testing to gain a better sense of what salts and growths were present and was able to sample some for analysis. Working with scientists at the Detroit Institute of Arts and the mycology and electron microscopy laboratories at the University of Michigan, I have been able to characterize different forms of deterioration and pinpoint effective treatments for them. We were fortunate enough to have use of a portable X-ray fluorescence spectrometer in January, which allowed for the characterization of pigment remnants on a number of the stelae.

In developing a treatment protocol that addresses these different deterioration phenomena, I worked with Suzanne, Claudia, and Associate Curator Terry Wilfong to prioritize stages of treatment. The most essential step would be to stabilize the deteriorated stone—especially in areas where information preserved in the stone carving could be lost. Any coated areas containing carved details or information would also have to be stabilized. A series of consolidants and adhesives—materials used to restore structural integrity to crumbling or powdery stone—were tested to determine an appropriate means of slowing this deterioration.

Not all steps in the protocol involve treatment. An equally important consideration is environmental control, which can be used as an alternative to stabilize the stelae. Salts interact with changes in the temperature and humidity of the air, and controlling these climate factors can help prevent further damage to salt-contaminated stelae. Over the past five months I have monitored the storage and display environments of the stelae and have found them to be well controlled, which should keep the risk of future salt damage at a minimum. A controlled environment will also slow the deterioration of the coating and decrease the potential for ongoing biological activity on the stelae.

Although the protocol itself is nearly complete, I have only just started to treat the stelae that are currently in the conservation lab. With approximately 200 of these artifacts in the collection, 20 percent of which have been given a high priority for treatment, the task of actively conserving the stelae will take place over the course of many years, and the protocol I have developed can be used by other conservators over time. Working with these artifacts has showed me how much can be learned from the stelae themselves; their shape, carvings, and painted surfaces all convey important information and a potential for future discovery. This potential makes the long-term preservation of the stelae essential.

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