THE STUDY AND TREATMENT OF TWO CROCODILE MUMMIES
AT THE PHOEBE A. HEART MUSEUM OF ANTHROPOLOGY

Allison Lewis,  Jane Williams1,  Beth Szuhy2,  Rebecca Fahrig,  PhD3,  Richard Dodd,  PhD3,  Richard Evershed,  PhD and  Lucy Cramp,  PhD4
1Phoebe A. Hearst Museum of Anthropology;  2Fine Arts Museums of San Francisco;  3Stanford University,  4University of California, Berkeley,  University of Bristol

DESCRIPTION AND HISTORICAL BACKGROUND

Two crocodile mummies, PAHMA 5-513 and PAHMA 6-20100, were acquired in Egypt around 1900. Both mummies are believed to have been votive mummies dedicated to the god Sobek, or to the composite god Sobek-Ra (6-20100).

Materials: Crocodile remains, mummy balm, linen, palm stem
Culture/date: Ancient Egyptian, Greco-Roman period
Dimensions: 170 cm x 16.5 cm x 16 cm

PAHMA 5-513

Description: Adult Nile crocodile with approximately thirty juvenile crocodiles massed on its back. The juvenile crocodiles are tied between pairs of sticks. Plain weave linen wrappings had mostly been removed prior to acquisition. Shiny black mummy balm covers much of the adult and juvenile crocodile remains.

PAHMA 6-20100

Description: Elaborately decorated crocodile mummy bundle with a painted mask, separate solar disk head ornament, and painted linen wrappings (red, black, brown, yellow) arranged in a concentric square pattern. Below the linen wrappings on the dorsal surface, lengthwise bundles of reed-like stems bound crosswise with twisted fiber cording and flat reeds are visible.

Materials: Crocodile remains, linen, plant fibers, pigments, mummy balm
Culture/date: Ancient Egyptian, Roman period, first three centuries CE
Dimensions: 236 cm x 19 cm x 33 cm

MATERIALS INVESTIGATION

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Table 1. Materials investigation of 5-513 and 6-20100. Mummy balm samples were analyzed with gas chromatography/mass spectrometry (GC/MS) and biomarkers indicative of organic compounds present in the balm were identified. Transverse sections and macerations of samples of plant materials were examined with a transmitted light microscope for species identification. A sample of the pale yellow plaster from 6-20100’s mask was analyzed with Fourier-transform infrared spectroscopy (FTIR) and X-ray fluorescence (XRF) to characterize the ground and pigment(s). Yellow pigment from 6-20100’s dorsal surface was tested with a microchemical spot test for the presence of arsenic, and the painted wrappings were examined with an infrared energy source in order to distinguish carbon-based media.

COMPUTED TOMOGRAPHY (CT)

CT images of both mummies were acquired using a clinical CT scanner with standard resolution (Siemens SOMATOM Definition, Stanford Medicine Imaging Center) and a C-arm CT scanner with ultra-high resolution (Siemens AXIOM Arts dTA, Dept. of Radiology, Stanford University). Clinical CT data resolution is 512 x 512 x 4028 cm (with 10, 10, 60 cm spacing) for 6-20100, and 512 x 512 x 2949 cm (with 48, 48, 60 cm spacing) for 5-513. C-arm scanner data has resolution of 512 x 512 x 498 cm (with 14, 14, 14 cm spacing) over small volumes of interest for both mummies.

CONDITION & TREATMENT

5-513’s surfaces were cleaned by gentle vacuuming with a HEP-filtered Nilfisk vacuum. After solubility tests of the black mummy balm determined that the balm was soluble in acetone and ethanol but not in water or petroleum benzine, trials were conducted to select a consolidant: 2-5% w/v solutions of Aquazol (molecular weights 200 and 500) in deionized water, singlass, methyl cellulose, funori, and Acrayl B-67 in petroleum benzine were tested on small detached flakes of balm and in discrete locations on the adult crocodile. Strength, penetration, and visual change were evaluated. 5% B-67 performed best, and was used to consolidate the flaking coating. B-67 was applied with a fine brush to cracked and flaking balm on the dorsal, lateral and ventral surfaces of the mummy. Tacks of 20% B-67 in petroleum benzine bulked with glass microballoons and toned with carbon black dry pigment were used to reattach juvenile crocodiles. Loose linen scraps and threads were secured with pre-cast Parafilm-F film reactivated with petroleum benzine.

PAHMA 6-20100 was structurally unstable due to widespread breakage of the linen wrappings and interior plant elements, as seen above on the ventral surface. Breakage and displacement of linen strips and plant binding elements rendered the entire bundle overly flexible, and shedding small pieces of linen, plant matter, and mummiﬁcation balm. Much dust and grime had accumulated on the mummy’s surfaces, dulking the appearance of the polychrome mask and wrappings.

CONTACT

Allison Lewis
Phoebe A. Hearst Museum of Anthropology
Email: allisone@berkeley.edu
http://hearstmuseum.berkeley.edu/index.php