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Egyptian Bioarchaeology

humans, animals, and the environment

edited by

Salima Ikram, Jessica Kaiser & Roxie Walker



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From Egypt to Lithuania: Marija Rudzinskaitė-Arcimavičienė's Mummy and its Radiological Investigation

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Introduction

A student of the famous Russian Egyptologist Boris Turayev (1868-1920) Marija Rudzinskaitė-Arcimavičienė (1885-1941), the first Lithuanian Egyptologist, collected antiquities for educational purposes during her travels to Egypt (Snitkuvienė 2009; 2011). An entry in her travel diary dated 1924 reads:

“So far, the Cairo Museum’s “Archaeological commission” still allows [us] to export mummies and various antiquities, of course, only those that the museum has in excess” (Rudzinskaitė-Arcimavičienė 1933: 62).

By taking advantage of these opportunities, Rudzinskaitė-Arcimavičienė bought a demotic papyrus and a few fragments of a hieratic papyrus from the Russian Egyptologist Grigory Lukyanov (1885-1945). Lukyanov worked as a personal secretary for the Czechoslovak envoy in Cairo (Rudzinskaitė-Arcimavičienė 1936). Whilst at the Cairo Museum – most probably assisted by Lukyanov – she also acquired a unique mummy inside the trough of a sarcophagus. Sadly, there was no accompanying lid (*Ibidem* 1924). It was customary at the time for antiquities removed from the Egyptian Museum in Cairo to be accompanied by a stamped certificate, guaranteeing their authenticity; however, there is no extant document of this nature (*Ibidem* 1935). Had the document survived, it may well have indicated that the sarcophagus was discovered in the Luxor area (Deir el-Bahari) and, together with the mummy, might be attributed to the 11th/12th c. BC.

According to the repository registry of the Kaunas National Museum of Art (1940: 1.59), where the item is presently accessioned, Rudzinskaitė-Arcimavičienė was convinced that the sarcophagus was made specifically for the mummy. In a

letter written by the scholar to that museum on February 2 1937, the deceased was referred to as the “Egyptian princess Shemait” or “sky goddess - priestess”. For the deceased’s name and titles, the scientist probably relied upon the inscription painted on the sarcophagus. According to her, the mummy purchased from the Cairo Museum was the wrapped remains of an Egyptian princess and priestess of the god Amun. The body, in its entirety, was contained within a mat made of sticks or palm ribs – something she believed was a special burial custom used in certain parts of southern Egypt (Rudzinskaitė-Arcimavičienė 1933). After inspection of the sarcophagus, Evgeny Bogoslovsky (1941-1990) revised the name of the deceased to Shemait-imen-peri-Heru, further adding the information that she was a married woman or “housewife” (Snitkuvienė 1990).

Egyptologist Svetlana Hodjash (1923-2008) subsequently re-dated the sarcophagus to the 21st Dynasty or later, claiming that it was not possible to deduce the deceased’s name or any further details that had previously been ascribed to it as information of this kind is generally recorded on the lid. Since the sarcophagus lid has not survived and the mummy has no shroud, the name of the deceased should be regarded as unknown. According to Hodjash, the hieroglyphic text on the sarcophagus indicates that it is intended for a married woman or “housewife”, who has the title of highest priestess – chantress of Amun (Berlev and Hodjash 1998).

Recently, the sarcophagus and the mummy both underwent restoration at the Lithuanian Art Museum Pranas Gudynas Restoration Center, Vilnius (Žičkuvienė *et al.* 2011). Following the restoration, a bio-anthropological investigation of the bundle was permitted (Aufderheide 2003). The main scope of the investigation was to answer questions about the mummy’s identity and features: does this mummy really belong to the sarcophagus? Is it really the singer of the god Amun? What is the quality of preservation of the individual? How old was the subject when she died? What form of mummification treatment did she receive? To answer these questions, a radiological examination of the body using computer tomography (CT) was conducted in July 2011. C-14 dating of organic material and linen samples was performed at the Curt-Engelhorn Center for Archaeometry, Mannheim, Germany. The results from this were compatible with the stylistic dating of the coffin to the 21st Dynasty (organic matter - 2842 a BP +/- 20 = cal BC 1037-941; linen - 2843 a BP +/- 27.1 = cal BC 1041-941).

Materials and Methods

The mummy under consideration here, Tt 2797, is allegedly associated with the polychromous anthropoid sarcophagus, Tt 2798. The dimensions of Tt 2798 are approximately 187 cm (length), 29 cm (height) and 50 cm (width). The body is completely wrapped in bandages that vary approximately between 12 and 16 cm in width, which is supported by a mat constructed from sticks. This support, in turn, is fastened to the wrapped body using additional linen, constructed from cloth measuring eight cm in width, folded in two, and tied at the rear of the bundle with a knot. No shroud is visible (Fig. 1). The mummy bundle measures 157.7



Fig. 1. The Kaunas mummy at the Lithuanian Art Museum Pranas Gudynas Restoration Center, Vilnius (photo: Lithuanian Mummy Project).

cm (length), 42 cm (width) at the chest level, and 22 cm (height) at the level of the feet making it appear to be much shorter than the coffin (Vedrickienė, personal communication 2013).

The remains were examined at the Central Branch of Vilnius University Hospital using a Philips Mx8000 Dual CT scanner (Best, The Netherlands) with a slice thickness of 1.3 mm, at increments of 1.3 mm, and dose of 120 kV/90 mA. In total, the procedure produced 1188 individual axial slices. DICOM data were later processed using a workstation (ADW 4.3, General Electrics, Milwaukee, USA) in the Department of Radiology, Trauma Center Murnau, Germany.

Since the first X-ray studies of human and animal mummies, performed at the close of the 19th c. AD (König 1896; Londe 1897; Böni *et al.* 2004), mummy investigations have benefited from the use of radiological methods. Technical innovations in Radiology, most notably the introduction of computed tomography (CT), have enhanced the possibility of investigating ancient remains and enabled the diagnosis of pathological conditions (Chhem and Brothwell 2008). Specifically, in this case, the Hounsfield Units (HU) Scale – a quantitative scale used for describing radio-density that is applied by radiologists in routine CT investigations – was usefully employed to investigate the presence of any foreign bodies and anomalous areas. Hounsfield Units represent the density values of the single voxel elements and can prove useful in identifying anomalies lying within wrapped bundles (Gostner *et al.* 2013). Water, considered as a reference value, measures zero HU, while air has a value of -1000 HU and compact bone has a value up to 3000 HU (Laubenberger and Laubenberger 1999).

Radiological Findings

Skeletal Elements

Upon examination, the remains were found to consist of a skull, all long bones of the upper and lower extremities, bones of the hands and feet, sternum and both clavicles, 25 vertebral bodies – 7 cervical, 18 thoracic/lumbar – and in excess of

24 ribs. Sex and age estimation obtained through skull and pelvis observation (Buikstra and Ubelaker 1994) revealed that the body belongs to a middle-aged adult male, rather than a female (Fig. 2). The head was in a slightly oblique position compared to the rest of the skeleton and most teeth had been lost post-mortem. The spine was completely disarticulated. Vertebral bodies, ribs, both clavicles and the sternum were completely disarticulated and positioned in the anatomical region of the chest and abdomen, framed by the upper extremities; the latter appeared folded, with the hands in the region of the pelvis, the pelvic bones were not in the correct anatomical position and the hips were disarticulated. The long bones of the lower extremities were predominantly in the correct anatomical position, but the individual distal phalanges of the toes were dislocated or absent (Fig. 3). From the skull to the pelvis and proximal femora the skeleton appeared to be partially embedded within an inhomogeneous mass which partially fills the skull and paranasal sinuses: parts of this mass lay as clots between the ribs and vertebral bodies. Inside this mass, five teeth or bigger tooth fragments could be found intra-cranially, while 16 of them were observed in the area of chest and abdomen (Fig. 4). An estimation of stature in life of approximately 159 cm (Raxter *et al.* 2008) was calculated from the humeral and femoral length.

Soft Tissues and Body Covering

Some capsular structures were evident around both proximal femora; the patellar ligament and parts of the capsular structures of the knees were preserved bilaterally, along with most of the tendons of the feet. The mat of wooden sticks was wrapped around the mummy, open at the chest and abdomen and overlapping at the lower extremities; both upper extremities appeared to be separately wrapped, with defects of the material in the region of both elbows. The chest and abdomen were held together by different wrapping materials containing gaps and defects; the lower extremities were separately surrounded by one thin layer – either part of the skin or preserved tissues, and, apart from that, they appeared to be wrapped together by several layers of different material. No craniotomy – either trans-nasal or trans-sphenoidal – could be identified.



Fig. 2. 3D reconstruction of the left hemipelvis indicating sex and age of the subject (reconstruction: Lithuanian Mummy Project).



Fig. 3A) Topogram of the CT examination providing an overview of the mummy and wrapping; B) 3D-reconstruction of the head and body of the mummy showing marked anatomical dislocations of vertebral bodies, ribs, sternum, both clavicles and the pelvic bones. Note the small bottle and the cap on the right side next to the skull (images: Lithuanian Mummy Project).

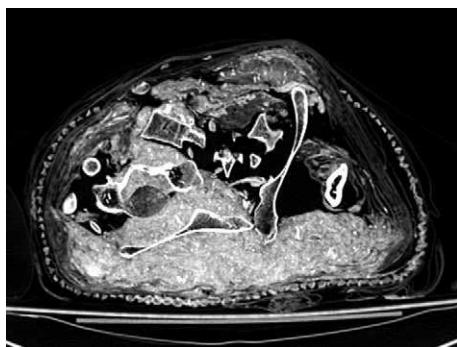


Fig. 4. Axial slice of the CT examination at the height of the elbows illustrating the mass lying under the body, most probably consisting of sand (image: Lithuanian Mummy Project).

Foreign Bodies

The investigation highlighted the presence of a small bottle (height: 2.7 cm; length: 2.4 cm; width 1.4 cm) with a mean HU value of approximately 1500, slightly damaged at one edge, which was positioned at a distance of 1.4 cm from the right side of the skull, at the inner edge of the mat (Fig. 5). A cap with HU of at least 3000 was visible within the mat at the rear right hand side, at the same level laterally as the small bottle, producing metal artifacts. Small linear radiodense structures were also seen inside the wrapping material distally to the feet. No ornaments, jewels or amulets were identified.

Discussion

The CT investigation of the specimen enabled a number of important conclusions to be drawn. Firstly, if we are to rely upon the linen dating, the mummy looks very different from good quality mummies dated to the 21st Dynasty (Ikram and Dodson 1998; Giuffra *et al.* 2001). It is widely accepted that during this period, the embalmers went to great lengths to ensure that the mummy portrayed the lifelike appearance of the individual, making stark parallels to the idealized representations favored during the Old Kingdom, although in the latter case the portrayal was more external than internal. Subcutaneous packing using mud, sand and sawdust was routinely employed to “plump up” the body following the evisceration process. The number of incisions made in the body vary and, although the Rhind Magical Papyrus (c. 200 BC – some 700-850 years after the presumed date of this mummy) describes the location of seventeen such incisions, the majority of mummies display far fewer. Generally, the areas of the body “packed” by the embalmers could be accessed through carefully positioned incisions and the use of sticks to push the packing material into hard-to-reach areas. Visceral packages were returned to the body during this period, often with the addition of small wax and faience figures. Bungs made from linen were commonly used to plug the orifices and prevent the packing material from escaping whilst the body was moved (Ikram and Dodson 1998). The use of such vigorous subcutaneous packing often led to “over-stuffing” as the skin simply could not stretch to accommodate the volume of packing material used by the embalmers. As the skin desiccated, it split, creating a number of mummies with a rather bizarre appearance such as the well-known Henttawi, mother of Pinudjem, whose cheeks display noticeable cracking (*Ibidem*).

Mummies dating to the 21st Dynasty continue to display evidence of the use of resin during the mummification process. The cranial cavity was generally filled with resin following the evisceration process. The body was generally positioned with the arms to the sides and the hands placed over the pubic region. Following mummification, the body was traditionally painted – red for men and yellow for women. The addition of false eyes made from stone, glass or painted linen and the use of wigs was also reported from this period, enhancing the lifelike appearance of the body. The use of amulets is prolific (Ikram and Dodson 1998).



Fig. 5. The small glass bottle containing lavender oil, seen in (B) at the moment of removal (A) (photos: Lithuanian Mummy Project).

The Kaunas mummy does not appear to fit the “standard description” of a preserved human body dating to the 21st Dynasty. Externally, the plain linen wrappings and the use of a mat tied in place using rope are already documented in the New Kingdom (18th-20th Dynasties, c. 1549-1064 BC). Some parallels can be drawn with mummy 3496 from the Manchester Museum collection – a child mummy which displayed almost identical linen bandaging wrapped within a reed mat and tied with rope at both ends (Isherwood *et al.* 1979). This particular child mummy is from Gurob and dates to the New Kingdom (18th Dynasty). No exterior coffin was located so the child’s name, affiliation and family details remain unknown. Burials incorporating palm mats were common during the Greco-Roman era (c. 332 BC-AD 395) (Ikram, personal communication 2014). A notable fact about these mat coffins is that they were not generally employed in elite burials. This is a further indication that the Kaunas mummy is unlikely to belong to the coffin in which it is now presented.

A further point of interest is the lack of soft tissue, the dislodging of the teeth, and the disarticulations, which suggests that the body was at least partly skeletonized at the time of wrapping, possibly due to an initial burial. In fact, the material in which the skeleton is now embedded seems to be consistent with sand, a considerable amount of which was lost from the bundle during the recent restoration attempts (Vedrickienė, personal communication 2013). The wrapping of a partially skeletonized subject, however, is not totally surprising. A comparison can be made with the bundle found in the coffin of priest Ankhpakhered, currently kept at the Archaeological Museum of Asti, Italy, which has been tentatively dated to the 21st-22nd Dynasties (Malgora 2012). The remains, belonging to a middle-aged adult male, show several dislocations including the positioning of the feet between the femora, the pelvis at the scapular level, and the vertebrae scattered in the thoracic cavity, interspersed with the bones of the hands. The bones were carefully wrapped, and a number of sticks located beneath the skeleton – a feature typical of the Greco-Roman Period – to provide rigidity and support (Ikram and Dodson 1998). The absence of amulets and funerary ornaments, as well as some other bio-anthropological features, were considered suggestive of a low status subject. Subsequent archaeo-metric investigation revealed that the mummy was actually produced between 360 and 200 BC, confirming that the sarcophagus was reused in antiquity (Malgora 2012). In addition, anatomical details may also contribute to the understanding of this case: while the presence of 25 vertebral bodies could be an anatomical norm variant, this, coupled with the presence of more than 24 ribs increases the likelihood that more than one subject was involved.

Composite mummies from ancient Egypt are indeed well-attested, and seem to be a feature of the Greco-Roman Period, when the art of embalming appears to decline following its peak in the New Kingdom (Aufderheide *et al.* 2004; Giuffra *et al.* 2006). For example, one such example comes from Kellis, a site located in Dakhleh Oasis, 400 km west of Luxor. This mummy appeared to be a linen-wrapped adult, but when autopsied it was revealed to be a mélange of four subjects, whose ages spanned from early childhood to old age. All the skeletal elements

were held together by linen straps attached to a frame composed of palm-leaf ribs (Aufderheide *et al.* 1999).

The data suggest that our mummy was either fabricated from older remains, perhaps following looting of a cemetery, or that the embalmers were a little careless in their workshop and allowed parts of a second body to be included accidentally. The rather haphazard nature of the remains, particularly in the torso region, points to at least partial skeletonization and a distinct lack of care prior to wrapping. CT images highlighted the bandaging methods well and it would appear that the mummy has been rather hastily produced. One explanation is that this is a non-elite New Kingdom individual whose remains were disturbed and wrapped with linen also dated to the the 21st Dynasty (Ikram, personal communication 2014). Other possible scenarios include the addition of the palm mat during the Greco-Roman period to act as a supportive frame for an older mummy or at a later date for aesthetic reasons to make the mummy more attractive for sale.

Lastly, it is worth commenting on the small glass bottle highlighted during the radiological investigation, which was later removed from the mummy. This is essentially a modern bottle containing lavender oil, produced in Simferopol, Russia. A letter written by the Head of the Museum to the Lithuanian Ministry of Education dated January 8 1927 indicates that only the owner had access to the mummy and that, because she trusted nobody, it must be locked away at all times. This suggests that it was Rudzinskaitė-Arcimavičienė herself who inserted the bottle of lavender oil into the bundle. It is possible that the Egyptologist wished to create a mystifying odor. If so, the desired goal was achieved as the press reported:

“In the room where the embalmed dancer’s body is located there is a peculiar aroma, reminiscent of dried flowers smell” (Anonymous 1937: 15).

Lavender oil has long been used for scenting people, clothing, rooms and bathrooms, and is effective against insect infestations. Rudzinskaitė Arcimavičienė loved incense (Lomsargytė-Pukienė 2004) but incense sticks burn quickly, while the smell of oil lasts far longer. Given the Egyptologist’s fondness for incense, it is unlikely that lavender oil was employed as a pesticide, but rather for its distinctive odor, or perhaps both.

Conclusions

The recent bio-anthropological investigation of the Kaunas mummy has enabled new light to be shed on this intriguing case. Firstly, because of the smaller dimensions of the bundle, and because the remains appear to be male, probably of low social status, the mummy is not associated with the sarcophagus in which it was purchased. The presence of exogenous elements such as the extra ribs is a feature shared with burials from the Greco-Roman period, as is the presence of the palm mat. During this period, the art of embalming was extended to a wider demographic, and the resulting mummies became less accurately and more hastily prepared. Paradoxically, radiocarbon dating of the linen wrapping indicates a much earlier date within the the 21st Dynasty. This would suggest that such anomalous

preparations were already present at a much earlier date. The authors suggest that the bundle represents fabrication of a composite mummy from ad hoc skeletonized remains based on the radiocarbon results. The presence of a large amount of sand adhering directly to the remains themselves and as an inclusion within the bundle suggests that the remains may originally have been interred. It is plausible that the palm mat was added later for practical or aesthetic reasons.

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