

Coffins in Context

Abstracts

An unpublished coffin of sAb pA di Ast from Giza No. 369 stored in the Giza magazine

This poster presents a study and publication of the unpublished coffin of *sAb pA di Ast* from Giza No. 369 preserved in the Giza Magazine.

Status of preservation: Good, except some parts of lid, inscriptions and the two sides of the coffin.

The human-shaped wooden coffin was covered with a thin layer of cloth topped with a thin coating of plaster that was colored in bright colors. The head was beautifully made and the eyes were made of pieces of stone attached using an inlay method. There is a line of writing that starts at the bottom of the necklace and extends to the feet.

The study compares the style of the design of this coffin with other Late Period coffins, discussing the major similarities and differences. This article was developed using analytical and comparative approaches based on document and picture analyses. These features are compared, and the results are discussed in the article.

In this article, the influence of colors and their use in Egyptian beliefs is clarified; where color choices in representations are not always meaning less and do not merely attempt to represent tangible truth. This statement is all the more true that we are interested in the representations of beliefs, legends and everything that constitutes the intangible world of ancient Egyptian.

The colors used in Ancient Egypt were primarily a 6 color palette using: Red *dSr*, Yellow *Xnt*, Blue *irtyw*, Green *wAD*, White *HD*, Black *km*. There was not much color mixing for their artwork because certain pigments reacted chemically with one another, which caused unfavorable results. The hieroglyph signs written in black ink, while the signs inside are colored in different colors.

Symbolically, the coffin is charged with a number of religious concepts of Ancient Egypt concerning death and life after death through its form, its decoration and the texts that he can wear. We can even consider that it ends up constituting a tomb in miniature, even a microcosm of the world in which the deceased lived. As Egyptian civilization evolved, ancient Egyptian concepts of the afterlife evolve, as do settings and functions symbols of the coffin.

There is no doubt that the coffin served as a shelter for the ancient Egyptians. According to ancient Egyptian beliefs, the deceased would unite with Osiris and Re, who could then raise him from the dead.

As a result, starting the Old Kingdom and continuing to the end of the Late Period, coffins generally served as an alternative tomb rather than a container. Therefore, they were adorned with paintings and decorative scenes that assured the deceased's safe journey.

The design and decorations of the coffin indicate that the social status of its owner is average. The coffins enclose valuable information about the Egyptian social structure, economic system, religious rituals, fashion, and art. All this information would be insufficient to date the time period of any coffin.

The Vatican Coffin Project. The coffin set of Ikhy from the Museo Gregoriano Egizio provides new observations on the tomb of Bab el-Gasus

Yellow coffins are omnipresent in Egyptological collections around the world today. In 1891 the corpus of objects increased by more than 250 examples, thanks to the discovery of the Bab el-Gasus tomb. However, the subsequent development of new understanding of these materials has been hindered by insufficient documentation as well as their haphazard diffusion across the globe. This paper, part of the results of the Vatican Coffin Project's ongoing research on yellow coffins, will focus on the analyses of specific aspects of one outer coffin and mummy board originating from that tomb and attributed to Ikhy (MV 25035.3.1-3). These artifacts are today part of the Egyptian collection of the Museo Gregoriano Egizio.

Firstly, the precise position of the coffin set of Ikhy in the corridors of Bab el-Gasus is investigated, as its exact position in the tomb appeared lost to history. However, a new analysis of the documentation associated with the discovery of the tomb points towards a specific place of origin for Ikhy's funerary ensemble.

Secondly, although the funerary elements attributed to Ikhy's set have traditionally constituted only an outer coffin and mummy board, new analysis suggests that an inner box, also preserved at the Museo Gregoriano Egizio (MV 25016.2.2), was originally part of the ensemble.

Thirdly, and finally, new perspectives about the supposed reuse of the materials attributed to Ikhy will be presented.

This contribution complements past and present multi-disciplinary approaches on yellow coffins conducted by the Vatican Coffin Project. It addresses some of the knowledge gaps regarding the organization of the tomb of Bab el-Gasus and its archaeological context, and points to new perspectives and future trends for the study of this tomb. In this regard, the combination and study of the modern history of the materials alongside analyses of the ancient objects themselves are vital for reconstructing their precise origin and context.

The Religious Significance of Coffin Timbers

Over the last decade or so, the construction of ancient Egyptian coffins has gained considerable attention. Part of this interest includes identifying the species of trees used for coffin timbers. Thanks to these analyses, it is clear that there was a selection of tree species that were particularly favoured by the ancient Egyptians for this purpose. In addition to material advantages and disadvantages offered by various types of wood, the ancient Egyptians also attributed religious significance to each species. This discussion explores the textual, pictorial, and archaeological evidence available to help Egyptologists understand the important religious connections associated with timber, specifically as it relates to the construction of coffins. This analysis takes as its starting point a later variant of the Book of the Dead spell 193, in which the speaker describes the magical properties of coffins made

from different species of wood. These statements are compared to earlier references, and then assessed in light of scientifically identified examples. The significance of these woods is shown to change over time, and often relates to both the physical properties of the trees and the availability of different timbers. This study demonstrates how important the woods were to the ancient Egyptians, but also shows the modern importance of identifying the woods used for coffin construction as part of a standard full analysis.

Rachel Aronin and Isabel Schneider

PAPER

Paint It Black: New scientific analysis of black “goo” on Brooklyn Museum 37.1927Ea-b

This paper will examine a previously unpublished black anthropoid coffin currently undergoing a major conservation and analysis project for the first time since its acquisition by the Brooklyn Museum more than 85 years ago. The entirety of BkM37.1927Ea-b was painted with a thick black coating over which extensive but damaged pale yellow inscriptions and iconography were applied on both the exterior and interior, appearing stylistically to date it to Dynasty 22. Traces of an additional black substance (which may or may not be identical to the ground coating) can also be seen in the interior, but their haphazard application perhaps suggests that they were unintentionally transferred from another object once housed inside the coffin (such as a nesting coffin, cartonnage, or mummified individual).

This substance, probably a mixture of resins, pitches, waxes, and/or bitumen, which Kate Fulcher of the British Museum and others have affectionately dubbed “goo,” may be found on a number of ancient funerary items. While its exact composition is still a matter for debate, it seems that in the Egyptian worldview it possessed either practical (preservative) or ritualistic benefits (or perhaps both) for the deceased and their burial goods. The color black was particularly associated with Osiris, the god of death and regeneration, as well as the life-bringing Nile flood with its deposits of dark rejuvenating silt. At certain periods in Egyptian history, various types of mortuary objects were either deliberately or accidentally anointed with “goo,” or sometimes simply painted black to share in some of the perceived ritual associations of this practice. These actions raise questions about wealth and status, access to materials, and shifting beliefs and burial customs during times of political and religious transformation.

Interest in the exact nature and usage of the black substance(s) on the coffin has prompted further investigation into a number of additional objects in the Brooklyn Museum’s collection, all of which are funerary in nature and roughly contemporaneous with BkM37.1927Ea-b. Samples and cross sections from a selection of these comparanda, alongside those from the coffin, will be analyzed using gas chromatography-mass spectrometry (GC-MS). Additional analysis of the coffin will utilize a wider variety of techniques, including C-14 radiocarbon dating, microscopic wood analysis, portable X-ray fluorescence (pXRF) spectroscopy, multiband imaging (MBI), Fourier-transformed infrared spectroscopy (FTIR), and X-radiography. This paper will present the initial findings of these investigations, carried out jointly by conservation and curatorial staff, and demonstrating how the integration of scientific analysis and Egyptological interpretation may provide new information about ancient economic, social, and religious practices. We will discuss conservation challenges and approaches for treating the coffin, and explore wider implications for conceptual understandings and usages of black “goo” in the Egyptian mortuary sphere. This in-depth examination of the material

properties and symbolic values of BkM37.1927Ea-b and other comparable funerary goods will help to elucidate their usage, meaning, and place in ancient Egyptian society.

Ghada M. Azzam

POSTER

Unpublished Sarcophagus no.75, in the Giza magazine, currently in the GEM no. 5185 A-B

This sarcophagus is important as it belongs to one of the priests and servants of the god Horus, on which many forms of Horus were mentioned, including Horus the avenger of his father, Horus Khenti-Irty and Horus-Ha and forms associated with particular places: Horus of Buto and Horus Lord of Buto.

The limestone sarcophagus was found by the excavation of the SCA in the southern necropolis of Giza, near the tomb of 'Tary'.

The story of this sarcophagus begins when I started working on it: it did not have a lid and it was kept in the magazines of Giza, but while preparing some pieces to go to the Grand Egyptian Museum, one of the inspectors informed me that the lid of the coffin had been found, but unfortunately it was broken.

The name of the owner of the sarcophagus indicates his status, as he is a priest of the god Horus in many forms. His name is *Gm.n.f Hr bAk* "He found Horus the falcon". The importance of this sarcophagus is due to the text that was found on both sides of the sarcophagus. The text of the first side is devoted to the god Osiris and the other side to the god Horus.

The text on the sides of the sarcophagus begins with the title *ImAx* at the beginning of a text on the left relating to Osiris and a sentence on the right relating to Horus.

Finding the lid of the sarcophagus was significant, as the texts, though smashed, are similar to those on the sides of the sarcophagus.

The lid of the sarcophagus was broken into more than one piece. It contains the remains of the goddess Nut spreading her wings, carrying a feather of Ma'at in each hand, and she is kneeling on the representation of the door of the kingdom of the dead, Ro-Setaou.

The sarcophagus and lid were transferred to the Grand Egyptian Museum.

Nour M. Badr, Moamen Othman,
Mohamed Abdel-Rahman, Eid Mertah, Ahmed Tarek
and Mohamed Ragab

PAPER

The power of imaging techniques for documentation of ancient Egyptian coffins applied on the coffin of Ankhefenkhons CG 41001 and the coffin of King Ramses IV CG61041, in the Egyptian Museum, Cairo

This research paper presents a comprehensive investigation into the application of imaging techniques (low cost techniques) for the documentation of Egyptian coffins. The study aims to make guidelines for archaeologists, Egyptologists and conservators in recognising the importance of documentation and cutting-edge imaging in preserving ancient Egyptian coffins, by using low cost techniques like high-resolution photography, Multispectral Imaging, Reflectance Transformation Imaging (RTI) and computer software (such as D Stretch and Photoshop). This study uses imaging techniques to study two different types of ancient Egyptian coffins; the first type is a coffin covered with faded painted layers, and the second type is a reused coffin.

The study begins with a detailed examination of the outer qrsw-coffin of Ankhefenkhons, dating to the Twenty-sixth Dynasty (circa 625 BC). Notably, the majority of our knowledge about this coffin is derived from the meticulous work of French Egyptologist Alexandre Moret, who recorded its inscriptions and representations. The paper underscores the importance of digital imaging techniques in reviving faded inscriptions and elucidating the iconographic motifs, employing visualization methods to assess its current state and revealing nuances in color gradations. By combining classical and modern imaging techniques in a non-invasive manner, this research evaluates the uniqueness of the coffin.

In parallel, the study investigates the coffin of Ramses IV, which presents a unique case of reuse, with its original decoration concealed beneath a layer of plaster inscribed in black ink, and which was published by Daressy in 1909. The newer documentation methods were able to reach a deeper understanding of the Ramesses IV coffin's manufacturing technology by revealing the sequence of layers and by providing a digital epigraphic recording of the coffin's original use for a priest named aHA.

This paper provides valuable insights into the evolving field of low cost imaging techniques for the documentation of Egyptian coffins, offering a comparative perspective on two significant artifacts from different historical periods. The findings contribute to a deeper understanding of ancient Egyptian art and preservation practices, highlighting the importance of interdisciplinary approaches to heritage conservation.

The use, placement, and design of body containers in K24, Saqqara, and their social level

The large shaft tomb K24 was recently excavated by the late Ramadan Hussein and his German-Egyptian team of archaeologists and Egyptologists. It is situated to the south of the Pyramid of Unas, close to the so-called Sarcophagus-Tombs of Tjanihebu, Psamtik, and Padieniset. The new shaft tomb is 30 metres deep and contained multiple burials on seven different levels, some of which were found undisturbed. The burial complex at the lowest level of the shaft was the largest: It consists of nine chambers with 16 individuals buried there, all of them dating to the Late Period. For many of them, different ways of bodily interment were employed, ranging from simple burials of the mummified body within clean sand to painted anthropoid and rectangular wooden coffins and full scale anthropoid and rectangular stone sarcophagi within one largely undisturbed context. The social stratigraphy of the individuals – when known – is limited to priestly titles, but the accompanying equipment hint towards a high social standing of at least some of the family members – especially the women – buried in the chambers. The poster presentation will detail the use, placement, and design of the different types of body containers in relation to the social level of their owners, but also give an overview of other body containers employed in the tombs in K24's closest vicinity, i. e. the aforementioned Late Period Sarcophagus-Tombs and other tomb complexes excavated and documented by the Saqqara Saite Tombs Project (University of Tübingen).

E. Ferraris, P. Buscaglia, S. Maineri,
J. Vilaro Fabregat, C. Ricci and T. Cavaleri

PAPER

*The role of museums in research, preservation and presentation of coffins
The coffin set of Tamutmutef storytelling: a new exhibition area in the Museo Egizio of Turin*

Archaeometry applied in the study of objects allows new ways to explore, preserve, and exhibit, and nowadays, it represents for the Museo Egizio of Turin a standard method to understand its collection. For this reason, in the frame of the Bicentennial celebrations of the museum, a new 700-square-meter area highlighting the growing collaboration between Egyptology and the Natural Sciences in the study of archaeological finds will be inaugurated to engage visitors in dialogue.

The project represents a milestone in the axis of research dedicated to the interdisciplinary study of the materiality of objects, which started in 2017 with the joining of the Museo Egizio to the *Vatican Coffin Project* and was first shared with the general audience in a temporary exhibition entitled "Invisible Archaeology" in March 2019. The exhibition emphasised collaboration between Digital Humanities, Museology, Egyptology, and Heritage Science to uncover hidden information in artefacts from the Turin collection. It reconstructs unknown aspects of an artefact's biography, such as who made it, how, why, when, where, and with what materials. Simultaneously, it supports the design of conservation treatment for their correct preservation.

The first room of the new exhibition area will feature a permanent display dedicated to studying the wood species and pigments used in Ancient Egypt, starting in 2024. The Tamutmutef coffin set (ME Cat. 2228; 21st-22nd Dynasty.) and the investigations performed to tell its artistic technique story will be catalysing the room's storytelling.

The presentation will showcase the preliminary Egyptological and technical investigations, as well as the process linking research, conservation, and dissemination in the new exhibition project.

Kathlyn M. Cooney

PAPER

Surviving King's Coffins from the Royal Theban Cache TT 320: Seqenenre Tao, Thutmose I, Thutmose III, and Ramses II

The Theban Tomb 320 burial cache discovered at Deir el Bahari revealed a number of king's coffins used to rebury kings and priest-kings. These coffins were crafted with royal headdresses and inscriptions for their royal inhabitants, including cartouche names. The surviving royal coffins have been stripped of gold and other valuables before they were reused in the 20th and 21st Dynasty to rebury kings. The coffins provide stratigraphic evidence in the coffin substrate of wood, plaster and paint indicating multiple forced openings, removals of material, and closings, providing evidence that kings' burials were systematically recommodified through time. Most kings were not reburied in their own royal coffins but in non-royal, elite coffins, but some kings including Seqenenre Tao, Thutmose III, and Ramses II were reburied in king's coffins. The coffin of Thutmose I was modified to rebury the 21st Dynasty priest-king Panedjem I. The surviving king's coffins suggest they were regilded even after gold sheeting and inlay was removed, probably for display of some kind by 20th and 21st Dynasty Theban agents. Such gilding was later removed in the 21st and 22nd Dynasties. The stratigraphy of these New Kingdom royal coffins thus preserves a series of contradictory actions, including recommodification and reuse to source scarce and necessary valuables, restoration to broadcast care and ritual attention for the ancestor-kings, and finally stripping of valuables after that display potential had run out. This talk will include material analysis of the surviving kings' coffins along a timeline of changing social conditions to examine contradictory actions of reuse, restoration, display, and recycling.

Alicia De la Serna Saenz

POSTER

Complexities of preserving Egyptian Coffins: introducing funori to treat decorative surfaces with low-binding media

The British Museum holds a renowned collection of Ancient Egyptian coffins that it strives to preserve for future research and public engagement. One of the typical issues encountered in coffin preservation that endangers their research potential and display value is the loss and staining of the decorative surface due to friable pigments and low binding media. The coffin of Lahmose (1891,0511.209) from the early period of the 22nd Dynasty (943 BC – 716 BC) showed extensive areas of loss of the protective layer, which was actively delaminating, unable to grip due to the low-

binding paint surface underneath. This poster aims to explore the use of Japanese algae funori, a polysaccharide mucilage extracted from the red algae *Gloiopeltis* species, as a minimally staining consolidant using the coffin of Lahmose as a case study. The stabilisation treatment will allow the coffin to be displayed for the first time on record.

Marta Domínguez-Delmás, María Oliva
Rodríguez Ariza, Gersande Eschenbrenner-Diemer,
and Alejandro Jiménez-Serrano

PAPER

Dendrochronology and palaeography shed light on coffin production and burial practices of Twelfth Dynasty Egypt

Establishing the chronology of funerary complexes in necropolises of Ancient Egypt is crucial to interpret interpersonal relationships between the deceased and infer cultural changes related to burial practices. Currently, the construction dates of funerary complexes are inferred from written sources, material culture, and architectonic features. However, the complexes had lengthy periods of use, so determining their relative chronology is often a challenge. Here, we combined non-invasive dendrochronology based on digital photographs, and palaeography of three cedar coffins of the Twelfth Dynasty (1939-1760 BCE) from Qubbet el-Hawa Necropolis (Aswan) to identify possible connections between the deceased and assess the potential of combining these techniques to determine the relative chronology of that part of the necropolis. Our results show that two of the coffins, found in two different tombs and spatial contexts, were made of wood from the same individual tree, implying that the coffins were made in the same workshop. The striking similarities in the palaeography of these two coffins supports this, and suggests that they were painted by the same hand, thus they are likely contemporary. We argue that the coffins must have been purchased as a lot by a member of the elite for individuals of his household. Therefore, even when the individuals in those coffins may not have died at the same time, there may not have been many years (decades) between them, linking by inference the style and motifs of the funerary goods accompanying the burials. Furthermore, the fact that the coffins were in different tombs, suggests that the individual buried outside the complex must have had a lower rank within the family elite. The third coffin was located inside the main complex, and it seems that the individual have had a high rank. However, the coffin differs from the other two in construction and palaeography, indicating production in a different workshop, and thus a purchase at a different time.

These findings shade light on the organization of households in funerary contexts reflecting the social structure of the elite communities. Tree-ring data from these coffins remains for now floating (not yet anchored in time), and the lack of bark hampers determining the felling date of the trees used for the coffins. Nonetheless, our research combining dendrochronology and palaeography has provided valuable information about this part of Qubbet el-Hawa. Expanding this research within Qubbet el-Hawa and to other necropolises and dynasties of the Middle Kingdom will increase our understanding of the production of cedar coffins and burial practices of elite communities in ancient Egypt.

How to monitor, identify and assess biodeterioration in ancient Egyptian wooden coffins

For the last twenty years, with the rising interest in ancient Egyptian coffins, many conferences and published papers have discussed topics related to manufacturing techniques, iconography, materials' analysis, and documentation. These studies are of major importance to researchers who work in the field of ancient Egyptian burial practices. Unfortunately, the burial environment of the coffins can cause biological decay, due either to microorganisms or to insect infestation. This decay factor may continue to attack and deteriorate the wood when the object is stored on excavation sites, in magazines and inside museums. Generally, however, it is less well understood by those who study and care for coffins than other attributes of these important artifacts.

Therefore monitoring and control form an essential periodic preliminary procedure. To monitor wooden coffins visually is the easiest detection method. In museums that have a small collection of coffins exhibited in well- controlled showcases, a conservator/curator can detect problems that may arise if the humidity or temperature are not within the average range of museum standards. However, on excavation sites and in storage areas which are not accessed frequently, an attack can continue unnoticed for some time. This risk is a matter of concern and various approaches, both passive and active, that can be taken on site and in the museum to preserve wooden objects form one area of recent research.

"Green methods", nanocomposites and modified atmospheres for the treatment of infested wood are being evaluated on a wide scale, but some of these methods are too expensive. Cheaper and easily applicable methods such as the use of basil oil, tea tree oil, a mixture of both oils and cedar wood oil have been under examination and have shown promising results on a few types of wood.

Ficus sycomorus wood was one of the most common types of wood used in the manufacture of a large number of coffins, especially polychrome ones and it has, therefore, been chosen for many experimental studies to evaluate both deterioration and treatment. However, research on other types of wood is necessary (and in progress), because it has become obvious that different types of wood could decay differently in the same environment and do not react in the same manner when treated alike.

In this review, the aim is to highlight the scientific findings of recent and ongoing research on the biological deterioration of coffin woods, in addition to monitoring, identifying, assessing and controlling their biodeterioration.

"Coffins in 3D": The coffin collection of the SMAEK and their digitization

The State Museum of Egyptian Art in Munich (SMAEK) preserves an extensive collection of Egyptian coffins (28 intact ones made of wood, cartonnage or clay), as well as numerous coffin fragments, mummy masks and portraits, and other mummy equipment, which are currently the focus of two new scientific projects. Within the framework of the "Inscriptions Project" of the SMAEK, the inscribed coffins and related objects are for the first time being scientifically catalogued and prepared for a comprehensive publication. One focus here is on systematic research into the provenance of the objects. Most of the coffins (and mummies) were acquired from Egypt around 1820 through the collections of the Egyptian travelers and scholars Edward Dodwell and Franz Wilhelm Sieber. In the 20th century, further coffins came to Munich through the division of finds from the excavations of William Matthew Flinders Petrie in Memphis and Howard Carter in Thebes, among others, as well as from the Friedrich Wilhelm von Bissing Collection.

Some of the coffins have been restored in recent years in the course of the museum's new construction and relocation, and wood and pigments have been examined. Currently, 18 whole coffins are presented in the museum's permanent exhibition in the rooms "Art and Time", "Five Millennia" and "Belief in the Afterlife". Media stations and media guides provide supplementary information on the individual objects.

One focus of the new photographic and digital documentation is on the presentation of texts and improving the legibility of faded inscriptions. Among other things, multi-spectral images and 3D scans are being made for this purpose. The three-dimensional recording of the coffin collection is being carried out in the second project "Coffins in 3D" in cooperation with the LMU Institute for Digital Cultural Heritage Studies and the Department of Middle Eastern Languages and Cultures UC Berkeley. The aim is to annotate 3D models and make them digitally accessible to experts and the public. The SMAEK also plans to digitally reconstruct fragmentary coffins as part of its digitization strategy and to digitally bring together coffin ensembles scattered across different collections. Last year, during a pilot project, the SMAEK was able to apply not only the digital merging and modelling of fragmentary sculptures but also digital color reconstruction. The lecture will discuss the role of a museum in research, preservation, and presentation of coffins from the perspective of the SMAEK.

The Application of Reflectance Transformation Imaging (RTI) on Ancient Egyptian Coffin-lids at the Israel Museum, Jerusalem as a New Analytic Approach to Workshop Identification

This ongoing project (expected for September 2023) focuses on the study of two anthropoid coffin-lids donated to the Israel Museum in the early 1980s.

The coffin-lid of Djedmut, Chantress of Amun-Re (Inv. IMJ 82.2.341), most likely originated from the Deir el-Bahari Second Cache at Bab el-Gasus in the Theban area. The iconographic characteristics and

the colouring technique allow to identify the coffin as Type V of the Yellow Coffins category, dating from the late 21st Dynasty to the early part of the 22nd Dynasty.

The coffin-lid of Ptahhotep (Inv. IMJ 82.2.342), can be dated no earlier than the Late Period or even as late as the early Hellenistic Period.

The coffins have been the subject of an analytical study aimed at the identification of specific workshops through the characterization of materials using X-ray fluorescence (XRF) spectrometry (used as a complementary analysis for the identification of pigments), Raman Spectroscopy, microscopic observation, CT scan and Reflective Transformation Imaging (RTI).

In the field of Egyptology, RTI has only recently gained increased attention as a tool for the analysis of painted wooden surfaces. Recent studies using RTI on coffin surfaces while changing between different filters of RTI viewer program, have clarified the sequence of the painting layers including the under-drawing. These few, but significantly successful, applications demonstrate the great potential of RTI for painted wooden surfaces and in particular for the identification of workshops, tool marks and artisan's hands, a venue which has so far been only marginally explored through RTI. In the present research, RTI is combined with multispectral imaging, valuable for the study of pigments, to improve a detailed analysis and visualization of the artifacts' surface and highlight otherwise difficult-to-perceive features. This analysis enhances faded decorations, reveals under-drawings, and aids in the identification of pigments, binders, reuses and other minute details of the production process, thus contributing to the identification of specific workshop profiles.

Abdelmoniem Mohammed Gomaa

SHORT-FORM

Conservation processes of a painted wooden coffin at Saqqara

This paper documents the conservation processes of a polychrome wooden coffin dated to the 26th Dynasty, which was found at the archaeological area of Saqqara. It has the registration number there of 18610. Its dimensions are 218 cm long, 67.7 cm wide, and 51.7 cm high. It consists of a box and lid, which were each formed in one piece by hollowing out a tree trunk, There are numerous longitudinal cracks, some of which penetrate through the depth of the wood and have caused warping. In addition, there is a missing part in the foot area of the lid. The outer surface of the coffin is covered with a white preparation layer and decorated with paint (green, blue, yellow, red, and black), while the inner surface is covered with a black resin layer decorated with a depiction of Nut, the goddess of the sky.

The coffin was in a bad condition. It was covered with a thick layer of dust. Parts of the paint and gesso layers were already lost or were becoming detached. Some parts of the construction were missing from the foot area of the coffin lid. Technical imaging, 2D illustrations and 3D models were made to document the coffin. The conservation processes of the wooden coffin included mechanical and chemical cleaning, reattachment of the separated parts of the ground layer and painted layers, filling the edge of the painted layer, and consolidating the black resin layer. The materials used for these processes proved to be stable and have been used by many researchers.

The conservation process included mechanical cleaning using soft brushes, chemical cleaning using ethyl alcohol and water for the painted layer and xylene and water for the black resin layer, stabilization of the separated gesso layer using Paraloid B72, filling cracks of the gesso layers using glass microballoons with Paraloid B72. The painted layer was consolidated with Klucel E and the black resin layer with Nano Paraloid B72.

The coffin was located in a storeroom at the archaeological area of Saqqara. Working in the restoration laboratory of a site was challenging, as facilities and materials were limited, especially with regard to the conservation of the black resin layer. Before consolidating the black resin layer, experimental samples were made based on analysis carried out on the coffin wood and the black resin. Light and thermal aging were performed on them to study changes on the surface resulting from addition of the strengthening materials used. After the conservation process was completed, the coffin was transferred to good conditions in the Imhotep Museum at Saqqara. Here temperature and relative humidity of the coffin could be monitored easily.

Abdelmoniem Mohammed Gomaa

SHORT-FORM

Preserving History: The Formal Approach to Conservation of a Wooden Coffin Covered with a Black Resin Layer and Colored Materials at Dahshur Archaeological Area

This paper describes the results of a multi-technological analytical protocol performed on a Late Period wooden coffin from the Dahshur Archaeological Area and documents the conservation processes of its black resin layer and the painted surface which overlies this.

The coffin, which was found in the Dahshur storeroom, measures (190) cm long, (51) cm wide, and (55) cm high. It consists of a box and lid. However, the lid was broken into more than 16 pieces. Due to the difficulty of assembling them in a previous conservation intervention, these pieces had been wrapped and placed inside the coffin. The box of the coffin was separate because of damage to the tenons. In addition, there is a missing part on the left side of the box and of the lid, and the face of the lid is missing. In the original manufacture of the coffin, linen fibres had been used to fill some of the voids in the wooden construction and the outer surface was then covered with a textile layer in some places under the preparation layer. A black resin layer over this ground on the exterior surface has painted decoration (yellow, red, and blue), while the inner surface is covered with a yellow-painted layer. The painted surfaces have suffered from many deterioration issues, including flaking, cracking, and loss.

Earlier conservation using unsuitable materials had damaged the black resin layer and the coffin had been left in a broken condition. These factors made it a priority for examination and treatment. In addition, the coffin was covered with a thick layer of dust resulting from long-term storage inside the storerooms of the Dahshur Archaeological Area.

The investigation utilized visual observation, optical microscopy (OM), technical imaging, 2D and 3D programs, scanning electron microscopy coupled with energy dispersive X-ray spectroscopy (SEM-EDX), and X-ray diffraction (XRD). Wood identification was carried out. The results showed the use of yellow ochre for the yellow painted layer. The ground layer is calcium carbonate with gypsum, the fabric layer is linen.

The conservation of the wooden coffin included mechanical and chemical cleaning; reassembling the separated wooden parts, ground layer, and black resin layers; filling the edge of the ground layer; consolidating the wood, black resin, and painted layer. The conservation processes included mechanical cleaning using soft brushes, chemical cleaning using xylene and distilled water for the black resin layer and ethyl alcohol and distilled water for the painted layer. Separation in the ground layer was stabilized using Paraloid B72, cracks in the ground layers were filled using glass

microballoons with Paraloid B72, and the painted layer was consolidated with nano-silica in Klucel G (hydroxypropyl cellulose) (0.5% concentration).

Lubica Hudáková and Uta Siffert

PAPER

Best practice at local level – the decoration of Middle Kingdom coffins from Beni Hassan

The Lower Necropolis of Beni Hassan excavated by John Garstang and his assistant Harold Jones during two archaeological seasons in 1902/3 and 1903/4 plays an extraordinary role in the funerary archaeology of the Middle Kingdom. The site yielded nearly 900 tombs with a huge number of items, including wooden box coffins that have been hardly accessible for study because of the short and very selective overview published in the excavation report in 1907. While some of the coffins such as those in the kept in the Fitzwilliam Museum in Cambridge were known, numerous coffins fell into oblivion due to Garstang's lavish division of the finds.

In the course of the project Painted for Eternity (2019–2023), an in-depth examination of the history of excavation and the distribution of finds allowed for locating c. 74 decorated coffins (or fragments thereof) in museums all over the world. Careful study of published as well as archive material (excavation photographs, correspondence, documents) indicates that in total more than 260 coffins were discovered during the excavation.

The project focused on the decorated coffins from an art-historical perspective, analysing the decorative scheme as well as the iconography of the decorative elements. The study revealed the existence of a well-established local tradition and involved an analysis of how the coffin decoration was produced. Important phenomena became visible in the coffin corpus: a) an extensive use of templates (for ornamental and non-ornamental texts as well as for the figurative decoration), b) prefabrication, and c) reuse. Moreover, the coffins allowed conclusions to be drawn about technical details and aspects of the manufacturing processes (for example the application of paint, etc.). The in-depth analysis of all coffins also made it necessary to establish a terminology to describe the decorative elements such as the ornamental frames or the elaborate façade (also called palace façade). The paper shall present an overview of the project results.

Charlotte Hunkeler

PAPER

Small pieces in the bigger picture: coffin and cartonnage fragments from Tomb KV40 in the Valley of the Kings

The University of Basel Kings' Valley Project (UBKVP) is researching the non-royal tombs. Besides the aim of reconstructing the New Kingdom burials, the reuse of these undecorated shaft-tombs is a further major research topic of the team. Among these burials are the well-known coffin and stela of Nehemesbastet, which were found in situ undisturbed within KV64. Contrary to these findings, the

Third Intermediate Period burials in the neighbouring tomb KV40 are heavily fragmented and damaged due to looting and fire.

Preliminary results of the Third Intermediate Period coffins and cartonnages have been presented at the Second Vatican Coffin Conference in 2017. Since then, further studies of the material led to a more detailed picture of these hundreds of small pieces: (1) different types of coffins and an approximate number could be established; (2) this resulted in a more precise dating of the burials; (3) and hence, a clearer picture of when the tomb was reused and who was buried in KV40.

The aim of this paper is to present the UBKVP's most recent results on this topic and put them into the bigger picture of the Third Intermediate Period burials within the Valley of the Kings. These results would add to the pioneer studies conducted by David Aston and John Taylor on the history of the Valley of the Kings in the Third Intermediate Period.

Agathe Jagerschmidt-Seguin, Delphine
Elie-Lefebvre, Sophie Joigneau, Marie Louis,
Thierry Palanque, Marta Garcia-Darowska, Laure de Guiran,
Agnès Lattuati-Derieux, Louis Chassouant, Yannick Vandenberghe
and Noëlle Timbart

SHORT-FORM

Material history and restoration of Setjaimengaou's coffins kept at the Museum of Picardie (Amiens, France): An integrative approach

The Museum of Picardie (Amiens, France) entrusted the C2RMF the study and restoration of a set of two coffins (inner and outer) belonging to the *nbt pr* Setjaimengaou. Dating to the 25th-26th dynasty, the set was acquired with its mummy by the society of antique dealers of the city in 1839 and integrated into the museum when it opened a few years later. The restoration provided the opportunity to conduct a multidisciplinary study on the mummy's anthropoid boards and lids.

A technical study was realized in order to characterize the materiality involved in the construction of the coffins (wood assemblies, preparatory and polychrome layers and varnishes) thanks to analyses and scientific imagery. Moreover, traces of Egyptian tools, still visible on the wood were noticed.

Close observation during the condition assessment suggested restoration related to ancient deteriorations arising from attempts to open it and extract the mummy. The position of alterations on the lid, and comparison with the box, suggest that a tool was used at this location to open the coffin. Some modifications are still visible like on the wig of the inner coffin. These modifications also testify to the evolution of restoration processes over time as a pink color was used to fill the hole and many nails to consolidate the coffin. Additionally, the set suffered various changes, including cracking, lacunae and uplifting of polychromy. It was darkened by soiling and needed consolidation to be displayed with the mummy. Conservation enabled iconography no longer visible on the top of the inner coffin, and also the texts written on the foot, to be revealed, thus completing knowledge of the coffins. Preliminary tests enabled a conservation protocol to the coffins' needs: mainly consolidation of the structure and refixing the polychromy. Nails were retained since they did not threaten the conservation.

Multispectral imaging revealed information concerning the positions of certain materials. UV imaging showed a very interesting distribution of varnish on the outer lid, with only some parts varnished.

The UV images from other coffins of the same period may show if it is something usual or not. VIL imaging helped to locate Egyptian blue in the blue paint layer and in a brown layer. For the polychromy, analysis of micro-samples revealed the composition of the ground layer, the different skin tones of the two coffins and the use of an altered copper green pigment than now appears brown.

Organic analyses were conducted to identify the molecular composition of the external varnish and the nature of the binders used for the preparatory and painting layers. Chromatography coupled to mass spectrometry (GCMS) revealed the use of two natural di- and triterpenic resins from respectively the *Pinaceae* family and *Pistacia* genus for varnishes on the board and lid. Chromatographic analysis supported by MALDI-Tof MS highlighted the occurrence of a natural gum as binder for the polychromy and the preparatory layers. Chromatography is regularly used for molecular analysis while MALDI-Tof analysis is not common on archaeological materials although it was used to analyse the botanic nature of the binder sugar.

The restoration project of this funerary set allowed, in addition to a better conservation, a deeper understanding of the techniques of manufacture of the coffins at this period. Thanks to this integrative approach and the development of new analytical tools, it was possible to go deeper in its material history, to compare data obtained with those from other coffins of the same period hosted at the C2RMF and more largely with previous published researches.

Jiří Janák and Renata Landgrafova

PAPER

Coffinless resurrection. The tombs of the Saite-Persian period at Abusir

Since 2006, the Czech archaeological mission in Abusir has discovered several shaft tombs belonging to Egyptian high officials of the Saite-Persian Period. These tombs differ in size, shape, style and elaboration but, they all share one feature: the mummy of the deceased was buried directly into a stone sarcophagus, without a wooden coffin. Although some of the sarcophagi are rather huge and elaborate, their inner space was very limited, so only the mummy of the owner would fit in. With “resurrection machine” in the form of the wooden coffin missing, the sarcophagus (most often an inner anthropoid one of hard stone) took over its significance and symbolism, as well as many of its ritual texts and images. The paper will explore the in many ways unique decoration of these sarcophagi, as well as the general situation and symbolism of these coffinless tombs.

Kea Johnston

POSTER

Palaeographical comparison and the origin of the coffin of Ankhtashepsit

Theban coffins have received the bulk of scholarship on coffins because of their datability and the history of documented excavations at this important religious capital. However, it has become increasingly clear that regional styles and local workshops existed throughout Egypt during the Third Intermediate Period and Late Period. One way to study these local workshops is by using art stylistic and paleographical comparison to group pieces by the same artists and scribes. This paper discusses

the techniques, methods, and pitfalls of using paleographical comparisons of the texts and stylistic comparison of the vignettes to associate a coffin with a particular artist or workshop. It uses as a case study the Third Intermediate Period coffin and cartonnage of a lady named Ankhtashepsit, now in the Toledo Museum of Art in Toledo, Ohio. This coffin was purchased in the early 20th century with a provenience of Akhmim as provided by the dealer. Though the coffin shares some features with contemporary pieces from Akhmim, overall, it is visually quite dissimilar to these. An analysis of the paleography and vignette style on the set raises the question of whether the pieces may have instead been made instead at Beni Hasan. It also brings to light a further unprovenanced cartonnage which may have been by the same artist and scribe.

Salwa Kamel and Howida Mohamed

POSTER

Unpublished coffin of MS-pA di- pA di- #nsw No. TR 18/ 1/ 27/ 12- SR 7/ 23548 at Egyptian Museum in Cairo

Dimensions: Length: 174 cm, width at the shoulders: 46 cm, width at the feet: 29 cm, depth: 32 cm.

Date: Late Period

Status: Good condition

Findspot: Unknown

There is a mention of the name of the owner of the coffin, whom the scribe rewrote *pA di- pA di* twice. Was it written incorrectly or was there a purpose for writing it in this way? His name was not found in Ranke, which indicates that he does not have any information about his tomb and even that the source of the location of the find is unknown. No title related to this person was mentioned in the coffin texts to determine his social status.

It was concluded that its most likely source was Deir el-Bahari, and it was dated to the period of the end of the Twenty-Fifth Dynasty and the beginning of the Twenty-Sixth Dynasty. This is based on many pieces of evidence that confirm this, in addition to comparing the coffin with many other human coffins that bear Late Period characteristics. In addition this coffin was compared with another that has the same general style and identical arrangement and colors of the scenes, which is the coffin of *nbw-f.nAy-imn-in* in the Leiden Museum and dated to the same period.

The coffin is in a good state of preservation, and its colours are wonderful and bright, as its floor was colored yellow, and the scenes were designed in blue, red and green, while the texts were written in blue on a white ground. This coffin represents a picture of the deceased person himself, and it consists of two parts, the lid and the coffin box, which are integrated together as one unit in an even, curved shape. Under the feet of the coffin there is a low rectangular base attached to the feet in imitation of the base of a statue.

The tripartite wig has many symbolic and religious connotations in the ancient Egyptian faith. It gives the deceased the appearance of a noble image or the sacred Osirian form "*saH*", which indicates that he is united with Osiris, and grants him resurrection and rebirth in the netherworld, and therefore it has become the most common. It was used on the heads of human coffins after the end of the Middle Kingdom onwards.

The appearance of Horus in the ritual form of a crouching divinity *aXm*, which the ancient Egyptian was keen to depict on the lid of the coffin, and even linked this form to the Osiris-Sokar as one of the

most important bodies associated with the netherworld and the deceased, the ancient Egyptian created a fusion between the Osiris mummy body and the crouching mummified divinity body, in order to ensure greater protection and the resurrection and life of the deceased in the other world with the help of Osiris, Sokar and Horus in the crouching body.

Janice Kamrin, Anna Serotta, Adriana Rizzo
and Ahmed Tarek

SHORT-FORM

The Embalming Coffin of Khaemhor: Context and Construction

The Metropolitan Museum of Art is privileged to have a remarkable collection of coffins, in some cases accompanied by additional mortuary equipment. A significant percentage of these were excavated by The Met's Egyptian Expedition, led by Herbert Winlock, in the early twentieth century. The Department of Egyptian Art, in collaboration with the Department of Objects Conservation, has embarked on a group of complementary projects to study and publish each of these coffins or assemblages, and as part of this process make primary material from the excavation records available through the Met's website. A coffin discovered by Winlock during the 1923–24 season at Deir el-Bahri will be presented here as a case study. The coffin (MMA 26.3.13a, b), which is undecorated but has the name "Khaemhor" painted on one shoulder, was filled with embalming materials; piled on top were large jars and other objects used in the mummification or burial process. Recent technical study and scientific analysis of the coffin has revealed interesting evidence of wood reuse, as well as information about the embalming materials it once held. Additional embalming coffins and caches from Thebes, both excavated by Winlock and known from other publications, will be used to contextualize this coffin and explore its role in Theban funerary practices of the seventh century BCE.

Tuuli Kasso, Jens Stenger, Caterina Zaggia,
Gianluca Pastorelli, Max Ramsøe, Elsa Yvanez,
Chiara Spinazzi-Lucchesi, Matthew Collins and Cecilie Brøns

SHORT-FORM

Craft for context: a multidisciplinary analysis of a Romano-Egyptian mummy mask at the Ny Carlsberg Glyptotek, Copenhagen

This paper presents the results of a multidisciplinary study of a mummy mask (no. ÆIN 297) from the collections of the Ny Carlsberg Glyptotek in Copenhagen. The mask portrays the bust of a young woman with a gilded face. Her chest, arms, and hands are adorned with jewellery and she is dressed in ornate clothes: her garments are stylistically rendered, likely after a local fashion, which makes the details challenging to decipher. Previously the provenance of the mask was unknown, but we can now locate it to a distinctive group, whose origins can be clearly identified to the oases of Dakhlah and Kharga, dated to the 1st-3rd century CE.

We employed non- and micro-invasive methodology (imaging, microscopy, FTIR, SEM-EDS, palaeoproteomics) for a thorough understanding of the construction of the mask, and discuss the results in the broader framework and knowledge on materials sourced and used in the craft and production of similar artefacts. Through this careful examination we have been able to establish a comprehensive understanding of the cultural and temporal contexts in which the object was produced.

Our results on the plaster, gilding, pigments, adhesives and textile fibres convey a rich variety of different materials, reflecting a carefully chosen and elaborate artist's palette. Through our study we discuss Romano-Egyptian mummy masks as an expression of cultural interactions and as an example of the transitional time in the funerary traditions. Additionally, our investigation offers a framework for researching similar mummy masks and comparable artefacts.

This study is part of the ArchHives project, funded by Carlsbergfondet Semper Ardens No CF18-1110.

Verena Kotonski, John Taylor, Roux Malherbe
and Barbara Wills

PAPER

The Aswan mummy case: cartonnage conservation, curatorship and finding a YouTube audience

The mummy case (EA95851, 2018,1005.1), acquired by the British Museum in 2018, is of special interest because it has a secure archaeological context and is of a relatively uncommon type. Notably, and unusually, the case had been made in two parts, joined with wood and palm leaf tenons which echo wooden coffin construction techniques. The cartonnage was found on El-Hesa Island, near Aswan in the First Cataract region, and dates to the Ptolemaic period, 305 to 30 BC. It was excavated by the Harvard-based scholar George Reisner as part of a large-scale salvage operation which began in 1907 near Aswan. The object provides a rare opportunity to study the funerary iconography of a Ptolemaic burial from this locality. The figure of the male deceased on the frontal surface seems to be painted in a rather informal style, which adds further interest. The paper will also explore different theories of how the cartonnage case might have been constructed following clues found on the object. This includes a discussion whether the cartonnage was fashioned in two parts to start with or was made in one piece and then cut in half.

The challenge to conservation was to recover the original shape of the cartonnage to stabilise it for display. Alongside the lengthy and complex work over a period of several years the treatment was filmed for YouTube in six episodes. For this series, the producer acted as both videographer and presenter, in a 'desk-top' type documentary. This format allowed the presenter to provide additional commentary for the benefit of a wide audience who would follow this project over a long period of time. It also introduced an informal, friendly voice in contrast to the specialist contributions provided by the curator and conservators; the presenter was seen as a co-traveler in the story. The individual episodes were finally stitched together and re-released as a single, long film, accessible through a QR code on a label next to the object in the display case, or via links included in blogs and social media posts. The aim was to show in an intimate, thoughtful, and accessible way the relevance of the object, its history, its conservation, and the creative treatments needed to solve problems. The paper will also consider the impact and success of the videos and other social media posts from the perspective of both the audience and the British Museum's team and explore how audience responses are monitored and measured.

A coffin for dating – Or should we even date?

The coffin of Ipi-Ha-Ishutef was found during excavations of Cecil Mallaby Firth in the area of the Teti necropolis in Saqqara. The exact location or context of its discovery as well as further objects of the burial to which the coffin originally belonged, are unknown. In 1923 James Henry Breasted acquired the coffin in Cairo from the Department of Antiquities for the Oriental Institute Museum in Chicago, where it is still included in its collection (OIM E 12072). As part of the Egyptian Conservation Project, conservation treatment of the coffin took place between September 2014 to August 2015, and research was carried out to analyze the wood and the decoration. The dendrochronological dating of the wood of the coffin and its lid led to a dating range from 2081 – 2064 B. C., which is consistent with the accepted time frame of the First Intermediate Period.

This result implies an absolute historic dating for the coffin and its associated burial, and one might be tempted to use this dating range to chronologically classify yet undated coffins from the Teti necropolis based on their similarities or differences to the coffin of Ipi-Ha-Ishutef. However, considerable difficulties would arise using this approach, since practical aspects of time, human and economic effort and the extent of the manufacturing processes would not be considered. For the chronological classification of a coffin more information is necessary, for example from the associated burial equipment or other contemporary burials. In addition, prosopographical data and research concerning the processes and dynamics of a burial equipment's assemblage need to be considered. These aspects of a contextual study cannot be observed – provocatively speaking – from the dendrochronological dating of a wooden plank that was eventually used for a coffin. In this context, the focus should not be on criticising the method, but rather on utilizing the possibilities of interpreting the results of this methodology, including other aspects and considerations of the manufacturing process and use-life of objects.

This presentation focuses not only on the coffin of Ipi-Ha-Ishutef but also on the intact burial of Gemniemhat from the Teti Necropolis whose dating is still being debated among scholars. Based on these distinctive examples the possibilities and challenges of dating coffins will be tested and discussed, emphasizing dating approaches based on stylistic similarities. Different temporal and practical aspects of the manufacturing processes will be considered to answer the pending question if one can actually date a coffin or if a coffin can date a burial.

Frieze inscriptions – Only text describing image?

Object friezes are a fundamental part of the decoration of coffins especially during the First Intermediate Period and the Middle Kingdom. On the one hand, these figurative elements play a decorative role and represent an accumulation of objects which should be available for the deceased in the afterlife. On the other hand, the depicted objects can also be identified as utensils used for

cultic acts during the funerary ritual, as has already been analysed and presented in various examinations by Willems, Dahms, Backes and others.

However, these ritual utensils do not appear in pictorial form only, but they often have accompanying inscriptions to name or specify their type, or to mention their material or their amount. In some cases, the depicted objects are also attributed to the coffin-owner himself, as his name or even his titles are inscribed on the individual objects, thus personalizing them.

These “frieze inscriptions” vary in regard to their content and their placement in relation to the depicted objects. The utensils chosen for the inscription can differ, and even the execution of the inscription can vary, as most inscriptions are applied with paint, but some are engraved into the wood. These “frieze inscriptions” or “labels” have never been systematically recorded or studied in detail.

The planned poster will give an overview of the different kinds of “frieze inscriptions”, and present their context, regional distinctions and possible functions, thereby also highlighting regional differences and interconnections between sites, objects and ritual acts during the funeral.

Rennan Lemos

PAPER

The social context of coffins in New Kingdom Nubia

Access to mainstream funerary objects in the Nubian colony of the New Kingdom was limited. Certain objects seemed to have been available only to the uppermost elite groups, who also had to rely on adaptation to a large extent in order to possess funerary items. Coffins in New Kingdom Nubia were primarily wooden box coffins or anthropoid coffins, with the exception of two sarcophagi from Soleb, which originated in exceptional social circumstances. Wooden objects are not typically well-preserved in Sudan, making it challenging to fully assess the role of coffins in the social landscape of colonised Nubia. However, recent on-site observations of the coffins from the tomb of Djehutyhotep, now located in Khartoum, enable us to further contextualise coffins from New Kingdom Nubia.

Alex Loktionov

PAPER

Coffins in court: the place and value of coffins in Ramesside legal documents

This paper provides a survey and analysis of the available textual evidence concerning coffins in the legal context of Ramesside Egypt. It categorises such texts into three groups, which are:

- 1) Trial records where theft or destruction of coffins was prosecuted by state actors, namely the corpus of texts now collectively known as the Tomb Robbery Papyri;¹
- 2) Records of legal disputes and/or resolutions involving coffins between private parties, generally from Deir el-Medina;²

3) Other administrative documents relating to transactions featuring coffins that could confirm legal ownership, again mostly from Deir el-Medina.³

By looking at the mentions of coffins in each of these categories, the paper will seek to both identify the situations in which coffins could enter the legal space and quantify their value as objects of legal dispute. Mechanisms for coffin exchange and the movement of coffins through the Ramesside economy will be considered, as well as the situations in which this could go wrong. The question of whether coffins had greater value as worked objects, as sources of spare parts, or simply as raw material, will also be considered, as will the possibility of the perceived value of coffins changing in different legal settings. This will in turn lead into a broader discussion of the interplay between religion and the practicalities of law, feeding into existing debates around the commodification of religious objects in Egyptian burial practice.⁴

Notes

1. T. E. Peet, *The Great Tomb Robberies of the Twentieth Egyptian Dynasty* (Oxford: Clarendon Press, 1930); J. Capart, A. H. Gardiner and B. van de Walle, 'New Light on the Ramesside Tomb Robberies', *JEA* 22(2) (1936), 169–193.
2. Primary textual dataset derived from S. Allam, *Hieratische Ostraka und Papyri aus der Ramessidenzeit* (Tübingen: Selbstverlag, 1973).
3. Primary textual dataset derived from S. Allam, *Hieratische Ostraka*.
4. See for instance K. M. Cooney, *The Cost of Death: The Social and Economic Value of Ancient Egyptian Funerary Art in the Ramesside Period* (Leiden: EgUit 22, 2007); K. M. Cooney, 'How much did a Coffin cost? The Social and Economic Aspects of Funerary Arts in Ancient Egypt', in E. Bleiberg, *To Live Forever: Egyptian Treasures from the Brooklyn Museum* (Brooklyn, NY: Brooklyn Museum, 2008), 110–145.

Stefania Mainieri

SHORT-FORM

The “missing piece of the puzzle”. The way to render the human shape and facial features in the yellow coffins of the Third Intermediate Period and their evolution

The anthropoid coffins present two different levels of decoration: the “primary decoration”, which represents the “human shape: the shape of the human silhouette in the carpentry and application of plaster, wig, facial mask, arms and hands”; and the “secondary decoration” that is decoration and texts (Bettum 2012). Even if these two levels are strictly linked to each other, the study of coffins always starts from the most external and visible features, iconography, layout of decoration and texts, leaving aside the representation of human forms, considering them ‘secondary’.

The ongoing *Faces Revealed Project* (H2020-MSCA-GF 2019: 895130) is based on the observation of this (still) “missing piece of the puzzle” in the study of coffins. The observation of the geometry and masks without decoration, through photogrammetry, allows a detailed and objective analysis of the forms and facial features. Analysis of a group of around 100 yellow coffins from the 19th to the early 22nd dynasty shows in fact a high variability of forms which changed and evolved during the time. The numerous ways to render masks, with specific and detailed and sometimes individual facial features, wigs, forearms and hands demonstrates the attention that artists paid to reproduce the human body, working on these objects as if they were “statues” and not a “mere support” for vignette and spells.

On this occasion will be presented the methodology and the new vocabulary created for the analyses of these peculiarities and the results that we are obtaining especially in terms of style and changing of forms. An evolution of human shape and facial features is in fact clearly visible and a gradual change of these forms from yellow coffins dating back from the 19th dynasty to those dating to the beginning of the 22nd can be traced: from more slender and detailed human bodies with individual facial features in the 19th dynasty, to a schematic and “serial production” with the stola coffins at the beginning of 22nd dynasty.

Mohamed Moustafa, Medhat Abdallah,
Ahmed Abdrabou and Hussein M. Kamal

SHORT-FORM

New insights into the materials and manufacturing techniques used to paint a late period wooden coffin

In 2016, the Grand Egyptian Museum received from the Beni Suef storage room a painted wooden coffin dating back to the late period (GEM No. 65490). The coffin is decorated with multicolored inscriptions in vertical registers. Applying an integrated approach, including multispectral imaging, high-resolution digital microscopy, scanning electron microscopy, x-ray fluorescence, x-ray diffraction, and Raman spectroscopy, we have gained comprehensive insights into the painted layers, the underlying substrate, and the wood species.

The wood samples were identified as *Ficus sycomorus*, and *Acacia albida*, which support a strong suggestion that panels of different woods were connected together to create the coffin. The coffin tenons are *Tamarisk* sp. Preliminary results revealed original painted layers as well as subsequent over-painting, which was in specific places, and particularly evident in the yellow and black painted layers.

Comparing the results of the painted layers of the figure of the goddess Nephthys on the interior base-boards of the outer coffin box with those of the painted layers of the coffin lid provides a clear understanding of the coffin's colour palette, as follows: the yellowish painted layer decorating the body of Nephthys is revealed as orpiment, whereas, yellow ochre is detected on the coffin lid.

The reddish painted layer of the goddess's face is identified as cinnabar, a pigment which was still rare at this period. The decorated reddish parts of the coffin lid were identified as the more usual hematite. The bluish painted layer of the goddess's decorated body is identified as the rarely-found azurite, with signs of using Egyptian blue on some particular parts only. The bluish areas of the coffin lid were painted with Egyptian blue.

It was evident that filler materials, covered with a thin layer of yellowish pigment were present in several places on the coffin. The identification of these filler materials revealed the use of gypsum with a yellowish titanium-based pigment to replicate the original surface of the coffin's ground base. Moreover, the microscope detected signs of different yellowish grains on the original layer, possibly remnants or impurities of a previous conservation intervention involving a titanium-based painted layer in certain areas. Additionally, there were a few signs of retouching on a small part of the black painted layer. The identification of the original black painted layer indicated the use of a carbon-based pigment, while signs of a titanium-based pigment from a previous conservation intervention were also observed.

Moamen Othman, Mohamed Abdelrahman,
Ahmed Tarek Ibrahim, Eid Mertah, Mohamed Ibrahim
and Akram Atallah

PAPER

Multidisciplinary investigation of the complex layered structures of a 'bivalve' coffin made of cartonnage for the Prophet of Montu, Besenmut II (CG 41047)

During the Third Intermediate Period, the innermost coffin of elite burials was replaced by a cartonnage mummy case, often brightly painted. "Cartonnage" is familiar as a lightweight material composed of layers of gummed linen and plaster that could be moulded to the desired shape, with a polychrome paint layer. During the late eighth century BC, these earlier cartonnage cases, which formed an ensemble with one or more outer coffins, began to be replaced by wooden inner coffins of bivalve form with back-pillar and pedestal, densely covered with texts and images.

In the ensembles of Ankhefenkhons and his sons Nesamun and Besenmut from Deir el-Bahri (Cairo CG 41001, 41042-3; 41002, 41044-5; 41007, 41047), the mummy, wrapped in linen bandages, was enclosed in a body-shaped envelope of cartonnage, depicting the mummified deceased with a plinth beneath the feet and supported by a dorsal pillar, like a statue.

In some of the earliest examples of this model, the covering of the body is a cartonnage case, or a hybrid bivalve coffin made of cartonnage overlaid on a wooden substrate or in other examples simply a wooden bivalve coffin. This raises several questions: why in some examples was wood used instead of glued linen? And why in other cases was only cartonnage used? Was it because flax has properties not found in wood, or was it for ritual purposes?

This paper will explore the bivalve coffin of Besenmut II which was analysed using X-radiography and various non-invasive techniques such as the program Adobe Illustrator, multispectral imaging with ultraviolet and infrared rays, an optical microscope, X-ray fluorescence spectrometry (XRF), and Fourier transform infrared spectroscopy (FTIR). These revealed the materials and stratigraphy of this bivalve coffin showing that it was made of cartonnage consisting of twenty-five distinctive layers of gummed linen and plaster.

Through comparison with other bivalve coffins, the paper will place this coffin within the context of the development of these objects at this period.

Marie Peterková Hlouchová

PAPER

Wooden coffins of the centre and provinces in the Old Kingdom

Wooden coffins of the Old Kingdom were studied mainly from decorative perspective in the past, and thus only for late phase of that period. However, there are many undecorated examples from earlier phases that remained beyond the interest of scholars. This has changed lately since a project was established, supported by the Czech Science Foundation ("Ancient Egyptian Burial Containers of the Old Kingdom and First Intermediate Period. Evolution, Contextualisation and Significance" [No.

23-04989S]), that focuses on the Old Kingdom and First Intermediate Period burial containers from different materials, including wood. One of the goals of the project is to create a database of all available finds in order to provide source base for further analyses (such as, for instance, burial container production, socio-economic implications, religious aspects). One of the interests of the project also is the spatial distribution of wooden coffins in the periods under survey. This paper aims to compare the finds from the Memphite area and from other provincial localities across Egypt. It will focus on decorated as well as undecorated objects and special attention will be devoted to construction details, which can provide additional information about various workshops and uncover similarities and differences in coffin production of the central and provincial parts of Egypt.

Mohamed Ragab

POSTER

Investigating the yellow coffin lid: between original and retouched

A polychrome anthropoid wooden coffin lid, now bearing the number GEM no. 22452 following its move to the Grand Egyptian Museum in 2016, originates from the Bab el-Gasus cache at Deir el-Bahari and dates to around 1070 to 945 BCE. It originates from a “yellow coffin”, with raised figures modelled in paste and coloured with different shades of green. During investigation, inappropriate decorative elements were observed on the chest collar, and the appearance of a glossy half scarab which is different from other scarab half led us to suspect that the decoration had been retouched.

The greens, used for different decorative elements, were distinguished visually using Multispectral Imaging (MSI) and it was revealed that Egyptian blue was present in some figures, while absent in others. More precise identifications were carried out using X-Ray Florescence (XRF) spectrometry. The use of coloured wax, probably indicative of previous conservation work, was detected using ultraviolet-induced fluorescence. Reflectance Transformation Imaging (RTI) yielded new and valuable information about the surface condition of the painted layers, revealing the grainy surface of the pigments and the presence of numerous deformations. Comparison with the results of MSI also provided a clear image of the non-restored parts and mapped out the retouched ones and confirmed the retouching of the scarab that had prompted the investigation.

Finally, the coffin lid was investigated by optical microscopy, including polarized light microscopy.

Ficus sycomorus was identified as the wooden support..

These methods, especially MSI, provide a cost-effective method of providing an overview of the use of different painting materials and surface treatments on a single coffin, supported by analytical methods such as XRF, to shed more light on the manufacturing techniques involved. The investigation has provided data that can be added to the growing corpus of Bab el-Gasus coffins that have been studied around the world and which could potentially lead to identifying the practices of individual workshops at Thebes during this period.

The Medjehu Project and its interdisciplinary study of New Kingdom wooden coffins originating from Deir el-Medina

In recent decades, the study of wooden objects from Deir el-Medina has mainly focused on artifacts preserved in museum collections. However, the archaeological mission of Deir el-Medina, directed by the French Institute of Oriental Archaeology (IFAO), uncovered an unexpected treasure: the reopening, during 2018 and 2019 seasons, of funerary structures repurposed in modern times as storerooms. These structures contained hundreds of wooden objects, including many excavated by Bernard Bruyère. Consequently, it has become apparent that the existing range of wooden objects from the archaeological site is far more diverse and extensive than previously acknowledged.

Following the discovery of this corpus of mostly unpublished artifacts, the Medjehu Project, comprising a team of woodcraft specialists, embarked on the task of documenting, analyzing, and preserving these wooden objects, trying to expand the current knowledge of woodcraft production in Deir el-Medina. Remarkably, among the materials, numerous coffins and coffin fragments encompassing various periods were identified.

The paper will discuss the latest research findings and preliminary results from the interdisciplinary study conducted on a subset cluster of the corpus coffins, specifically the black coffins with yellow decoration dating from the New Kingdom, and the yellow coffins from the same period. Following the overview of the documentation and classification work carried out on these specimens, the paper will focus on the examination carried out on coffins texts and iconography, highlighting atypical elements, with a glimpse of the exploration of manufacturing techniques, investigation into varnishes and resins used, and anatomical identification of the woods involved.

In summary, this multidisciplinary approach has collectively provided new data on the production of both black style and yellow style coffins in the Theban area during the New Kingdom.

Representations of Nut in Twenty-Second/Twenty-Third Dynasty Theban coffins

The figure of the goddess Nut is represented in various ways inside Theban coffins during the Twenty-second/Twenty-third Dynasty. As Taylor (1986) suggested, there seems to be some chronological significance to these depictions, which may also indicate some difference in meanings attributable to the role of the goddess Nut in the afterlife at this time. The paper will focus on various ways the figure of Nut is represented in coffins and on the orientation of the sky sign in writing the name of Nut as indicators of the spatial relationship between the deceased and the goddess. This is a preliminary study, since the interiors of coffins in particular, where for the most part Nut is represented, remain poorly published or even illustrated, so only some selected yet hopefully representative examples are presented.

There are two primary beliefs about the destiny of the deceased after death in ancient Egypt. One is to be identified with the god Osiris, the mythical ruler of the other world. The second is to be part of the solar cycle in the following of the sun god Ra. These notions are expressed in the form and decoration of burial containers, which, as with many ancient Egyptian cultural productions, may be assigned multiple layers of meaning. One of the primary interpretations of coffin decoration is to associate it with the deceased becoming an Osiris in the other world. However, another important interpretation is based on the association of the coffin with the goddess Nut, in whose womb the rebirth of the deceased as a solar being takes place. These ideas are not mutually exclusive; in the belief system developed at Heliopolis, Nut was the mother of Osiris.

In coffin studies the tendency has been for researchers to look from the outside in, with the ultimate goal to reach the body of the deceased within, when bioarchaeologists take over the examination of the mummy, most particularly its skeleton. This approach leads to a focus on Osirian beliefs embodied in the shape of the coffin, often termed 'anthropoid' but perhaps better described as 'Osiriform'.

Yet from the ancient Egyptian deceased's point of view, the mummy kernel of a nested coffin set was looking from the inside out, towards the eternal cosmic existence it would enjoy. Niwinski (1989) has already suggested that in Twenty-first Dynasty coffins, the mummy lying in the coffin is the key to understanding their decoration. Thus, if we begin with the coffin as the womb of Nut within which the mummy to be reborn lies, we may find other layers of meaning in Twenty-second/Twenty-third Dynasty Theban burial containers.

Rogério Sousa

PAPER

On the making of the yellow type: coffin craftsmanship in Thebes during the Ramesside period

The genesis of the yellow type is a distinctive phenomenon of the Egyptian funerary culture whose features remain very unclear to this day. In this presentation we focus on a small corpus of Ramesside anthropoid coffins involving nearly twenty sets. Through the combination of the information collected from carpentry work and pictorial decoration, most of them collected by visual inspection of the objects, the author proposes a genealogy of coffin craftsmanship.

The examination of the material features of these objects helps us to identify different patterns in the use of techniques and visual resources in the Theban necropolis, which reveal to be instrumental in the reconstruction of the processes that led, from the late 18th Dynasty to end of the Ramesside period to the shaping of the yellow type.

This analysis, fundamentally grounded on the material analysis of the objects, help us to identify the defining features of the yellow type and to approach us from the way these objects were perceived in antiquity.

Reading residues on coffins: reflections on ten years of molecular research at the BM

This paper reviews more than ten years of research on amorphous organic substances on ancient Egyptian coffins undertaken in the Department of Scientific Research at the British Museum (BM). It will consider the variety of materials we have observed on ancient Egyptian coffins and cartonnage, their origin and use, and the wider perspective of their appearance in other ancient Egyptian contexts. Developments in analytical technologies and approach and how these have extended what we can learn from molecular analysis will also be discussed, as well as the challenges and limits to interpretation. Reflecting on the knowledge acquired to date, we will consider future research directions for continuing study of these materials.

The wide range of amorphous organic substances that can be present on ancient Egyptian coffins is a feature of their material complexity. These substances may be present as construction materials, as components of surface decoration or as residues or deposits related to their use in funerary practice. They include varnishes, coatings, paint media, adhesives, anointing fluids and embalming materials, often comprising complex mixtures of natural products such as resins, gums, fats and waxes.

Considerable research has been undertaken over the past decade to better understand these materials on the basis of their molecular composition. Their composition reveals not only characteristics indicative of taxonomic origin (specific plant/animal, or geology in the case of bitumen) but also encodes change brought about by ancient processing practices and subsequent degradation. Once identified, the materials define practical parameters that are significant to interpretation of their use and often raise new questions for research.

A group of el-Hibe coffins in the Egyptian Museum Cairo. Unique iconographies and unusual wealth in a provincial cemetery

The Egyptian Museum Cairo (Tahrir) houses nine coffins from the Late Period cemetery of el-Hibe (inv. nos. JE 66783–66790), excavated by E. Breccia in 1934–1935. The coffins were recently documented and analysed by a German-Egyptian team using interdisciplinary approaches and non-invasive analysis methods.

The presentation of the project's results will focus on the partly unique iconography of the coffins, their textual decoration, as well as their manufacture. The selected coffins can be (re-) contextualized through careful evaluation of their object biographies as well as through comparisons with other coffins from el-Hibe from the same excavations (now in the Museo Egizio Florence) and earlier excavations by B. P. Grenfell/A. S. Hunt, H. Junker, and H. Ranke. As a result, the coffins in Cairo show not only a wide variety of coffin styles found at el-Hibe at this time, but also unusual scenes and interesting textual variations for a provincial cemetery.

Through comparison with coffins from the Memphite necropolis as well as from Southern Egypt (such as Thebes and Akhmim), patterns of coffin manufacture and decoration can be discerned. This could indicate an interregional network of craftspeople who shared their knowledge of coffin production and a common visual repertoire.

Thus, the aim of this paper is not only to identify the coffins as local products, but also to combine these analyses with the perspective of regional variability and to investigate the possibility that decoration patterns can be linked to specific areas of Egypt at a certain time.

Mykola Tarasenko

SHORT-FORM

Fragment of the coffin of Amenhaiu (Odesa Archaeological Museum Inv. No. 52611)

The fragment of the coffin lid of Amenhaiu (OAM No. 52611) is discussed in the paper. This fragment is an element of the lower part of the lid of a wooden anthropoid coffin (its base, 25 x 32 cm). The surface of the fragment is covered with yellow soil and decorated on both sides. On the inside, there are images of the goddesses Isis and Nephthys. Columns of hieroglyphic text are written on both sides. At the same time, on the inner side of the fragment the direction of text is different. The outer columns are read from top to bottom, and the three middle ones from bottom to top. Five columns of hieroglyphic text have been preserved on the outer side.

This object could be originated from the former collection of Mykhailo O. Khitrovo (1837–1896), an ambassador of the Russian Empire to Portugal, Romania, and Japan. During 1883–1886, he was diplomatic agent and consul general of the Russian Empire in Egypt, where he acquired a collection of Egyptian antiquities. After the death of Khitrovo, Egyptian artifacts from his collection were apparently acquired from his descendants by the K. I. Yanni Anatomical Museum. Later, these objects entered the collection of the Odesa Museum of the local region, and in 1920, twelve Egyptian artifacts from this collection were transferred to the Odesa State Historical and Archaeological Museum (OAM now). Although the museum documentation does not have detailed information about the received objects, it was possible to discover that in the Khitrovo collection there was a coffin of the 22nd Dynasty and a fragment of the coffin to which the report is dedicated. The owner of the coffin fragment OAM no. 52611 could be identified as Amenhaiu, son of Bakenamon, who was buried in the Theban tomb no. 408 at Asasif (Western Thebes). The coffin can be dated by the end of the 20th Dynasty. Other elements of Amenhaiu's burial assemblage, in particular, the rest of the coffin, have not yet been found.

The coffin has a rather rare design feature. On the outer side of its foot is written a pray to Osiris, interpreted as a speech by Isis. At the same time, this inscription mentions “sandals”, that is, it is related to the concept of feet (*qnftyw=k Hr tbwty=k* “your enemies are under your sandals”). It should be especially emphasized that usually this segment of the coffin decoration (foot) during the New Kingdom and the Third Intermediate Period does not contain texts, which makes the Odesa fragment important for the study of the development of the iconography of the coffin design of the specified period.

Implementing Modern Imaging techniques in examining and visualizing Middle Kingdom coffins

Notwithstanding their fame and significance, the Middle Kingdom coffins are still understudied so far as their material aspects are concerned. Most previous studies focused primarily on their dating, decoration programme, and typology. The textual element, i.e., the so-called Coffin Texts, represented the primary interest in a scientific climate driven by the need to publish the contents of this important body of religious texts. As a result, the majority of these coffins are still awaiting comprehensive publication and study according to modern scientific standards. One of the preliminary steps to achieve this goal is the application of advanced and sophisticated methods of photographic documentation.

The Egyptian Museum Cairo houses some of these coffins in its collection, others have been moved recently to the Grand Egyptian Museum at Giza. The well-equipped laboratories of the new museum offer us the possibility of applying rigorous imaging methods in examining these coffins in both collections. An exemplary start was the famous coffins of *Mesehti* (CG 28118), the nomarch of Asyut. Other, similar coffins in both museums are being prepared for study.

Two main imaging techniques were used, namely RTI (Reflectance Transformation Imaging), and MSI (Multi-Spectral Imaging). These techniques permitted improved examination of the medium, substance, and surface of the studied coffins. In addition, the use of computer-aided image enhancement, such as D-Stretch, resulted in recovering lost and invisible writings and decorations. RTI revealed coffin surface information and allowed for the creation of models of surface morphology. This eventually helped in studying the carving techniques of the inscriptions. While D-Stretch allowed for visualizing the faint and superimposed paintings which are difficult to identify with the naked eye, MSI made it possible to recognize applied pigments on huge areas of the wood surface and revealed some more illegible inscriptions. Additionally, a by-product of investigating the coffins in question was the disclosure of a number of hidden and hitherto unpublished inscriptions on mitred edges.

The preliminary results of this investigation represent a launching pad for further technical analysis of similar Middle Kingdom coffins.

They are cartonnage coffins, not mummy cases: a small production between tradition and innovation

There are many examples of cartonnage coffins that were mistaken for wooden coffins and published as such, before more detailed observations or analyses set the record straight, starting with John Taylor's seminal work. We are not referring here to mummy cases, which are better known

and more widespread, but to coffins in two halves, box and lid, assembled together. At the Louvre, the recent undertaking of the *catalogue raisonné* of coffins from the First Millennium confirmed this ambiguity on certain coffins whose decoration suggests a wooden coffin or a mummy case, which turned out to be made of two halves of cartonnage.

This type of production, which is rare and therefore less well identified and studied, seems to have been particularly popular in Thebes at the crossroads of the 22nd and 25th dynasties, in the 8th and 7th centuries, although some examples predate or postdate them and come from other sites. An iconographic, stylistic and textual study, coupled with a more in-depth approach to the technological aspects, enables to compare them and reflect on the reasons for this unique production. Was it a technical experiment, between the traditional cartonnage mummy case and the new wooden bivalve coffin? Are there more symbolic reasons for this choice? Can we detect patterns of workshops creativity within this small group? What was the social status of the people who commissioned these cartonnage coffins? A dozen examples gathered in this paper show illuminating variations and similarities and open up avenues for study.

The topic has given rise to a great deal of reflection, as shown for instance by the work of Helen Strudwick or Fruzsina Bartos, and current PhD candidates such as Charlotte Hunkeler. It seems to us that museums would do well to re-evaluate some of their pieces in the light of these observations. Coming together to expand the corpus can only help to improve our knowledge of a rare production, whose variety raises the question of the commissioners and the workshops involved. This topic deals with many of our common interests regarding the theme of this conference, from the development of coffins in antiquity, including technological, iconographic and textual studies, to social groupings (choice of a different kind of coffin, integration among a coffin set, socio-economic context of commissioners and workshops) and to the roles of museums in studying rarer productions and naming them with a shared terminology.

Kylie Thomsen

PAPER

Reassessing the Sarcophagus of Hunefer in Context

Crafted out of red granite, the anthropoid sarcophagus of Hunefer located in the Fitzwilliam Museum in Cambridge (E.1.1835) is a somewhat perplexing object. While the object's provenance is unknown, Hunefer, mayor of Thebes during the end of the reign of Ramesses II, has a tomb located in the Theban Necropolis (TT 385) where the sarcophagus would have ostensibly been found. At first glance, this stone monument seems to be a standard Nineteenth Dynasty example, albeit rare as stone sarcophagi in the New Kingdom for private individuals are uncommon. However, it is upon closer examination that several elements stand out that point to a more complex object life history. To wit, the sarcophagus lid and case do not align well, the exterior is irregularly carved and displays varying degrees of polish, the inscriptions seem to be incongruous, amongst other variances. While these inconsistencies have been previously thought to be the result of a lack of coordination between the craftspeople working on the object, there are possible alternative explanations for this apparent disharmony.

Broadly speaking, the reign of Ramesses II is characterized by a significant amount of hard stone reuse, specifically as it relates to statuary. While this has been more systematically studied for royal statuary, there are several documented examples of reuse of private statuary dating to this time period as well. It is therefore why the present study seeks to situate the red granite sarcophagus of

Hunefer within the broader landscape of hard stone reuse in the Theban region during the Ramesside period. In order to nuance our understanding of the trends in stone craft production during the reign of Ramesses II in particular, this paper will offer an alternative approach to assessing the incongruity apparent on the sarcophagus of Hunefer, namely as an object that has been recarved, reworked and reinscribed. Through an analysis of the sarcophagus' composition, I will identify and differentiate tool marks, polishing, inscriptions, and other marks which are key in describing the processes and decision-making of the individual(s) who reworked the object.

Marie Vandenbeusch

PAPER

Exploring coffin manufacture during the 25th Dynasty using CT scan technology

CT scan and other imaging techniques have increasingly been used over the past decades to learn more about mummified remains and embalming techniques. More recently, these non-invasive techniques have started being used to explore coffins and other ancient artefacts. This paper proposes to investigate two coffins produced during the 25th Dynasty: the coffin of Penamunnebnisuttawy (now at the British Museum, London) and the coffin of Pypy (now at the Derby Museum and Art Gallery). Most likely buried somewhere in the Theban necropolis, these two men were mummified and their mummy was placed in at least one coffin. Their two inner coffins are at the heart of this presentation. They are made of wood, which was covered with various layers of paste before being decorated. These layers are completely hiding the wooden structure, and it is thanks to CT scan investigation that the internal structure of both coffins can be examined, revealing some of the techniques used by ancient carpenters. We will compare the two structures and explore the many pieces of wood that was needed to build a coffin. We will conclude by discussing the utilisation of imaging techniques in exhibitions, including the inclusion of visualisations, and how it can be used to convey the results of such an investigation to the public.

Caterina Zaggia, Jan Dekker, Louise Le Meillour,
Matthew Collins and Marcos Martín-Torres

PAPER

Employing paleoproteomic techniques for the characterisation of glues and binders from Egyptian coffins

Paleoproteomics is a term indicating the study of ancient proteins in archaeological artefacts. It is a rapidly growing field, created by the synergistic contribution of molecular biology, paleontology, archaeology, paleoecology, and history and capable of contributing highly detailed data towards a wide range of research into the relationships of societies to each other and to the environments they inhabited.

Recently, the approach has been applied to plasters and mortars, giving information about organic binders sometimes employed in the production of these structural materials, highlighting the origin

of these materials (animal or plant), defining the species and, in the case of animals, the different body part (skin or bone) employed. This information calls new attention to technological skills and development, trading possibilities and the exchange of information between different workshops.

Animal glue is a sticky substance made by heating collagenous organic material, such as animal skin and bones, in water. Compared to other materials found in the construction of Egyptian coffins, animal glue used as an adhesive, a binder and a gap-filler has received little research attention.

This study aims to shed new light on its presence in the construction of two Third Intermediate Period nested coffin sets in the collection of the Fitzwilliam Museum (Cambridge, UK): the ‘yellow coffin’ set of Nespawershefyt (E.1.1822) dated to about 1070–1000 BCE and the inner and intermediate coffins of Papepu (E.2.1869) dated to about 680–664 BCE. Calcium carbonate based pastes mixed with glue binders were used as gap-fillers in the construction of the wooden carcasses of the coffins and as ground layers to support the painted decoration. In the case of the coffin set of Papepu, however, each coffin has a different surface construction. On the intermediate coffin there are simple paste layers. But on the inner, bivalve coffin there is a complex layering reminiscent of cartonnage, constructed over a thick layer of ‘fibrous glue’ which lies directly on the wooden surface.

Preliminary data from optical microscopy, scanning electron microscopy and from Fourier transform infrared spectroscopy confirmed the presence of collagen in the binders of the pastes and in the thick fibrous glue. These methods were supplemented with palaeoproteomic techniques (MALDI-TOF MS and LC-MS/MS), to provide information on the production stages employed in the creation of these organic materials and about the animal species from which they were obtained. We aim to discover if the organic binder present in the pastes is completely different from the fibrous glue present in the pseudo-cartonnage or if we see some similarities in their composition.

We will present preliminary results from the study of the two coffin sets and from layered structures similar to those overlying the inner coffin of Papepu, found on coffin fragments of the same style and date in the Fitzwilliam’s collection.

Through this work we may start to gain a better understanding of how different glues were made and used for specific purposes and see whether the fibrous glue layer is characteristic of a particular craft practice.

Antje Zygalski

POSTER

Ancient Egyptian Wooden Objects: Contribution to the study of ancient timber and wooden object life-cycles (in two parts)

GENERAL METHODOLOGY

Timber processing and the manufacturing of wooden products are amongst the activities in Egypt for which very limited ancient recording exists. The reconstruction of these operations therefore requires, firstly, detailed investigations of the material remains. Subsequently, the investigation results are interpreted by the use of different methods, depending on the profession(s) of the investigator.

For the author, as a trained cabinetmaker, one method for reconstructing ancient woodworking processes is the comparison with modern (standardized) woodworking processes. These reflect the

current state of development within the technical history of wood processing since its beginning and therefore, are used as starting point.

MODERN INDUSTRIAL STANDARDS

R-Principles

One of the main topics in modern industry is sustainability, especially since climate change has become an issue in all areas of life. Several decades ago, concepts were designed to optimize the life-cycles of materials and products, starting with the waste management of them: In 1975 the European Parliament & Council (EPC) issued the first version of the 'Waste Framework Directive' (WFD, 75/442/EEC). In 1996, the new topic of 'Environmental management systems' was developed by the International Standardisation Organisation (ISO) which published the first standard on this topic (ISO 14004). A major component of this is the Life-Cycle Assessment (LCA) of products, with the goal of minimizing environmental impacts by thematizing aspects such as energy required and emissions produced. The first standard on LCA was published in 1997 (ISO 14040).

This modern development for minimizing environmental impact led from 'linear' economy to 'circular' economy and therefore includes the so-called 'R-Principles' (e. g. the principles of 'Reduce, Reuse, Recycling').

Documentation / Visualisation

The first step within LCA is called Life-Cycle Inventory (LCI). This step refers to the visual modelling of the life-cycle of a product and the materials used, which results in a flow diagram (ISO 14041, first published in 1998). The flow diagram will later serve as the basis for the Life-Cycle Inventory Analysis.

POSTER PART 1: Flow diagram for the life-cycles of modern timber and wooden products (according to normative standards)

Product life-cycle flow diagrams from the woodworking industry serve as a starting point for studying and reconstructing ancient life-cycles of wooden products and the used timber. Therefore, the poster will present a general flow diagram for modern wooden products and will include the relevant R-Principles of 'Reuse', 'Repurpose' and 'Recycling' as defined by the ISO.

POSTER PART 2: Transferring The flow diagram for life-cycles of modern timber and wooden products into Ancient Egypt

The concept of Part 1 will be transferred to Ancient Egypt by keeping the general layout of the diagram but presenting examples from ancient Egyptian woodworking for each of the single steps.

Examples for the linear economy life-cycle will be presented by single exemplifying images, mostly originating from depicted stages (e. g. from wall-paintings). Within the circular economy stages, the R-Principles of (wooden products) 'Repurpose' and (timber) 'Recycling' will be put into focus and visualized by the results of investigations on two archaeological objects.