

Surface Treatment of Mummies: Mummification, Conservation or Beautification

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Abstract

This study focuses on the presence of an apparent “varnish” on three Latin American mummies from three European museum collections. In particular, the research considers the possibility that varnishes were applied to prevent the mummies from deteriorating during the long shipboard journeys between South America and Europe, for conservation purposes, or in an effort to present a mummy with a suitable “antique” appearance.

Introduction

A group of Latin American mummies, present in three separate collections in France, Germany and Switzerland are similar in that they have no documented origin, nor documented burial; no associated cultural objects and no other indication of context or origin, despite coming from the west coast of Latin America. They do, however, share one commonality: they are coated with a substance, which we will refer to as “varnish”. This article will concentrate on three mummies, one from each of the collections, and discuss the reasons for “varnishing”, the period during which this was practiced and, in as far as possible, the composition of the applied varnish.

The three mummies

The mummies considered in this paper are from the Muséum national d’Histoire naturelle de Paris (MNHN) (Paris, France), the Lippisches Landesmuseum (Detmold, Germany) and the Musée Jurassien d’Art et d’Histoire (MJAH) (Delémont, Switzerland). These mummies were arbitrarily selected from their collections for other exhibitions or research. During these studies it was discovered that each of the mummies was treated with a varnish. Further investigation confirmed that, in all cases, the mummies’ origin, culture, context and burial site were undocumented or that those documents are missing. The starting point of our investigation was the discovery of a thin layer applied to the skin of the mummies. We refer to this surface coating as ‘the varnish’.

Reasons for the application of a varnish-layer

Four potential reasons are known, or suspected, for the treatment of the mummies with the varnish: funerary processes, hygienic protection for those around the mummies (i. e. museum staff and visitors), long-term conservation of the physical body of the mummy and finally, visual or aesthetic reasons.

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Funerary

Certain mummies, from rainforest areas of Latin America, have mummified in conditions that are generally inhospitable to mummification, despite high temperature, fluctuation of temperature, and extreme humidity. The hypothesis here is that the corpses were treated prior to being wrapped in a bundle, surrounded by layers of textiles. This treatment is believed to have happened at least among the Chachapoya and the Incas (Guillén 2004: 144, 152–154). The latter is chronicled by the Spanish missionaries, who described the “perfect state of preservation” (Garcilaso de la Vega [1609] 1987, Guamán Poma de Ayala [1615] 1936). One of them is Guamán Poma de Ayala. He described the pre-Hispanic customs in an illustrated letter to the Spanish king (Fig. 1a,b).

The Incan veneration of their royal mummies surprised the Spanish so much that they speculated over their composition and mentioned “embalming” as one of the treatments to achieve mummification (for the discussion see Guillén 2004: 144–145).

Nevertheless, all reports seem vague and were based on information from informants, not direct personal observation of the process. Since many Incan mummies were destroyed by Spanish conquistadors, the mummies were lost as a source for the investigation of artificial mummification practices. The application of an “outer layer of varnish” as part of the mummification process can only be assumed.

The situation of the mummies of the Chachapoyas is different. Despite the humid environment of the cloud forest they inhabited, in what is now northern Peru, about 200 mummies from the Chachapoya-Inca time have been found. These mummies display evidence of evisceration. There is also little evidence of insect infestation, so the bodies must have mummified quickly (Guillén 2004: 153). The bodies were



Fig. 1. In this illustrated codex from 1615 royal Incan mummies are shown being carried on litters by special servants. It is possible to observe the different state of preservation: the mummy in a is very well preserved, while the individual in b is more skeletonized. The difference may be due to the length of time since death. Both drawings were done by Guamán Poma de Ayala in 1615 (Codex péruvien illustré 1936: 258, 379).

placed in dry rock niches that further enhanced the process of mummification.

There is no written record from the Chachapoyas, but the preparation of the body suggests certain knowledge of mummification. These mummies date to a period where the Inca conquered the territory of the Chachapoya and may have brought the knowledge of mummification with them. The complete mummification process of the Chachapoyas is, however, unknown. Guillén observed an antiseptic smell (Guillén 2004: 153) while unpacking some of the Chachapoya bundles, and interpreted it as a possible sign of artificial mummification. Native plants, poleo (*Chenopodium ambrosioides*) and muña (*Minthostachys mollis*), were placed inside the bundle, on the surface of the naked mummy. These plants may have played an important role in the successful mummification of the body (Guillén 2004: 153). It is also very possible, that corpses were painted with a type of varnish as part of the funerary treatment for their respective burying culture. The same is true for the many pre-Hispanic mummy bundles that come from burial sites along the coastal regions of South America. Here, it became obvious that burial chambers were visited; older mummy bundles were repaired and new bundles added to the chambers (Begerock 2008).

Currently, it is not possible to determine whether treatment with a varnish was part of a normal funerary procedure or a special, perhaps ritual, preparation for the afterlife. The possibility of a layer of varnish on the outer side of mummies from pre-Hispanic Latin America should always be taken into account during analysis and conservation of the mummies.

Shipment and hygiene

Very few of the Andean mummies brought to Europe have documented origins or sources, and the condition and context of discovery is rarely recorded. A few letters from archives in France do, however, provide some interesting information (Carminati 2010). In particular, the letters describe the transportation of the mummies by ship. Since the moisture in the air while on board the ship represented a significant challenge, the shipping process often led to the putrescence of the mummies. This, in turn, led to disease among the crew and the ship's passengers. As a result, travelers and explorers sought ways to protect the mummies from moisture in order to prevent disease while still being able to bring these specimens to the museums in Europe. In 1843, naval doctor Liautaud reported:

“Several of my colleagues have tried to ship to France some of these Peruvian mummies many times. But despite the most careful precautions, they could never escape the humidity of the atmosphere inside the vessel, this then entering the soft tissues in a short time and converts them into a sort of liquidious, decaying, mass without form. No-one that I know of has succeeded so far, and my efforts have been no more successful. My specimens could not resist the excessive humidity in the lower decks of the Danaïde [the ship]. The health of the crew entrusted to my care forced me to abandon nearly all the anatomical specimens, keeping only the skulls and those only after being thoroughly cleaned.” (Riviale 1996: 236, transl. Simon Parkinson, pers. comm).



Fig. 2. Frontal view of the mummy from the Musée de l'Homme. – Photo: Pauline Carminati.

Liautaud did not specify what those “careful precautions” were. Ship’s Master Bougourd, who donated of three Peruvian mummies to the Museum of Natural History in Paris in 1852, had successful preservation methods, and described those methods. He stated in a letter published in *La Revue du Havre* on 31 October 1852: “*The great difficulty is the transport of these mummies to the place of embarkation. These were carried for five miles on mats; the smell they have today is due to guano, in which they were immersed, to protect them from the humidity during the long passage.*” (Cochet 1855: 215, transl. Simon Parkinson).

In 1849, the Société de Médecine reported: “*The ship Octavia had recently arrived in Liverpool with a cargo of guano collected from the Peruvian coast. Amid this pile of animal dung were found the corpses of a man, woman and child. These three natural mummies were in a state of perfect preservation. The child remained in Liverpool, those of man and woman were sent the British Museum in London.*” (Cayol 1849: 452, transl. Simon Parkinson).

Presumably, Captain Bougourd had heard of the preservative properties of guano.

Regardless, we know that the mummies taken from a guano-environment were exhibited to audiences during the nineteenth century (Buckland 1859: 102).

According to the MNHN’s inventory, the three mummies donated by Bougourd, were deliberately defleshed upon their arrival at the museum. Therefore, no trace of any material used to treat the mummies after their discovery remains. Defleshing mummies was common in many institutions during the 19th century: the objective was to access the bones, the study of which was better understood at that time (Carminati 2011).

Treatment by the museum

Despite unfavorable environmental conditions during transportation, numerous mummies from Latin America managed to reach European museums intact, via donation or purchase. European institutions, keen to both preserve and to exhibit their collections, subjected the mummies to specific treatments. This section focuses on changes made to the mummy by a museum or individual, whether for conservation or display, as a possible interpretation for the varnish seen on the mummies in this study. Conservation is undertaken to maintain or improve the preservation condition of the mummy. These procedures may include application of substances that are insecticidal and/or fungicidal. Substances can also be used to halt any further decomposition or deterioration of the mummy. Treatment for display, on the other hand, was designed for beautification of the mummy or to give the body an antiquated appearance. The reason for varnishing, in the cases of the mummies in this study, may have been routine investigation of the mummies, protection of the mummy via conservation methods, or preparation for exhibition.

The conservation of organic artifacts, such as mummies, can be problematic. They are susceptible to insect infestation (e.g. from keratophagous insects), mold and decomposition. Anatomical preparation manuals and books about natural history collections of the 18th and 19th century contain many formulae for compounds to protect specimens or for use as insecticides (Boitard & Joly 1852: 181–183). These publications reflect the continuing concern represented by the conservation of this type of collection. For example Jean-Joseph Sue advised in 1765: “*To prevent that anatomical parts are eaten by moths or worms in the summer, you need to take care to visit them from time to time, and then putting the spirit of wine or oil of turpentine, or by applying the above using a brush, and this will be more or less repeated, depending on the amount of mites you see*” (Sue 1765: 259, transl. Simon Parkinson).

Later, in 1829, Lauth advocated that: “[the body part] is covered by a varnish, making a polished surface that prevents dust from adhering, repels insects, and defends against humidity preventing mold [...]. Some anatomists advise, to thoroughly protect against insects, covering the specimen with a varnish containing a suspension of a corrosive sublimate or arsenical salts reduced to an impalpable powder” (Lauth 1829: 737, transl. Simon Parkinson).

The varnish was an indispensable element in the preparation of human and animal anatomical specimens; all manuals and handbooks advocated the use of varnish both for protection or conservation of the body, and to enhance the final appearance. Indeed, the visual effect given by the varnish was important, as evidenced by Pierre Boitard:

“*I have used [to varnish a skeleton], to much advantage, varnish used for tableaux [canvases], made a little more fluid by adding a small quantity of ‘spirits of wine’. This varnish is preferable to others in that it does not yellow with age, and is perfectly transparent*” (Boitard 1853: 416, transl. Simon Parkinson).

Case studies – three mummies from different museum collections

The first case study was a South American mummy (Fig. 2), curated at the National Museum of Natural History in Paris (MNHN), from the former collection of the Department of Anthropology (Carminati 2010). The mummy entered the collection during the middle of the nineteenth century. Analysis conducted by the C2RMF Laboratory provided a calibrated date of AD 1021–1155. This mummy may originate from the area around Iquique, in what is now Chile. Anthropological investigation showed that the mummy is that of a woman who was over 40 years of age at the time of her death, and she was eviscerated post-mortem, as part of the funerary ritual.

This mummy was completely covered with a thick varnish that was translucent, shiny and orange (Fig. 3). It was possible to determine that this varnish was applied by the museum during the late 19th century, based on two observations. Firstly, the varnish did not cover the skin directly but had been applied over different deposits from the burial environment, which indicated that the application was post-burial. Secondly, four other mummies with different provenance, in the same collection and arriving before the late 19th century, had the same varnish.

The mummy, which was comprehensively studied, had varnish covering numerous insect boreholes (Fig. 3), as well as cover actual insects and beetles. Clearly it was used in order to stop infestation by keratinophagous insects, and at the same time, to stabilize and cover the damaged surface of the mummy. It is noted that not all of the four mummies showed sign of insect infestation at time of varnishing. Therefore, it was possible to deduce that a single conservation action was undertaken on all five mummies, for both remedial and preventative purposes. Additionally, it is possible that the varnish also served an aesthetic role. Indeed, at the time, it was believed that the varnish enhanced the beauty of the exhibited specimens. Most artifacts of the MNHN anthropological gallery were varnished and it is, therefore, no surprise that the mummies were also treated in a similar manner.

The analysis of the varnish by gas chromatography coupled with mass spectrometry (GC/MS) revealed the presence predominantly of a triterpene resin, with traces of pine resin (*Pinus* sp.) (Richardin et al. 2010). The main triterpene resins used in varnishes of the time were mastic and dammar, with the latter being the most commonly used. Traces of pine resin in the varnish may correspond to the addition of either small quantities of Venice turpentine, or of residues of turpentine, used to dissolve the triterpene. Varnishes based on both dammar resin or mastic are transparent upon application, but over time they oxidize, turning yellow, resulting in the orange color seen on the mummies. The application of thick or multiple layers of the varnish also added opacity.

The second mummy is curated at the Musée Jurassien d'Art et d'Histoire, in Delémont, Switzerland, and is one of two similar mummies in the collection of this museum (Fig. 4). The mummy is that of an adult male, who was approximately 25 to 30 years of age at the time of his death. His skull shows evidence of cultural artificial cranial modification, and the brain is well preserved and resting at the back of the braincase. Samples from the mummy were analyzed at the Klaus Tschira Laboratory of the Reiss-Engelhorn Museums (rem), of Mannheim, Germany, and produced a calibrated radiocarbon date of AD 902–994.

The acquisition history of the mummy is unknown, as is its provenance. Close ties between the museum in the neighboring town of Neuchâtel and the museum in Delémont suggest that both museums received their mummies as part of a donation by Johann Jacob von Tschudi, a zoologist who travelled to Southern Peru (1838–1842) and bequeathed his collected specimens to both museums after his return. During preparations for display in a traveling exhibition, the mummy was cleaned, conserved and investigated by the German Mummy Project in Mannheim in 2009 (Begerock et al. 2011: 56).

During the cleaning and restoration processes, it became obvious that the dark color of the skin was not a product of the funerary practices or burial site, but rather a modern application, intended to make the mummy “look older”. Hence, the coloring was applied where the skin was visible. Parts of the textile were lifted to make the dark color shine through, and to give the mummy an older, and perhaps more “authentic” appearance. This practice of applying “galerieton” is well known for paintings in museum galleries of the 16th to the 19th century, where a layer was applied on top of the painting, to create an antiquating shine (Henriette Bierbrodt 2012, pers. comm.)

The specific composition of the varnish layer that was applied to the mummies from the MJAH, Delémont is still unknown. As in the collection of mummies from the MNHN in Paris, both mummies of the Swiss collection are suspected to have been treated at the same time, in the late 19th or early 20th century



Fig. 3. Detailed view of the skin of the mummy from the Musée de l'Homme. Clearly visible is the shiny appearance of the applied varnish. – Photo: Pauline Carminati.

The third case study presents a mummy from the Lippisches Landesmuseum Detmold, Germany (Fig. 5). Analysis conducted by the Klaus Tschira Laboratory provided a calibrated date of AD 1319–1361. This is the mummy of an adult female, who was probably more than 40 years old at the time of her death. The woman shares the same uncertain provenance and lack of acquisition history with the previous two mummies in this study.

Researchers of the German Mummy Project observed a shiny surface on this mummy, with accumulations as drops on certain areas, e. g. her left knee. Since the textile that once wrapped the mummy now rests loosely around the shoulders of the mummy, and this textile does not show any traces of the shiny varnish, it is most likely that the varnish was applied while the mummy was prepared for exhibition at the museum.

Despite the lack of further investigation on the composition of the varnish on this particular mummy, it was included in this paper to emphasize the importance of the study of the outer surface of mummies in museums collections. Non-destructive analyses are generally preferred in mummy studies and, in this case, the restoration specialists contributed to the interpretation through observation of the surface.



Fig. 4. The male mummy from Delémont. – Photo: Heather Gill-Frerking.



Fig. 5. The female mummy of the Lippisches Landesmuseum Detmold. – Photo: Heather Gill-Frerking.

As noted by Panagiaris (2001), part of the responsibility of conservators is not only to conserve human remains, but also to study them and take detailed records of the preservation condition of the body. All of this information contributes to the multidisciplinary interpretation of a mummy.

Conclusion

Aufderheide (2003) discussed potential issues related to museum conservation of mummies. In particular, he noted that the method of conservation used reflect the practices at the time, but that the chemicals and other substances used may actually damage the mummy, or lead to deterioration in the future. Furthermore, any changes made to the mummy during conservation may affect future scientific analyses (Aufderheide 2003: 513–514).

Although many kinds of resins have been studied in relation to mummies (e.g. Buckley et al. 1999, Degano & Colombini 2009, Klys et al. 1999), most of these related to the processes of mummification,

rather than post-excavation or museum-based conservation treatments. It is important that researchers consider the potential application of resins and other substances in post-excavation or museum contexts during the analysis and interpretation of a mummy. This paper has presented several potential reasons for the application of varnishes to human mummies, and without adequate information related to the conservation of the mummy, or related to the provenance of the mummy, there is potential for misinterpretation.

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