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The "Invisible" Side of Yellow Coffins—The Set of the Chantress of Amun Tanethereret in the Musée du Louvre and Some Considerations on the Production of Yellow Coffins in the First Half of the 21st Dynasty

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Abstract: Through the coffin set of Tanethereret—dated to the first half of the 21st Dynasty—this article aims to underline the importance of analysing the masks and human features of ancient Egyptian yellow coffins and their value in disclosing new and important information about the Third Intermediate Period society. By moving between different visualisations, overlapping layers, measuring, and comparing, the sculpted human forms can be, for example, further indices of the quality of the production/"workshop"/artist and of the socio-economic power of the client. The possibility of making a three-piece set—coherent not only in decoration but also in form—suggests the existence of workshops capable of producing high-quality coffins and, consequently, that some people could still economically afford such coffin sets. Gaining access to such "workshops" and this type of production may indeed represent a further attempt to "manufacture social power" for the middle or high elites. Moreover, this specific case study also shows the dynamism of ancient Egyptian artistic production in a period of crisis, with artists able not only to re-adapt and re-commodify an ancient object but also to create possible new compositions with a balanced mix of styles between tradition and innovation. The study of this "invisible" part of the yellow coffins thus represents a new way of reconstructing the history of the people "hidden behind" the yellow coffins and the socio-economic sphere of ancient Egyptian society in the Third Intermediate Period, manifested through the resulting art and material culture.

Keywords: yellow coffins; Third Intermediate Period; 3D models; photogrammetry; geometry; style; production; reuse

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1. Introduction

Iconography and texts are the most prominent features of Egyptian yellow coffins from the early Third Intermediate Period (11th to 10th centuries BCE) and have long served as the primary "diagnostic features" for reconstructing the development of this coffin type from the end of the New Kingdom to the early 22nd Dynasty (13th to 10th centuries BCE). Scholars have therefore attempted to catalogue, classify, and date these objects based solely on their most visible features (Taylor 1985; Niwiński 1988, 1989, 2000, 2018; van Walsem 1997; Sousa 2018a, 2018b, 2020a; Johnston 2022; Vilaró-Fabregat 2024).[1] However, in recent years, a growing interest in the materiality of the coffins has also directed research towards the materials that compose them, leading to multi- and transdisciplinary approaches and directing greater attention to their more concealed features such as the types of wood, carpentry techniques, and pigment compositions used to produce them. These new trends in yellow coffin research began with the development of archaeometric approaches and the awareness that these objects are the result of a sophisticated production system involving multiple processes, materials, and skills, especially in terms of work specialisation. Due to these complexities, it is essential that yellow coffins are studied by diverse specialists

from different backgrounds and using various analytical instruments to reconstruct their history and answer pertinent questions.

In the last few decades, new important projects have emerged with the goal of providing a deeper reconstruction of the history of these coffins but, above all, on their production (Amenta et al. 2010; Amenta 2014; Dawson et al. 2016; Strudwick and Dawson 2016; Amenta and Guichard 2017; Dawson 2018; Dawson and Strudwick 2019). However, until 2018, another feature of these coffins had never been considered in any detail, namely the way to reproduce the 3D masks and human features on anthropoid coffins. This new line of research is the focus of the *Faces Revealed Project*, which is investigating this still "missing piece" of Egyptological inquiry.[2] Launched in 2020 as an extension of an idea first conceived as part of the Vatican Coffin Project (VCP),[3] *Faces Revealed* aims to address this gap in current research by using photogrammetry as its main diagnostic and analytical tool (Mainieri et al. 2022; Mainieri 2024b; Mainieri Forthcoming).[4]

Analysing the forms and geometry of heavily decorated three-dimensional polychrome objects poses challenges, as visual appearance (decoration) often obscures physical geometry (shapes), hindering objective analysis with the naked eye. However, advancements in digital technologies and 3D modelling offer a solution. Photogrammetry enables the creation of a precise, submillimetre, and high-resolution "digital twin" of objects, facilitating a detailed analysis of their forms (i.e., eyes, eyebrows, nose, mouth) without visual interference, making "visible" the "invisible" (Figure 1).

Figure 1. "Digital twin" of the upper part of the mummy board of Panebmonthu, Musée du Louvre, E 13046. On the left, the orthophoto with texture (the wrapping of 2D images around the 3D model) is shown; on the right, the orthophoto without texture (the 3D model without the application of 2D images) is shown.

This ability forms the cornerstone of the *Faces Revealed* methodology, as it can create two distinct visualisations of the same object—one with and one without decoration (iconography and text)—and analyse the surfaces and forms in detail. Following a specific protocol of acquisition, a precise methodology is possible, for example, to determine the contextual production (or not) of different pieces forming the same set or their level of production. Moreover, the possibility of identifying specific markers and enlarging the study to include other yellow coffins may lead to identifying common styles of production and common "workshops" and maybe even re-evaluating some previous interpretations.

Through the figure of the Chantress of Amun Tanethereret, this article aims to show how important such an analysis of human forms may be and how the numerous pieces of information it can yield can be added to current and previous research on the anthropoid yellow coffins of the Third Intermediate Period. Contextually, this specific case study underlines the possibility of a partial reinterpretation of the Ramesside markers on yellow coffins[5] and of interpreting these data as the result of changes introduced by specific workshops, which were able to create new products and an innovative style by skilfully mixing tradition and innovation in a period of scarcity when the reuse of coffins was a custom rather than an exception.

2. Materials and Methods

2.1. The Coffin Set of Tanethereret

The coffin set of the mistress of the house, Chantress of Amun, Great *ḥsyt*-singer in the choir of Mut, Tanethereret, is held in the *Musée du Louvre* in Paris. It is a complete coffin set formed by an outer coffin (E 13027), an inner coffin (E 13034), and a mummy board (E 13035) (Figure 2).[6] Despite the coffins being clearly produced in the Theban style, we do not know its exact geographical provenance. Possibly found in the Theban area around 1819 and 1821, the set was donated in 1822 by Frédéric Caillaud (Bierbrier 2012, p. 99) to the *Bibliothèque Nationale* and was part of the collection of *Cabinet des Médailles* until 1907, when it finally entered the *Musée du Louvre* (Aston 2017; Rigault 2020; Rigault-Déon 2024).

Figure 2. The coffin set of Tanethereret: outer coffin (E 13027), inner coffin (E 13034), and mummy board (E 13035) (© 2015 *Musée du Louvre*, Dist. GrandPalaisRmn/Georges Poncet- "Etalab" Open Licence collections.louvre.fr/en).

On the base of its stylistic features, the lids and the mummy board can be ascribed to the first half of the 21st Dynasty and were likely produced during the middle of the 21st Dynasty towards the end of the pontificate of Menkheperre (late 11th–early 10th century BCE) (Niwiński 1988, pp. 71–73; Niwiński 2017, pp. 163–64, n. 328; Rigault-Déon and Niwiński 2024, p. 297). The pieces have a basic scheme, where the lower section of the lid is the longest and organised in a triptych (inner and outer lids) or a diptych (mummy board), the central part is decorated with two horizontal registers divided by a representation of

a sky, the figures are of large size, and the composition is simple without any decorative-filled elements.[7]

Consisting of lids and cases, the different pieces of the set were assembled with different species of wood[8] covered by a layer of brown paste, with traces of textiles for the *incamottatura*[9] and a finer white paste layer that functioned as the base for decoration.[10] The coffins have a multi-coloured paintwork composed mainly of blue, green, and red on a yellow background which was then varnished.[11] The rich decoration of the external surfaces contrasts with the internal parts that are covered by a shiny black or brownish-red pitch, where the only figure is a large standing goddess, Nut, depicted on the back of the mummy board or at the bottom of the boxes.

According to Cooney, this set presents strong and incontrovertible evidence of ancient reuse (Cooney 2014). This observation was based on the presence of some stylistic markers dating to the Ramesside period, which could indicate that this mid-elite coffin set was reused from 19th to 20th Dynasty coffins and repainted in the early 21st Dynasty (Cooney 2014, 2020). Evidence of this reuse includes the style and wrap-around shape of the mummy board, with two side pieces of wood used for the head and the protruding raised belly on the outer and inner lids, all typical elements of 19th–20th Dynasty coffins. This hypothesis of reuse or modification finds support in other evidence on the inner case. In fact, the case shows the filling of previous mortises, while on the outer sides of the lid, there is a double layer of plaster, comprising a yellow one with a white preparation layer, together with fabric, and a pink coating (Figure 3) (Rigault-Déon and Niwiński 2024, p. 270).

If only the external upper part of the coffin lids as far down as the lower part of the crossed forearms are considered, the Tanethereret coffin lids were examined between 2021 and 2024[12] and were subjected to the specific reference protocol for 3D acquisition, which was developed in collaboration with the *Politecnico di Milano*. After a photogrammetric survey and the creation of 3D models using Agisoft Metashape Professional 1.8.3, both textured and untextured high-resolution orthophotos were obtained. These orthophotos represent the first two layers of the same object with the same orientation and projection; these are called the "Visual appearance layer" (layer 1, the textured model) and the "Physical geometry layer" (layer 2, the model without texture). The two visualisations of the same object with an identical orthogonal projection allow for the inspection of possible concealed elements and also for these elements to be precisely overlapped. In order to analyse and observe whether any possible corrections were applied to the geometry during the decoration phase, two more layers were drawn, one dedicated to tracing the decoration (layer 3) and another aiming to identify landmarks on the geometry (layer 4). The creation of these layers and the possibility that they overlapped represent the main feature of the methodology and will help to detect if any vertical and horizontal links exist between the objects.[13]

2.1.1. Layer 1: The Visual Appearance (Figure 4)

The objects have the same colour palette and well-produced decorations with a naturalistic style used for the pictorial scenes and a beautiful treatment of the details, all of them suggesting that the set came from a high-level Theban workshop. The deceased wears a tripartite plain blue wig with floral headbands and lotus flowers and buds ranging from one (on the outer lid) to three (on the inner lid and mummy board) hanging down from the crowns to the heads. The lappets of the wig display binding bands decorated with a yellow net featuring either green dots on a red background (on the inner lid and mummy board) or floral motifs (on the outer lid).

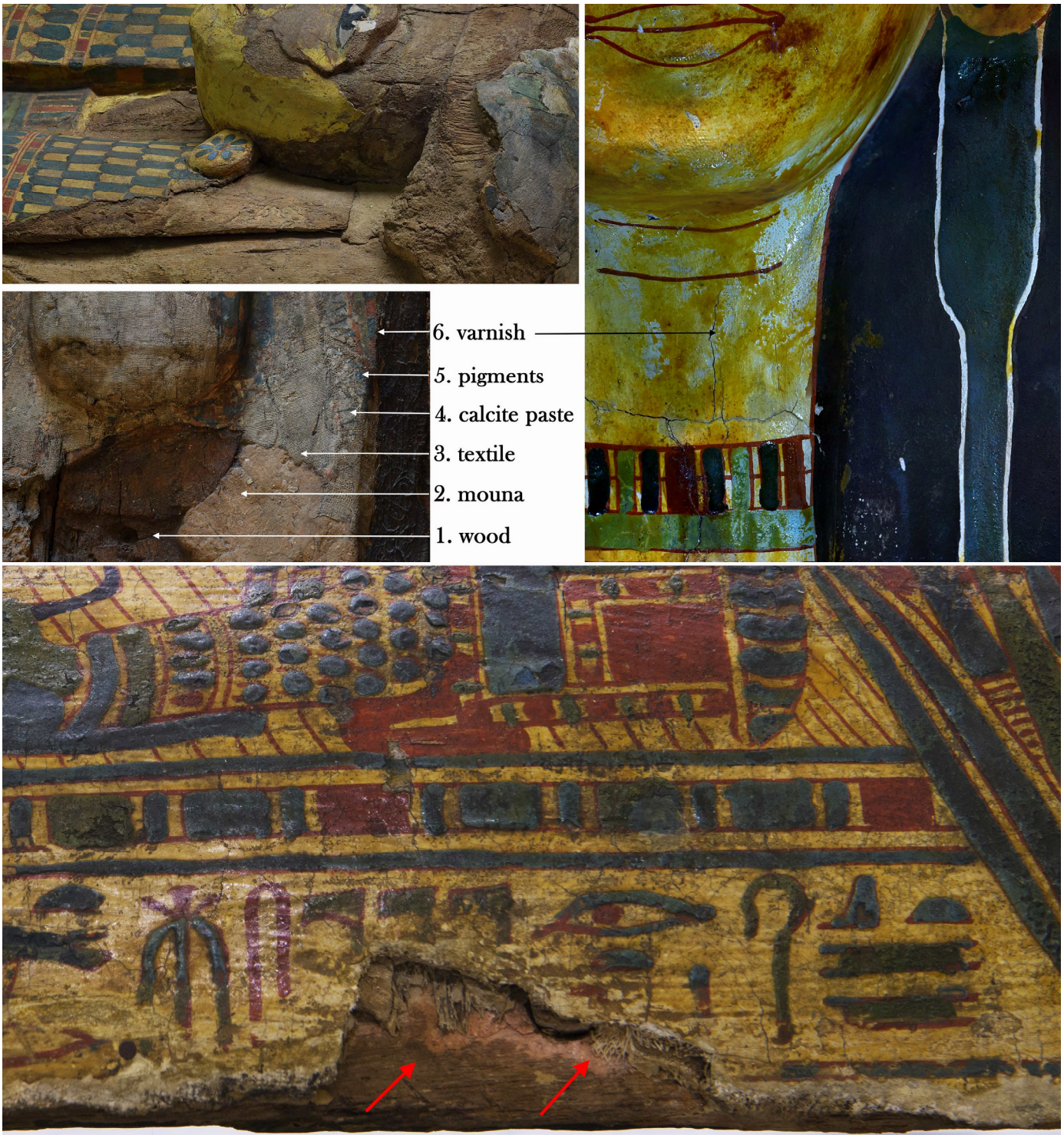

Figure 3. (**Above**): the layering of different materials used to make yellow coffins. (**Below**): *lacuna* on the right side of the inner lid of Tanethereret and the double layer of plaster, possible evidence of reuse.

Figure 4. Orthophotos with texture of the outer lid (**left**), inner lid (**middle**), and mummy board (**right**) of Tanethereret.

The wigs frame the yellow faces, which are outlined in red with detailed and delicate features. The eyes all have a hieroglyphic shape, are horizontal or slightly oblique with make-up and short cosmetic lines in blue; the black half-moon irises are painted against a white background and the eyelids are marked in red. Thick blue eyebrows frame the eyes, drawing a light curve over them and ending at the same level. Traces of red colour to indicate nostrils survive on all three pieces, even though the noses are broken at different levels on each find; the mouths are simple and unsmiling, with small and unique circles in the corners, and are contoured in red. The necks are decorated with two short semi-circular red lines depicting creases. Earrings and breasts are decorated with multi-coloured rosettes on a yellow background, except for the outer coffin, where the breasts are only shown in yellow.

Between the lappets are short collars decorated with rows of floral motifs (on the inner lid) or simple alternating green, blue, and red lines (on the outer lid and mummy board), while *wesekh* collars with hawk heads on the shoulders cover the area of the chests. Above the hands and in the centre of the chest are *bꜣ*-birds facing left with enlarged wings on the outer lid and the mummy board, while a winged scarab is on the inner lid. Moreover, red stripes, which recall the pleated sleeves of a tunic, are painted on the sides of the arms both on the outer and inner lid. Specular figures of jackals with sceptres and double crowns (on the outer lid) and of Osiris on a cubic throne in front of an adoring *bꜣ*-bird (inner lid) are also represented in this area. In contrast, the arms on the mummy board are covered by plumage, a feature coming from an older tradition (Schreiber 2006; Bettum 2018). The forearms are crossed above the collars and covered with double polychrome bracelets on the wrists and close to the elbows. Between the bracelets are scenes with mummiform gods (on the outer lid), scarabs flanked by winged *cobras* (on the inner lid), or winged scarabs on the solar boat (on the mummy board); the elbows are covered by large lotus flowers. The hands are open, which is the norm for female coffins, but the anatomical rendering of the lines of the fingers and nails with one ring at each finger, including thumbs on the outer lid and the mummy board, are of a high quality. On all three lids, the quality of the decoration and paint is high, even though it appears less accurate on the outer coffin.

2.1.2. Layer 2: The Physical Geometry (Figure 5)

By switching off the decoration, it is immediately clear that the lids share a uniformity in their visual appearance and also in their physical geometry. The anthropoid forms and masks of Tanethereret's coffins are very well rendered in terms of their human features, with specific female gender markers[14] delicately realised by plaster on all three pieces. The coffins have a smooth surface with a few elements made with the *pastiglia* technique[15] to

reproduce relief, applied only for a few features on the inner lid (i.e., the scarab on the chest). Nevertheless, it is interesting to note the visual effect created by the granulometry of the colours—mainly of the blue and green—resulting in a kind of very low relief (Figure 6).

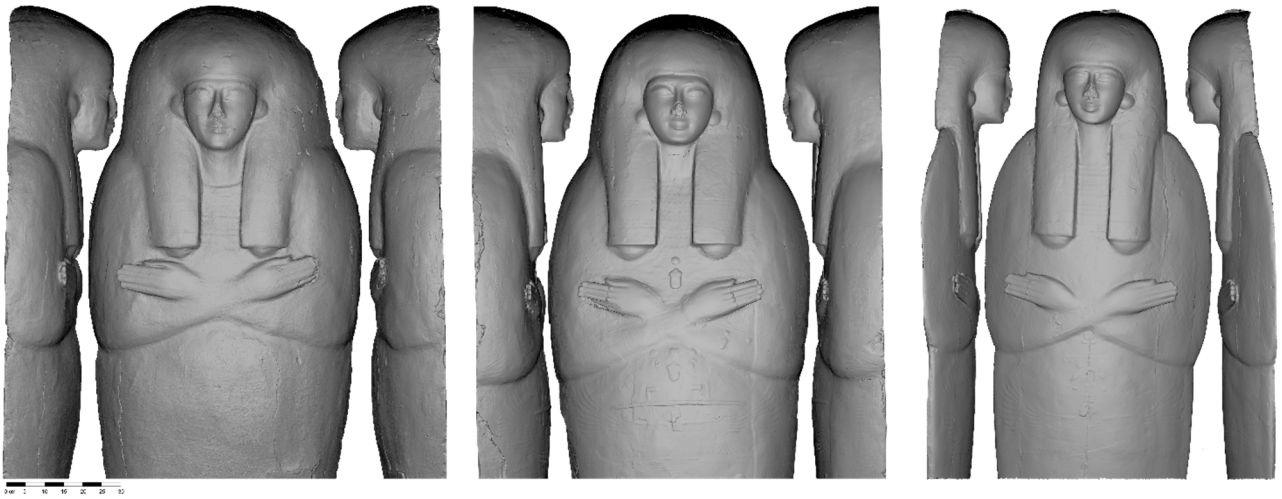

Figure 5. Orthophotos of Tanethereret without texture of the outer lid (**left**), inner lid (**middle**), and mummy board (**right**).

The faces are very well carved; they are almond shaped with a low and protruding forehead, high cheekbones, rounded cheeks, and an oval chin. The eyes are small and located in the upper part of the faces. They are surmounted by straight eyebrows that are slightly titled at the end, attached to the root of the noses with an angular orientation. The noses are thin and long, even though they are broken on all three pieces, and it is impossible to reconstruct their original form and clarify whether they had nostrils or not. The mouths are represented as smiling but are narrow and with thin lips.

The earrings are small, modelled by plaster, and are located at the level of the cheekbones (on the outer lid) or slightly below, at the height of the cheeks. The necks are long, naturalistic, and with a very thin and imperceptible straight (on the inner lid and mummy board) or rounded (on the outer lid) line that divides them upon reaching the short collars. The faces are framed by rounded wigs with long and straight lappets. A rounded and thin line marks the separation of the wigs on the foreheads. The breasts are moulded with paste at the ends of the lappets, are semi-circular in form, but do not cover the full width of the ends of the wig lappets; they are smaller and thinner.

All the pieces have full and very well-rendered forearms both in paint and in their three-dimensionality. They are crossed on the chest with the right arms over the left ones; the hands are hieroglyphic in form with delicate and tapered fingers and the points of their thumbs slightly turned up. Although they are well realised in terms of their three-dimensionality, the hands are more or less flat and attached to the body. The orientation of the hands follows the crossing of the forearms with an oblique orientation (a V-form). While the belly is rounded on both the outer and inner lids, it is protruding on the former but more subtle on the latter. In contrast, it is flat on the mummy board, even though it is possible that the concave form helped the artist to create the rotundity of the abdomen in this piece.

Figure 6. Details of the granulometry of the pigments on the inner lid—central panel—(**above**) and in the area of the eyes on the mummy board (**below**).

As for the decoration layer, we can see that the pieces have a high-quality level of craftsmanship and modelling apart from the outer lid, which is less accurate. The three pieces are also connected to each another through their geometry, which shows very few differences. These few differences in physiognomy and quality do not therefore lead to the conclusion that these coffins were produced in different places. It is more possible that they were not intentional, but maybe only linked to the impossibility of reproducing the same forms and accuracy on objects different in size, even if it is clearly the same style.

2.1.3. Overlapping the Layers (Figure 7)

The use of models and exported orthophotographs also allowed for the creation of different layers which could be used to better analyse the way the artist/(s) applied the decoration on the forms. In order to achieve this, another layer with a drawing of the decoration (layer 3) and one with the points for geometry (layer 4) were drawn and applied in transparency onto the physical geometry of the lids.

This phase showed that the pictorial layer corresponds exactly to the features rendered in the geometry and although some mismatches have been identified (i.e., the eyes), their regular occurrence on all three pieces suggests a specific/common way of reproducing and applying the decorated features on the modelled ones. For example, the eyebrows are painted above the mask's brow lines; the eyes, with iris and cosmetic lines, are drawn in the lower middle part of the bulged eyes, even though the lower part of the eyes and the make-up lines are lower or larger and overpass the limits of the bulge; the red eyelids

are drawn in the upper middle part of the bulged eyes; the thin red lines for the mouths follow the delicate forms given by the geometry.

Figure 7. Details of the faces of the Tanethereret set both with (**left**) and without texture (**middle**) and the overlapping of the drawing and point layers (**right**).

A kind of correction was made with regard to the earrings but this only occurred on the outer and inner lids. This appears to be different from the mummy board, as the bulged earrings on the two lids are less detailed and the rounded form they have seems to have been realised with the help of the colour that was applied. This is especially evident on the inner lid, where the right earring is less detailed than its counterpart on the left, and this was thus adjusted by the paint.

3. Analysis

3.1. Vertical and Horizontal Links: A Contextual Production?

The vertical and horizontal correspondences of both the visual appearance and the physical geometry observed in the three different pieces forming the Tanethereret set, as well as the perfect match between the decoration on the modelled three-dimensional objects, cannot be undervalued.

However, vertical and horizontal connections, as well as the precise overlapping of layers, are not predictable elements. The study of the geometry applied to more than 100 yellow coffins clearly demonstrates that when the pieces forming the same set are analysed, the results can indicate one or more of the following three different situations (Figure 8):

1. The visual appearance and the physical geometry match each other across all the pieces;
2. The visual appearance and the physical geometry are mismatched across all the pieces;
3. There is a partial match, where only the visual appearance matches across the different objects but they all differ in their physical geometry.

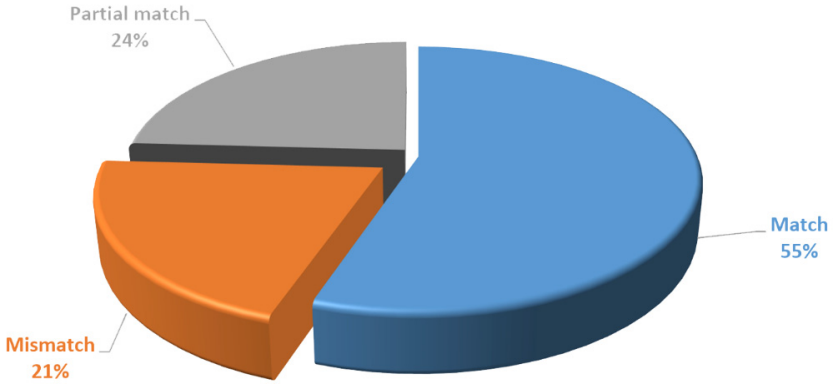

Figure 8. The percentage links between the objects that form parts of a set within the *Faces Revealed Project* corpus.

Where the two visualisations match, this has been interpreted as evidence of a possible contextual construction of the coffin, both in terms of its craft and decoration, by a single/specific "workshop"/artist at a specific date or time. This match was found for 55% of coffins in the *Faces Revealed* corpus, including the Tanethereret objects, and especially the inner lid and the mummy board.

Where no connection between the visual appearance and physical geometry is found, it is clear that the pieces were produced following different styles and were only put together to form a set at a later date or it is indicative of something happening during the production process. This is evident, for example, in the reused objects, which correspond to roughly 21% of the coffins. This interpretation is also supported by other data and studies. Due to the complexity and variety of the types of reuse of the "yellow" coffins and the identification of this reuse, the reliance on traditional methods (iconography, palaeography, craft, and structure) and more recent innovative techniques (archaeometry and imaging techniques, such as X-rays and CT scans) remains fundamental.

The best example to explain the match and the mismatch of an object within the same set as proof of a case of possible reuse or a different workshop is the coffin set of the royal scribe of the necropolis, Butehamon, in the *Museo Egizio di Torino*. This set comprises an outer and inner coffin, along with a mummy board (Cat 2236/01-02; Cat 2237/01-03) (Niwiński 1984; 1988, pp. 172–73, n. 385; 2024, pp. 21–47). While the outer coffin of the Butehamon set has largely been studied from an Egyptological perspective, recent years have also seen in-depth analyses being performed on the materials used in its production. Identification of the wood, the chemical composition of the colours and varnish, and its construction all formed the foundation of a project led by the VCP and culminated in a temporary exhibition in Turin in 2019 (Prestipino 2015; Prestipino et al. 2015; Santamaria et al. 2015; Prestipino 2019; AA.VV 2019). These new archaeometric investigations have focused on the outer coffin due to its "atypical" appearance, which has been deemed as such for the rare colour of the background being white instead of yellow, the limited use of varnish, and for some intriguing archaizing elements that hint at an ancient reuse. On the basis of its visual appearance, therefore, the outer coffin exhibits substantial differences from the inner lid and the mummy board, which in contrast share the same style of decoration. The same strict link between the inner lid and the mummy board is visible in the geometry, while the features and the human forms realised on the outer lid are different. This object thus seems to represent an isolated element of the set and differs from the related inner coffin and mummy board in its dimension, colours, and the layout of its decorations, but also in its geometry and quality of production (Figure 9).

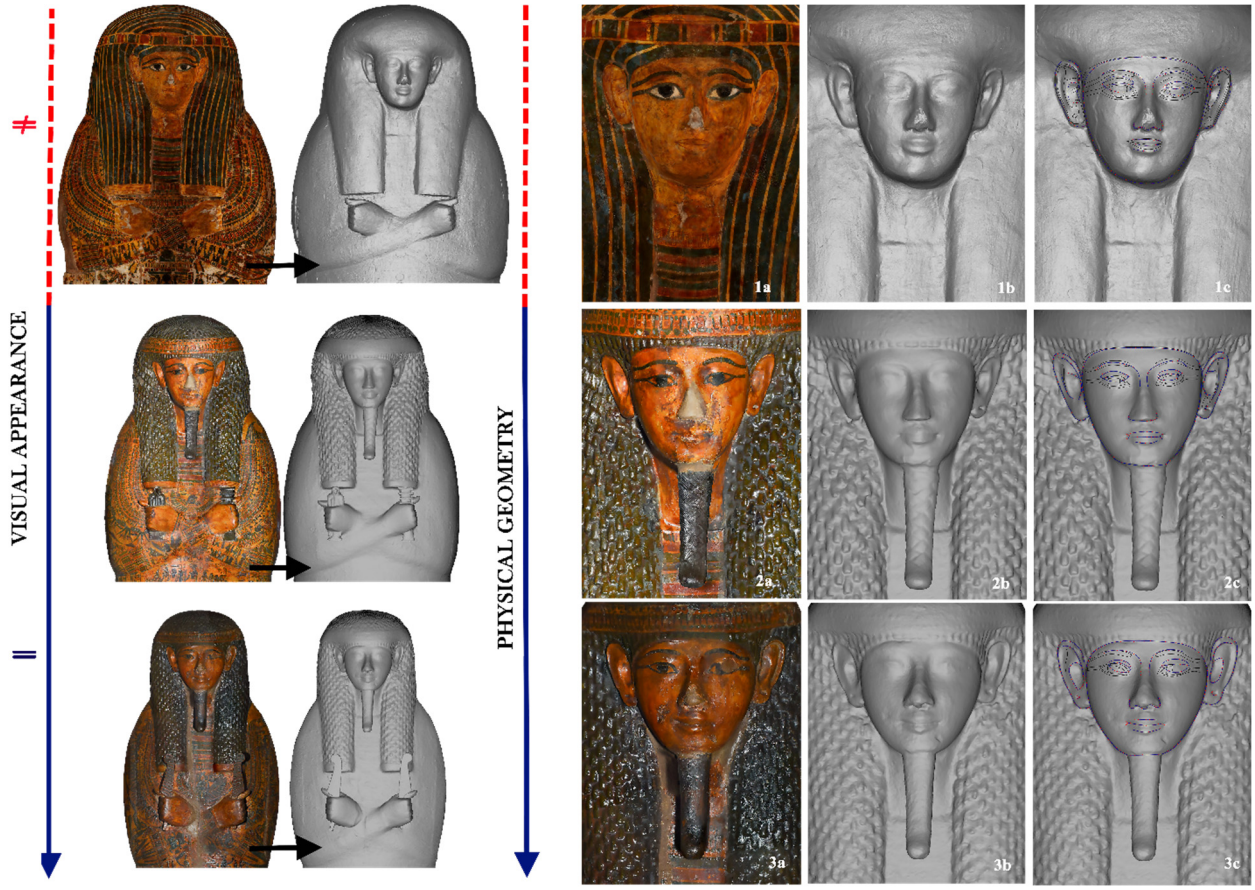

Figure 9. The coffin set of Butehamon (*Museo Egizio di Torino*, Cat 2236/01-02; Cat 2237/01-03). On the left, the vertical and horizontal connections between the three pieces forming the set are shown; on the right (**1a–3c**), details of the faces with and without texture and the overlapping of the drawing and point layers are shown.

More recent studies have confirmed that this coffin was built at a later date by assembling pieces of other coffins for the purposes of reuse; pieces of older black coffins were used for the box, while the lid was assembled using leftover wooden pieces that were possibly readily available in the workshop (AA.VV 2019, p. 80). It is still difficult to know exactly what happened during the production of the Butehamon coffin set, largely because another fragmentary outer coffin was found by Belzoni at the beginning of the 19th century (Niwiński 1988, p. 112, n. 47; 2024, p. 45). The close relation with the Belzoni finding and the Butehamon inner coffin in Turin suggests that while they were potentially produced in the same workshop, the outer coffin was never used but was replaced by the new outer coffin that is now in Turin. The fact that the history of the Butehamon outer coffin has been reconstructed via new technology lends further support to the hypothesis put forward by the *Faces Revealed Project*, stating that it is possible to identify different centres of production and the dates of objects by analysing their geometry, especially when they are part of a set.[16]

The final possibility to compare the two visualisations or layers is the partial match of coffin sets, pertaining to 24% of coffins in the sample. For example, if the match regards only one visualisation but very few matches exist in the geometry; this might be due to a possible adaptation of different objects that were made to match each other in their decoration by repainting an older coffin (ancient reuse) or by the use of other materials already present in the "workshop" that were "re-adapted" by the craftsman through the use of paint. This possibility is evident in the numerous coffins from the Bab el Gasus *Cache*, a high percentage of which were formed with reused coffins (Cooney 2019, 2020). The anonymous male coffins in the Louvre (E 10636) (Figure 10) or the set of Ikhy in the *Musei Vaticani* (MV 25035.3.1-3) (Mainieri 2023, Figures 11.5 and 11.6; Mainieri Forthcoming) are exemplary, showing that while sharing the same decoration, they exhibit different ways of rendering their human features and masks.

Figure 10. An anonymous coffin set of a deceased male from Bab el Gasus *Cache* (Lot I) in the *Musée du Louvre* (E 10636).

Another salient point emerges from the investigation of the way the decoration was applied to the three-dimensional features such as the modelled masks. This has yielded some important data that could be used to "detect" or give further information on the production of these objects, especially with regard to the quality of the "workshop" or the ability of the artist.[17] For example, it is not uncommon for the decorated features to not follow the modelled traits. It has been proven during the project that in various cases, there is a high modification of the modelled forms by the paint that may suggest more an intentional will to change the proportions, features, and perhaps the style of the coffin rather than a simple correction of errors made by the painter during the production process

(as observed, for instance, in the case of the right earring on the Tanethereret inner coffin lid). Massive modifications have been made, for instance, on the mummy board of a lady named Mutempermun in the *Museo Egizio di Torino* (S 7715/02) (Niwiński 1988, p. 173, n. 388; 2024, pp. 73–82; Del Vesco and Moiso 2017, p. 215).[18] The original form of the face on the Mutempermun mummy board was enlarged by 0.8 cm on the forehead by using yellow paint; the eyes were decorated in an attempt to correct the asymmetry of the bulged eyes and for this reason, the right eye does not correspond to the geometry; the painted earrings are smaller than the modelled ones with a difference in ca. of 0.8 cm. The failed application of the paint, symmetries, and the fact that the forearms and the hands are too big for the object, all suggest a very low level of craftsmanship of this object with leftover pieces possibly being used to assemble a mummy board, which was then adjusted through the decoration that was applied to the surface of the coffin (Figure 11).

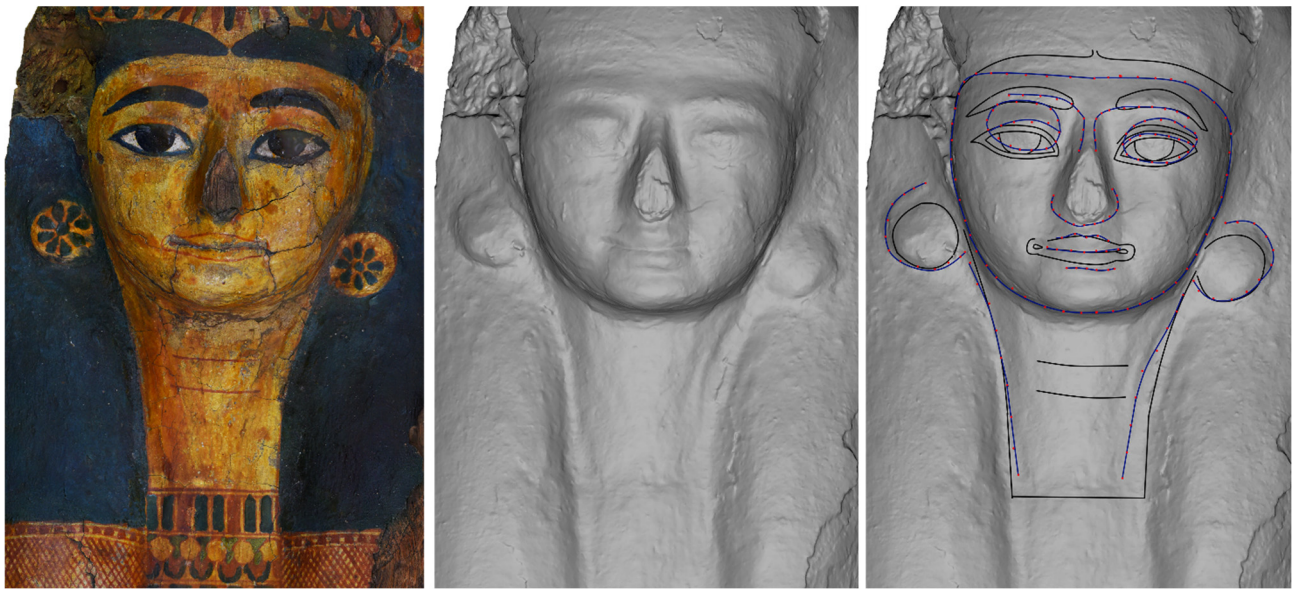

Figure 11. Details of the face of the mummy board of Mutemperamun (*Museo Egizio di Torino* S 7715/02) with (**left**) and without texture (**middle**) and the overlapping of the drawing and point layers (**right**).

Following these principles and considering all the evidence that has emerged from the Tanethereret objects, it can be assumed that the different pieces forming the coffin set were not opportunistically acquired to create a coffin set but were deliberately produced to create a coherent set both in craft and in decoration because they coincide in both their visual appearance and physical geometry and also in the way the decoration layer was applied to the traits. Even though the inner lid has elements that exhibit evidence of reuse, it was likely limited to the box itself or to a few other elements, or maybe the object was modified by the artists with the precise intention of following the same scheme across all three objects to have a coherent assemblage.

3.2. Evidence of Ancient Reuse or Stylistic Markers?

A second detail also merits further investigation here, namely the Ramesside features, and it needs to be questioned whether their presence on these objects is evidence of reuse or is perhaps more related to a specific style of production that was in use at a specific moment in history.

One of the most challenging tasks of the project is to isolate markers that could indicate the same production style and therefore lead back to some possible common origin (in terms of workshop) for various yellow coffins. While it remains possible to identify similarities between pieces from the same ensemble, finding identical objects outside the set is

more complex. This project, in fact, highlighted two important points, the high levels of variability observable in the rendering of the coffin forms and the different ways these features were mixed together on the same object. However, although they are less frequent, it is possible to find different sets that nonetheless share the same peculiar characteristics. This is the case with the Tanethereret set and the inner lid and mummy board of the singer of Amun, Henuttawy, at the Metropolitan Museum in New York (MET 25.3.183a, 25.3.184) (Figure 12). These objects demonstrate strong links to each other both in terms of their style of decoration but also in the way the features were modelled, and the decoration was applied to the three-dimensional surfaces.

Figure 12. Orthophotos of the inner lid and the mummy board of Henuttawy (MET 25.3.183a, 25.3.184) both with and without texture.

Found in Thebes in the reused tomb of an official of Hatshepsut, Minmose, during the MMA excavations in 1924–25,[19] the Henuttawy set has been dated to the middle 21st Dynasty (Niwiński 1988, p. 161, n. 313). Even though small differences in the painting exist, the objects have the same colour palette and the same decoration style and layout as that seen on the Tanethereret coffin set, especially in the choice of the form of the eyebrows, eyes, and mouths, as well as the way the hands were rendered, which are detailed and with numerous rings. But these objects also represent the closest parallel to the Tanethereret set in terms of their physical geometry. Both the visual appearance and physical geometry all the objects share ca. 15 to 19 common features, a high number, which until now was only found in objects forming the same set (Table 1).

Comparing the geometrical features, the five objects all share the following:

(1) A delicate almond-shaped face with full cheeks and a rounded chin with a small nose, small eyes in the upper part of the face, and a smiling mouth;
(2) Small earrings that are placed more or less in the middle of the face (cheekbone area) or slightly below (Figure 13A);
(3) A long naturalistic neck with a thin and almost imperceptible line of separation from the collar;
(4) Breasts that are smaller than the width of the lappets, even though they are smaller and more rounded on the inner lid (Figure 13B);
(5) Forearms that are fully rendered and arranged in a V form;
(6) Hieroglyphic hands that are well rendered, flat, and attached to the body (Figure 13C);
(7) A mummy board with a curved and enveloping shape;
(8) Inner lids that are rounded with a protruding belly, while the arms are less rounded on the sides, giving a slender appearance on the upper part of the lid.

Table 1. Table showing the comparison between the visual appearance and physical geometry variables of the objects forming the Tanethereret and Henuttawy sets. Results of the research are presented on the Compare Spreadsheet and can be accessed—with manual use—via the following link: https://facesrevealed.museoegizio.it/en/section/Compare/Compare-Spreadsheet/ (accessed on 1 June 2024).

		Visual Appearance								Physical Geometry									
		Wig	Breast	Eyebrows	Eyes	Mouth	Ear/Earrings	Forearms	Hands	Face	Wig	Breasts	Eyebrows	Eyes	Nose	Mouth	Ear/Earrings	Forearms	Hands	Shape
Tanethereret (Louvre E13035)	MB																			
Tanethereret (Louvre E13027)	OL																			
Tanethereret (Louvre E13034)	IL																			
Henuttawy (MET 25.3.183a)	IL																			
Henuttawy (MET25.3.184)	MB																			

Features in common with Tanethereret Mummy Board

Features in common with Tanethereret Outer Lid

Features in common with Tanethereret Inner Lid

No correspondence

Considering all these elements, it is clear that the Henuttawy and Tanethereret coffins are related in terms of the carpentry work and pictorial decorations. It is therefore possible that the sets share a common production style, that they come from the same "workshop", and that they were produced at the same time or very close to each other.

The most interesting link found between the objects regards the shape of the inner lids (Figure 14A1,A2) but above all, the enveloping shape of the two mummy boards with wooden axes on either side of the heads, the curvature and shape of the arms, and the orientation of the hands (Figure 14B1,B2). Furthermore, another interesting element of these two objects is the decoration of the arm area, with plumage for the Tanethereret mummy board and a reticulated pattern on a red background—covering the arms and the entire lower surface of the board—on Henuttawy. The plumage and bead-netting motifs come from the 20th Dynasty tradition. Both have been explained by scholars as being related to the feathered pattern of the 17th Dynasty *rishi* coffins or linked to the representation of Osiris and is therefore evidence for the identification of the god with the deceased (Schreiber 2006; Bettum 2012, 2018). The choice of these motifs on both mummy boards must also respond to the same ideology and cannot be a random choice, but is maybe a specific sign of the artist/workshop.

This study therefore raises the following important question: how is it possible that two different coffins with the same "distinctive" markers and geometric details were later repainted in exactly the same way in the early 21st Dynasty? Another theory can potentially be advanced at this stage, that perhaps the coffins were not reused and repainted from specimens of the Ramesside period, but were produced following an older style, at least concerning the shapes and geometrical features.

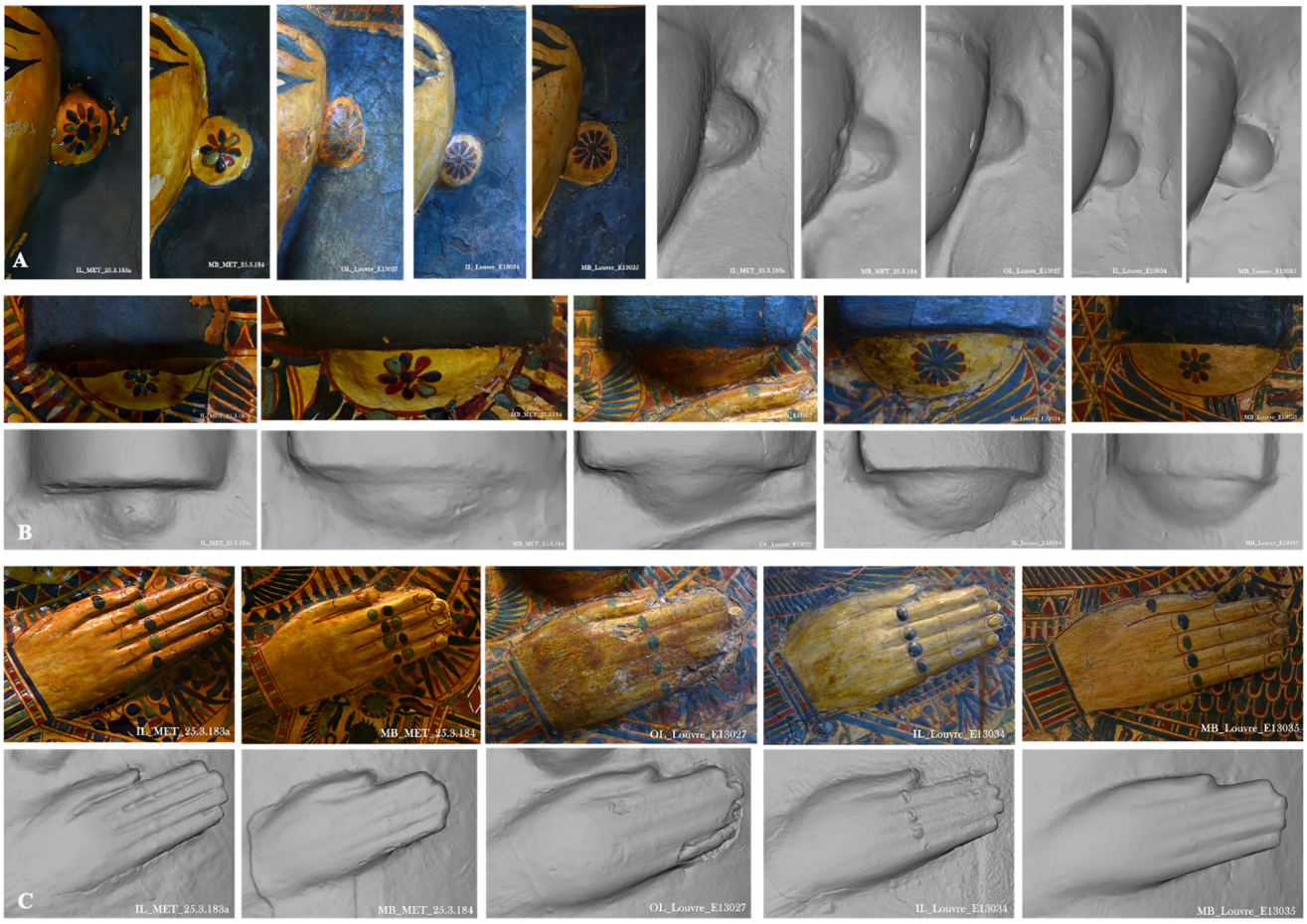

Figure 13. (**A**–**C**) Comparison of the earrings (**A**), breasts (**B**), and hands (**C**) with and without texture: (from the left) the inner lid and mummy board of Henuttawy (MET 25.3.183a, 25.3.184); the outer lid, inner lid, and mummy board of Tanethereret (*Musée du Louvre* E 13027, E 13034, E 13035).

As is usually the case in ancient societies, there is not an improvised break from the older style, but there is a slow and gradual transformation over time. As Sousa has recently pointed out, "innovations were systematically introduced in small details [...] were introduced coffin by coffin with the later objects adding new results to the earlier designs" (Sousa 2020b). While in the coffin decorations, a diachronic chronological evolution from the simple to the more complex (*horror vacui*) can clearly be seen, in the geometry, we encounter the opposite, namely from the more complex to simple. Furthermore, it seems that this evolution in the geometry is much slower and more gradual than that that occurs in the decorations.

The choice of a corpus of coffins covering the period between the 19th and the beginning of the 22nd Dynasty makes it possible to trace a chronological line of development of the forms. In the female coffins, this evolution is evident in the female gender markers. In the 19th Dynasty, earrings were small and located in the central part of the face or not present at all; the breasts were smaller and barely emphasised in the geometry at the end of the lappets. This element can be linked to the shape of the female wigs of this period, which are characterised by large lappets. Moreover, the forearms during this period were rendered three-dimensionally on the surface with a V-shaped cross, while the hands were hieroglyphic, attached to the body, and arranged horizontally.[20]

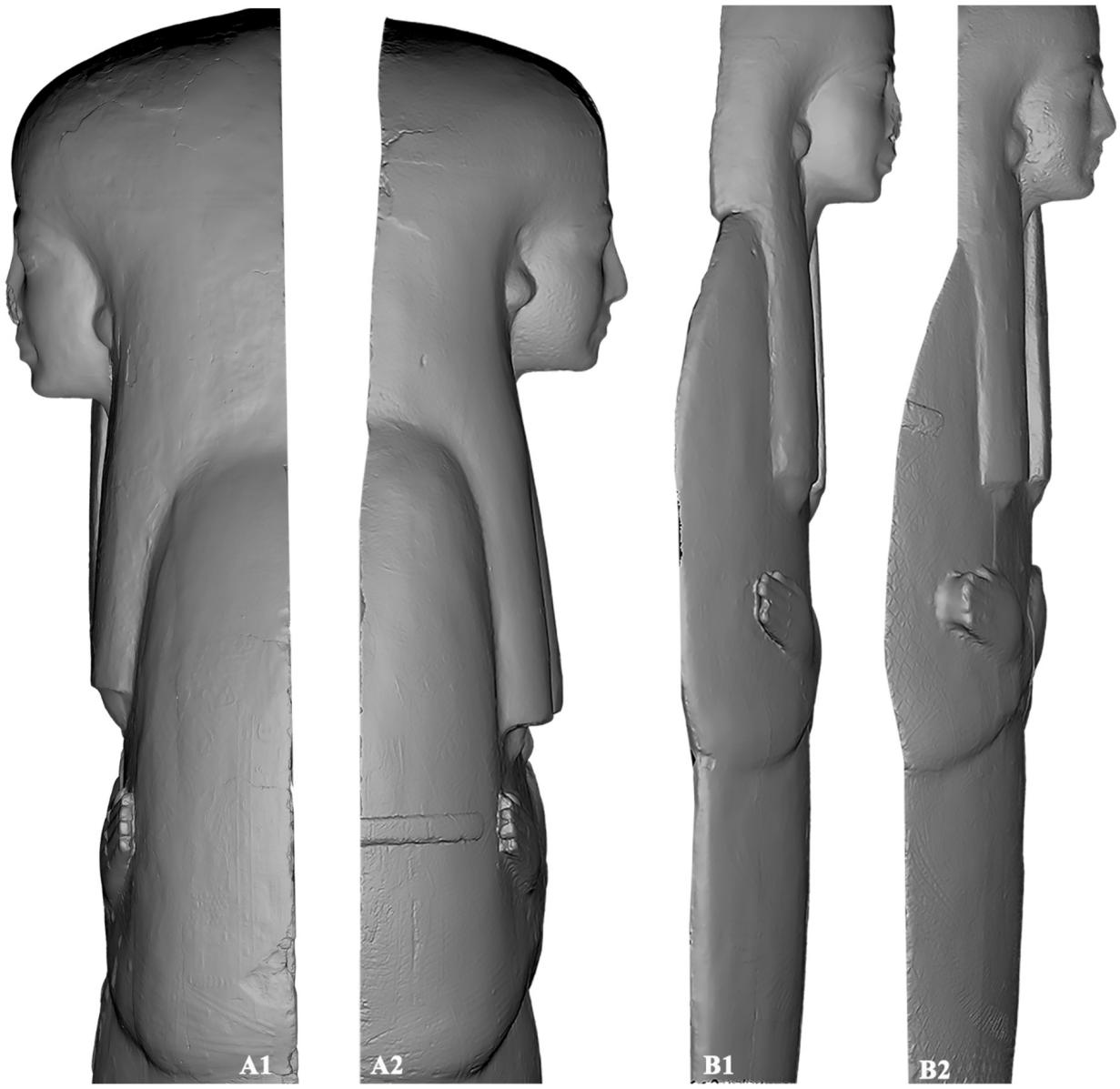

Figure 14. Comparison of the orthophotos without texture of the inner lid of Tanethereret (**A1**) and Henuttawy (**A2**) and the mummy board of Tanethereret (**B1**) and Henuttawy (**B2**).

From the Ramesside period until at least the beginning of the 22nd Dynasty—when these gender markers and forearms disappear completely—one can observe a gradual but progressive transformation of these elements both in their form and position. While at the beginning of the 21st Dynasty, the breasts appear narrower than the ends of the wig lappets, the more the dynasty progresses, the more they enlarge, until they completely cover both the width and thickness of the ends of the lappets. Similarly, the size and placement of earrings change in relation to the face, from round, small, and bulging earrings located in the centre of the face (level with the cheekbones) to gradually larger and less prominent earrings placed in the lower part of the face, more or less at the height of the jaws. The hands, which are almost flat and attached to the body by means of large amounts of plaster, become entities in their own right. Made three-dimensionally of wood, the hands are then attached to the body using pegs hidden by a thin layer of plaster. While the forearms are rendered three-dimensionally with the right arm crossing over the left and an oblique orientation, they gradually lose their detail over time. The thin lower roundness, which only indicates a line of demarcation of the upper from the lower part, was replaced by

shorter curves at the more external part of the forearms, which result in a flat and smooth surface at the end of the dynasty, when the only surviving feature are the narrow sides or lines to indicate elbows. The same line of development can be observed in the shape of the lids, changing from slender and elongated to rounded forms, and the mummy boards, where the enveloping shape becomes progressively flat while retaining the two wooden planks on either side of the head until (at least) the middle of the dynasty, only to then disappear at the end of the dynasty.

In this hypothetical development of changing forms and features (Figure 15), the coffins of Tanethereret and Henuttawy can be placed at the beginning of this chronological evolution, closer to the prototypes of the 19th–20th Dynasty, when the mix of tradition and innovation on these objects remains considerable. The Ramesside shape of the coffins and the painted yellow coffin style that decorated them has been traditionally interpreted as evidence of reuse. However, it is argued in this paper that rather than reuse, the Ramesside form continued to be used into the early 21st Dynasty when the new painted decorations were applied. In support of this hypothesis could also be in the combination of the new "yellow coffin" style with older patterns in decoration, such as the red stripes on the arms, the plumage and nets, and the plain black or red pitch on the inner parts. The continued use of these earlier forms could therefore be linked to the aforementioned line of development, i.e., in female forms (see *above*).

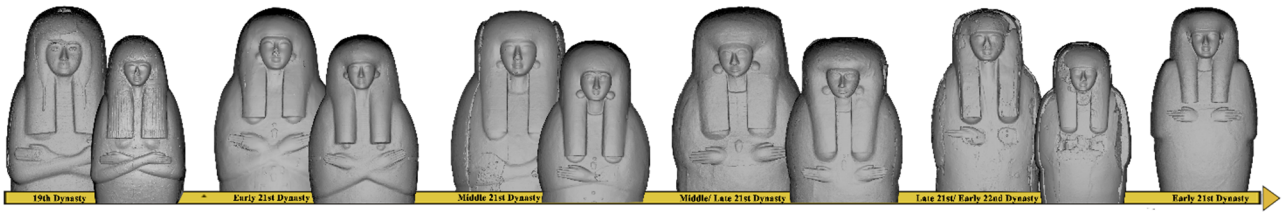

Figure 15. The chronological evolution of coffin forms. From the left, the outer lid of Tamutneferet (Louvre, N 2571), the inner lid of Iineferty (MET 86.1.5a), the inner lid of Tanethereret (Louvre, E 13034), the inner lid of Henuttawy (MET 25.3.183a), the inner lid of Tanetimen (Louvre, N 2562), the inner lid of Tabakenkhonsu (*Museo Egizio di Torino*, Cat.2226/02), the outer lid of Ikhy (MV, 25035.3.1), the outer lid of Djedmutiuesankh (*"Museo Egizio" di Firenze*, 8524), an anonymous female inner lid (Louvre, E 13045), the inner lid of Tanetshedmut (Louvre, N 2612), and the outer lid of Djedmut (MV, 25008.2.1) are shown.

4. Conclusions

Through the case study of the coffin of the Chantress of Amun Tanethereret, this article has shown how important the analyses of geometry and forms can be to the study of yellow coffins, especially in terms of their production. In the case of the *Louvre* set, a detailed analysis of the geometry, the human characteristics, and the way the decorations were applied to the forms indicate a common workshop for the three pieces that make up the set. Similarly, these same variables can allow one to link objects to other sets. This method made it possible to identify a common source of production between the coffins of Tanethereret and those of another Chantress of Amun preserved at the Metropolitan Museum in New York, Henuttawy.

The close correlation between the characteristics of these coffins also raises doubts concerning the hypothesised reuse of Tanethereret's own set, advanced due to the presence of Ramesside elements. The investigation of the features of a group of yellow coffins ranging from the 19th to the 22nd Dynasty has helped to identify a chronological development of the coffin forms. This could suggest that if Ramesside markers are found on the yellow coffins of the 21st Dynasty, then they could also be related to other reasons, such as the conservative style of the geometry and the shapes of the anthropoid coffins when compared to a new style of decoration, rather than an example of reuse.

Reuse is currently considered the most interesting artistic and social "action"/reaction performed by the ancient Egyptians, especially in periods of crisis and scarcity of materials. During the Late New Kingdom and the 21st Dynasty, reuse became common for coffins.[21] Making a coffin implied a huge demand on the economy, money, and skills and therefore, when the materials or money were scarce, coffin reuse became "the best way to create 'new' funerary objects for elites who required such funerary objects to manufacture social power" (Cooney 2023b, p. 4). Patrons and artists were therefore obliged to find the best solutions and the best way to adapt this concept in both the social and artistic spheres.

In the artistic sphere, numerous solutions were adopted by the artists to adapt an older coffin, all of them applied depending on what objects and money an individual could afford in a constant "balance of economic and social interests" (Cooney 2023b, p. 2). Those who were rich could afford to follow the most correct and traditional practise, while others negotiated their rituals to fit their socioeconomic group's values and purchasing power (Cooney 2007b, p. 286). The number of pieces that form a set and the different types of adaptations are therefore closely linked to the economic possibilities of the buyer, just as the quality of the result is linked to the ability of artists and workshops to re-commodify an object. For sure, dismantling a coffin was economically more disadvantageous and technically more complex than replacing a name or repainting an object while maintaining the old structure. In the latter case, the result was an object with the contemporary presence of old and new features, an original composition showing on the one hand archaism (visible generally in the morphology and shapes) and, on the other hand, innovations (generally visible in decoration). The identification of original "compositions" with reused products is still a matter of debate, as we know that the more reuse becomes necessary during the 21st Dynasty, the more artisans veil their changes, and without sophisticated diagnostic analyses, their correct interpretation is a challenging task.

Although we cannot (and do not want to) completely discard that old shapes and morphology can also be an indication of reuse—certainly attested to some coffins (e.g., the inner coffin lid of Muthotep, in London, British Museum EA 29579 (Cooney 2018a))—the hasty interpretation that everything "peculiar" in this period is an indication of reuse may be a limitation. This, in fact, leads to automatically dismissing the possibility that (at least) in the late 20th-early 21st Dynasty, some people could still economically afford new and coherent coffin sets but above all, that workshops and artists could be creative and innovative only in the way they re-adapt an object, freezing inevitably the dynamism of Egyptian artistic production. Analysing not only the decoration but also the way it is applied on the forms and then moving from one layer to the next, observing facial features and forms in detail, and extending the same type of analysis to other coffins, make it clear that there is a gradual and slow transformation of forms and objects. Tanethereret's example shows that workshops/artists were able to create high-quality products, consistent objects of different sizes and new shapes using ancient/archaic features, adding new details, eliminating others, and reworking everything until a new style of production was achieved. Similarly, the presence of the same features on different sets, such as that of Henuttawy, seems to confirm this hypothesis, further suggesting the existence of specific productions and workshops that perhaps brought about these innovations in morphology and decoration.

If this study supports the possibility of the existence of new objects and new forms created by specific workshops of high-level quality during a period of scarcity, it also implies that maybe some parts of society still had sufficient economic possibilities to commission new coffins and to pay for them. Tanethereret was a middle-class woman, perhaps endowed with the necessary money and able to engage craftsmen and artists to produce a coherent set consisting of three interconnected pieces with the same geometric style and the same masks, with her name and titles on all the pieces of the set (lids and boxes). The workshop and the artist who produced the coffins paid attention to the details, all the forms were the same, the masks had recognisable features, and the proportions were maintained. These elements seem then more in line with a new production than a reuse. If these coffins were reused, they were completely readapted to appear consistent not only in decoration

(the most visible part of the coffin during ceremonies (Cooney 2007b, p. 283; 2023a)) but also in modelling and masks, and also in perhaps unnecessary elements that required more time, more professionalism, and a greater expenditure of money, features apparently at odds with the economic concept of reuse. This aspect represents an important index of the socio-economic power of the client that cannot be undervalued, as it may represent an attempt to "manufacture social power". The nested coffin sets, in fact, were removed from their nest and paraded to the tomb, allowing the public to view and admire each container along the route (Cooney 2023a). Although the decoration was undoubtedly the most visible element during the funeral, the various aforementioned possibilities regarding the matching and mismatching of faces and geometrical forms across the different parts of the same sets demonstrate that despite being less visible, contextual sets in geometry played an important role in social power dynamics. It cannot be undervalued that most parts of coffins presenting both matches belong to middle- or high-level elites. In this context, the artistic forms are used as a tool to further reinforce hierarchisation and the exercise of power in the society. The middle or high elites were able not only to create full sets formed by three different pieces but had also the possibility to contact high-level quality workshops able to produce coherent sets in all points of view.

In conclusion, although the identification of reuse is still a major challenge, the application of this cheap and easy-to-use technology to this still little explored area of the study of yellow coffins has produced a considerable amount of new information, opened up new avenues for future research, advanced various hypotheses and perhaps changed some pre-existing interpretations, raised questions that need to be further analysed, and helped to reconstruct the complex history of these fascinating objects, the people who created them, and the society and time in which they were produced.

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Data Availability Statement: The *Faces Revealed Project* is accessible at the public page https://facesrevealed.museoegizio.it/. The raw and generated data and metadata are and will be stored in a Zenodo repository at the link (https://zenodo.org/communities/facesrevealedprojectmsca895130?q=&l=list&p=1&s=10&sort=newest and below). Full or limited access is regulated according to individual museums' copyright restrictions. Zenodo: 3D Models of the yellow coffins in the Museo Egizio, Torino (Italy) (1.0). https://doi.org/10.5281/zenodo.10589491 (Mainieri, 2024a). This project contains the following underlying data: Zenodo: 3D Model of the Mummy board of Butehamon, Museo Egizio, Torino (Inv. n. Cat. 2237/03) (Version 2). https://doi.org/10.5281/zenodo.10722083 (Mainieri, 2023c). Zenodo: 3D Model of the Inner lid of Butehamon, Museo Egizio, Torino (Inv. n. Cat. 2237/01) (Version 2). https://doi.org/10.5281/zenodo.10722825 (Mainieri, 2023d). Zenodo: 3D Models of the yellow coffins in the Rijksmuseum van Oudheden, Leiden. https://doi.org/10.5281/zenodo.10992877 (Mainieri, 2024b). Zenodo: 3D Models of yellow coffins in the Musée du Louvre. https://doi.org/10.5281/zenodo.11063613 (Mainieri, 2024c). Data are available under the terms of the Creative Commons Attribution 4.0 International license (CC-BY 4.0). The following data cannot be made publicly available due to individual museums' copyright restrictions. To have access to the data please contact the author. Mainieri (2023e). 3D Models of the coffin set of Tabakmut, Metropolitan Museum of Art, New York (Version 2) [Data set]. Zenodo. https://doi.org/10.5281/zenodo.10723049. Mainieri (2024d). 3D Models of yellow coffin lids in the Museo Archeologico Nazionale di Napoli (MANN) [Data set]. Zenodo. https://doi.org/10.5281/zenodo.11002992. Mainieri (2024e). 3D models of the yellow coffins in the Museo Gregoriano Egizio, Musei Vaticani [Data set]. Zenodo. https://doi.org/10.5281/zenodo.11080925. Mainieri (2024f). 3D Models of yellow coffin lids in the Egyptian Museum in Cairo (EMC) [Data set]. Zenodo. https://doi.org/10.5281/zenodo.11003088 Mainieri (2024g). 3D Model of the yellow coffin of Padiamon in the National Museum of Egyptian Civilization (NMEC) [Data set]. Zenodo. https://doi.org/10.5281/zenodo.11003100. Mainieri (2024h). 3D Models of the Anonymous yellow coffin set in the Los Angeles County Museum of Art (LACMA) (1,0) [Data set]. Zenodo. https://doi.org/10.5281/zenodo.10590118.

Conflicts of Interest: The authors declare no conflict of interest.

Notes

1 The chronological framework in this article is based on Shaw (2004, pp. 481–89).

2 The project received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement no. [895130]. https://facesrevealed.museoegizio.it/ (accessed on 1 Jume 2024). (Mainieri et al. 2022; Mainieri 2024b).

3 The *Vatican Coffin Project* (*VCP*) is an international project set up by the Egyptian Department of the *Musei Vaticani*, directed by the Curator Alessia Amenta and in collaboration with the Diagnostic Laboratory for Conservation and Restoration of the *Musei Vaticani* to study the yellow coffins of the Third Intermediate Period. Other partners are the *Rijksmuseum van Oudheden* in Leiden, *Musée du Louvre* in Paris, *Museo Egizio di Torino*, *Centre de Recherche et de Restauration des Musées de France* (C2RMF) in Paris, *Centro Conservazione e Restauro La Venaria Reale* in Turin, and *Xylodata* in Paris (see Amenta et al. 2010; Amenta 2014; Amenta and Guichard 2017).

4 See also the public webpage https://facesrevealed.museoegizio.it (accessed on 1 June 2024).

5 The shape of the mummy's boards, the pieces of wood for the head, the raised belly, and the crossed forearms have always been considered indicative of an older period, characteristic of Ramesside coffins.

6 https://collections.louvre.fr/en/ark:/53355/cl010077886 (accessed on 15 April 2024) (Delange and Colinart 1997; Niwiński 1988, pp. 163–64, n. 328; Aston 2017; Cooney 2018b; Rigault 2020; Rigault-Déon and Niwiński 2024, pp. 250–97, Cat. 6 a-e).

7 In this article, a detailed description of the decoration will only concern the features which are the object of study of the *Faces Revealed Project*, such as the facial features and human forms. For a full and detailed description of the iconographic and palaeographic apparatuses (see Rigault-Déon and Niwiński 2024, pp. 250–97, Cat. 6 a-e).

8 Outer coffin: *Ficus sycomorus* L., *Faidherbia albida*, *Acacia* cf. *nilotica*, *Tamarix* sp., and *Salix* sp.; inner coffin: *Ficus sycomorus* L., *Faidherbia albida*, and *Jujubier* (*Ziziphus* sp.); mummy board: *Faidherbia albida*. The coffins of the *Musée du Louvre* have been analysed for wood identification since 1998 with the *Centre de Cooperation Internationale en Recherche Agronomique pour le Développement* (CIRAD). In 2012, microsamples were taken, built upon previous research, allowing for the species used in the construction of these coffins to be determined (Asensi Amorós 2024).

9 The *incamottatura* technique consists of the application of tissue (generally linen textile) over wood joins to bridge any plank irregularities and to better fix the layers where the paint was then applied.

10 The production of yellow coffins is a highly complex process, involving the layering of diverse materials, including wood, tissue, plaster, paint, and varnish (see also in this article Figure 3). For a detailed account of the structural composition and the materials used in the fabrication of these coffins, one may refer to (Dawson 2018).

11 The *VCP*, the *Musée du Louvre*, and the *Centre de Recherche et Restauration des Musée de France* (C2RMF) have been working on identifying the composition of pigments used on the yellow coffin since 2011 in order to identify the painter's palette and the development of the colouring of the coffins. Amongst the 10 groups of coffins analysed is the inner coffin of Tanethereret. This coffin is formed by iron-based yellow, black, and red colours, Egyptian blue, and a copper-based synthetic pigment for the green colour, while the white paste layer is formed by (1) huntite and (2) dolomitic limestone (Brunel-Duverger 2020; Brunel-Duverger and Pagès-Campagna 2024).

12 The linked data are stored in the *Faces Revealed Project* repository (Mainieri 2024a).

13 Vertical connections mean that links exist in both the decoration and geometry between the different pieces forming the set; for horizontal connections, one indicates how the two visualisations (visual appearance and the physical geometry) of the same object match up. For more information and a detailed description of the instruments, methodology, and the different phases used to create the "digital twin" (see Mainieri et al. 2022; Mainieri 2024b).

14 In contrast to the preceding periods, in the "yellow coffins", artisans commenced depicting the gender of the deceased interred in the coffin by incorporating specific gender markers. The presence of breasts, earrings, or open hands signified a female deceased, whereas a beard, ears, and closed hands indicated a male deceased. For gender transformation (see Cooney 2010).

15 The *pastiglia* is a low-relief decoration technique in a white paste, which can be gilded or painted, used on coffin lids for making scarabs, sun discs, and deities in a low relief (see Geldhof 2017).

16 Unfortunately, the outer lid of the coffin in Brussels is not preserved and a geometric analysis and a comparison with the inner lid and the mummy board of Butehamon in *Museo Egizio* cannot be made.

17 The use of colour "to mask the poor work of the sculptors" is well known in the tombs. See, for example, the tomb of Mereruka, Pieke 2011.

18 https://collezioni.museoegizio.it/itIT/material/S_7715_02/?description=&inventoryNumber=&title=&cgt=&yearFrom=&yearTo=&materials=&provenance=&acquisition=&epoch=&dynasty=&pharaoh= (accessed on 15 April 2024).

19 The objects were found with the outer coffin, which is not considered in this article (Winlock 1942, p. 110).

20 Examples are the Iineferty set (MET 86.1.5.a, 86.1.5.c) and the Tamutneferet set (Louvre N 2571, N 2623, N 2361).

21 All the implications that reuse had on the economy, society, religion, and artistic production have been largely and masterfully analysed by Cooney (see Cooney 2007a, 2007b, 2011, 2014, 2017, 2018a, 2018b, 2019, 2020, 2021, 2023b).

References

AA.VV. 2019. *Archeologia Invisibile. Catalogo della mostra (Torino, 13 marzo 2019-6 gennaio 2020)*. Torino: AA.VV.

Amenta, Alessia. 2014. The Vatican Coffin Project. In *Thebes in the First Millennium BC*. Edited by Elena Pischikova, Julia Budka and Kenneth Griffin. Newcastle: Cambridge Scholars Publishing, pp. 483–99.

Amenta, Alessia, and Hélène Guichard, eds. 2017. *Proceedings First Vatican Coffin Conference: 19–22 June 2013*. Città del Vaticano: Edizioni Musei Vaticani.

Amenta, Alessia, Ulderico Santamaria, Fabio Morresi, and Giovanna Prestipino. 2010. "Vatican Coffin Project". Alnalisi per immagini nel campo spettrale dell'ultravioletto e dell'infrarosso. Paper presented at the VIII Congresso Nazionale IGIIC—Lo Stato dell'Arte, Venezia, Italy, September 16–18; pp. 359–65.

Asensi Amorós, María Victoria. 2024. Etude des matériaux et technques. Les bois des cercueils. In *Les cercueils égyptiens de la XXIe au début de la XXIIe dynastie. La collection du musée du Louvre*. Edited by Patricia Rigault-Déon and Andrzej Niwiński. Paris: Khéops/Muséé du Louvre, pp. 36–44.

Aston, David A. 2017. "The third cache": Myth or reality? In *A True Scribe of Abydos: Essays on First Millennium Egypt in Honour of Anthony Leahy*. Edited by Claus Jurman, Bettina Bader and David A. Aston. Leuven: Peeters Publishers, pp. 1–26.

Bettum, Anders. 2012. Faces Within Faces. The Symbolic Function od Nested Yellow Coffins in Ancient Egypt. Ph.D. dissertation, University of Oslo, Faculty of Humanities, Oslo, Norway.

Bettum, Anders. 2018. Nesting (part two): Merging of layers in New Kingdom coffin decoration. In *Ancient Egyptian Coffins: Craft Traditions and Functionality*. Edited by John H. Taylor and Marie Vandenbeusch. London: British Museum London, pp. 275–91.

Bierbrier, Morris Leonard. 2012. *Who Was Who in Egyptology*, 4th ed. London: Egypt Exploration Society.

Brunel-Duverger, Lucile. 2020. Couleur et technique des cercueils à fond jaune de la 21e dynastie égyptienne: De l'origine des pigments à leur altération (LuxOr). Ph.D. thesis, CY Cergy Paris Université, Cergy, France. Available online: http://www.theses.fr/2020CYUN1006 (accessed on 3 December 2021).

Brunel-Duverger, Lucile, and Sandrine Pagès-Campagna. 2024. Identification matérielle et protocole de mse en couleur des cercueils à fond jaune. In *Les cercueils égyptiens de la XXIe au début de la XXIIe dynastie. La collection du musée du Louvre*. Edited by Patricia Rigault-Déon and Andrzej Niwiński. Paris: Khéops/Muséé du Louvre, pp. 45–56.

Cooney, Kathlyn M. 2007a. *The Cost of Death: The Social and Economic Value of Ancient Egyptian Funerary Art in the Ramesside Period*. Leiden: Nederlands Instituut voor het Nabije Oosten.

Cooney, Kathlyn M. 2007b. The Functional Materialism of Death in Ancient Egypt: A Case Study of Funerary Materials from the Ramesside Period. In *Das Heilige und die Ware.Zum Spannungsfeld von Religion und Ökonomie*. Edited by Martin Fitzenreiter. London: Golden House, pp. 273–99.

Cooney, Kathlyn M. 2010. Gender transformation in death: A case study of coffins from Ramesside Period Egypt. *Near Eastern Archaeology* 73: 224–37. [CrossRef]

Cooney, Kathlyn M. 2011. Changing burial practices at the end of the New Kingdom: Defensive adaptations in tomb commissions, coffin commissions, coffin decoration, and mummification. *Journal of the American Research Center in Egypt (JARCE)* 47: 3–44.

Cooney, Kathlyn M. 2014. Ancient Egyptian funerary arts as social documents: Social place, reuse and working towards a new typology of 21st Dynasty coffins. In *Body, Cosmos and Eternity. New Research Trends in the Iconography and Symbolism of Ancient Egyptian Coffins*. Edited by Rogério Sousa. Oxford: Archaeopress Publishing Ltd., pp. 45–66.

Cooney, Kathlyn M. 2017. Coffin reuse: Ritual materialism in the context of scarcity. In *Proceedings of the First Vatican Coffin Conference: 19–22 June 2013*. Edited by Alessia Amenta and Hélène Guichard. Città del Vaticano: Edizioni Musei Vaticani, pp. 101–12.

Cooney, Kathlyn M. 2018a. Coffin Reuse in Dynasty 21: A case study of the coffins in the British Museum. In *Ancient Egyptian Coffins: Craft Traditions and Functionality*. London: British Museum London, pp. 295–322.

Cooney, Kathlyn M. 2018b. The end of the New Kingdom in Egypt. How ancient Egyptian funerary materials can help us understand society in crisis. In *The Ramesside Period in Egypt. Studies into Cultural and Historical Processes of the 19th and 20th Dynasties. Proceedings of the International Symposium held in Heidelberg (5th–7th June 2015)*. Edited by Sabine Kubish and Ute Rummel. Hurghada: Sonderschriften des Deutschen Archäologischen Instituts Kairo (SDAIK), vol. 41, pp. 63–88.

Cooney, Kathlyn M. 2019. Patterns of coffin reuse from Dynasties 19 to 22. In *Ancient Egyptian Coffins*. Edited by Helen Strudwick and Julie Dawson. Oxford: Oxbow Books, pp. 96–108.

Cooney, Kathlyn M. 2020. The Bab el-Gasus coffin cache and patterns of reuse. In *Bab El-Gasus in Context. Rediscovering the Tomb of the Priests of Amun*. Edited by Rogério Sousa, Alessia Amenta and Kathlyn M. Cooney. Roma: L'ERMA di Bretschneider, pp. 109–36.

Cooney, Kathlyn M. 2021. *Coffin Commerce: How a Funerary Materiality Formed Ancient Egypt*. Cambridge: Cambridge University Press.

Cooney, Kathlyn M. 2023a. Golden Coffins, Golden Tombs: Innovation and Display of Social Power. In *Mural Decoration in the Theban Necropolis: Papers from the Theban Workshop 2016*. Edited by Betsy M. Bryan and Peter F. Dorman. Studies in Ancient Cultures. Chicago: Institute for the Study of Ancient Cultures, vol. 2, pp. 35–60.

Cooney, Kathlyn M. 2023b. *Recycling for Death: Coffin Reuse in Ancient Egypt and the Theban Royal Caches*. Cairo: American University in Cairo Press.

Dawson, Julie. 2018. *How to Make an Egyptian Coffin. The Construction and Decoration of Nespawershefyt's Coffin Set*. Cambridge: The Fitzwilliam Museum.

Dawson, Julie, and Helen Strudwick, eds. 2019. *Ancient Egyptian Coffins: Past—Present—Future*. Oxford and Philadelphia: Oxbow Books.

Dawson, Julie, Jennifer Marchant, and Eleanor Von Aderkas. 2016. Egyptian coffins: Materials construction and decoration. In *Death on the Nile: Uncovering the Afterlife of Ancient Egypt*. Edited by Helen Strudwick and Julie Dawson. Cambridge: Fitzwilliam Museum, pp. 75–111.

Del Vesco, Paolo, and Beppe Moiso. 2017. *Missione Egitto 1903–1920. L'avventura archeologica M.A.I. raccontata*. Modena: Panini editore.

Delange, Elisabeth, and Silvie Colinart. 1997. Un champ d'observations: La restauration des sarcophages au Musée du Louvre. *Bulletin de la Société française d'égyptologie (BSFE)* 139: 18–38.

Geldhof, Elsbeth. 2017. Painting techniques of the Leiden coffins. In *The Coffins of the Priests of Amun. Egyptian Coffins from the 21st Dynasty in the Collection of the National Museum of Antiquities in Leiden*. Edited by Lara Weiss. Leiden: Sidestone Press, pp. 49–67.

Johnston, Kea M. 2022. Unseen Hands: Coffin production at Akhmim, Dynasties 21–30. Ph.D. dissertation, University of California, Berkeley, CA, USA.

Mainieri, Stefania. 2023. Photogrammetry and Face Carvings: Exploring the 'face' of the Egyptian anthropoid coffins by 3D modelling. In *Ancient Egypt, New Technology the Present and Future of Computer Visualization, Virtual Reality and Other Digital Humanities in Egyptology*. Edited by Rita Lucarelli, Joshua A. Roberson and Steve Vinson. Harvard Egyptological Studies. Leiden: Brill, vol. 17, pp. 261–80.

Mainieri, Stefania. 2024a. 3D Models of Yellow Coffins in the Musée du Louvre. [Data Set]. CC-BY 4.0. *Zenodo*. [CrossRef]

Mainieri, Stefania. 2024b. Faces Revealed Project and ancient Egyptian 'yellow' coffins: A new methodology step-by-step. *Open Research Europe* 4: 193. [CrossRef] [PubMed]

Mainieri, Stefania. Forthcoming. Faces Revealed Project. Analysis of the yellow coffins in the Museo Gregoriano Egizio. *Bollettino Monumenti, Musei e Gallerie Pontificie Musei Vaticani* 41: 53–79.

Mainieri, Stefania, Alessandro Mandelli, and Corinna Rossi. 2022. Digital Humanities: A holistic approach to classify yellow coffins. *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences* 46: 335–41. Available online: https://www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XLVI-2-W1-2022/335/2022/ (accessed on 8 March 2022). [CrossRef]

Niwiński, Andrzej. 1984. Butehamun. Schreiber der Nekropolis. *Studien zur Altägyptischen Kultur* 11: 135–56.

Niwiński, Andrzej. 1988. *21st Dynasty Coffins from Thebes Chronological and Typological Studies*. Mainz: Philipp von Zabern.

Niwiński, Andrzej. 1989. The 21st dynasty religious iconography project: Exemplified by the scene with three deities standing on a serpent. In *Akten des Vierten Internationalen Ägyptologen Kongresses München 1985*. Edited by Sylvia Schoske. Hamburg: Buske, pp. 305–14.

Niwiński, Andrzej. 2000. Iconography of the 21st dynasty: Its main features, levels of attestation, the media and their diffusion. *Images as Media: Sources for the Cultural History of the Near East and the Eastern Mediterranean (1st millennium BCE). Orbis Biblicus et Orientalis* 175: 21–43.

Niwiński, Andrzej. 2024. *Sarcofagi della XXI dinastia (CGT 10101–10122)*. Serie II—Collezioni. Torino: Ministero per i beni e le attività culturali-Soprintendenza al Museo delle antichità egizie, vol. IX.

Niwiński, Andrzej. 2017. The 21st Dynasty coffins of non-Theban origin. A 'family' for the Vatican coffin of Anet. In *Proceedings of First Vatican Coffin Conference: 19–22 June 2013*. Edited by Alessia Amenta and Hélène Guichard. Città del Vaticano: Edizioni Musei Vaticani, pp. 335–48.

Niwiński, Andrzej. 2018. The decoration of the coffin as a theological expression of the idea of the universe. In *Ancient Egyptian Coffins. Craft Traditions and Functionality*. Edited by John H. Taylor and Marie Vandenbeusch. London: British Museum London, pp. 33–46.

Prestipino, Giovanna. 2015. *Il sarcofago esterno di Butehamon. Relazione tecnica dell'intervento di restauro*. Vatican City: Musei Vaticani, Unpublished Report.

Prestipino, Giovanna. 2019. Experimenting with adhesives and consolidants for use in the conservation of Egyptian polychrome wooden objects. In *Ancient Egyptian Coffins: Past, Present, Future*. Edited by Julie Dawson and Helen Strudwick. Oxford: British Museum London, p. 208.

Prestipino, Giovanna, Ulderico Santamaria, Fabio Morresi, Alessia Amenta, and Christian Greco. 2015. Sperimentazione di adesivi e consolidanti per il restauro di manufatti lignei policromi egizi. Paper presented at the XIII Congresso Nazionale IGIIC—Lo Stato dell'Arte—Centro Conservazione e Restauro La Venaria Reale, Torino, Italy, October 22–24; pp. 261–70.

Rigault-Déon, Patricia. 2024. La constitution de la collection. In *Les cercueils égyptiens de la XXIe au début de la XXIIe dynastie. La collection du musée du Louvre*. Edited by Patricia Rigault-Déon and Andrzej Niwiński. Paris: Khéops/Muséé du Louvre, pp. 2–7.

Rigault-Déon, Patricia, and Andrzej Niwiński. 2024. *Les cercueils égyptiens de la XXIe au début de la XXIIe dynastie. La collection du musée du Louvre*. Paris: Khéops/Muséé du Louvre.

Rigault, Patricia. 2020. The constitution of the collection of 21st Dynasty coffins of the Egyptian department of the Louvre Museum. In *Bab El-Gasus in Context. Rediscovering the Tomb of the Priests of Amun*. Edited by Rogério Sousa, Alessia Amenta and Kathlyn M. Cooney. Roma: L'ERMA di Bretschneider, pp. 395–408.

Santamaria, Ulderico, Fabio Morresi, Smone Bizzarri, Fabio Castro, Lucia Colarusso, Maurizio Delle Rose, Valentina Morandi, and Andrea Pernella. 2015. *Sarcofago di Butehamon. Relazione Analisi effettuate dal Laboratorio di diagnostica per la Conservazione ed il Restauro dei Musei Vaticani*. Vatican City: Musei Vaticani, Unpublished Report.

Schreiber, Gábor. 2006. The Mummy-board of Tashedamun from TT -61-. *Acta Antiqua* 46: 185–95. [CrossRef]

Shaw, Ian. 2004. *The Oxford History of Ancient Egypt*. Oxford: OUP Oxford.
Sousa, Rogério. 2018a. *Gleaming Coffins. Iconography and Symbolism in Theban Coffin Decoration (21st Dynasty): The Sheltering Sky*. Coimbra: Imprensa da Universidade de Coimbra/Coimbra University Press.
Sousa, Rogério. 2018b. The genealogy of images: Innovation and complexity in coffin decoration during dynasty 21. In *Ancient Egyptian Coffins: Craft Traditions and Functionality*. Edited by John H. Taylor and Marie Vandenbeusch. London: British Museum London, pp. 17–32.
Sousa, Rogério. 2020a. *"Yellow" Coffins from Thebes: Recording and Decoding Complexity in Egyptian Funerary Arts (21st–22nd Dynasties)*. Oxford: BAR Publishing.
Sousa, Rogério. 2020b. "Yellow" type and genealogy: Formal variability and meaning in coffin decoration. In *"Yellow" Coffins from Thebes. Recording and Decoding Complexity in Egyptian Funerary Arts (21st–22nd Dynasties)*. Edited by Rogério Sousa. Oxford: BAR Publishing, pp. 209–16.
Strudwick, Helen, and Julie Dawson, eds. 2016. *Death on the Nile: Uncovering the Afterlife of Ancient Egypt*. Cambridge: Fitzwilliam Museum.
Taylor, John H. 1985. The Development of Theban Coffins During the Third Intermediate Period: A Typological Study. Ph.D. dissertation, University of Birmingham, Birmingham, UK, , vols. I–II.
van Walsem, René. 1997. *The Coffin of Djedmonthuiufankh in the National Museum of Antiquities at Leiden. Technical and Iconographic/Iconological Aspects*. vols. I–II. Leiden: Nederlands Instituut voor het nabije oosten.
Vilaró-Fabregat, Jaume. 2024. Social Signifiers and Creative Production in the 20th and 21st Dynasties: (Re)Discovering the Individual in Yellow Coffin Decorative Models. Ph.D. dissertation, Scuola Superiore Meridionale, Napoli, Italy.
Winlock, Herbert E. 1942. *Excavations at Deir el Bahri: 1911–1931*. New York: Macmillan Press.