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Reviewed Article:

‘Re-rolling’ a Mummy: an Experimental Spectacle at Manchester Museum

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Ancient Egyptian animal mummies and votive statuettes were often wrapped in linen, concealing the contents and conferring sanctity to the remains. Mummy autopsies were commonplace in 19th century Europe, when ancient mummified bodies were unwrapped to reveal what lay beneath the linen bandages. Similarly, votive statuettes were often unwrapped upon discovery, either by archaeologists or grave-robbers. Modern radiographic

techniques allow researchers to better understand the nature of their contents and construction in a completely non-invasive manner.
Researchers at the University of Manchester have successfully mummified animal cadavers using techniques witnessed through the radiographic study of ancient mummies, yet how these artefacts were wrapped, often elaborately, remains unknown. In February 2016, combining the expertise of conservators, textile specialists and artists, a modern mummy was 're-rolled' at Manchester Museum in the UK marking the 40th anniversary of the unwrapping of Mummy 1770.

> Forty years after the autopsy of Mummy 1770, Manchester Museum played host to a rather different event - a mummy re-rolling. The event highlighted the progress made in the non-destructive study of mummified remains since Victorian times through the continued application of non-invasive imaging methods which preserve the integrity of mummies. Founded upon sound scientific evidence acquired through the academic study of ancient mummies, the live experimental event fulfilled the engagement criteria of the funding body whose support made the research possible.

Introduction

The unwrapping and dissection of mummified bodies was a common practice in 19th century Europe. These autopsies were conducted as part of scientific endeavours and social spectacles, motivated by a desire to advance the fields of science, medicine and archaeology, coupled with a sense of macabre fascination (Moshenska, 2014). The scientific capability required to study mummified remains non-invasively had yet to be developed, leading to the destruction of many hundreds of specimens.

Manchester Museum, the University of Manchester, played host to a number of human mummy autopsies, including that of Khnum-Nakht and Nehkt-Ankh, the 'Two Brothers' documented by Margaret Murray in 1908 (Murray, 1910), and Mummy 1770 by Rosalie David in 1975 (See Fig. 1) (David, 1979). Mummy autopsies today are rarely considered necessary due to the availability of a suite of non-invasive scientific techniques which enable these valuable remains to be studied in an ethically acceptable way.

Linen in ancient Egypt

The flax plant (*Linum usitatissimum*), grew in abundance in Egypt during ancient times and the linen produced from it was a highly prized and valuable commodity used to manufacture household items, clothing and material goods for religious purposes. Linen was also used in large quantities to wrap the bodies of humans and animals following artificial embalming. Votive artefacts made from metal, ceramic, wax, wood and faience were originally wrapped in layers of linen, much of which was removed upon discovery, either by archaeologists

or grave-robbers (See Fig. 2) (Riggs, 2014). Linen garments played a major role in daily temple life whereby sacred statues would be 'dressed' at prescribed times as part of temple ritual (Vogelsang-Eastwood, 2000, p.94; Riggs, 2014, pp.130-40).

Varying qualities of linen were used in the production of mummies, not all of which were produced specifically for the purpose (Ikram and Dodson, 1998, p.153; Taylor, 2001, pp.58-60; Vogelsang-Eastwood, 2000, p.295). Many of the fabrics used to wrap the dead had previously served other functions, such as clothing, household linens and as the sacred coverings of religious statues. Spell 61 of Coffin Texts, a mortuary corpus which eludes to the Egyptian desire for immortality, suggests that temple linens were reused to make mummy wrappings – '*You are dressed in the pure garments of Ptah, in the cast-off garments of Hathor*' (De Buck, 1935 p.258).

The use of linen as a wrapping medium signified an attempt by the ancient Egyptians to conceal the contents from public view. Whether the object being wrapped was a religious statue, a mummified human or animal body, or a votive artefact, encapsulation in linen formed a highly symbolic boundary between the object and its surroundings (Riggs, 2014, p. 21-27). The linen's semi-permeable qualities allowed the essence of the object contained within to be absorbed into the fabric, therefore itself assuming a semi-divine state (Riggs, 2014, p.132).

In contrast to the importance afforded to linen by the ancient Egyptians, many mummy autopsies concentrated on the physical remains and paid little attention to the wrappings. When Murray unwrapped the 'Two Brothers' in 1908, attempts were made to preserve the linen rather than discard it, and in David's autopsy of Mummy 1770 in 1975, a textile conservator prepared an accurate record of the unwrapping, layer by layer (Wild, 1979). Few stories are as shocking to modern sensitivities as the arrival of two ships containing an estimated 180,000 ancient Egyptian cat mummies, bereft of their linen wrappings, at the port of Liverpool in 1890 (Cooke, 2015). Archaeologists faced with wrapped votives and 'dressed' statuary on site, deemed the contents to be of greater importance in financial and archaeological terms, and were quick to remove the linen wrappings to reveal the once-secret contents (Riggs, 2014, p.27-32). This stripping back of the linen covering, at whatever point in history and for whatever motivation, destroyed the sacred context of the artefact and a wealth of information about their production.

Animal mummies produced as votive offerings for dedication to the gods demonstrate a remarkable array of wrapping styles and decorative features. These range from plain monochrome shrouds to elaborate designs constructed from multi-coloured linen strips arranged to form geometric patterns. Artistic conventions such as applique, modelled forms and painted features give the bundles a more 'life-like' appearance, therefore enhancing their appeal to the animal god to whom they were offered (Price, 2015, p.21).

Due to the complete absence of documentary evidence to explain how these mummies were produced, studying the mummified remains themselves provides the best hope of understanding the ancient design and production process. Scientific techniques enable researchers to view the contents of these wrapped bundles, yet how the linen designs were created remains largely unknown.

Investigating ancient mummies

Researchers at the University of Manchester into the practice of animal mummification have developed a rigorous and replicable non-invasive methodology for the study of animal mummies housed in museum collections (McKnight, Atherton-Woolham and Adams, 2015; McKnight and Atherton-Woolham, in press). Macroscopic recording is crucial, particularly for mummies which are too fragile to be transported to an imaging facility for further investigation. In cases where mummies have suffered damage, visual assessment is particularly valuable in demonstrating the varying qualities of linen, the number of layers used, and in showing how decorative effects were achieved. It is possible to see how linen strips were manipulated to form elaborate geometric designs, how seams were created by folding the strips and how rough linen ends were hidden below subsequent layers to achieve clean lines.

Wherever possible, radiographic imaging (digital X-ray and CT scanning) is used to visualise the contents of wrapped mummies. A major advantage of CT is the ability to manipulate scan data using post-processing techniques to identify bundle construction techniques and the underlying composition of stylistic features (McKnight, 2014). Evidence suggests that ancient mummies were produced using a 'conveyor belt' production system, allowing maximum throughput as multiple craftspeople took on defined roles (McKnight, 2014, p.247). This is evidenced radiographically by the multiple clearly defined stages of linen wrappings applied concentrically at varying compressions around the core.

Replicating ancient methods in the laboratory

Alongside the study of ancient animal mummies, researchers at Manchester employ experimental techniques to replicate the preservation witnessed in the archaeological specimens, using techniques witnessed radiographically and with mummification materials identified through the chemical analysis of mummy samples. Radiographic analysis of ancient votive animal mummies suggests that evisceration and excerebration were not required to preserve the cadaver, with many animals showing evidence of contents within the body cavities. A radiodense layer visible directly on the body in many of the ancient examples suggests that the initial phase in the mummification process was the application of a molten substance poured over the cadaver prior to wrapping (Atherton and McKnight, 2014). Chemical analysis of small samples removed from damaged ancient mummies reveals that votive animals were treated with a mixture of beeswax and tree resins which acted both as a

protective anti-microbial barrier around the cadaver and as an adhesive to fix down the linen wrappings (Brettell, *et al.*, 2015).

Radiographic observations helped to inform the programme of experimental mummification, and, for accuracy, the birds chosen for the experiments belonged to species identified in the ancient mummy record. The specimens, all of which had died naturally and were dry-frozen since collection, were donated by the Natural History Museum Bird Group, Tring, for the purposes of the experiment. Prior to mummification, the birds were radiographed to assess the presence of any pathology and to act as the base line for the experiment. The birds were thawed to room temperature and, in keeping with the radiographic evidence, no evisceration or excerebration was performed. The cadavers were coated with a 4:1 emulsion of pine resin and beeswax which was melted and combined over an oscillating hotplate. This process was conducted in a laboratory fume cupboard to minimise the effects of the noxious fumes given off by the emulsion. The coated cadaver was immediately placed onto a square of linen which was folded to form the initial covering. Subsequent strips of linen were applied to completely cover the cadaver and fixed down with dabs of the same molten emulsion. Once completely wrapped, the mummies were placed into the fume cupboard where they continue to be regularly monitored. Radiographic assessment of the modern mummies is conducted on an ongoing basis to monitor the changes to the cadavers as they desiccate.

The experimental process highlighted practical concerns including the difficulty in handling cadavers during mummification due to the heat and viscosity of the molten emulsion, and in achieving the level of compression witnessed in the ancient mummies. Production, at least until the point at which the body was completely covered by the initial linen layer, required the input of more than one individual. The ability to manipulate the cadaver, linen and resinous emulsion required more than one pair of hands to keep the emulsion molten and stirred, manage the required heat source and to select the linen strips. The stickiness of the resin on the embalmer's hands would have made selecting linen difficult, and the system proved more efficient when a second individual could fulfil this role.

Ongoing assessment of the twenty-one experimental mummies of avian and rodent species produced to date suggests that the mummification techniques employed, despite being unsophisticated in their nature, are adequate to achieve desiccation. No attempt was made to replicate the external designs. However, the preservation process raised many interesting questions which formed the inspiration for a live archaeological experiment to evaluate the materials used and the practicalities involved in the construction of complex wrapping designs.

Re-rolling: experimental design and conduct

The experimental 'Mummy Re-Rolling' event was held at Manchester Museum to coincide with the exhibition 'Gifts for the Gods: Animal mummies in ancient Egypt' and the 40th anniversary

of the unwrapping of Mummy 1770. The event had multiple objectives; to encourage visitors into the museum, to drive engagement with the themes of the exhibition, to challenge historic perceptions of the ethics of archaeology and museology, and to showcase scientific research into the practice of animal mummification.

For this experimental re-rolling, the team chose to reconstruct the wrapping design depicted on a conical-shaped mummified African sacred ibis (*Threskiornis aethiopicus*) (Accession No. 11501, Manchester Museum) from the animal necropolis at Saqqara (See Fig. 3). This particular mummy was selected as it displays a standard herringbone design, common on many votive mummies, and was ambitious without being too challenging for a first (and very public) attempt. Mummy 11501 was in excellent condition with no damaged areas through which the inner linen configuration could be visualised; however, comparison with damaged ibis mummies offered suggestions as to how this effect was achieved.

Another appliqued ibis mummy from Saqqara, AN1878.36 from the collection at the Ashmolean Museum, Oxford, UK, displays remarkable similarities to the Manchester example (See Fig. 4a). Both have a fine herringbone design created from linen strips with a shroud covering the widest point and a cap at the base. The Ashmolean example, although in excellent condition, provides important clues as to how the design was created using individually prepared narrow linen strips, folded to form a clean edge, which encircle the bundle, meeting and crossing at the front. Subsequent strips were added to build the design with the effect of securing the earlier layers and covering the rough edges of the linen (See Fig. 4b). This information proved valuable in directing the experimental design.

To determine the contents of the mummy and the foundation for the experiment, mummy 11501 was studied radiographically in 2014 at the Royal Manchester Children's Hospital using digital X-ray and CT scanning[1] . The investigation revealed the presence of a partially-articulated ibis skeleton with damage to the central area causing extensive disruption to the integrity of the underlying skeleton (See Fig. 5). An air void caused by the settling of the disturbed contents was visible, and although the outer linen layers survive intact, there was evidence of bundle mobility manifesting as a slight 'spongey' texture.

For experimental purposes a mummy form was created from plastizote using the dimensions of the bird remains measured directly from the CT data. Plastizote was chosen as it can be easily cut to the required shape and size and it forms a rigid shape around which the wrappings can be applied.

The fabric strips were prepared in advance of the event. The different fabrics and wrapping stages were developed based upon those witnessed during the radiographic investigation and visual assessment of ancient mummies. Cotton calico and hessian were used as substitutes for linen in this experiment; however, the qualities of the fabrics were chosen for

their similarity to ancient linens. Fabric rolls were used to pad the plastizote form as identified in the ancient mummies (See Fig. 6). A summary of the various stages of wrapping is presented in Table 1.

Stage (internal-external)	Material	Dimensions (mm)	Quantity	Purpose
1	Plastizote	450 x 145 x 90	1	Mummy core
2	Close weave (calico)	1600 x 70	13	Initial 'fine linen' layer next to the body
3	Pads and rolls (cotton)	80 x 20 x 20	8	Individually tied rolls of fabric to enhance shape
4	Thread (bonded nylon)			Thread to tie the rolls to the plastizote
5	Loose weave (hessian)	1470 x 70	11	Middle layer of poorer quality fabric
6	Close weave (calico)	1600 x 70	13	Continuous strip of fabric inscribed by visitors
7	Head cap (calico)	400 (triangular)	1	Cap to cover the widest end of the bundle
8	Tail cap (calico)	315 x 315 (square)	1	Cap to cover the narrowest end of the bundle
9	Bias binding and thin strips of darker cotton, folded	measure	43	Strips passed around the back of the bundle and crossing at the centre front to create the herringbone effect
10	Applique motif	measure	1	Decorative motif

TABLE 1. A SUMMARY OF THE VARIOUS STAGES OF WRAPPING.

Once the internal layers of linen had been applied, individually cut strips of bias-binding and folded linen were used to create the pattern, passing around the back of the bundle and crossing at the front to form the herringbone effect. The use of authentic resin and beeswax was not permitted for the experiment as the emulsion produces noxious fumes which require an adequately ventilated workspace (usually a laboratory fume cupboard) and protective face masks. For the purposes of the live experiment, the molten resin and beeswax emulsion was substituted with a craft glue gun. For all previous experiments where the preservation of the cadaver was the research goal, the authentic resin and beeswax emulsion was used under controlled laboratory conditions. Dabs of the glue were used to secure the wrappings periodically and pins were used to fix the ends of the herringbone-forming strips until the pressure of subsequent layers was sufficient to hold them in place.

Ancient linens used in the wrapping of animal mummies usually occupy a spectrum of neutral, brown and red tones, usually with the paler colours forming the base design, with darker shades used to give the designs a three-dimensional appearance. It is common to find that the darker shades have degraded over time, indicated by stained impressions on the underlying paler fabric (See Fig. 7). Analysis suggests that hydrated iron oxides mixed with clay were used to dye linen to achieve the darker shades, perhaps explaining the noticeable degradation as iron is known to negatively impact upon the delicate cellulose composition of flax (Bruno, 2013, pp.113-114; Vogelsang-Eastwood, 2000, p.278). As linen pigmentation was not the focus of the experiment, the linen from which the applique was created was dyed by steeping the pre-cut linen strips overnight in water with onion skins and coffee grounds to achieve a darker shade.

The applique motif for the surface of the wrapped mummy was produced by Dr Atherton-Woolham prior to the event as it was correctly anticipated that this would require more time than was available. A photo of the mummy was used to trace a life-size outline of the design. This template was used to cut two of each of the individual elements of the design out of linen, which were stitched together to give a raised appearance. These elements were then stitched together onto a backing layer to form the design (See Fig. 8). The applique took fifteen hours to produce using modern haberdashery materials and tools.

The event

The event took place in February 2016 in the main foyer of Manchester Museum before an assembled crowd of over 300 people (See Fig. 9). In a scene reminiscent of the Victorian unrolling parties, guests were invited to enjoy a drink whilst the event unfolded on an elevated stage before them, harking back to the social aspect of the earlier events. The event was live-streamed via the Periscope.tv app to a further 900 viewers. Live updates were provided throughout the evening on the museum's social media platform using the #AnimalMummies hashtag which stimulated an interactive experience.

Visitors were invited to write messages on linen strips which were then incorporated into the experimental mummy (See Fig. 10a and b). Inscriptions on animal mummies are rare; however, it is possible that they exist on the inner layers, hidden from view. The team felt that this activity reinforced the role of animal mummies as votive gifts, designed to convey messages of hope and thanks to whom they were dedicated. Visitors engaged wholeheartedly with the activity, with the majority writing personal messages of hope for peace, health and wellbeing, family and success. The concept of votive communication with an other-worldly figure, whatever or whomever that may be, was echoed in the exhibition where visitors were invited to write messages on postcards which were then offered to one of three animal gods (Thoth – god of wisdom and writing, Sobek – god of the Nile and fertility, and Sekhmet – goddess of warfare and motherhood), depending on the nature of the request.

The re-rolling activity was conducted over three 30-minute sessions, interspersed with breaks for guests to enjoy the exhibition and associated activities. Throughout the sessions, the presenters (the author and colleagues, Drs Stephanie Woolham and Campbell Price) provided a lively commentary, discussing the history of mummy studies, the techniques used to study mummies today and the practicalities of the experiment. This was very much ad hoc rather than to script as it was felt that this led to a more natural event, plus it emphasised the fact that this was 'live archaeology' and as such it served a valid research purpose, providing an insight into the difficulties encountered and the solutions that might be implemented to achieve the desired effect. Visitors reflected on how the knowledge of the presenters came across with humour and enthusiasm, leading to an enjoyable event, but one which raised thought-provoking debate. Questions were welcomed from the audience throughout.

To add to the atmosphere of the occasion and to encourage visitors to engage with the wider themes of the exhibition, a range of activities ran throughout the evening. Visitors could attempt mummification of oranges (See Fig. 11) before going upstairs to see ancient human mummies on display in the Egyptian 'Ancient Worlds' gallery. A local textile artist used screen-printing techniques to copy short Egypt-inspired poems onto linen fragments (See Fig. 12). These fragments were offered to visitors echoing the strips of mummy linen given as souvenirs to guests at Victorian un-rolling parties. A ceramicist recreated a coiled pot similar to those used to hold ibis mummies at Saqqara (See Fig. 13). An interactive theatre company re-enacted Liverpool's dockside auctions of 1890 which added to the dynamic atmosphere in the exhibition space itself and reinforced the underlying concept of mummy destruction.

Discussion and Conclusion

The re-rolling experiment was successful in recreating the herringbone design on ibis mummy 11501 (See Fig. 14). The overriding discussion points arising from the experiment concerned the complexity of the process even when the pattern being recreated was relatively simple. This was particularly true of the later stages when wrapping the thinner end of the conical bundle as the layers became loose as subsequent ones were applied. Care had to be taken to ensure that the centre of the herringbone lined up perfectly to form the design and conscious efforts had to be made continually to check all sides of the bundle to ensure that layers were not coming undone which would have spoiled the final effect. This pattern of damage, where earlier layers work loose creating an untidy appearance, can be seen on mummy AN1878.36 from the Ashmolean Museum (See Fig. 4b).

Complex herringbone, square or diamond lozenge designs have been found to cover an isolated section or completely cover the mummy bundles. It is not known whether these were produced *in situ* or as separate distinct pieces before being fixed to the wrapped bundle. The latter seems unlikely in the case of complete coverings where no discernible seam can be detected (See Fig. 15) suggesting that the bundle must have been supported and perhaps rotated for the duration of the activity. Further research is required to answer these

questions.

The experience led the team to postulate that the process would have involved multiple individuals and would have been a very hot and noxious-smelling process. The complexity and amount of time and work involved in the creation of even the simplest designs highlights that the decorative wrapping of mummies was the work of talented artisans. Whether those responsible for this work were embalmers *per se*, or rather a dedicated group of craftspeople remains open for discussion.

Forty years after the autopsy of Mummy 1770, Manchester Museum played host to a rather different event - a mummy re-rolling. The event highlighted the progress made in the non-destructive study of mummified remains since Victorian times through the continued application of non-invasive imaging methods which preserve the integrity of mummies. Founded upon sound scientific evidence acquired through the academic study of ancient mummies, the live experimental event fulfilled the engagement criteria of the funding body whose support made the research possible. Following on from the success of the first event, three further experimental 're-rollings' have taken place at World Museum Liverpool and the Museum of Wigan Life focusing on different mummy shapes and decorative designs. These experiments mark an important first step in improving our understanding of this ancient practice. Further experiments will investigate the construction of more complex decorative designs.

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1 Digital X-ray was performed (Phillips Eleve Digital Diagnostic) in anterior-posterior and lateral projections at 57kV 1mAs. CT scan data was obtained using a 128 row multi-detector scanner (Siemens Somatom Definition AS+) with a slice thickness of 0.625mm and a pitch of 0.969:1 resulting in 759 axial images.

Keywords mummification
post depositional process
funerary

Country Egypt
United Kingdom

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Gallery Image

FIG 1. ROSALIE DAVID AND PATHOLOGIST, DR. EDDIE TAPP, INSPECTING MUMMY 1770 PRIOR TO AUTOPSY IN 1975. (REPRODUCED COURTESY OF MANCHESTER MUSEUM).

FIG 2. A WOODEN SHRINE FILLED WITH WRAPPED BRONZE VOTIVE STATUETTES (REPRODUCED COURTESY OF THE EGYPT EXPLORATION SOCIETY, LONDON).

FIG 3. IBIS MUMMY 11501 (MANCHESTER MUSEUM) SHOWING THE INTRICATE HERRINGBONE DESIGN AND THE APPLIQUE IMAGE OF THE IBIS-HEADED GOD, THOTH, SEATED ON A THRONE (REPRODUCED COURTESY OF MANCHESTER MUSEUM).

FIG 4A. IBIS MUMMY AN1878.36 (ASHMOLEAN MUSEUM, OXFORD) SHOWING WRAPPING AND DECORATION SIMILAR TO MUMMY 11501, AND B) PHOTO SHOWING THE DETAIL OF THE FOLDED LINEN STRIPS CREATING THE HERRINGBONE DESIGN (REPRODUCED COURTESY OF THE ANCIENT EGYPTIAN BIO BANK PROJECT).

FIG 4B. THE DETAIL OF THE FOLDED LINEN STRIPS CREATING THE HERRINGBONE DESIGN (REPRODUCED COURTESY OF THE ANCIENT EGYPTIAN BIO BANK PROJECT).

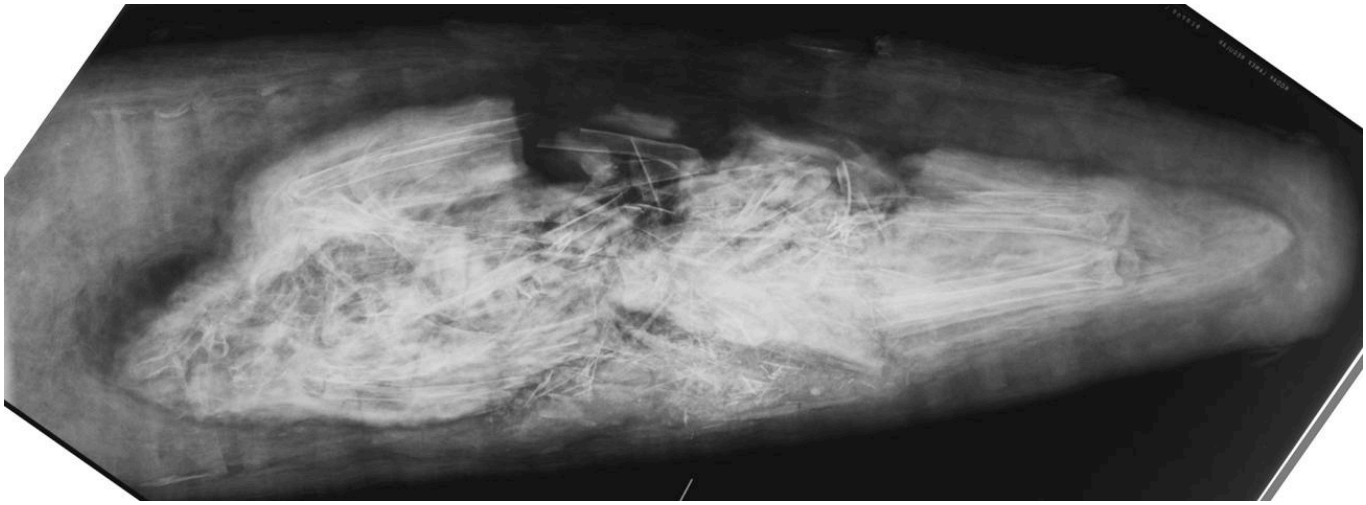

FIG 5. LATERAL DIGITAL X-RAY OF MUMMY 11501 SHOWING EXTENSIVE DISRUPTION TO THE SKELETAL CONTENTS (REPRODUCED COURTESY OF THE ANCIENT EGYPTIAN BIO BANK PROJECT).

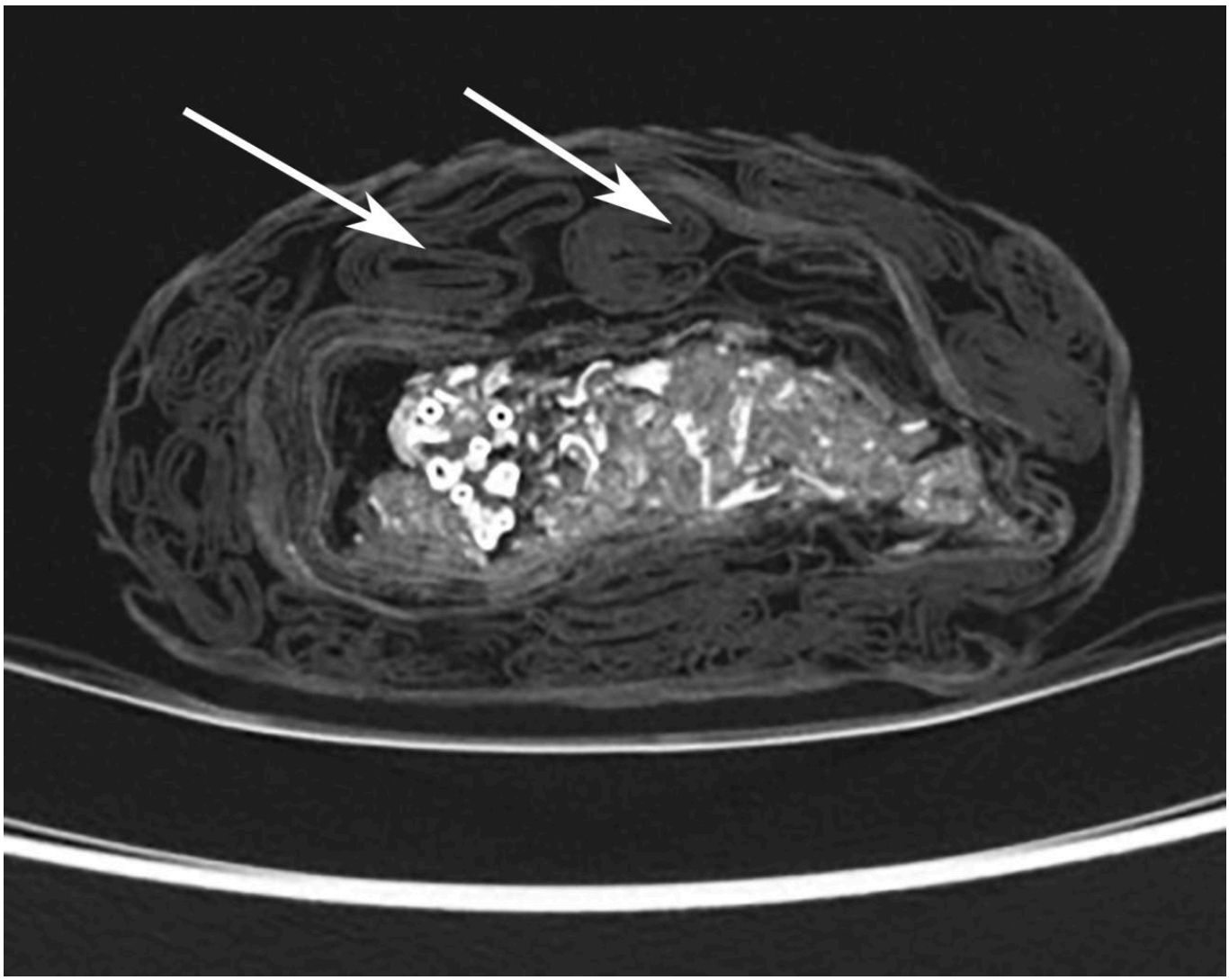

FIG 6. AXIAL CT IMAGE OF AN IBIS MUMMY (AREGYPT457, HANCOCK MUSEUM, NEWCASTLE) SHOWING THE PRESENCE OF LINEN ROLLS USED TO PAD OUT THE WRAPPINGS AND PROVIDE STABILITY TO THE CORE (REPRODUCED COURTESY OF THE ANCIENT EGYPTIAN BIO BANK PROJECT).

FIG 7. THE CHARACTERISTIC DEGRADATION OF DARK LINEN ON A VOTIVE ANIMAL MUMMY (REPRODUCED COURTESY OF THE ANCIENT EGYPTIAN BIO BANK PROJECT).

FIG 8. THE APPLIQUE MOTIF SHOWING THOTH SEATED ON A THRONE, REPRODUCED FOR THE PURPOSES OF THE EXPERIMENT (REPRODUCED COURTESY OF THE ANCIENT EGYPTIAN BIO BANK PROJECT).

FIG 9. THE CROWD ASSEMBLED IN THE FOYER OF MANCHESTER MUSEUM FOR THE EVENT (REPRODUCED COURTESY OF MANCHESTER MUSEUM).

FIG 10A. VISITORS WRITING THEIR MESSAGES ON LINEN FOR INCORPORATION INTO THE EXPERIMENTAL MUMMY (REPRODUCED COURTESY OF MANCHESTER MUSEUM).

FIG 10B. THE INSCRIBED LINEN BEING INCORPORATED INTO THE EXPERIMENTAL MUMMY (REPRODUCED COURTESY OF MANCHESTER MUSEUM).

FIG 11. VISITORS ATTEMPTING TO MUMMIFY ORANGES (REPRODUCED COURTESY OF MANCHESTER MUSEUM).

FIG 12. VISITORS SCREEN-PRINTING EGYPT-INSPIRED POEMS ONTO LINEN STRIPS AS SOUVENIRS OF THE EVENT (REPRODUCED COURTESY OF MANCHESTER MUSEUM).

FIG 13. THE CONSTRUCTION OF AN EXPERIMENTAL CERAMIC MUMMY POT, PRODUCED USING THE COILED METHOD (REPRODUCED COURTESY OF MANCHESTER MUSEUM).

FIG 14. THE TEAM AND THE COMPLETED EXPERIMENTAL MUMMY (REPRODUCED COURTESY OF MANCHESTER MUSEUM).

FIG 15. THE ELABORATE GEOMETRIC DESIGN WHICH COMPLETELY COVERS AN IBIS MUMMY FROM SAQQARA (1969.112.42, WORLD MUSEUM, LIVERPOOL) (REPRODUCED COURTESY OF THE ANCIENT EGYPTIAN ANIMAL BIO BANK PROJECT).