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Title: Conservation of a Foetal Elephant's Hind Limb, Cole Museum of Zoology, Reading University

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Conservation of a foetal elephant's hind limb, Cole Museum of Zoology, Reading University

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Abstract
The following is an example of how a published and figured but sensitive object that has become seriously decayed can be saved rather than binned. This particular hind leg from a foetal elephant had been found in a state of terminal decay. Initiated by a training course, the process of conserving the specimen is given in detail.

Background
The Cole Museum of Zoology is situated at Reading University. It can be visited by students and the general public and attracts many visitors each year who are impressed by its diversity of specimens and their presentation.

Most of the fluid preserved collection is kept in an outbuilding, quite usual for this type of collection since the contained specimens are preserved in either flammable alcohols or toxic formaldehyde preservatives. This outbuilding may leave much to be desired architecturally but its contents are housed in the correct environment and only about 10% of the collection actually requires any remedial work; even after the period of time whilst funding was found to train the conservator in charge, with the specialised technology.

Technique
The foetal elephant's limbs are presented as anatomical dissections and have been figured in a dissertation by Eales in 1929 (Fig. 1). These figured specimens are largely in good condition and require no treatment but the hind limb specimen was found with a very low fluid level in the jar and that the previous alcohol (70% concentration in deionised water) had evaporated leaving just the water behind in the jar. This evaporation and dilution factor was noted by Carter (1995). Unsurprisingly, fungal spores of a black pin mould had entered the jar and spread in a thick mycelium across the surface of the fluid and across the bones left out of the fluid (Fig.2). The fungus had invaded [spread] and rotted the surface of the bone, staining it black, but had not totally compromised the surface structure.

The problem was how to clean off the fungus, and consolidate the bone but keeping it moist since the specimen has to be kept under fluid so that the cartilaginous areas could still be seen but not become distorted or discoloured through drying out at all. In addition, the specimen was extremely fragile, resulting in detachment of the patella and its attaching ligaments (Fig. 3).

The ligatures attaching the specimen to its glass mounting plate held firm fortunately.

1 The specimen was removed from the fluid; the fluid was checked for detached specimen parts and then discarded, its pH was 6.3.
2 The gelatinous fungal mycelium was carefully removed from the bone, using forceps.
3 The patella was found coated in black fungus just below the tibial upper epiphysis and was removed for cleaning. The upper patellar ligament had not survived.
4 The fungal coating was removed by brushing 30% IMS over it. This also neutralised any active or live areas of fungus.
5 The specimen was left in 30% IMS to commence its re-preservation (overnight).
6 Once clean, the fragile lower epiphysial section of the femur had part detached and was rejoined using celloidin in ether/IMS (50: 50) mixture as an adhesive.
7 The patella and ligament were similarly re-attached (Fig. 4).
8 The specimen was immersed in 50% IMS for the celloidin to gel; also the next stage in the preservation/dehydration ladder.
9 The fragile foot area was rinsed in ether IMS solvent and any tiny cracks and crevices were gap-filled with 8% celloidin. Fragile areas of bone were also consolidated using 3% celloidin.
10 The specimen was then immersed in 70% IMS (preservation strength) overnight.
11 Next day the specimen was checked and then replaced in its jar filled with 70% IMS (Fig. 5).

12 The lid was sealed using a gelatine/acetic acid/glycerol sealant.
13 After several days, the fluid level was topped up through a hole in the lid, using a syringe, and the lid hole sealed off using poly-propylene rod, gelatine sealant and a cover slip.

Conclusion

This shows how close one can get to disposal of a valuable and figured specimen and yet still save it and bring it back to a clean and stable condition. Although pyroxylin/celloidin solution (commercially 'Necoloidine') has been used for some years as an adhesive for IMS-preserved specimens, its additional use as a consolidant is proved here.

References:

Carter J. A short study into the changes in alcohol concentration due to evaporation. *Conservation News,* **56,** 24-25 (1995).

Eales Dr N.B. The anatomy of a foetal African Elephant *(Elephas africanus/ Loxodonta africana)* part III. *The contents of the thorax and abdomen and the skeleton* (1929).

Acknowledgement:

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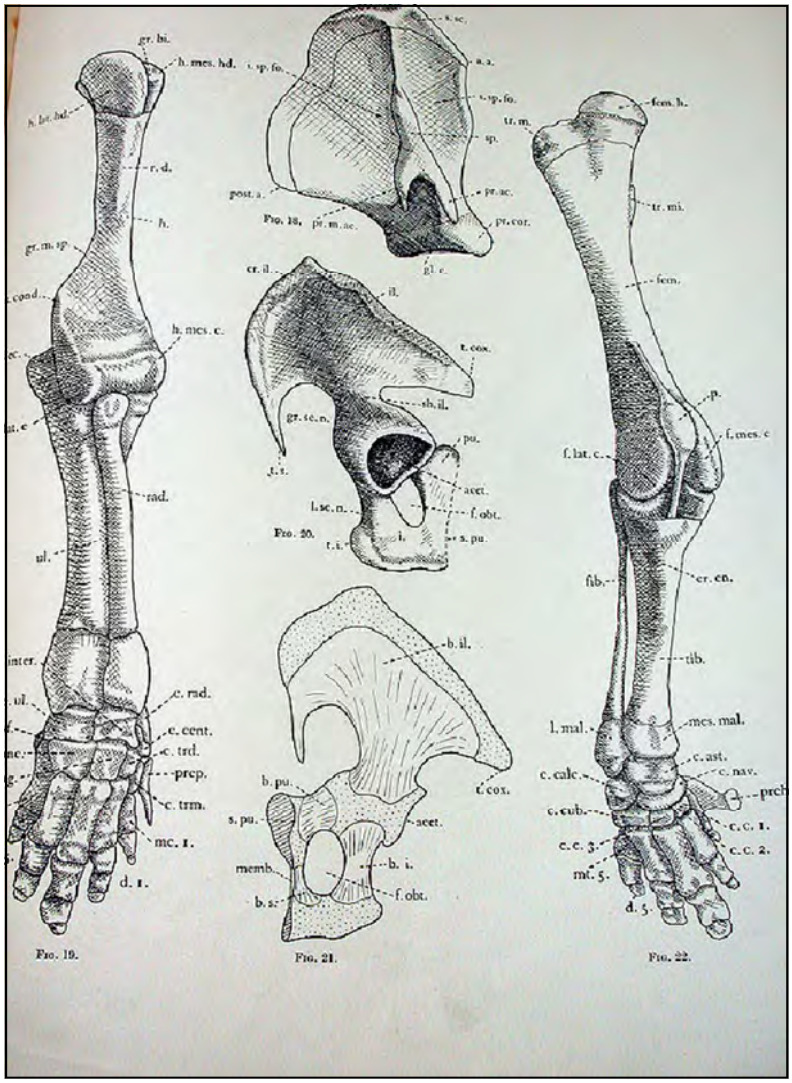
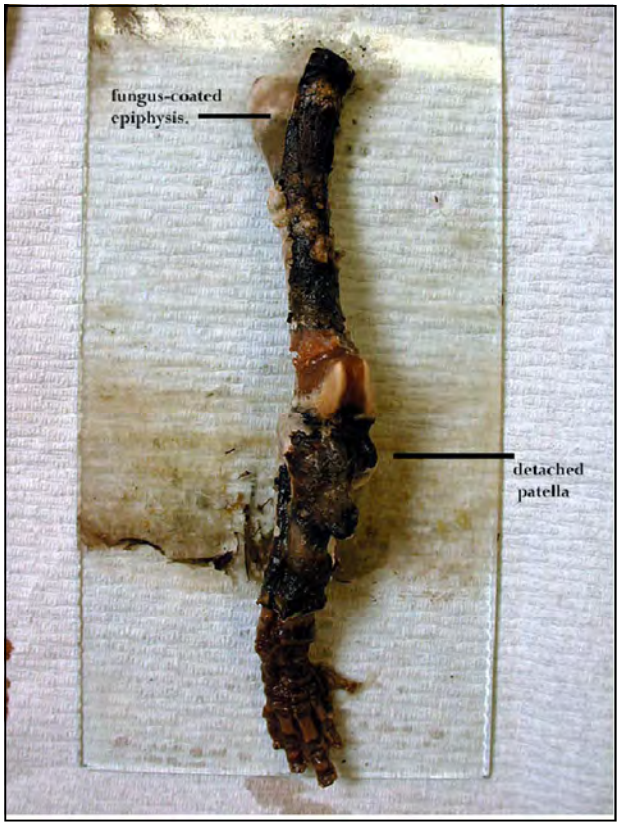


Diagram of foetal elephant's foot (right) from Eales, 1929.

The same limb as found. The lumps in the brown aqueous fluid are fungus. The femoral epiphysis can just be seen near the top of the jar.



Fungus largely cleaned away, except for top left of femoral epiphysis to show contrast between fungal layer and bone surface blackened by fungal decay.

Blackened bone before fine cleaning and with patella replaced

Following fine cleaning, the detached joints and patella have been glue-gelled back together with pyroxylin (celloidin) and re-mounted in jar.