



# ESSEX EGYPTOLOGY GROUP - REVIEW

## February 2019 Meeting

by Margaret Patterson

"Ancient Egyptian and Nubian Leather Technology" Lucy Skinner

At the beginning of February Lucy Skinner

([https://www.britishmuseum.org/research/research\\_projects/all\\_current\\_projects/collaborative\\_doctoral\\_awards/lucy-anne\\_skinner.aspx](https://www.britishmuseum.org/research/research_projects/all_current_projects/collaborative_doctoral_awards/lucy-anne_skinner.aspx)) came to talk to us about her work on leather technology in Ancient Egypt and Nubia. She has been a conservator working on leather for years, and is now doing her PhD at the University of Northampton and the British Museum. Earlier in her career she worked conserving leather items from Europe as well as from Egypt and Nubia. The European leather is generally waterlogged, so the desiccated leather from the Nile Valley is very different to work with as a conservator. There are other differences too, and she became interested in why it's so different and how it was made. Skinner told us that the main questions that her PhD research is focused on are: what animals were used to make Ancient Egyptian and Nubian leather? what processing techniques did they use? is Ancient Egyptian leather different from Nubian leather? does the material or methodology change over time?

In terms of time frame she is interested in leather objects from the Predynastic period through to the beginning of the Roman period. She set her cut-off point there because Romans brought European style leather technology with them, and that is well understood. Geographically she is interested in the whole sweep of the Nile Valley in Egypt and Nubia - from Alexandria in the north to Meroë in the south. Her primary approach is to investigate the objects themselves and try to reverse engineer the processes used to make them. There are quite a lot of Ancient Egyptian leather objects available for her to study in the UK and Europe, including at the British Museum, Manchester Museum, the Petrie Museum and Turin Museum. Nubian material is rarer in the UK so she is looking at items in the National Museum of Sudan that were excavated by Reisner, as well as items more recently excavated in Sudan.



### Leather Sandals

(A note on the photos in this article: They are two examples of leather objects on display in the British Museum as at February 2019, but Skinner didn't mention either of them explicitly; they're just what I found to photograph.)

Skinner next gave us an overview of how leather is made in general and what evidence there is for specific processes in Ancient Egypt and Nubia. Leather can be made from the skin of any vertebrate, in each species the skin is a bit different so produces leather with different characteristics. For instance cow skin is very thick and so produces thick leather. The first step in the process is to kill and skin the animal. There are depictions of this in butchery scenes in Egyptian tombs, and Skinner also showed us a photo of a camel being skinned in the modern day so that we could see what it looked like. The skin next needs to be cured, to stop it rotting, before it is tanned. There are a couple of different methods to do this. One is to dry the skin, which is easy in Egypt and Sudan but less so in the UK! The method more commonly used in the UK is to salt the skin, and this is also sometimes done in Egypt.

When the time comes to use the skin it needs to be rehydrated, and any salt washed out. The next stage is to remove the hair and flesh, which is generally done by soaking it in a pit with lime to loosen the hair. This is then scraped off and she showed us a picture of the waste that this produces (from a modern tannery in the Nile Valley). Given how much waste is produced it's odd that there isn't much archaeological evidence of tanneries, but she said that no-one has really looked into it much. I think she also said that the waste might have been mistaken for butchering waste, and the two sorts of processing might happen at the same sites. Once the hair and flesh is removed the skin can also be shaved to make it thinner, and then stretched out flat to dry in the sun. Once dry any remaining hair and flesh can be scraped off.

At this stage in the processing the skin has become rawhide. This can be used as is - to make things like shoes. Sometimes they didn't even scrape the hair off. In Nubia, and in Predynastic Egypt, graves were lined with hairy rawhide. The hide can be softened before it's used by chewing it. Although there hasn't been much research done on this, Skinner said that there are hints that the Ancient Egyptians did this.

Leather is made from the rawhide by tanning it, and this can be done in a variety of ways. The first method Skinner told us about was oil tanning. This is done using fish or vegetable oils that are worked hard into the skin. This processing method often removes the grain layer of the skin and so that can be evidence that an object was made using oil tanned leather. The surface of the leather produced this way is rough and fibrous rather than being smooth. The next method she talked about is called "Native" tanning because Europeans first encountered it in the context of Native American leather production. And Skinner told us that in a continuation of this Eurocentric attitude it's often overlooked as an option for Ancient Egyptian leather. This method involves using the brain of the animal, and working that into the hide to tan it - apparently each animal comes with enough brain to tan its own hide! She's trying to identify the fats present in the leather objects she is investigating in order to discover if oils or brains were used in their tanning. Often leather made using these methods was smoked afterwards which makes it more waterproof and a darker colour. She's not sure yet how to test for this part of the processing on her objects.

The last method Skinner told us about was vegetable tanning, using the tannin found in some plants - this is the European way of making leather. Leather produced in this fashion is quite resistant to water, unlike the other two methods. This might be why there is less leather in pre-Roman Egyptian and Nubian archaeology - after the Romans brought the new technology to Egypt leather objects are more likely to survive the years. And that also explains why what does survive is generally from elite tombs, which are drier. Vegetable tanning takes longer than the other two methods, and the

processing takes place in distinctive pits. There are no signs of these pits in Ancient Egyptian and Nubian archaeological contexts, another piece of evidence that this wasn't how they tanned their leather.

Having talked to us about how leather is made Skinner next moved on to discuss other things one can discover by examining leather objects. The different parts of the hide of an animal are of different qualities and are good for different things - for instance belly skin generally produces low quality leather. Another factor that needs to be considered when cutting leather to make an object, is the direction of the fibres in the skin. Leather made from different species is also suitable for different purposes. As mentioned earlier cattle skin is thick. Goat skin is very uniform and the leather made from it is of a high quality, unlike sheep skin which makes poor quality leather which isn't very strong. One of the ways that Skinner is examining her objects is by looking at follicle patterns - these vary between species so you can use that to see what the leather was made from. She's also using more advanced analytical technology, including Reflectance Transformation Imaging and microscopy to examine the surface of the leather, but these methods are not always easy to use on ancient objects. One thing she pointed out was that looking at what species of animal leather was made from tells you more than just about the leather items themselves. It also gives you insights into other parts of the culture - like did they kill more goats than sheep? And that in turn tells you something about what each sort of animal was kept for.

Another analytical technique she's using on her leather objects is multi-spectral processing to look at the colours of the original items. Green and pink are the most frequent colours she has found. Probably these pigments soaked in better to the leather, unlike something like Egyptian Blue which would remain on the surface and then flake off. A bit later in the talk Skinner returned to the subject of colouring the leather, and told us that it's inaccurate to say that the leather was dyed - this implies that the material was dipped into the colour to apply it. Instead normally only one side of Egyptian leather was coloured. Flexible leather was generally stained, whereas parchment (another skin product) was painted.

As well as directly examining the items themselves she's looking at evidence from reliefs showing craftsmen to how the Egyptians depicted the process themselves. The tomb of Rekhmire (TT100) includes more than one scene of craftsmen working with hides and leather. In one there is someone scraping a hide, cutting one into strips and working the hide. There is also a scene of a chariot being made - the wheels had rawhide "tyres" - and this scene also shows bow cases being made.



**Leather Archery Wrist Guard**

In the last part of her talk Skinner told us about a few of the items she's worked on in more detail, and showed us some pictures of other examples. One of the items she's spent some time investigating is a chariot called the Tano Chariot, which is now in the Egyptian Museum in Cairo where it was mostly forgotten about until 10 years ago. She worked for four months on the leather parts of it - starting with just a space on a gallery floor before they found a proper room for her to

work in. The leather of this chariot includes the largest and oldest bits of leather still surviving in the world, probably dating to the 18th Dynasty so some 3000 or so years ago. These large pink and green pieces of leather were stretched across the wooden frame of the chariot. There are also surviving pieces of leather that come from the horse harnesses in yellow and green. Other pieces were to protect the wheels, and there were also pieces from the bow case. The leather was thick and made from cattle hide that was then decorated with an applique technique using pieces of goat hide. There are a lot of layers to the leather and although it looks very decorative the decorative elements also made it stronger. Although nothing is known about the provenance there are signs of dirt on the leather so it was used rather than just having been made for the tomb. I don't think she mentioned it in her talk, but there's a book on the chariot to which she's contributed published last year by Sidestone Press (<https://www.sidestone.com/books/chariots-in-ancient-egypt>).

Just before we stopped for coffee and cake Skinner showed some photos of other leather objects - including a sandal in the British Museum with a falcon decoration on it, some more shoes from the Egyptian Museum in Cairo and a funerary tent discovered in TT320 (also now in the Cairo Museum - there is a gallery of photos of this object on flickr taken by a Russian team working on it about a decade ago: <https://www.flickr.com/photos/horemachet/sets/72157594488934160>).

After our coffee break Lucy Skinner told us about some other work she's done on leather that is not included in her PhD (because it's on objects she can't remove from Egypt to subject to the various analytical methods her PhD research is based on). The first topic she discussed was her investigation of Nubian leather found in graves at Hierakonpolis. Clothing material was part of the cultural difference between Nubians and Egyptians - the Nubians wore leather and Egyptians wore linen. In the graves were lots of fine creased pieces of leather which must have been like suede when new. There were also tough and hardwearing loin cloths made of perforated leather found in female graves, and skull caps of perforated leather found in the graves of elderly women. Some of the material that has been found in these graves provides corroborating evidence for depictions of Nubians seen in Egyptian art. The reliefs in the tomb of Huy (TT40) show Nubians wearing leather belts and kilts made of perforated leather that looks like that found at Hierakonpolis. Also in the tomb of Huy is a depiction of a Nubian woman wearing a panelled leather skirt, and they have found fragments of leather that look like they come from that sort of garment. Another example is a tomb model from the tomb of Prince Mesehti at Asyut which shows Nubian archers who have embellished leather sashes, and some of the material from Hierakonpolis is decorated in beads in a similar fashion to the model.

Tutankhamun had a lot of leather in his tomb, but it was all in bad condition when it was excavated. This is because the tomb was quite moist, and a lot of the leather has basically turned into blackened glue. Skinner showed a photo of a sandal which had essentially melted into the bottom of the box they had been stored in. Some things were more intact and recognisable, however. Parts of his chariot were made of leather, which had been embellished with gold foil. In this case the decoration was made with raised parts on the leather and then the gold pressed over it, which is unusual. Also unusually some of the leather had traces of Egyptian blue on it.

Last year on Channel 5 (in the UK) there was a three part series about Tutankhamun

( <https://www.channel5.com/show/secrets-of-tutankhamuns-treasures/> ), and Skinner was one of the experts filmed for that. The object she was talking about in the programme was Tutankhamun's cuirass (body armour), and so she finished up her talk to us by telling us a bit about what she had found out about it during her research for the documentary. It was found in the Annexe, in a box under some furniture and was in reasonably good shape at the time of discovery (see this photo by Harry Burton from the original excavation: <http://www.griffith.ox.ac.uk/perl/gi-ca-qmakedeta.pl?sid=62.88.104.165-1358530861&qno=1&dfnam=587a-p1304> ). Sadly it has deteriorated since then - Skinner was keen to stress that this wasn't the fault of the Cairo Museum. Instead it seems that Howard Carter and team tried to unfold it using chemicals and instead damaged it. So in order to learn about it she studied both what remains of the object itself and also the original photographs. In addition she's been doing some experiments herself to see if she can make replica scales to see how it might have been made.

The armour was made of leaf shaped scales which were positioned in rows with each scale overlapping the next. There were ridges on each scale which helped to keep the pieces in place, and the scales were stitched together and then stitched onto linen. Carter said that there were six layers of linen, and that sort of leather coated multi-layered cloth is known from other contexts to be a rather effective armour construction. The lacing is different on different sections of the cuirass, and from examining the photos she thinks that there was diamond lacing on the outside of the scales on the skirt which would have made that a looser, flexible section. The chest section has horizontal lacing which makes it much stiffer. There are also traces of colour - reds and greens in alternating rows. She also examined the surfaces of the scales with Reflectance Transformation Imaging and this shows that surfaces of the scales are roughed up in some areas where they would be exposed. This suggests that the armour had been used - and the documentary used this as "proof" that Tutankhamun was a warrior king. She feels this is a step too far - there's no telling who the armour was made for, nor who wore it. She's hoping for the chance to do more work on this armour in the future - they have funding lined up and are just waiting on permissions.

This was a really interesting talk - I'd not realised in advance that there was so much difference between different sorts of leather, nor that there were different ways to make leather.