

Throughout history, animal pelts that have been tanned, tawed or made into parchment were used in the production of books and manuscripts as leaves, binding covers, and sewing supports. Conservators, curators, and historians share an interest in identifying the species of animal skins used in making manuscripts and bindings in order to better understand their historical context and differing properties for treatment.

Due to the scraping and stretching necessary in the making of parchment and vellum, it is nearly impossible to identify the animal pelt after processing through visual examination alone. However, variations in the texture, color, thickness, and follicle patterns of leather and tawed skins often offer clues.

Though there can be quite a bit of variation, due to breed, coloration, age of the animal or area of the body the sample is taken from (such as the armpit as opposed to the back or belly) it is sometimes possible to determine the animal used in the making of leather and tawed skins by observing the follicle patterns and texture under magnification.

As one of the defining characteristics of mammals, we are covered in follicles which produce both hair and fur. Hair and fur follicles organize and align themselves into well-ordered patterns found in the dermis layer of skin. Generally, fur tends to grow in a more synchronized manner and stops at a certain length, while the hair grows independently and does not stop growing. Fur also tends to be coarse and short while hair, in contrast, is generally soft and long.

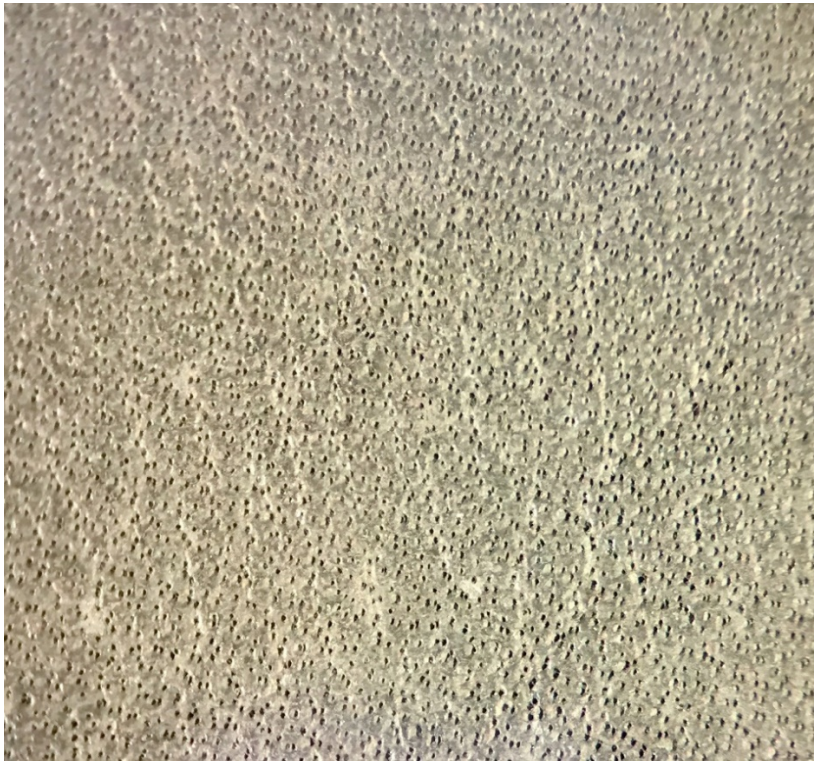
There are scientific methods for positively identifying the animal pelts used for manuscripts and in book bindings, such as the DNA Extraction Method; also referred to as the Erasure Crumb Test. Peptide/erasure crumb analysis can identify the animal species, and often offer information about where the animal originated, as long as it matches their growing DNA database. Research is being carried out at the University of York, using an eraser-based sampling method, to recover DNA from parchment. Dry cleaning with PVC erasers is conservation technique that allows the surface of parchment to be cleaned without causing damage to the object. Scientists at The University of York analyze the waste material from this process, which would otherwise be discarded. For more information on peptide/erasure crumb analysis, see links below:

<https://www.york.ac.uk/news-and-events/news/2015/research/pocket-bible-parchment/http://eprints.whiterose.ac.uk/124337/1/170988.full.pdf>
[https://pure.york.ac.uk/portal/en/publications/the-york-gospels\(3ae65b41-7fb9-4f53-899b-38e3da1fd4dc\).html](https://pure.york.ac.uk/portal/en/publications/the-york-gospels(3ae65b41-7fb9-4f53-899b-38e3da1fd4dc).html)

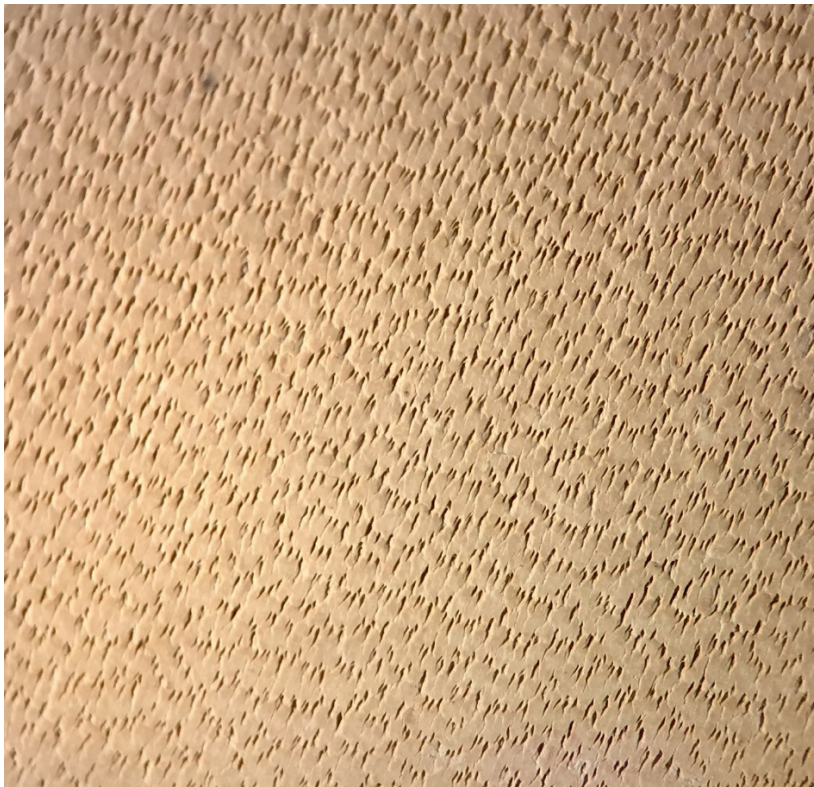
Availability, time, and cost of testing methods are a consideration, so often a conservator's first line of investigation is to examine the skin visually, both with and without magnification, for clues.

Leather and parchment can be made from nearly any animal skin, including some fish and fowl, but the most common animal skins used in the production of books and manuscripts are cow, goat, sheep, and sometimes deer or pig. Below are images of each under 100x magnification with the process identified and a brief description of the characteristics and follicle patterns.

Cow and calf skins have the same pattern. Adult skin patterns are just larger and the spacing is further apart since mammals are born with the same number of hair follicles they will have throughout their lifetime. Cows are generally hairy all over, so you do not see rows of hair where some follicles are clustered together in one direction and farther apart in another. Calf and cow skins are also much less creased than goat and not elastic like sheep.



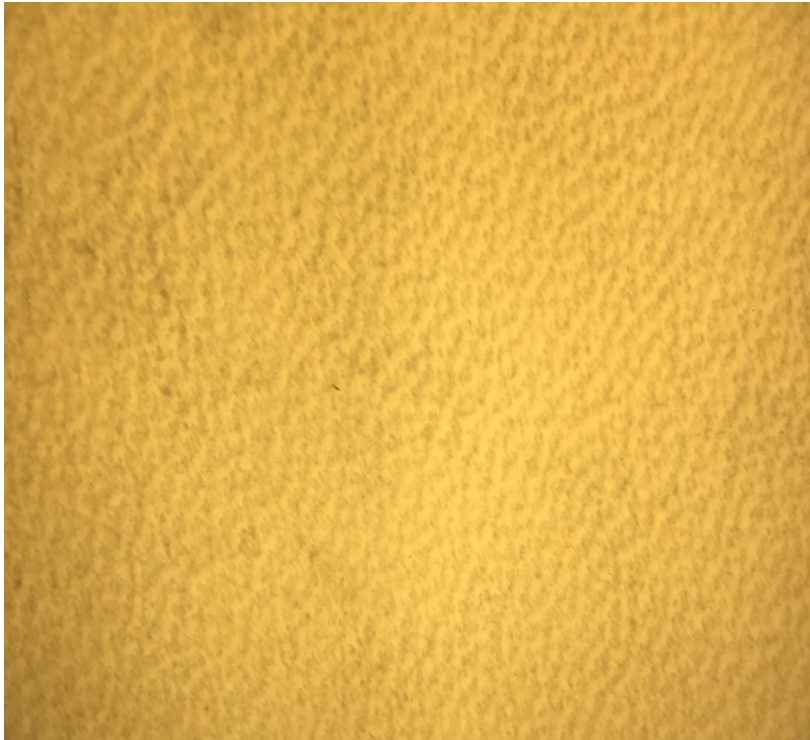
100x, Tanned calf



100x, Tanned cow

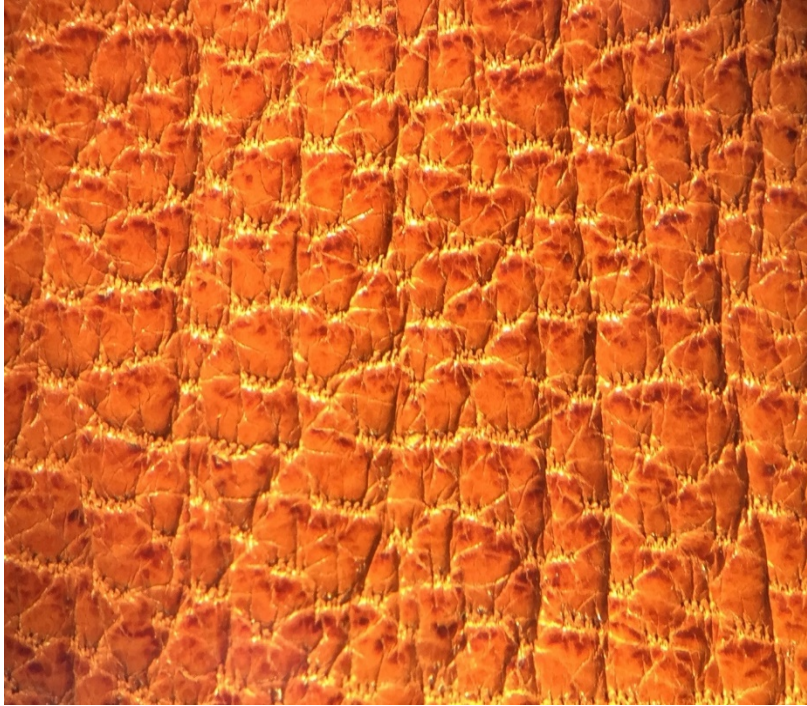


100x, Tawed calf



100x, Calf parchment

Goat follicle patterns look somewhat like paw prints. They are more spread out than cow or sheep follicle patterns and appear in clusters of 2-3 large holes surrounded by a number of smaller holes. Goat is also more creased than cow, sometimes so much so that it is necessary to spread out the sample to see the follicle pattern clearly.

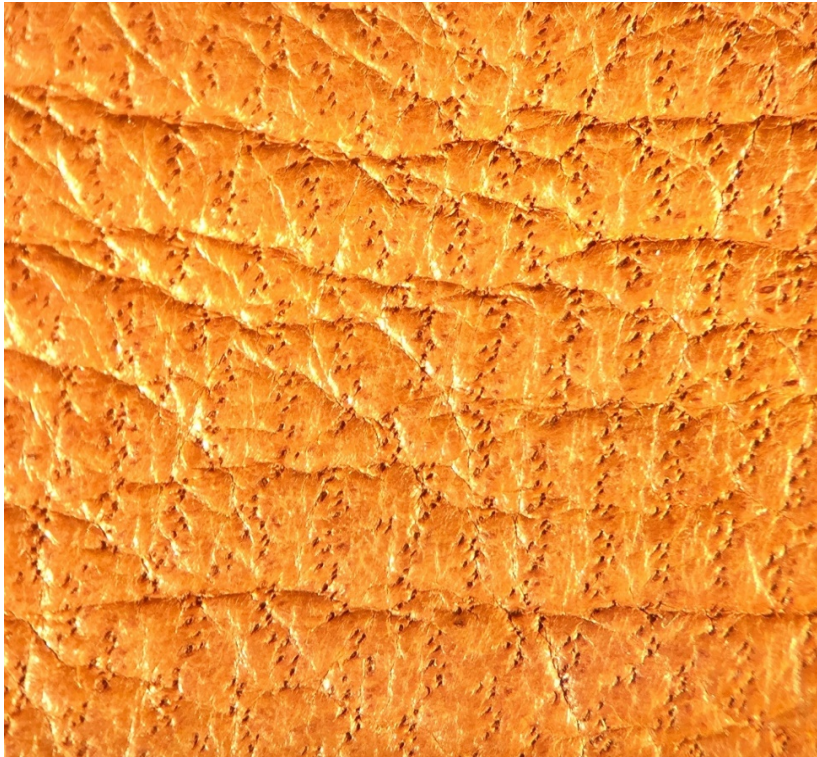


100x, Tanned goat



100x, Goat parchment

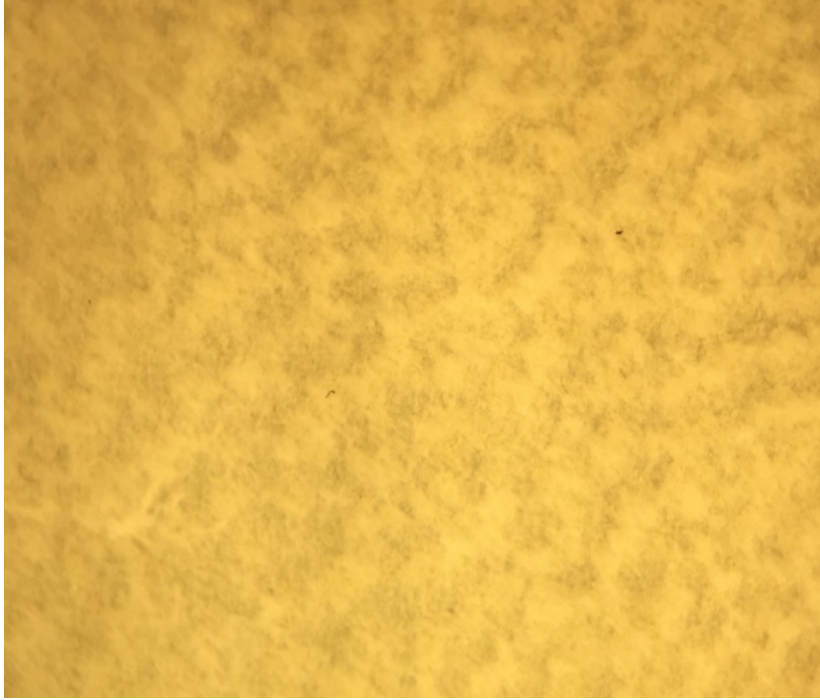
Sheepskins, depending on the age and breed of the animal (such as curly hair), can have quite a bit of variation in follicle patterns. Generally, the patterns of sheep are differentiated from other animals by the clusters of big and small holes that tend to be more spread out. The holes are also not as pronounced or as separate as calf, goat or pig. They appear in wide-set rows. Sheepskin is also considerably softer and suppler than other skins due to the production of lanolin. The added elasticity from the lanolin can cause the top layer of the pelt to peel off in heavily worn areas as it ages.



100x, Tanned sheep

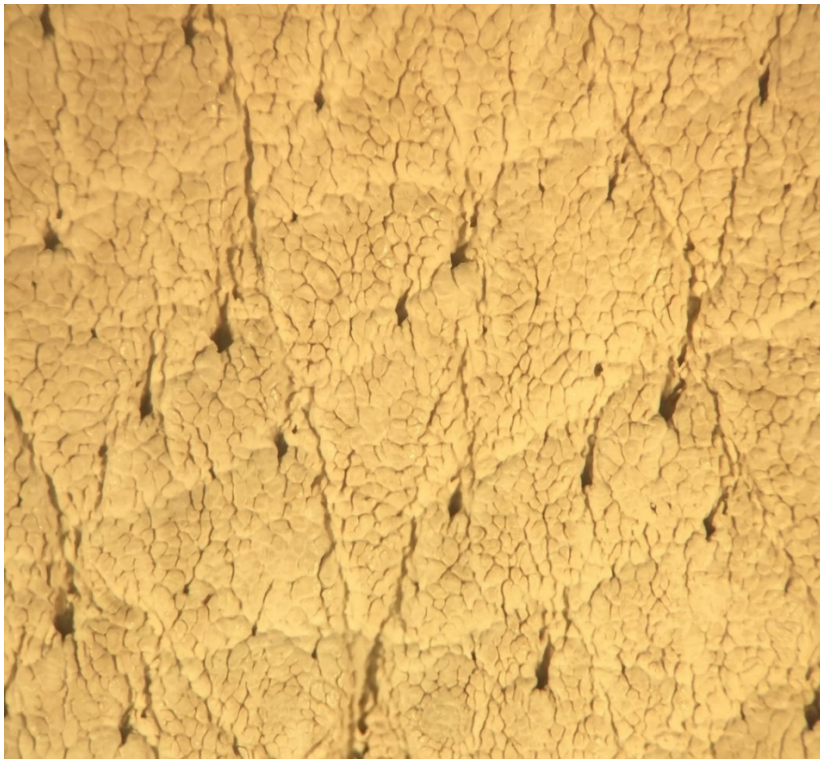


100x, Tanned curly-haired sheep



100x, Sheep parchment

Tanned pig looks a lot like human skin, not very hairy. The follicles are spread apart with very fine creases. The hair follicle goes all the way through the skin to the muscle in both pig and human, which is why the two are sometimes confused. When the muscle contracts, the hair stands up. Pigskins also tend to be quite a bit stiffer than calf, goat or sheep.

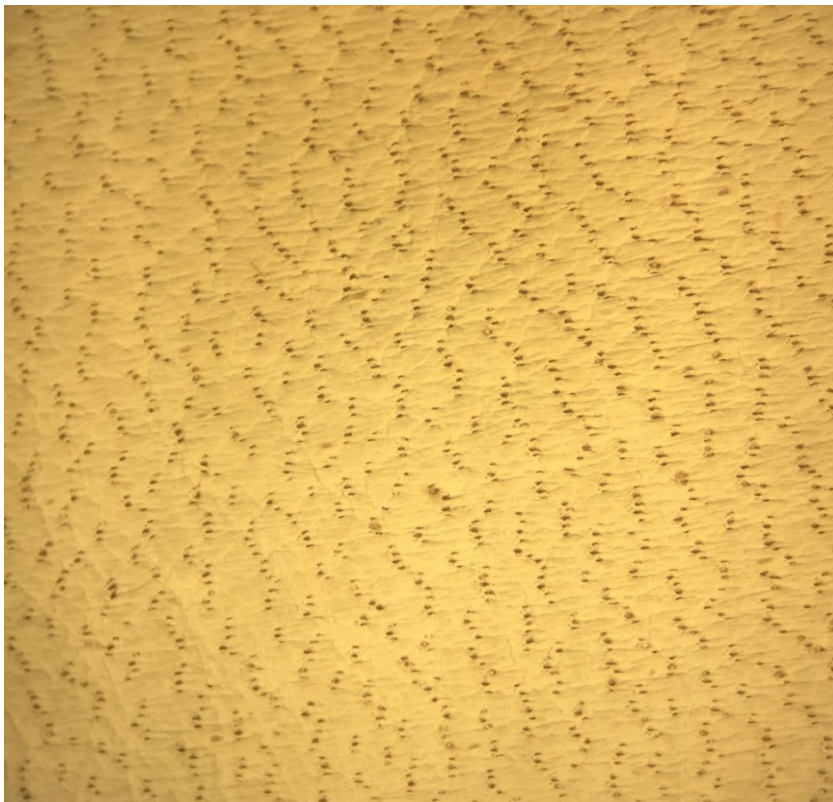


100x Tanned pig

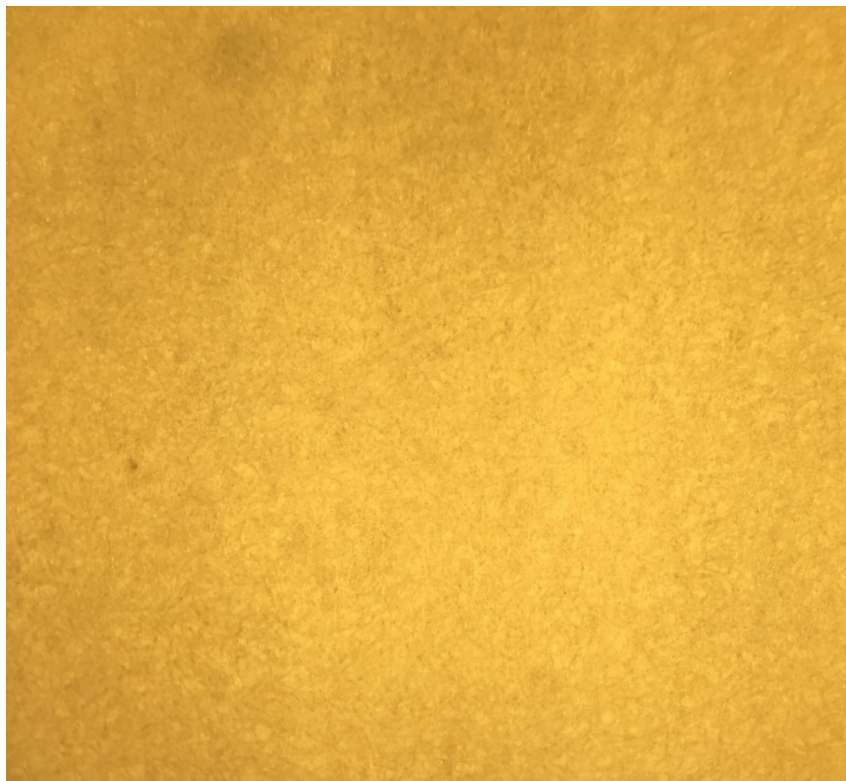


100x, Tawed pig

Tanned deer varies a lot by species, although the follicle patterns generally look like ripples on the sand after the tide goes out, in staggered rows with few creases.



100x, Tanned deer



100x, Deer parchment

For more information on the identification of pelts used in the making of books and manuscripts, see:

<http://britishlibrary.typepad.co.uk/collectioncare/2013/09/heres-looking-at-you-kid-under-the-microscope-with-leather.html>

<http://books.openedition.org/pcjb/608>

Also:

PORTER, Cheryl. *The use of Alum in the preparation of tawed skin for book covers in the 11th – 15th centuries: advantages and disadvantages for the book structure* In : *L'alun de Méditerranée* [en ligne]. Naples : Publications du Centre Jean Bérard, 2005 (généré le 06 mai 2019).

Disponible sur Internet : <<http://books.openedition.org/pcjb/608>>. ISBN : 9782918887379.

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<https://travelingscriptorium.library.yale.edu/2012/05/>

<https://travelingscriptorium.library.yale.edu/parchment-bibliography/>