HEAD HEART HANDS HEALTH

Leathercraft

4-H MANUAL

Revised 12.2022

COLORADO STATE UNIVERSITY
EXTENSION

4-H Leathercraft Manual

Acknowledgements

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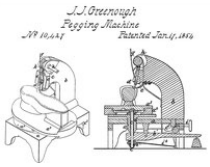
Chapter 1—All About Leathercraft

History of Leather

Eons ago, hunters found the animals they killed for food could provide them with sandals and garments by simply curing and fashioning the skins. For centuries, leather has continued to serve humans with each generation of people contributing something to the craft through technology and ingenuity. The table below outlines contributions to the art and uses of Leathercraft from various peoples and eras throughout time.

Era/Contributions	**Uses/Contributions to Leathercraft**
Cavemen 	Chose to wrap hides around their feet to prevent bruising and soreness creating the first shoes. Cavemen also used hides to create clothing and blankets.
Ancient Hebrews 	Believed to be the first people to use tanning to cure skins and keep them from rotting, allowing the leather to last for many years.
Egyptian 	Used beautiful jewels and other decorations to create leather sandals that have been discovered in ancient tombs, some over 3,000 years old.
Romans 	Centurions used shields of decorated leather for protection. Romans also used leather as money because they believed it had great value.
Middle Ages 	Leather Guildsmen closely guarded their art and as a result leather products could only be afforded by the wealthy. It was during this time that leather also became a source for creating pages for books or stationary as man realized the importance of writing things down.

Native Americans		Tanned deer, buffalo, bear, and other animals to make moccasins, clothing, vests, headbands, tepees, and other items. Native Americans discovered that smoking the leather would make it waterproof. The Native Americans taught early settlers to tan deerskins and create buckskin clothing.
Pioneers		Learned tanning and uses of leather from Native Americans and spread the knowledge throughout the west. The "cover" of a covered wagon was a special leather tarp and the harnesses used were also leather.
Conquistadors		Brought horses to the Americas and the saddle makers followed. Spanish tack makers were the first to use floral designs in leatherwork.
Shoe-Pegging Machine		Created in 1851, this machine took Leathercraft from art to industry by allowing mass production of leather shoes. Today American shoemakers turn out 5,000 pairs of shoes every minute.
Nuclear Scientists		Needed specialized gloves or gauntlets to protect their hands from burns, so a special leather glove was designed.
Astronauts		Pressurized leather suites, based on early flight suits designed to keep pilots warm and durable, were worn by early astronauts to go into space.

Leather today is wherever we are. All of us use leather in shoes, belts, handbags, watches, wallets, key cases, vests, jackets, gloves, and many other items, such as furniture and car interiors. And that is not to mention sports, where baseballs, softballs, golf balls, basketballs and baseball gloves are all made of leather.

Leather Sources

So where does all this leather come from? In most cases leather is a byproduct of meat processing where the animal is slaughtered for food, and the skin is preserved to become leather, but this may not always be the case. The table below includes the most common sources for leather and their relative uses.

Source	Uses
Cattle 	Most leather comes from cattle. The skin, called cowhide, is used for shoes and other heavy leather articles.
Calves 	Calf skin is used for thin items like coin purses and billfolds.
Sheep and Lambs 	Sheepskins and lambskin are used for clothes and gloves. Many of the skins come from New Zealand. Lambskin with the wool left on is used for coats.
Pigs 	Pigskin from South America is used for gloves, wallets, and shoes.
Horses 	Horsehide is used for sporting goods.
Water Buffalo 	Water buffalo, from Asia, provide strong leather for boots.
Shark 	Shark skin is strong for small leather goods and specialty boots.

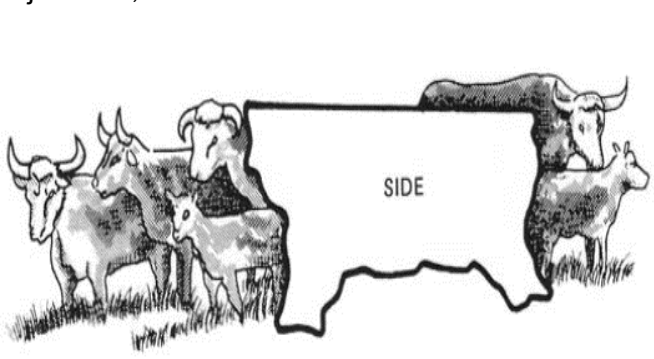
Reptiles 	Snake, alligator, and lizard skin are used to make fancy leather goods, most common are purses, jackets, boots and hat bands. This type of leather may not be tooled.
Elk or Deer 	Elk hide and deerskin are used much as they were by the Native Americans in making clothing, gloves and moccasins.

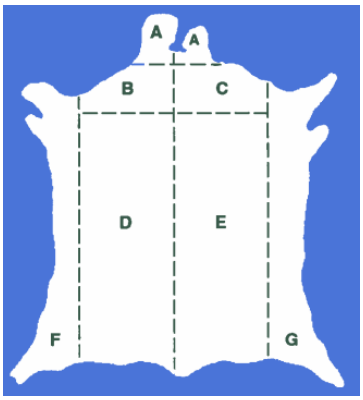
Leather Structure

The complete hide of an animal is known as a skin. The skin is made up of the following structures:

- hairs, which consist of a protein called keratin (Hairs and keratin are removed from leather by soaking the hide in a solution of lime and by applying unhairing agents like sodium hydroxide and calcium hydrosulfide. The hair can then be removed first with a machine and then by hand using a dull knife prior to the tanning process.)
- epidermis, a protective layer of keratinous cells that gives the skin strength and flexibility
- sweat glands, which discharge sweat through the pores of the grain
- sebaceous glands, which are at the side of hair follicles and discharge a waxy oily substance to protect hair
- corium, a network of collagen protein fiber, which is the strongest part of the skin (towards the center, fibers are coarser and stronger)
- flesh, which is next to the meat where fibers are more horizontal and fatty tissue may also be present

The skin may be left whole or cut into sections such as sides, bellies, or backs. Smaller animals (calves, goats, sheep) are usually tanned as a skin or full hide. Leather is usually sold by the square foot. For easier handling, large animal hides are usually cut in half. A side of leather is just that, one "side" or one half of a hide.





In the processing of hides from large animals, it is customary to cut them into two or more smaller sections for easier handling. The names of the various parts in the chart are shown below.
A - Head
B or C - Shoulder
D or E - Bend
F or G - Belly
A+B+D+F or A+C+E+G - Side
A+B+D or A+C+E - Crop
B+D or C+E - Back
D+E - Croupon

The thickness, or weight, of leather is usually measured in terms of ounces. One ounce equals approximately 1/64th of an inch in thickness. To make leather a uniform thickness, hides are run through special splitting machines. Since animal hides are not of a uniform thickness and wet when put through the splitting machine, the thickness of leather will not remain the same throughout the hide. There will always be slight variations and that is why leather weights seldom measure out in exact 64th's of an inch.

Leathers are usually shown as 4-5 ounces, 6-7 ounces, etc. Some leathers are also gauged in millimeters. For example:

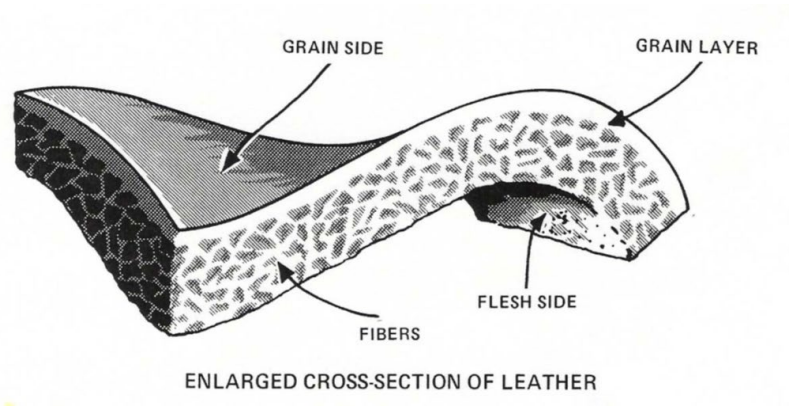
Weight of Leather in Ounces	Approximate Thickness in Inches	Approximate Thickness in Millimeters	Common Uses
1 ounce	1/64 of an inch	0.4mm	Linings, book bindings
2 – 3 ounces	1/32” – 3/64”	0.8 – 1.2mm	Molding, toolable linings, embossing
4 – 5 ounces	1/16” – 5/64”	1.6 – 2mm	Embossing, wallet backs, organizers, clutch purses
6 – 7 ounces	3/32” – 7/64”	2.4 – 2.8mm	Small cases, notebook covers
8 – 9 ounces	1/8” – 9/64”	3.2 – 3.6mm	Carved purses, camera cases, journal covers
10 – 11 ounces	5/32” – 11/64”	4 – 4.4mm	Belts, knife sheaths, holsters, saddle bags
12 – 13 ounces	3/16” – 13/64”	4.8 – 5.2mm	Saddles
14 – 15 ounces	7/32” – 15/64”	5.6 – 6mm	Saddles

Lighter weight leathers, such as calfskin, range from 1 ½ ounces to 3-4 ounces. Heavier leathers, 4-5 ounces to 10-11 ounces and more come from the hides of mature cattle.

The "flesh" side of the leather is the underpart that was next to the meat and flesh of the animal. The hair side, called the "grain" side, is most commonly used for carving and stamping. Its fiber

structure is more closely knit and easier to cut. When carving and stamping tools are used properly, the grain side will retain even the tiniest details.

The grain side has a "grain layer" of about one-fifth the thickness of the hide. The rest of the hide consists of a honeycomb fibrous structure that works like interlacing hinges or scales. During tanning, fats and oils are added to this honeycomb structure to make the grain side leather soft and workable.



ENLARGED CROSS-SECTION OF LEATHER

Leather Tanning

Leather is unique, different from any cloth put together by man, for it is the actual skin of an animal that grew as the animal grew. To change this skin into leather, the skin must be tanned. Various methods of tanning produce leather for different purposes. The two main ways of tanning leather are chrome tanning and vegetable tanning.

Chrome Tanning	**Vegetable Tanning**
Why? Chrome tanning is fast. It takes less time than any other tanning. How? Animal skins are washed in strong chemicals to make the skin strong. How can you tell? If leather is chrome tanned, when you cut into it the inside will be a bluish white color. What for? Chrome tanned leather is used mostly for shoes, or as with reptile leather, for purses and belts.	Why? Vegetable tanning creates leather that will absorb moisture readily, allowing leather to be easily molded and formed. How? Animal skins are put in big deep tubs that hold several kinds of tree bark, water, and chemicals. It takes over three months for the leather to cure with this method. Where does it come from? The most common leather that is vegetable tanned is from cattle and is commonly called “strap” leather. What for? Leather to be hand-tooled, carved, or stamped, must be vegetable tanned.

Another common type of tanning is oil tanning, which is the process of tanning with animal oils. Oil tanning is used in the manufacture of certain very soft and pliable leathers, particularly chamois and certain kinds of buckskins. Fish oil is generally used in oil tanning. In addition, Latigo Leather is cattlehide leather tanned with a combination of alum crystal and gambier. Gambier is a kind of dried sap derived from extracts of squeezed leaves and twigs of plants with the same name (Uncaria Gambier Roxb) used as a vegetable tanning agent. Latigo leather is used for cinches, ties, saddle strings, and other saddlery work.