

Tanning Goat Hides

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Introduction

Recently, there seems to be a renewed interest in tanned hides for use in the home as decoration, rugs, or coverings for chairs or other uses. A local farm supply store has even begun to carry tanned calf and cow hides. While attractive, the cost of purchasing a professionally tanned hide may be prohibitive for many people. Tanned sheep hides have been commonplace for years. Why not a tanned goat hide? Many goats have attractive hides that could be tanned and used in many ways. Learning the art of tanning hides can be very rewarding, through acquisition of new skills and the attractive products resulting from the endeavor. Tanning at home is also less costly than purchasing a tanned hide. When sending hides to a tanner, costs may be on a per hide or per square foot basis. Deer hides generally range from \$45 - \$60 unless it is exceptionally large. Calf, cow, and other larger hides will be on the square foot basis. Kits, some designed to tan up to 20 pounds of hide or the equivalent of two deer skins, can be purchased for between \$15 and \$35. The other equipment needed to tan hides can be purchased or much of it can be fashioned from items found around most households or farms. Although home tanning may not match the quality of a professional tannery, good quality, long-lasting products can be made. However, if you do have a special hide, it is best to send it to a professional rather than attempting it yourself. This is particularly true if you are new to the art of tanning.

Where to Find Information

The Internet is good place to begin learning about tanning hides. Much information will be found in conjunction with taxidermy or taxidermy supply companies. Skins and hides must be tanned before being mounted and the tanning methods used in taxidermy are very appropriate for home use. There are tanning chemical suppliers, taxidermy supply companies, and other outdoor sporting goods companies that sell tanning chemicals, supplies, and kits on-line or via catalogs. Some of their web pages and catalogs have very informative “How to” sections that provide excellent information on hide handling and newer tanning methods. Visit some of these sites (listed at the end of this article) to learn about products and techniques and also to purchase kits and supplies¹.

A local taxidermist or sporting goods store is another potential source of information and supplies. Books on home tanning and leathercraft are available but most were written between twenty and thirty years ago and do not contain information on newer tanning methods. One recent book, “The Ultimate Guide to Skinning and Tanning” by Monte Burch, 2002, does contain information on new techniques and chemicals (see the book list at the end of the article). Finally, the directions for use included with many tanning chemicals provide good detail and instruction on hide preparation and chemical usage.

When searching for tanning information on the Internet one will come across the art of “brain tanning.” This is the traditional method used by Native Americans and other cultures of using animal brains to make buckskin. This can certainly be done with goat hides. In addition to websites dedicated to “brain tanning,” several good texts have been written on the subject.

¹ Mention of trade names, proprietary products, or vendors does not imply endorsement by Langston University or the E (Kika) de la Garza American Institute for Goat Research of the products or vendors named or criticism of similar products or vendors not mentioned.

Different Tanning Processes

Before selecting a particular type of tanning method to try, it is best to familiarize yourself with some of the tanning processes available. Tanning methods can be vegetable, mineral, aldehyde, or synthetic. Oil tanning methods are used in the production of chamois leather. Vegetable tanning is the oldest method and uses tannins found in the bark and other parts of certain trees and shrubs. Extracts from oak, sumac, chestnut, and quebracho are a few of the “vegetable” tanning materials available. Vegetable tanning is used to produce heavy leathers, such as harness or sole leather, and the material used gives leather its characteristic color. It is not suitable for hair-on tanning and can result in stiff leather. Vegetable tanning can be tried at home by grinding bark, leaves, twigs, seeds, and other parts of tanning-containing plants into a solution into which small hides could be immersed. The tanning process is slow and thick hides can take months to finish. To test if the tanning process is complete, cut a thin strip of the hide and see if the color is the same throughout without a lighter middle layer indicating incomplete tannin penetration. The ultimate test of a properly tanned hide is to put a small piece into boiling water. If incompletely tanned, the piece will curl up; a properly tanned hide should be unaffected by boiling water (Hobson, 1977) or withstand at least two minutes of boiling before it begins to curl (G. Dimaio, Industrial Specialist, USDA-ARS Hides, Lipids, and Wool Research Unit, Eastern Regional Research Center, Wyndmoor, PA, personal communication).

Of the mineral tanning methods available, chrome tanning is the most common and uses chromium sulfate as the tanning agent. It is mainly an industrial process used for leather production on dehaired hides. It can be tried at home and chrome tanning agents are available from taxidermy supply stores. However, the chemicals need to be used with care and the spent solutions require proper disposal. There are other methods more suitable for home tanning. Aluminum salts are another mineral tanning method. Alum tanning is a method described in many texts. A disadvantage of alum tanned hides is that they may “sweat” if atmospheric humidity becomes too high. Additionally, inadequate washing of the hide after tanning to remove excess chemicals may leave acid residues that could react with moisture and damage the hide. Lutan F, made by BASF and available from many suppliers, is a mineral powdered tanning agent that is very popular in tanning hides for taxidermy and can be used at home with good results.

Synthetic tanning agents or syntans have been developed as a result of advances made in the chemical industry. Syntans are man-made tanning agents that are highly reactive, form strong bonds, and when used properly result in well-tanned, long-lasting hides. Syntans may be used by commercial tanneries in conjunction with mineral tans as they improve the dyeing ability of leathers (Rittel, 1994a). For home tanning, syntans are usually used alone. One example of a syntan is EZ-100 by Rittel. EZ-100 is administered as a soak or bath in which the hides are placed after pickling and neutralizing. EZ-100 touts itself as environmentally safe by using acids and tanning agents that are biodegradable. However, the salt used in the tanning solution still means that careful disposal is warranted. Hides tanned with EZ-100 can be washed in lukewarm water. Other tanning products, including many of the “paint-on” tans discussed in the following section, may also contain synthetic tanning agents (Rittel, 1994a).

Aldehyde tanning uses formaldehyde or glutaraldehyde. Information exists on tanning hides at home with glutaraldehyde but newer tanning methods, many using syntans, are safer for home use. Oil tanning is a means of preservation and not a true tanning method. A warm oil is brushed into the hide and the hide is left in a warm place for the oil to soak in. Several applications are needed and this method is not suitable for hair-on tanning.

Selecting a Tanning Method

A final consideration in selecting the tanning method is the form of the tanning agent and its ease of use. Tanning agents are available in powder, liquid, or cream form. The powdered forms, and some liquid forms

(such as Krowtann 2000), require the mixing of the chemical into a water and salt solution and immersing the prepared hide for the specified time period. Most liquid and cream tanning agents are designed to be applied directly to the prepared hide using a paint brush or by hand wearing gloves. There are advantages and disadvantages to both systems. While paint-on tans mean one less solution to make and dispose, they require careful application. They may stain the fur or hair of the hide so care is needed around hide edges; however, all areas of the skin must be covered for absorption of the tanning agent. The amount to use may be difficult to gauge. If too heavy an application is used on thin skins the tanning liquid may be absorbed through the skin resulting in potentially discolored and(or) greasy, oily feeling fur. While the greasiness can sometimes be washed out with detergent or a solvent, the stains remain. However, paint-on tans are easy to use, result in a well-tanned hide, and are preferred by many tanners and hobbyists. Examples of paint-on tans include: Liqua-Tan, made by Knobloch's and available through many distributors; Kwiz-n-Eze by Rittel's; McKenzie Tan, available from McKenzie Taxidermy Supply; Tannit Solution, offered by Tandy Leather Co.; Bollman's Mammal Tanning Cream; and Trapper's Hide Tanning Formula. Others are also available.

Use of immersion tanning methods negates problems with discolored or greasy hair sometimes encountered with paint-on tans. However, there is a need to make solutions, monitor pH, and properly dispose of solutions. Through soaking, the tanning agent has access to both sides of the hide, although the hide should be moved occasionally while in the tanning solution to ensure that there are no folds in the hide preventing adequate chemical penetration. This can be done with the blunt end of an old wooden broom or shovel handle. Professional tanneries use rotating drums containing tanning solution and hides. Please note that the hair of deer is hollow and deer hides will float so stirring may need to be more frequent. If tanning is done correctly, weighting a deer hide to keep it submerged in the solution is not necessary. Goat hides do not have this problem. There are many kinds of immersion tanning agents. Two examples are EZ-100 from Rittel's and Lutan F.

For initial attempts at tanning, it is beneficial to purchase a kit complete with tanning chemicals, instructions, and a list of the needed equipment. Rittel's manufacturers many types of kits available from various distributors including EZ100 Kit, Trapline Tanning Kit and Rancher's Tanning Kit that both utilize Rittel's Kwik-Tan, and Dehairing and Leather Tanning Kit. Kits using other chemicals, e.g., Liqua-Tan, Para Tan, Krowtann 2000, Lutan F, etc., are also available or one can also purchase tanning chemicals individually. Authentic Taxidermy Supply Company sells a product called "One Hour Tan" that requires hides to soak for only one hour in the tanning solution. Finally, while not covered in this article, chemicals and kits are available for tanning birds and reptiles.

Basic Tanning Steps

Whatever method is chosen to use in tanning a hide - immersion or paint-on, kit, or purchase of separate chemicals - many of the basic steps are the same: skinning the animal; preserving the hide; fleshing the hide; pickling and neutralizing; the actual tanning process; oiling; drying and softening; and finishing. As with any craft there are many variations on the main themes and different texts will provide different tanning recipes, order of steps, chemicals to use and tips on how to successfully follow their method. It is a good idea to read through several methods and speak with someone knowledgeable on tanning hides before selecting a particular one. As each method or tanning recipe is slightly different, it is best to follow the instructions and learn the basics. One can then experiment in the future.

It is not the goal of this paper to present all of the tanning variations available. Rather, some pertinent information on each of the basic steps will be given. More detailed information can be found in the texts listed at the end of this paper or one of the other information sources previously mentioned. Further, the information presented is designed for the hobbyist tanner and, as such, no use of tanning machinery is required.

Skinning

Most people who want to tan a hide will also use the carcass for meat and will take the animal to a meat locker or abattoir where it will be expertly skinned. If you wish to skin an animal for its hide, be sure the carcass is fresh as putrefaction and decay begin immediately upon death. Bacteria become active breaking down tissue, damaging the hide, and causing hair slippage. Also, ligaments under the skin can shrink as the carcass cools making skinning more difficult. If you do your own butchering ensuring that a carcass is fresh is no problem; however, if an animal is found dead caution is warranted. In addition to possible problems with skinning and hair loss you may be in danger of contracting a disease. Some animal diseases, such as rabies, tetanus, and anthrax, can be transmitted to humans through contact with infected animals. If an animal is seen to be ill, acting strangely, or found dead for an unknown cause it should be buried or disposed of and not skinned, even with gloves on (Hobson,1977).

For those people who hunt or raise deer and elk and wish to tan their hides, Chronic Wasting Disease (CWD) is of concern. CWD is a transmissible spongiform encephalopathy (TSE) of which bovine spongiform encephalopathy, BSE or Mad Cow disease, is the most well-known. Scrapie in sheep and goats is also a TSE. There is currently no evidence that CWD can be transmitted to humans but wearing gloves when skinning and butchering deer has been recommended. Hunters are advised not to consume meat from suspect animals. As the disease agent is found in central nervous tissue, the practice of brain tanning has been discouraged in some areas. More information on CWD can be found at the USDA Animal Plant Health Inspection Service CWD website, <http://www.aphis.usda.gov/vs/na/ahps/cwd>; the Chronic Wasting Disease Alliance Website, <http://www.cwd-info.org/>; and state wildlife departments and websites.

Many people who hunt or butcher at home have experience skinning and have their own favorite tools and methods. Skinning can be done with the carcass hanging or lying. Initial cuts should be made down the midline of the belly from the anus to neck and from the legs inwards. Cuts on the legs should be done on the side where the hock and knee bend, the rearmost portion of the hind leg and the foremost portion of the front leg. This will result in a more rectangular shaped hide. It is easier to skin a hanging carcass as the skin can be pulled downwards and “fisted” away from the body, thereby lessening the need to use a skinning knife. A skinning knife should be very sharp and used sparingly to decrease the chance of cutting the skin which mars the hide. Hides can also be removed using mechanical means. No matter how the hide is removed, large amounts of fat or meat should not be taken with the skin as this material will have to be removed later and can impede salt penetration when preserving (see following section). Any obvious blood spots or dirt should be washed off. A good job in skinning will make tanning easier.

Preserving

If the hide is not to be tanned immediately it must be preserved. The goal of preservation is to stop the putrefaction and decay begun by bacteria immediately upon death. Never leave fresh hides rolled up or stacked. The heat remaining in them will encourage bacterial growth and the possibility of hair slippage increases. If skinning takes place in a different location than preservation, try to cool the hide as quickly as possible by laying it open. While plastic garbage bags are useful in handling a wet, bloody hide, do not leave hides in a closed bag. This traps the heat allowing decay to start. Begin your preservation technique as quickly as possible.

The main methods of preservation are salting, freezing, and drying. In any method, the first step is to remove any large amounts of meat or fat remaining on the hide. Salting the hide to remove moisture and create an unfavorable climate for bacterial growth is the most common preservation method. In salting a hide use only non-iodized salt such as non-iodized table salt or pickling and curing salt. Rock salt should never be used as it has impurities. A fine grain salt is preferred as large grain salt does not penetrate the hide well.

To salt a skin, lay it flat and pour a generous amount of salt, approximately one pound salt per pound hide, down the middle of the hide and rub it in thoroughly covering every portion. Fold the hide flesh to flesh, roll it up and place it on a slanting board to drain. The following day shake off the wet salt and resalt with new salt. Once the skin has finished draining it can continue in the tanning process or be laid flat to dry which may take several days or longer depending upon the weather. Hides should not be dried in direct sunlight or where temperatures are very high. Dried skins can be stored in a dry place until tanning.



Salting a hide.



Salted hides draining on a slanted board.

When preserving by freezing, the goal is to reduce the hide temperature quickly. To best do this, lay the hide flat in the freezer and when it begins to stiffen fold it flesh to flesh, roll and place inside a plastic bag. A frozen hide will last for months or even years with no damage to the hide (G. Dimaio, Industrial Specialist, USDA-ARS Hides, Lipids, and Wool Research Unit, Eastern Regional Research Center, Wyndmoor, PA, personal communication). Air drying, also called flint drying, is a less effective preservation method than salting. It is extensively used in developing countries where hides are stretched and staked to the ground or tied in frames to air dry (Kniefel, 1991).

Once you are ready to begin the tanning process, the preserved skin must be rehydrated in preparation for fleshing. Frozen hides should be soaked in water to thaw. Soak salted hides in a brine solution of one to two pounds salt for each gallon of water needed to completely cover the hide. Hides should be soaked for 24 hours or until they are like a wet dishrag. If a hide is very dry care must be used in getting it into the solution so it does not crack upon bending. Additionally, very dry hides may have to be soaked for longer than 24 hours. Relaxing agents are available that can assist in preparing the hide for tanning.

Dirty hides need to be washed. This can be done by hand prior to or following fleshing after the hide is rehydrated or fully thawed. Use mild detergent and plunge the hide in soapy water and rinse thoroughly. If slaughtering one of your own animals, you can minimize hide dirt by care prior to slaughter and during the slaughter process. Angora hides can be a problem if excessively dirty and have hay or grass matted in the mohair.

Fleshing

To flesh a hide means to scrape all fat, meat and membranes off the skin in preparation for the actual tanning process. This can be done before the hide is salted to allow easier salt penetration. Fleshing is most easily accomplished through the use of a fleshing beam and a fleshing knife. A fleshing beam is a piece of



Fleshing beam.



Fleshing knife.

wood over which the hide is draped for scraping. A common type of fleshing beam can be fashioned out of a 2"× 6" or 2" × 8" board five or six feet long. One end should be cut to a blunt point and all edges rounded and smoothed. Legs are attached near the pointed end so that the fleshing beam slants upward from the ground to waist level. While this is the most common type of beam, others such as rounded logs or large PVC pipes are used.

A fleshing knife is a blade with a handle on both ends allowing even pressure to be exerted as the blade is pushed down the hide. Blades should be dull as the goal is to push and scrape all fat, meat, and membranes off the hide, leaving only the skin. A blade that is too sharp can cut the hide exposing hair roots leading to subsequent hair loss. Fleshing knives are available from many taxidermy supply stores at a reasonable cost. Alternatively, a dull draw knife or butcher knife driven into a block of wood for a second handle can be used. Churchill (1983) describes methods to make fleshing knives and other knives from used industrial hacksaw blades. Mill planer blades from logging mills can also be fashioned into fleshing knives and these types of knives are available on the Internet.

To flesh a hide, drape it over the pointed end of the fleshing beam and let it drain briefly. Push the fleshing knife down the hide scraping off unwanted material. To make fleshing easier and lessen the chance of cutting the hide, flesh with the lay of the hair. The legs should be fleshed towards the belly and the hide from the tail pushing towards the neck (Rittel, 1994b). Fleshing takes practice and initially can be time consuming but must be done properly, removing even the thin membrane held tightly onto the skin. Once a hide is fleshed any remaining dirt or blood should be removed from the coat in preparation for the next step.



Flesh down the hide, scraping off unwanted tissue.

Electric fleshing machines, found in taxidermy supply catalogs, are available for fleshing and shaving hides. The cost is usually prohibitive for the hobbyist tanner as the least expensive handheld models cost approximately \$200 and bench models cost over \$600. Even with machines, many professionals still do initial fleshing with a traditional fleshing knife and beam. Fleshing machines do have distinct advantages in shaving hides. Shaved hides are thinner, use less tanning chemicals due to reduced weight and result in a softer finished product. This is especially true for hides from thick-skinned species. While shaving can be accomplished using a very sharp knife, it is very difficult to produce a consistent thickness and to avoid cutting the hide. Generally, goat hides can be tanned and softened without shaving.

Pickling and Neutralizing

Pickling, as described by Rittel (1993), is the use of an acid solution to acidify and temporarily preserve a skin while physically and chemically preparing it for tanning. Most tanning recipes will call for an acid pickle, though it may be included in the tanning process itself and not a separate step. Some paint-on tans, such as Tannit solution and Liqua-Tan, are applied directly to the fleshed hide without the skin undergoing a pickle.

Pickling solutions are mixtures of water, salt, and acid made in a plastic barrel. Enough solution should be made to completely submerge the hide while not resulting in overcrowding if several hides are done together. If in doubt about proper quantity, Rittel (1993) suggests making two quarts of pickling solution for every pound of wet, drained hide. The pH must be carefully checked and proper precautions, i.e., use of eye protection, a protective apron, and rubber gloves, should be followed when using acids. Monitoring pH can be done using simple pH paper and adjustments made using acids or alkaline substances such as sodium bicarbonate. Acids should be added slowly to the pickle, pouring them along the side of the container so as to run gently into the solution. Use a wooden stick and mix slowly, but well. There are a number of acids and formulas that are used in pickling and the tanning recipe one follows will have specific instructions. As one example of a pickling solution, the EZ-100 tanning kit recommends 0.5 fluid ounces Saftee Acid (included in the kit) and 1 pound salt per gallon water.

Skins are usually left in the pickling solution for a minimum of three days after which time they must be neutralized. Neutralizing raises the pH of the skin through the use of a solution containing an alkaline substance such as sodium acetate, sodium formate, sodium bicarbonate, or other similar compound. Neutralization is generally brief, 15 to 20 minutes, after which the skins should be rinsed with clean water, drained, and put into the tanning solution (Rittel, 1993). Again, the tanning recipe or kit should have complete instructions on the neutralization method. After draining and prior to tanning, any holes in the hide should be sewn closed. This will prevent further ripping the hide during softening.

Care should be taken in disposing of the pickling and neutralizing solutions. Acid pickles should be raised to a pH of 6.5 to 7.0 before dumping. Rittel (1993) states that sulfates are considered hazardous materials and if an acid is used in which sulfates are formed local health authorities should be contacted concerning proper disposal. Do not dump or dispose of solutions where they can contaminate streams or ground water. If no other disposal means is available, neutralized solutions should be dumped in a driveway or other area where vegetation does not grow. Chemical and salt water solutions should never be put into septic systems as these can kill the microflora needed to break down waste. Contact local authorities about proper disposal methods.

Tanning

To describe the varying tanning recipes and methods is beyond the scope of this paper and those can be found in various texts, taxidermy supply, or tanning chemical dealer catalogs and in the instructions included with tanning kits or chemicals. The main tanning process may be as simple as one of the paint-on tans mentioned earlier or more complex entailing the application of chemicals in a tanning soak or bath. If making a tanning solution, the pH needs to be monitored and the solution neutralized prior to safe disposal. Hides should be stirred while in the solution to ensure proper tanning. Remove hides after the specified time length and drain and rinse prior to oiling. Do not overtan as this can result in a stiffer hide.

Powdered tanning agents will be mixed into a salt:water solution at the recommended rates. The skin is drained and weighed after neutralizing and draining. That weight is used to calculate the amount of tanning agent needed. As an example, Rittel's EZ-100 instructions state that for every pound wet, drained hide use 4 ounces salt, 0.5 ounces EZ-100, and 2 quarts lukewarm water. The solution pH should be 4.0 and skins tan

in 16 to 20 hours. Alternatively, one could mix enough solution to completely submerge the hide, though this is wasteful of chemicals.

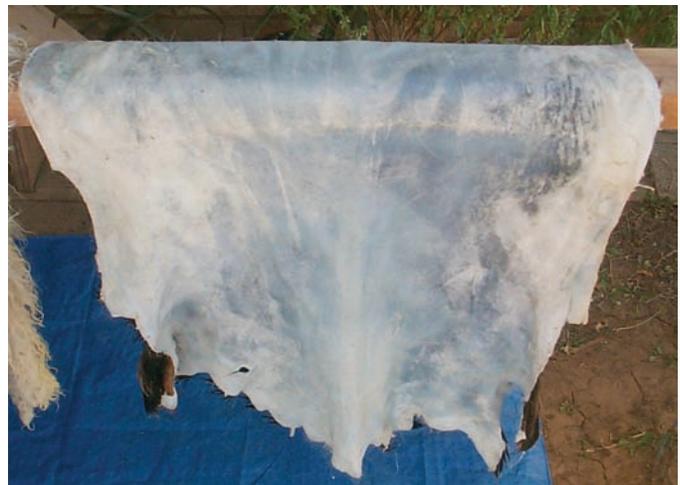
Paint-on tans that call for pickling and neutralizing also require draining before tanning. Others, such as Liqua-Tan that do not require pickling, call for the hide to be washed and drained well prior to application. The well-drained hide is laid flat on a plastic tarp and the tanning agent applied. After several hours, the excess is worked into the skin. Oiling may or may not be included in the instructions. Some paint-on tans state that oils are included in the tanning liquid, others suggest use of a separate oil for optimum softness. As an example, Knobloch's recommends applying Liqua-Soft tanning oil the day following application of Liqua-Tan if the tanned hide will be used for a flat skin or rug.

Oiling

Oiling is done to increase the softness of the finished product and many oils are available in the marketplace. If a tanning kit is purchased, the recommended oil will be included. To oil the hide, lay it flat with the flesh side up. One part oil is mixed with one to two parts hot water and liberally applied to the skin. The hide is folded in half skin to skin and again hair to hair. The folded hide should then be allowed to "sweat," or absorb oil, for approximately 4 to 6 hours. After that time, open the hide up and begin the drying process.

Drying and Softening

Drying methods can range from simple hanging or laying flat to tacking on wood or tying in a frame. Artificial heat should not be used in the drying process. Check the hide frequently to determine when softening should begin. If the hide is stretched and pulled while it is too wet it can become misshapen. If one waits too long the hide stiffens and becomes difficult to soften. If a white line appears when the hide is folded it is dry enough to begin softening. The thinner hide edges will dry out more quickly than the thicker center line and edges are usually worked first. If a hide does become too dry to soften adequately it can be rewetted using damp towels and the softening process begun again.



The white drier areas mean this skin is ready to soften.

Softening, referred to as staking, involves stretching and bending the hide to break up fibers in the skin. The time and effort spent in staking directly determines the suppleness of your final product. A common method involves use of a staking beam. This is a 2" × 6" board cut and fashioned in the shape of a braced, inverted T with the upright end rounded to a blunt edge. The flesh side of the damp hide is rubbed across the edge in much the same way as one shines shoes to pull, stretch and break up skin fibers. A highly effective method involves stretching and pulling the hide around a cable. Regular rope can be used but aircraft cable clamped around a pole works very well and can result in an extremely soft hide.

Commercial tanneries use equipment for softening such as large, rotating drums that tumble the hide, generally with sawdust, as it dries. In addition to softening the hide, a solvent may be added to the sawdust to help clean hair or fur. Some texts recommend using an old laundry dryer with the holes plugged for tumbling hides. Whereas this will help clean the hair, it will not help significantly in softening the hide. To do this requires a tumbler with at least a six foot drop along with 100 pounds of hardwood sawdust (P. Helms, McKenzie Taxidermy Supply, personal communication).



Staking beam.

Finishing

Finishing the softened hide entails cleaning or brushing the hair, sanding or rasping the skin side, and trimming off rough or uneven edges. The hair on some hides may only need combing or brushing whereas the hair on other hides may need a deeper cleaning. Cleaning the hair can be done with a tumbler or by simply rubbing sawdust or corn cob grit into the hair. Rittel (1994a) recommends that local sawdust not be used as it may contain pitch and be unevenly grained. Taxidermy or tanning chemical supply houses sell sawdust and solvents to be used in cleaning. Hobson (1977) explains how to use cleaning substances such as cornmeal, oatmeal, bran, chalk and plaster of Paris.

Once the hair is clean and brushed, the skin side can be sanded or rasped. This helps to remove rough spots and further soften the hide. Some staking methods can make the hide appear brown and dirty and sanding or rasping will make it look cleaner and more professional. Hide edges are usually uneven and may be stiffer than inner portions and trimming these results in a more attractive product.

Optional Steps

When reading about tanning, additional steps such as dehairing and degreasing will be found. Dehairing is accomplished by soaking the hide in a lime or caustic lye solution after which the hair is scraped off. The hide is then tanned for leather using the same or similar methods as those described. Degreasing is done on hides with large amounts of oil, such as raccoon, bear, and the like. It is unlikely that goat hides would need degreasing.

Use of Tanned Hides

Tanning is not easy and some difficulties can be expected. But, through practice and experimentation the techniques can be learned and good quality hides produced. The uses for tanned goat hides are limited only by the quality of the finished product and the imagination of the tanner, or purchaser. Rugs, seat covers, decorative wall hangings, or other handicrafts are possible.

References

- Churchill, J.E. 1983. *The Complete Book of Tanning Skins and Furs*. Stackpole Books, Harrisburg, PA. 197 pp.
- Hobson, P. 1977. *Tan Your Hide!* Storey Communications, Inc., Pownal, VT. 135 pp.
- Kneifel, E. 1991. Goat skins supply, demand and utilization. In: T.H. Teh (Editor) *Proceedings of the National Symposium on Goat Meat Production and Marketing*. pp. 42-47. Langston University Agricultural Research and Extension Program and E (Kika) de la Garza Institute for Goat Research, Langston University, Langston, OK.
- Rittel, B. 1994a. Syntans as a tanning agent. *Breakthrough* 38:26-31.
- Rittel, B. 1994b. When fleshing or shaving- the only way is the right way. *Breakthrough* 36:22-24.
- Rittel, B. 1993. The basic principles of pickling and neutralizing. *Breakthrough* 33:48-52.

Partial list of supplies needed to tan hides

- skinning knife if needed
- sharpening stone
- non-iodized salt, not rock salt
- fleshing knife
- fleshing beam
- plastic garbage can or barrel (metal containers should never be used)
- wooden pole or paddle to stir tanning solutions
- tanning kit or chemicals
- rubber gloves, protective apron, and eye protection for handling chemicals and solutions
- pH paper if pH of solutions must be checked
- staking beam, cable or other softening device
- comb or brush for hair
- suitable place for tanning, not too hot or cold
- area where hides can be laid upon wood or a bench, not concrete floors
- scale to weigh hides and chemicals
- source of hot water to mix solutions

List of some available books on tanning and taxidermy

Deerskins into Buckskins: How to Tan with Brains, Soap or Eggs. 2004. 2nd Ed. Matt Richards. Backcountry Publishing, Cave Junction, OR. 240 pp.

The Ultimate Guide to Skinning and Tanning: A Complete Guide to Working with Pelts, Fur, and Leather. 2002. Monte Burch. The Lyons Press. Guilford, CT. 240 pp.

Buckskin: The Ancient of Art of Braintanning (Originally titled "Wet-Scrape Braintanned Buckskin). 2001. Steve Edholm, Tamara Wilder and Jim Riggs. Paleotechnics, Boonville, CA. 307 pp.

How to Tan Skins the Indian Way. 1991. Evard H. Gibby. Eagle's View Publishing, Liberty, UT. 28 pp.

Outdoor Life Complete Home Taxidermy. 1987. Tim Kelly. Outdoor Life Books, Danbury, CT. 271 pp.

Home Tanning & Leathercraft Simplified. 1984. Kathy Kellogg. Williamson Publishing Co., Charlotte, VT. 192 pp.

The Complete Book of Tanning Skins and Furs. 1983. James E. Churchill. Stackpole Books, Harrisburg, PA. 197 pp.

The Complete Book of Taxidermy. 1979. Nadine H. Roberts. TAB Books, Blue Ridge, Summit PA. 351 pp.

Tan Your Hide! 1977. Phyllis Hobson. Storey Communications, Inc., Pownal, VT. 135 pp.

Home Book of Taxidermy and Tanning. 1969. Gerald J. Grantz. Stackpole Books, Harrisburg, PA. 160 pp.

Where to find tanning supplies and chemicals

The following is a partial list of companies and dealers that sell tanning supplies and chemicals. Other companies, dealers, or distributors can be found on the Internet at <http://taxidermy.net> or through using any Internet search engine. Local taxidermists and tanneries can also be a source of information and(or) supplies.

Adirondack Outdoor Company
P.O. Box 86
Elizabethtown, NY 12932
Phone: 518-873-6806
<http://www.adirondackoutdoor.com/tanning.htm>

Jonas Supply Company
1850 Dogwood St.
Louisville, CO 80027
Phone: 800-525-6397
<http://www.jonas-supply.com>

Knobloch's
1850 Dogwood St.
Louisville, CO 80027
Phone: 303-666-9045
<http://www.knoblochs.com/>

McKenzie Taxidermy Supply
P.O. Box 480
Granite Quarry, NC 28072
Phone: 800-279-7985
<http://www.mckenziesp.com/>

Rittel's Tanning Supplies
51 Summer Street
Taunton, MA 02780
Phone: 508-822-3821
Fax: 508-828-3921
<http://rittelsupplies.net/>

Tandy Leather Co.(Locations throughout the U.S.)
1339 SW 59th Street
Oklahoma City, OK 73119
Phone: 877-428-5754
<http://www.tandyleather.com/>

Van Dyke Supply Co. Inc.
Phone: 800-737-3355
<http://www.vandykestaxidermy.com/>

WASCO
1306 West Spring Street
P.O. Box 967
Monroe, GA 30655
Phone: 800-334-8012
<http://www.taxidermy.com/>

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