

## Tanning of 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 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, hair-on, and used in many ways. Learning the art of tanning hides can be very rewarding, through acquisition of new skills and through 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 designed to tan up to 20 pounds of hide (the equivalent of two deer skins) can be bought for between \$25 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 Can One Find Information?

While there are books dedicated to tanning hides, much of the information available will be found in conjunction with information on taxidermy. Thus, a local taxidermy shop would be a good place to start. The taxidermist either tans hides or sends them off to be tanned. He or she may also sell tanning chemicals or supplies. Many of the books available on tanning were written between twenty and thirty years ago. While they contain valuable information on hide selection and preparation, the tanning process, and working with leather, many newer tanning methods are not contained in those texts. Magazines dedicated to the taxidermy trade will also contain information on tanning hides.

A large amount of tanning information can be found on the internet. Much of it will be good but some may be confusing or incorrect. There are tanning chemical suppliers, taxidermy supply companies, and other outdoor sporting goods companies that sell tanning chemicals and supplies online or via catalogs. Some of their web pages and catalogs have "How to" sections that provide good information on hide handling and newer tanning methods. Performing an internet search on hide tanning will result in a list of numerous web pages that contain information on tanning or that are selling supplies or services. Interestingly, there is an increasing amount of information on tanning using animal brains to make buckskin in the traditional way of Native Americans. In addition to these websites dedicated to "brain tanning," several good texts have been written on the subject. At the end

of this article is a list of texts and websites of companies and distributors of tanning chemicals and supplies<sup>1</sup>. Finally, the directions for use included with many tanning chemicals provide good detail and instruction on hide preparation and chemical usage.

### **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. There are also oil tanning methods that 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, however, 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. Tandy Leather Co. does sell a chrome sulfate-based tanning kit called “Tannery in a Box” that includes chemicals for hair-on or hair-off tanning. Aluminum salts are another mineral tanning method. Alum tanning is a method that many texts include. 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, is a mineral powdered tanning agent that is very popular in tanning hides for taxidermy and can be used at home with good results. It is available from many suppliers.

Synthetic tanning agents or syntans have been developed as a result of advances made in the chemical industry. Syntans are described by Rittel (1994a) as 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). At home, syntans can be used alone or in combination with mineral tanning agents. 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 also 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 agents such as many of the “paint-on” tans discussed below 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.

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<sup>1</sup> 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.

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, require the mixing of the chemical into a water and salt solution and immersing the prepared hide for the time period specified in the instructions. 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, 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 available 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 may also be available.

When using powdered or liquid tanning agents requiring creation of a tanning solution, usually, the pH of the solution must be monitored. Monitoring can be done using simple pH paper available from suppliers and adjustments made using acids or alkaline substances such as sodium bicarbonate. If a tanning kit is purchased these chemicals are usually included. Generally, no other monitoring is required in using the tanning agent except adhering to specified soaking times to prevent overtanning. Tanning solutions should be neutralized and disposed of properly. Do not dump or dispose of solutions where they can contaminate streams or ground water. 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.

Use of immersion tanning methods negates problems with discolored or greasy hair sometimes encountered with paint-on tans. 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 may 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. For initial attempts at tanning, it may be beneficial to purchase a kit complete with tanning chemicals, instructions and a list of the needed equipment. Rittel's manufacturers a many types of kits that are available from various distributors. Examples include: EZ100 Kit, Trapline Tanner Kit and Rancher Tanning Kit that both utilize Rittel's Kwik-Tan, and Dehairing and Leather Tanning Kit. Kits containing Lutan F as the tanning agent are available from Van Dyke Supply Co. Inc. and WASCO. Of course it is possible to purchase tanning chemicals individually and there are many other chemicals on the market, one example being Para Tan manufactured by Knobloch's. 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 - chemical 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).* Chronic Wasting Disease (CWD) in deer is also of concern and while there is currently no evidence that CWD can be transmitted to humans, 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/lpa/issues/cwd/cwd.html>; 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. Generally, hanging is easier as after the initial cuts are made 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. This discourages proliferation of bacteria. 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 down the middle of the hide, approximately one pound salt per



pound 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 be laid out 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.

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). However, it has also been written that hides to be tanned with the hair on should not be frozen as this can cause hair to fall out (Tannery in a Box Instruction Sheet). As few people own a freezer in which they wish to freeze goat hides, salting will likely remain the preferred method of preservation. 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 them. Salted hides should be soaked 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.

Hides that are excessively dirty will likely need to be washed. This can be done prior to fleshing after the hide is rehydrated or fully thawed. 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 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 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. Using the fleshing knife, push downwards scraping off unwanted material. To make fleshing easier and lessen the chance of cutting the hide, it is important to 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.



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 to 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. Acids should be added slowly to the pickle, pouring them along the side of the container so as to run gently into the solution. Mix slowly, but well. There are a number of acids and formulas that are used in pickling and the tanning recipe one follows, or kit that is used, will have specific instructions.

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.

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 can be considered as hazardous solutions and if an acid is used in which sulfates are formed local health authorities should be contacted concerning proper disposal. If no other disposal means is available, neutralized solutions should be dumped in a driveway or other area where vegetation does not grow.

## *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 tanning chemicals in a tanning soak or bath.

Powdered tanning agents will be mixed into a salt:water solution at the recommended rates. Generally, the tanner would weigh the skin after neutralizing and draining. That weight is used to calculate the amount of tanning agent needed. Alternatively, one could mix enough solution to completely submerge the hide, although this tends to be more wasteful of chemicals. Tanning agents will come with instructions on calculating needed amounts and how to mix solutions. As discussed in a previous section, solution pH may need monitoring and adjusting and hides should be stirred occasionally. When making and disposing of solutions, follow safety guidelines discussed above. Upon removal from the solution, hides should be drained briefly. Some tanning methods call for a short rinse. The hides are then ready for oiling and drying.

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. Hanging the hide is generally the easiest. Artificial heat should not be used in the drying process. Check the hide frequently during drying to determine when softening should begin. 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. 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. However, if the hide does become too dry to soften adequately it can be rewetted using damp towels and the softening process begun again.



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).

### *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 removing 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**

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- 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**

- 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.
- Deerskins into Buckskins: How to Tan With Natural Materials: A Field Guide for Hunters and Gatherers. 1997. Matt Richards. Backcountry Publishing, Rexford, MT. 160 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  
2260 Industrial Lane  
Broomfield, CO 80020  
Phone: 800-525-6397  
<http://www.jonastaxidermy.com>

Knobloch's  
10675 Empire Road  
Lafayette, CO 80026  
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.taxidermyonline.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. (Has 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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