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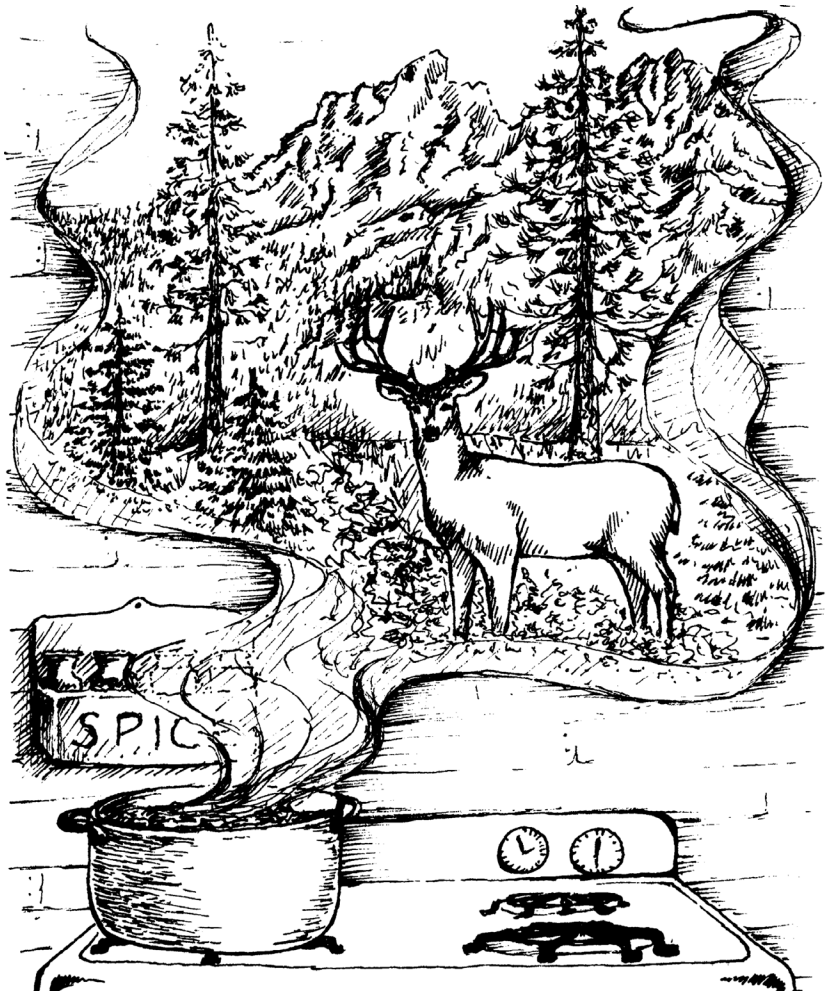
Big Game
from Hunt to Home



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Big Game from Hunt to Home

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Meat from big game animals (such as deer, antelope, elk, moose, and bear) is a nutritious choice for family meals. You'll enjoy eating it when it's good quality and well-prepared. For best flavor, it's important to handle game carcasses carefully and to butcher and store the meat correctly. This publication will help you do it right.

In the Field

The quality of your game meat depends largely on how well-prepared and efficient you are in the field. Here are some of the things you'll need for most field conditions:

- 20 feet of ¼-inch nylon rope to drag or hang your animal
- Sharp hunting knife
- Game saw to cut the pelvis, brisket, and legs
- 5 feet of string to tag your animal
- Plastic or cloth bags in which to put the heart and liver
- Game bags to cover the carcass of skinned animals
- Clean paper or cloth towels to clean up the carcass and yourself
- Black pepper (optional) to coat exposed meat and to deter blowflies

Because the conditions under which big game animals are killed vary considerably, it's impractical to list hard and fast rules for field care. However, there are some basic rules that apply in nearly all situations:

- Be sure the animal is dead.
- Bleed the animal (if necessary) and eviscerate it (remove its entrails) as quickly as possible.
- Keep the meat *clean*.
- Cool the meat quickly and *keep it cold*.

Most big game animals are bled automatically when shot in the chest cavity by an expanding-type bullet, which severs main arteries and veins. Head, neck, spine, and "gut" shots, however, may miss major arteries. If in doubt, bleed the animal.

There are two good ways to bleed an animal, depending on whether or not you want a trophy. If you want a trophy, insert your knife deeply into the soft spot where the neck meets the brisket (chest), aiming the point of the knife toward the tail (figure 1). Twist the point of the knife toward the withers (the top of the shoulders) to sever one or both of the common carotid arteries (the main blood vessels leaving the heart).

If you're not interested in a trophy, simply cut the throat below the jaw, severing the arteries and veins (figure 2).

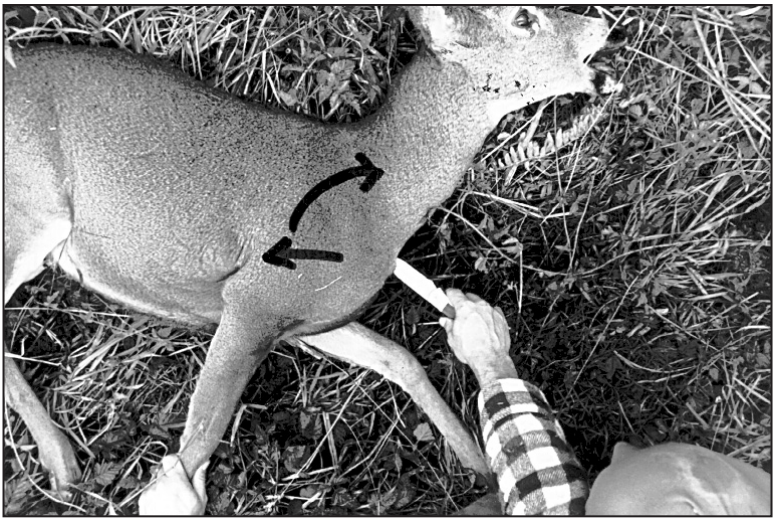

Figure 1. Bleeding method if you want a trophy.

Figure 2. Bleeding method if you don't want a trophy.

Deer

Eviscerate your deer immediately. This starts the cooling process and makes the animal lighter and easier to handle.

The following procedures apply to a deer that you can transport back to camp intact (leaving the skin on to keep the meat clean) and finish skinning and dressing in camp, at home, or at the cold storage locker.

Favorable Terrain

Here are the steps for eviscerating and skinning your deer on favorable terrain:

1. Use a rock or limb to prop the animal on its back with the head slightly downhill. This reduces the pressure of viscera against the stomach wall and makes it easier to cut the skin and muscle without puncturing the rumen or intestine.
2. Cut the hide from the groin to the beginning of the ribs (solar plexus). To prevent hair from dulling your knife and getting onto the meat, cut from the flesh side out; slide the knife carefully under the skin at the first cut and cut up and forward, toward the front of the deer. Note: It is important to be aware of your state's regulations with regard to preserving evidence of the animal's sex. You may need to maintain attachment of the sex organs to one-quarter of the meat or to preserve parts of the skull, possibly including an eye. Know what you need before you begin field dressing your animal.
3. Make an opening into the body cavity by cutting the thin belly muscle without puncturing intestines or rumen (figure 3). Make a small incision in front of the groin (figure 4), insert your hand, and cut the opening all the way to the rib cage. Be careful not to puncture the rumen or intestines.
4. Roll the viscera out onto the ground (figure 5). To do this, reach into the body cavity and start pulling the rumen (stomach) and intestines out. You may use a knife to cut points of attachment; be careful not to puncture the rumen or intestine.
5. Once the rumen and intestines are out, reach inside and cut through the diaphragm (figure 6) to remove the lungs and heart. Reach forward to the base of the neck and cut the esophagus and windpipe loose. Grasp the heart and lungs and roll the mass, including the rumen and entrails, toward the rear of the animal.

As you roll and pull, you will need to cut some points of attachment, the last one being the colon, near the anus. Cut around the anus. Tie the colon with a short piece of string before pulling it into the body cavity. You can keep the entire pelvic area clean by keeping the pelvic bone intact at this stage in dressing the deer.

Figure 3. Make an opening by cutting the thin belly muscle.

Figure 4. Make a small incision in front of the groin.

6. Cut the heart and liver free from the entrails. Put them in a cloth sack (an old pillowcase works fine and is handy to carry back to camp). If you use a plastic bag, remove the heart and liver from it as soon as possible so they will cool thoroughly.

Figure 5. Roll the viscera out onto the ground.

Figure 6. Cut through the diaphragm.

7. Once all the viscera are out, turn the deer over and drain out excess blood. After the blood has drained thoroughly, the deer is ready to be moved. If the deer is to be dragged over loose soil or rolled downhill, you can keep out dirt, leaves, and debris by sewing up the cavity with a strong cord.
8. When you get back to camp, hang the deer from a tree, a crosspole, or a tripod. While hanging and skinning the deer, do not touch the metatarsal glands. The metatarsal glands, located on the insides of the hind legs just below the hock, are 5 to 7 inches long and 2 to 4 inches wide and are easily recognized by the long, dark hair covering them. Secretions from these glands may give the meat an undesirable flavor and odor. The secretions may be spread by contact with your hands or knife.
9. After you have skinned and trimmed the deer and removed the lower legs, cover the carcass with a game bag. Tie the ends of the bag closed to keep flies out.

Difficult Terrain

If you kill your deer in a place where it is impractical or impossible to get the whole, unskinned animal back to camp or transportation, you can skin and quarter it in the field:

1. Your first concern is keeping the meat clean. Hanging the deer off the ground is the best way to ensure cleanliness. If that is not possible, attach the deer to a bush or rock on a steep hillside.
2. Eviscerate and skin the animal about the same way as described above in "Favorable Terrain."
3. Let the carcass dry a bit, cut it into quarters, and put the meat in adequate game bags. You can tie the bundled quarters on packboards and carry them out to camp or to transportation.

Camp Equipment

Your camp equipment should include a block and tackle, gambrel (frame for hanging the carcass), buckets, clean cloths or paper towels, tarpaulins, flashlights, a meat saw, game bags, and extra cord or rope. Hanging game in a good place with the right equipment is the secret to getting clean meat out of the woods. If you must quarter an animal in the field, you'll need meat sacks or bags to keep the meat clean. Homemade sacks of light cotton cloth, 3 feet by 4 feet in size, are suitable for both deer and elk. You can use them as ground cover while skinning your animal, and as sacks for the quarters or skinned pieces of meat.

Cool your deer meat quickly and keep it cold. If possible, cool the meat to an internal temperature of 40°F within 24 hours. To keep the carcass cold, hang it at night and keep the night chill in the meat during the day. One way to do this is to hang the meat in a shady thicket to protect it from warm sun and air. Another way is to wrap a cold canvas around the meat, lay it on the ground in the shade, and place sleeping bags over it to keep the cold air in and the warm air out. The object is to keep the meat as cold as possible and avoid fluctuations in temperature.

If the weather is warm, take the carcass to a meat cooler the day of the kill or as soon as possible to ensure the quality and safety of the meat.

Elk

Eviscerating and dressing elk in the field is a bit different from handling deer. Due to their size, most elk are eviscerated, skinned, and quartered on the spot. If you're hunting alone, you should have a block and tackle for hanging your elk. If you have help and can reach your elk with a vehicle, you may be able to carry the whole, unskinned carcass to a processing facility—which will result in a higher quality product and greater meat yield after aging, but this must be done the day of the kill.

As with deer and other game species, it is important to know and comply with state regulations for preservation of evidence of your animal's sex. In some cases, other body parts may also be needed for data collection.

Handling Elk without a Hoist

If you do not have hoisting gear, use the following method for field dressing and quartering an elk:

1. Combine the initial steps of skinning the animal with the process of eviscerating it. Start skinning by inserting the knife under the throat skin; cut the hide on the ventral line all the way from the throat, over the brisket, and down to the anus. With a hatchet or saw, cut through the bone in the brisket (breastbone) and spread the rib cage to expose the heart and lungs. Follow the windpipe with your knife, and open the neck to expose it and the gullet.
2. In preparation for later removal, skin around the vent (anus) and cut between the legs (groin) down to the pelvic bone. With a hatchet or saw, split the pelvic bone and expose the lower colon. Then cut the belly skin and muscle tissue to expose the entrails.

3. Cut the esophagus and windpipe loose and pull them out to start the heart, lungs, rumen, and entrails rolling toward the rear of the animal. You can remove the entire mass out to one side.
4. Cut the colon loose from the pelvic cavity, then cut the heart and liver free from the surrounding membrane and put them in a cloth sack to keep them clean while transporting. You can use a plastic bag, but there is a danger of improper cooling if you leave the heart and liver in the bag too long.

If temperatures do not drop below freezing at night, you must skin your elk very soon after you kill it. Eviscerated elk left overnight with the skin on may spoil by morning. If you kill an elk just before dark, stay with the animal until you have completely skinned it. If you must leave a skinned elk in the woods overnight, create air space between it and the ground by rolling the elk over on some rocks or poles. Air circulation all around the elk will ensure the escape of body heat and a thorough chilling of the meat.

Once your elk is skinned-out on the ground, the next job is to quarter it and get the meat ready for transportation. Before quartering, spread out the hide, extra canvas, and game bags to keep the meat clean. Then split the carcass in half. Start by cutting the bone between the spreading hind legs. Continue to split the backbone all the way to the last vertebra in the neck. Use the spinal column as a guide in centering the cut. A sharp ax or hatchet is suitable for this.

Quarter the elk on the ground by cutting between the last two ribs and severing the backbone. Put the quarters in large game bags. The protected meat is ready to be transported back to camp or to a locker for cooling and aging.

Handling Elk with Block and Tackle

The cleanest way to skin and quarter an elk in the field is to hang it with a block and tackle. Prepare the elk for hanging, eviscerating, and skinning by cutting the hide from the chin to the anus, via neck and belly. Cut through the meat and bone of the brisket with a knife and meat saw or ax to expose the heart and lungs. Next, cut between the hind legs to expose the pelvic bone. With an ax or saw, split the bone to expose the colon leading to the anus. While the elk is on the ground, skin around the anus and detach it from the bony pelvic structure surrounding it.

Partially skin both hind legs, then fasten the gambrel in the hocks. With the gambrel holding the rear end of the elk slightly off the ground, disjoint or saw off the hind legs below the hock.

Hoist the elk about one-third of the way off the ground. This will start the entrails rolling forward and move the blood in the cavity from the rear half of the elk. Skin the accessible areas, pull out and remove the colon from the pelvic cavity, and roll out the entrails. Then hoist the animal completely off the ground and remove the heart, lungs, windpipe, and esophagus. Finish skinning and cut off the head.

Split the animal in half with a meat saw or ax. Start at the base of the tail bone on the solid part of the backbone that is exposed in the pelvic cavity. Use the spinal cord as a guide in centering the cut. Leave the last vertebra of the neck uncut in order to balance the halves before separating. If the halves are not balanced, they will tip off the gambrel onto the ground.

To avoid having meat fall off the gambrel, tie hock and gambrel together securely. Then proceed to cut the carcass into quarters. Cut between the last two ribs, and drop the front quarters into game bags. Lower the hind quarters and drop them into game bags. The meat is ready to be carried out of the woods.

Antelope and Bear

State regulations may require you to retain part or all of the skull of these species to determine sex or for collection of other required data. Be sure to know what your state requires so that you can comply with regulations and maximize enjoyment of your hunting experience.

Because the weather is likely to be warm, you must eviscerate antelope immediately to start the cooling process. You can dress an antelope in the field like a deer. Hanging the animal is best, but this is not always possible. You can use a tripod, a pole suspended from a truck, or even the side of a pickup rack to support an antelope.

Have game bags or some extra canvas handy to help keep the meat clean. Get the meat to a cold storage plant as soon as possible. If you can get your animal to a cooler within a few hours, leaving the skin on will help keep the meat clean; otherwise, skin the animal.

Field dress a bear the same as described earlier for deer or elk. Avoid dragging the bear if you plan to save the hide.

Transporting Big Game Meat

If you transport game meat by automobile, you need to ensure cleanliness and preservation. Although wrapping meat in game bags, pieces of canvas, or heavy wrapping paper can ensure cleanliness, wrapping meat in this manner will also hold in heat and will hasten spoiling.

Thus, before covering meat for transportation, be sure it has cooled thoroughly. Avoid covering or otherwise enclosing game meat that has not been thoroughly cooled. Instead, place the meat in a cool location open to air circulation. You can carry a deer on top of your car if you have a ski rack or luggage carrier but you will need to travel when the air is cool. This may necessitate night traveling.

General Care of Big Game Meat

If you must leave skinned animals or any parts thereof exposed in the field for a day, protect the meat against animals by cutting cloth into thin strips about a foot long and attaching the strips in six or seven places on the carcass. Let them hang free. The slightest breeze will make the strips flutter, keeping magpies and ravens away for at least a day.

After dressing the animal, drag the entrails at least 25 feet from the meat cache. Marauding birds and animals usually will concentrate on the entrails and leave the meat alone.

Due to differences in the weather between hunting seasons, elk and deer meat may require different treatment in camp. Rocky Mountain elk often are shot in freezing weather, while deer may be bagged in warm weather in the early part of the season. Ideally, elk meat should not be allowed to freeze while hanging in camp. Therefore, it might be advantageous to take both deer and elk to a cold storage locker—to keep the meat cold or to keep it from freezing.

Wash the heart and liver in cold water immediately. Drain until dry and keep cold.

Tongue, brains, and kidneys are good eating. Remove brains as quickly as possible and cool them. Wash tongue and kidneys, drip dry, and keep cold.

Keep flies off skinned carcasses by covering the meat with sacks or game bags. In drier climates, a glaze forms rapidly on a freshly skinned carcass; while the glaze is forming, swish a branch or towel around the carcass to keep the flies off. The neck and the area along the backbone take the longest to dry. If you have to leave meat exposed, throw a liberal amount of black pepper on the moist areas.

Freshly laid blowfly eggs are not as bad as they look. When you find a cluster of eggs, simply remove it with a knife or cloth. The meat usually is not contaminated and none of it needs to be cut off and thrown away.

Aging, Skinning, and Boning Big Game

Aging

Aging of meat—also called seasoning, ripening, or conditioning—is the practice of keeping carcasses or cuts at temperatures of 30°F to 37°F for a period of 1 to 14 days. Hunters seldom agree on the length of time big game should be aged, but most locker plant operators and meat scientists agree that aging time should be minimized, and that game shot during warm weather and not chilled rapidly should not be aged at all. In warm weather, there is less toughening and hardening of the muscles from rigor mortis than when temperatures are below freezing. Also, the natural enzymes responsible for tenderizing meat work much faster in warm weather than in cold weather. So you should cut the carcass of an animal shot in warm weather as soon as the meat is chilled.

There are several other reasons for not aging game:

- You should not age the meat of an animal severely stressed from running a long distance, or from being wounded and trailed several hours prior to the kill. This is because stress uses up the energy sources that normally are converted to lactic acid in the muscle, and spoilage bacteria grow much faster in the absence of lactic acid. If you age meat from a stressed animal, it may go bad.
- If the animal has extensive gunshot wounds, bacterial contamination from blood (which has the optimum pH for bacteria), dirt, and hair around the wound also may cause rapid souring of the meat.
- There is no need to age a carcass that has been in camp for a week, because aging already has occurred and bacterial growth is underway.
- If you age meat at a locker plant, the law requires that the carcass be skinned, which can result in excess drying.
- Carcasses from animals under 1 year of age are already tender and need not be aged.
- You don't need to age meat that will be ground, cured, or made into sausage because these processes tenderize meat. In fact, unaged meat makes much higher quality sausage and ground meat than does aged meat.
- You also don't need to age meat that will be cooked by braising, pot roasting, or stewing because these moist-heat cooking methods tenderize and break down connective tissues.

Seldom will you find ideal conditions for aging game. However, under ideal conditions, when you take an animal with minimum stress and minimum tissue damage due to gunshot, and when you transport the carcass to a 34°F cooler the day of the kill, it's best to age antelope no more than 3 days; deer, sheep, goat, cow elk, and cow moose a maximum of 7 days, and bull elk and bull moose up to 14 days at 34°F. If you notice any mold, slime, or "off odors" developing, you should cut and freeze the carcass immediately.

If you age your game at home without controlled temperature and humidity, leave the hide on during aging to protect against drying and dirt. Laws requiring that game be skinned in commercial coolers do not apply to home coolers. Also, remember to age meat in a clean, cool, well-ventilated place free from strong odors (such as gas, oil, and paint), which can be absorbed by the meat. Aging periods at home should be shorter than those listed above, particularly if your storage area temperature rises above 34°F.

If you cut and wrap your own game, you may want to process the entire carcass, except for the loin and rib, as soon as the carcass is chilled. The loin and rib, which usually furnish steaks and roasts to be cooked by dry heat, may then be aged longer. Stop aging the meat as soon as you notice any deterioration or odor. Sour meat from excessive aging not only tastes bad, but may make you sick.

Skinning

The steps shown here apply to skinning elk, moose, deer, antelope, and other big game animals. A cow elk is pictured for an example.

Remove the front feet by cutting around the leg about 1 inch below the knee. You can snap off the leg at the break joint by bending it backward or sawing it off. Skin around the rear hock and remove the hind shank at the flat joint on the lower part of the hock. You also may remove the hind shank with a saw. Be careful not to cut the tendon above the hock, because it is the only means for hanging the carcass head-down during skinning and boning.

Make an opening between the tendon and hock, and hang the carcass by one or both hind legs. Then put the tip of the knife under the skin on the inside of the hind leg, near the pelvic region, and make a cut up to the hock. Pull the skin away from the meat so that hair does not contaminate the skinned surface (figure 7).

After you have skinned both hind legs, skin the ventral (abdominal side) portion of the carcass from the brisket to the pelvic region by cutting, pulling, and "fisting" the skin (pushing your knuckles and fists between the hide and the meat) from the sides. Then pull the skin from the back. You will need to cut some of the membrane holding the skin to the carcass (figure 8).

When you have pulled the skin down over the back to the shoulders, make a cut down the rear of the front legs and skin the legs (figure 9). Then pull the skin down the neck to the head and remove the head at the atlas joint (the joint closest to the skull). You can do this most easily by cutting the muscle and ligaments surrounding the joint, twisting the head off, and cutting away any remaining tissue. Remove the tongue to use in sausage or for cooking.

Figure 7. Pull the skin back away from the meat.

Figure 8. Pull the skin from the back after skinning the sides.

Figure 9. Make a cut down the front legs and skin the legs.

Making Boneless Cuts

Many locker plants do an excellent job of cutting, processing (making ground game, sausage, jerky, etc.), and wrapping game meat. Some butchers also will make boneless cuts if requested. Making boneless cuts usually is more expensive, but often results in higher quality, easier-to-carve cuts. Be sure to tell the butcher what cuts you want and how many people are in your family.

Whether a butcher does it for you or you do it yourself, there are several arguments for making completely boneless cuts:

- If you do not have a band saw, sawing through bone is difficult.
- Bloodshot and fat pockets are easier to remove from boneless cuts.
- Boneless cuts are much easier to wrap, and your paper will not be torn by bones.
- Boneless cuts take less storage space and cost less to ship.
- Boneless cuts are easier to carve when serving.

Described below are the procedures for making boneless cuts from an elk; the same steps apply to moose, deer, antelope, and other big game animals.

Before you begin, make sure you have the following:

- A clean, roomy, well-ventilated place to work
- A sharp, 5- to 6-inch boning knife
- A sharp, 8- to 10-inch steak cutting knife
- A sharpening stone
- A clean table
- Several pans
- Freezer paper and tape
- A marking pencil

Before making any cuts, carefully trim all hair and contamination from the hanging carcass. While cutting, be sure to separate entire muscles and keep the knife next to the bone. When making steaks and roasts, always cut across the grain. Above all, keep your hands, clothing, knife, saw, and anything else that could come into contact with the meat as clean as possible.

Steps:

1. Remove the shoulder by cutting between the shoulder blade and the rib cage along the natural seam (figure 10). This region often has bloodshot areas that need to be trimmed.

You can make a boneless arm shoulder roast by cutting next to the bones along the white line shown in figure 11. Make small blade roasts by removing the meat located on either side of the bony ridge of the blade bone. If you prefer, you can cut these blade roasts into steaks. You can bone and grind the rest of the meat, or cut it into pieces for stew (figure 12).

Figure 10. Remove the shoulder.

Figure 11. The line shows where the boneless shoulder roast is removed.

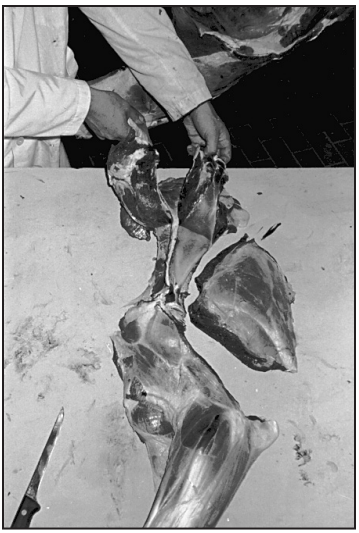

Figure 12. Remove blade roasts.

2. Make a horizontal cut just in front of the hip bone, located at the junction of the leg and the loin. Next, let the knife follow the vertical spine as a guide and cut down until you reach the base of the neck. Then make a cut just beyond the outer edge of the loin muscle extending from the hip bone to the base of the neck. Remove the loin muscle by cutting as close to the bones as possible (figures 13 and 14).
3. Trim excess fat and connective tissue from the loin muscle (figure 15) and make individual or butterfly steaks (figure 16). Cut next to the ribs to remove the remainder of the meat from the forequarter (figure 17) and make into ground game, stew meat, or sausage.
4. Remove the flank and neck meat. You can avoid contamination consisting of viscera, dirt, etc. on the inside of the carcass by cutting next to the rib bones but staying on the outside of the body cavity (figure 18). If inside contamination is not excessive, you can saw the ribs into strips for barbecuing or bone them out for ground meat or sausage. You also can remove the two tenderloins to make small butterfly steaks or stir fry.

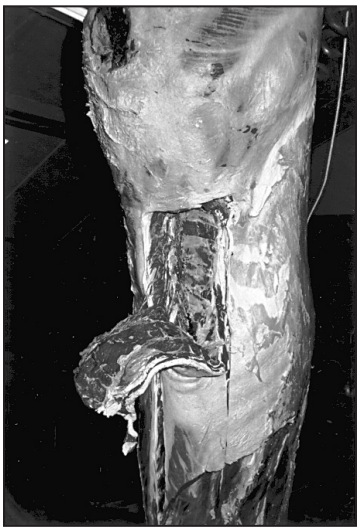

Figure 13. Cut next to the hipbone and then down the back.

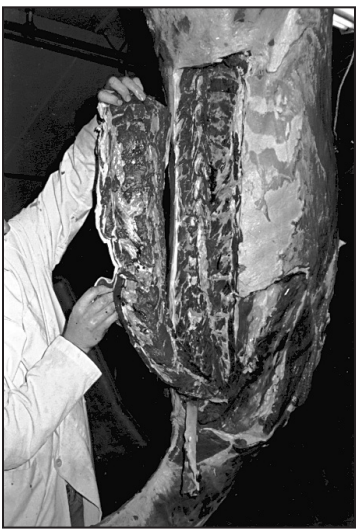

Figure 14. Cut close the bone.

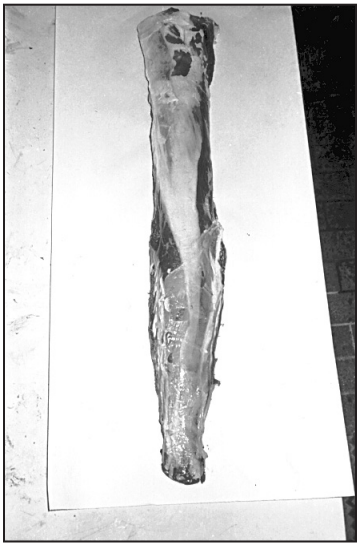

Figure 15. Trim fat and connective tissue.

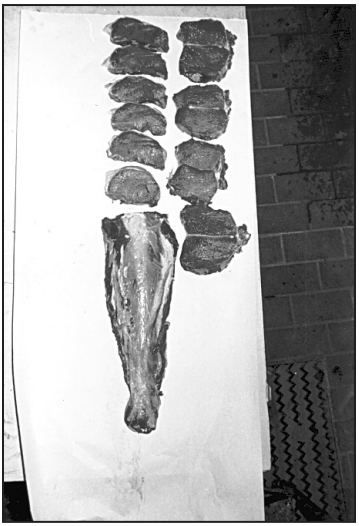

Figure 16. Make individual steaks (left) or butterfly steaks (right).

Figure 17. Cut next to the ribs.

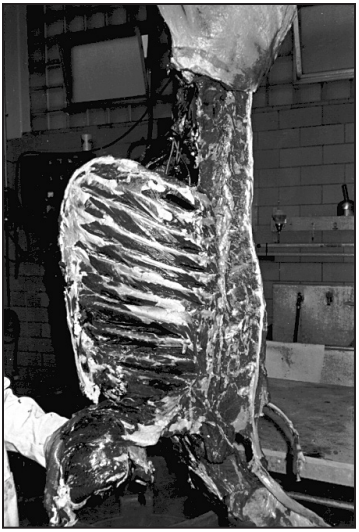

Figure 18. Avoid contamination on the inside.

5. Make cuts from the hind legs last. For a larger carcass, you will need to lower the suspended carcass or use a step ladder. As you remove the sirloin tip, the front of the femur is exposed (figures 19 and 20). You can make the sirloin tip into roast or steaks. Remember to cut across the grain when making steaks. Remove the sirloin butt and cut into steaks or roasts (figure 21).
6. After removing both sirloin butts, drop one leg and leave the other hanging to make it easier to remove the inside round muscle. Cut next to the pelvic bone and follow the seam. Be careful to cut between muscles when making this cut (figure 22). Make the top round muscle into roasts or steaks. After you remove the top round, remove the eye of round and bottom round muscles from the femur (figure 23).
7. The remaining muscle to which the tendon is attached is a heel of round roast. This roast generally is quite tough and is best used in sausage or ground meat. When you remove it, the skeleton will fall, so make sure you first trim all remaining edible meat (figure 24).

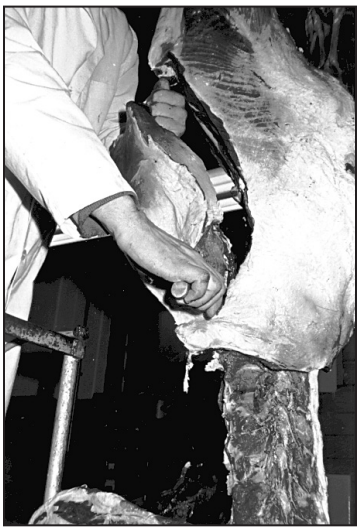

Figure 19. Remove the sirloin tip.

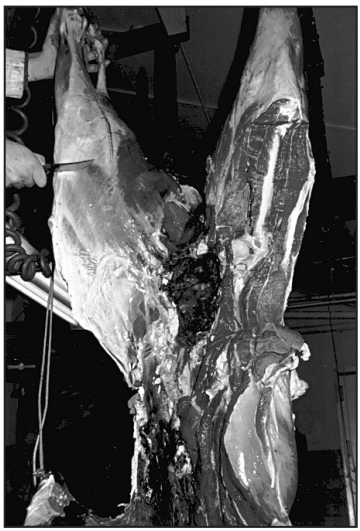

Figure 20. The front of the femur is exposed.

Figure 21. Remove the sirloin butt.

Figure 22. Remove the top round at the seam.

Figure 23. Remove the rest of the muscles from the femur.

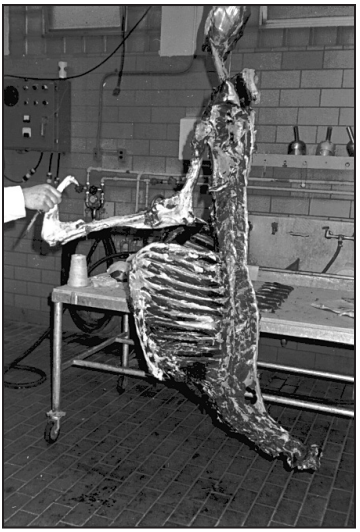

Figure 24. Trimmed skeleton with one tendon left intact to hand the carcass.

Cuts from the round from left to right are (1) bottom round steaks, (2) top round roast, (3) bottom round roast (above top round), (4) sirloin butt steaks, (5) heel of round roasts, and (6) sirloin tip roasts with cap off (figure 25).

Figure 25. Cuts from the round.

When making game roasts, you may want to add pork backfat. This prevents drying during cooking and improves juiciness and flavor. You can wrap pork backfat around the outside of the roasts (figure 26) or, for some rolled roasts, place pieces of pork inside the roast. If you don't add pork backfat, you can use strips of bacon at the time of cooking. It is best to add 5% to 15% beef or pork fat to ground game and 10% to 20% pork fat to fresh game sausage.

Figure 26. Cuts and lean trim.

Tables 1 and 2 show the pounds of boneless and bone-in cuts typically expected from various weights of elk and moose carcasses, and deer and antelope carcasses, respectively.

Table 1. Weight expected from elk and moose carcasses of various weights.

Field dressed weight (lb)	Weight of cuts	
	Bone-in (lb)	Boneless (lb)
200	111.2	86.0
250	137.9	107.5
300	168.2	129.0
350	196.7	150.5
400	225.2	172.0
450	253.7	193.5
500	282.2	215.0
550	310.7	236.5
600	339.2	258.0
650	367.7	279.5
700	396.2	301.0

Source: Adapted from Field and Raab (1983).
Notes: The weight of cuts to expect is an average figure for the corresponding field dressed weights. Individual carcasses could easily vary by 7% and in extreme cases may vary as much as 21% from the weights of cuts listed. Extent of gunshot area, aging time, closeness of trim, and amount of fat on the carcass are some of the factors affecting the weight of meat obtained.

Table 2. Weight of meat expected from deer and antelope carcasses of various weights.

Field dressed weight (lb)*	Boneless product weight (lb)‡	Semi-boneless product weight (lb)†
30	15.2	17.0
40	20.6	22.8
50	26.0	28.5
60	31.4	34.2
70	36.9	39.9
80	42.3	45.7
90	47.7	51.4
100	53.1	57.1
110	58.6	62.9
120	64.0	68.6
130	69.4	74.3
140	74.8	80.1
150	80.2	85.8
160	85.7	91.5
170	91.1	97.3
180	96.5	103.0
190	101.9	108.7
200	107.4	114.5

Source: Adapted from Ruby et al. (1992).

* Field dressed weight = animal minus viscera and legs (removed at knee/hock).

‡ Boneless product weight = 0.54 (field dressed weight) – 1.11.

† Semi-boneless product weight = 0.57 (field dressed weight) + 0.08.

Preparing Game Meat

Game meat has a distinctive flavor that is stronger in older and more active animals. You can keep off-flavors from developing by taking proper care of game in the field. Trimming fat away from mature, highly fattened carcasses helps, too. You can use a variety of herbs to mask or enhance the wild game flavor, depending on personal preference. Experiment with seasonings, but start with a small amount.

Meat of game animals is relatively low in fat (table 3). This makes the meat drier than domestic meat. Although you can

enhance the juiciness and flavor of drier cuts by adding fat during cooking, it is probably better healthwise to use marinades or other liquids instead. Marinades also tenderize and mask game-like flavors of more mature animals.

Table 3. Nutrients in 3½ ounces (100 grams) of cooked meat.

Meat	Calories	Protein (grams)	Fat (grams)	Cholesterol (milligrams)
Antelope	150	29	3	126
Bear	259	32	13	*
Deer	158	30	3	112
Elk	146	30	2	73
Moose	134	29	1	78
Beef (chuck roast)	332	27	24	99
Beef (round)	240	27	14	80

Sources: Adapted from U.S. Department of Agriculture (1989, 1990).
* Data not available.

Food Safety Pointers

Keep these food safety tips in mind when preparing game:

- Thaw frozen game meats in the refrigerator. This prevents growth of microorganisms.
- Wash hands, utensils, and work surfaces after handling raw game meats. Raw game can be a source of bacteria. These bacteria can be spread to foods that won't be heated before eating. Use soap and water to prevent "cross-contamination."
- Cook game meat adequately to destroy microorganisms. Use an instant-read thermometer to ensure that a safe temperature has been reached. Cook steaks, roasts, and chops to "medium"(160°F) or "medium well" (170°F). Cook bear meat to 170°F to destroy trichinae, a type of parasite. Cook ground meat to 160°F to destroy surface bacteria that will be mixed throughout the meat during grinding.
- Keep game dishes either hot (above 140°F) or cold (below 40°F). This prevents growth of bacteria that could contaminate the meat after cooking.

Marinating

To marinate, cover the meat with the marinade liquid and refrigerate for at least 24 hours before cooking. You may marinate meat in French dressing, tomato sauce, tomato juice, fruit juice (lemon, pineapple, or others), wine, or commercial marinades. You can also make one of these four marinades by mixing ingredients together.

Recipe Abbreviations

c	cup
lb	pound
oz	ounce
qt	quart
tsp	teaspoon
Tbsp	Tablespoon

Marinade 1

2 c vinegar
2 c water
½ c sugar

Marinade 2

2 c water
2 c vinegar
1 to 2 Tbsp sugar
4 bay leaves
1 tsp salt
12 whole cloves
1 tsp allspice
3 medium onions, sliced

Marinade 3

¼ c vinegar or lime juice
½ c vegetable oil
½ tsp pepper
¼ tsp garlic salt

Marinade 4

2 Tbsp vinegar
1½ tsp ground ginger
1 clove garlic, minced
2 Tbsp brown sugar
½ c soy sauce
¾ c vegetable oil

Cooking

You may cook game in a variety of ways. Like other types of meat, cuts from muscles that the animal uses a lot (such as chuck, round, and flank) will be less tender. Cuts from older animals also tend to be less tender. Figures 27 and 28 illustrate locations of cuts on carcasses.

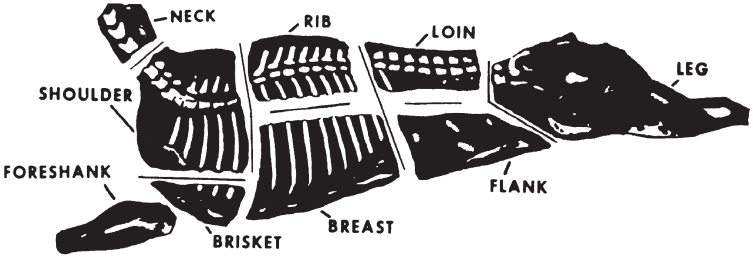

Figure 27. Locations of cuts on deer/antelope carcass.

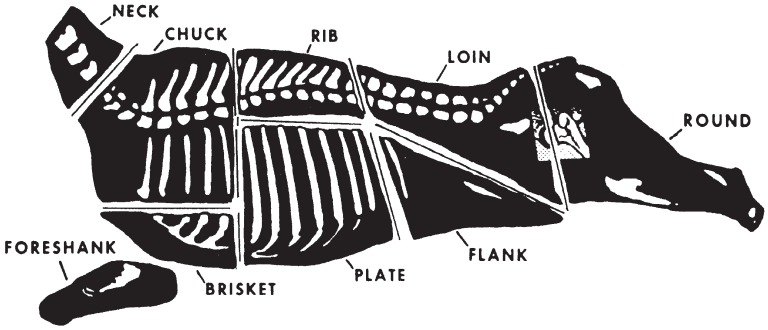

Figure 28. Locations of cuts on elk/moose carcass.

Less Tender Cuts

Choose a cooking method that is appropriate for the tenderness of the cut (see table 4). Cook less tender cuts in liquid (braising, stewing, pressure cooking). If desired, use marinades or pound or grind the meat first to tenderize it.

Table 4. Less tender cuts.

Part of carcass	Names of cuts
Shoulder or chuck	Arm pot roast or steak, boneless roast, blade roast or steak, stew meat
Foreshank	Foreshank
Brisket	Brisket
Breast, plate	Breast, short ribs, spare ribs
Flank	Flank steak
Leg, round	Round steak or roast, rolled leg or sirloin chop or roast, leg chop or roast

Braising:

1. Season with salt, pepper, and herbs.
2. Rub with flour.
3. Put in a pan and add a small amount of water (about ⅔ cup).
4. Cover pan with loose-fitting lid and cook slowly over low heat until tender (usually 1 to 3 hours—longer for thicker pieces). Turn the meat over occasionally, adding water if necessary.

Stewing:

1. Cut the meat into 1-inch cubes.
2. Sprinkle with flour and season.
3. Put the meat in a kettle and cover with boiling water.
4. Cover kettle with a tight-fitting lid and cook slowly over low heat until tender (usually 1 to 3 hours—longer for thicker pieces).
5. Add vegetables (such as potatoes and carrots) and continue cooking until they are tender (about 20 to 30 minutes).

Tender Cuts

Tender cuts of meat (see table 5) may be cooked by roasting, broiling, or pan-broiling. Cook to a "medium" or "medium well" stage of doneness, but avoid overcooking steaks, chops, and roasts. Game tends to toughen and dry out because of its lower fat content.

Table 5. Tender cuts.

Part of carcass	Names of cuts
Rib	Rib chops, steak, or roast
Loin	Loin chops or roast, tenderloin steak or roast, sirloin steak, T-bone steak

Roasting:

1. Season with salt, pepper, and/or herbs.
2. Place on roasting rack in uncovered pan, bone down.
3. Bake uncovered at 300°F to 350°F, basting with marinade if desired. Allow 20 to 25 minutes per pound. Cook to 160°F to 170°F; use a meat thermometer.

Broiling:

1. Preheat the broiler.
2. Season meat and brush with marinade if desired.
3. Place steaks or chops on broiler rack with top surface 3 to 5 inches below the heat source.
4. Broil until brown (about 5 to 7 minutes per side if 1 inch thick). Use an instant-read thermometer to ensure that a safe temperature has been reached: 160°F for "medium" or 170°F for "medium well" done.

Pan-broiling:

1. Heat a small amount of fat in a heavy frying pan.
2. Cook meat quickly over high heat, turning until brown on both sides.

Big Game Recipes

The following recipes suggest ways to prepare big game sauces, main dishes, and a dessert. Check cookbooks for other ideas. You can use any beef recipe to prepare venison, antelope, elk, or moose. Use pork recipes when preparing bear.

Barbecue Sauce

⅓ c cider vinegar
½ c catsup
¼ c water
1 Tbsp brown sugar
1 Tbsp Worcestershire sauce
1 Tbsp lemon juice
1 tsp salt
½ tsp black pepper
⅛ tsp garlic powder
¼ tsp red pepper sauce

1. Mix all ingredients.
2. Simmer (cook over low heat) for 15 minutes.

Storage tip: Refrigerate for later use.

Wild Game Horseradish Steak Sauce

⅓ c sour cream (regular or lower fat)
½ tsp salt
2 Tbsp prepared horseradish
1 tsp parsley flakes

1. Combine all ingredients.
2. Mix well

Serving suggestion: Serve with broiled or pan-broiled venison.
Storage tip: If desired, freeze for later use.

Elk or Venison Chili

(6 to 8 servings)
2 lb ground elk or venison
1 medium onion, chopped
1–2 Tbsp vegetable oil
1 can (14½ oz) stewed tomatoes
1 can (15 oz) tomato sauce
1 can (16 oz) kidney beans
1 c water
1 tsp dried leaf basil
1 tsp dried leaf oregano
1–2 Tbsp chili powder
2 cloves garlic, minced
1 Tbsp liquid smoke flavoring
Salt and pepper to taste

1. Brown meat and onion in oil.
2. Drain fat.
3. Add remaining ingredients.
4. Simmer (cook over low heat) for 2 hours.

Storage tip: Refrigerate leftovers promptly.

Venison or Elk Paprika Strips

(6 servings)

2 lb boneless venison
½ c all-purpose flour
Salt and pepper to taste
2 Tbsp vegetable oil
1 c celery, sliced
1 medium onion, thinly sliced
1½ tsp paprika
1 can (14½ oz) chicken broth*
1 c sour cream

* *Or you may use 2 tsp instant chicken bouillon in 2 c boiling water.*

1. Cut meat into 1-inch strips.
2. Coat strips with flour and season with salt and pepper.
3. Put oil in a Dutch oven over medium heat, add venison, and quickly brown on all sides.
4. Add celery, onion, and 1 tsp paprika.
5. Stir for 1 minute.
6. Add chicken broth, then cover and simmer (cook over low heat) for 1 hour.
7. Just before serving, add sour cream and heat, but do not boil.

Serving suggestion: Serve over hot noodles and sprinkle with remaining ½ tsp paprika.

Storage tip: Refrigerate leftovers promptly.

Hunter's Stew

(4 to 6 servings)

1–2 lb of stew meat
½ c all-purpose flour
Salt and pepper to taste
2 Tbsp cooking oil
2 c water
1 can (4 oz) mushroom stems and pieces
1 large onion, diced
1 can (15 oz) lima or butter beans
3 large carrots, sliced or diced
Instant beef bouillon to taste

1. Cut meat into 1½-inch cubes.
2. Sprinkle lightly with flour, salt, and pepper.
3. Put oil in a heavy Dutch oven or skillet and quickly brown meat.
4. Drain fat.
5. Add water and remaining ingredients.
6. Cover and simmer (cook over low heat) for about 2 hours or until the meat is tender.
7. If desired, make thickening for gravy by adding 1 Tbsp flour or cornstarch to 2–3 Tbsp cold water. Mix thoroughly, then add to meat stew and stir. Repeat until the gravy is as thick as desired. Sprinkle with beef bouillon to flavor.

Serving suggestion: Serve with biscuits or rolls and salad.

Storage tip: Refrigerate leftovers promptly.

Venison or Elk Lasagna

(4 to 6 servings)

4 oz lasagna noodles
1 lb ground venison or elk
¼ c onion, finely chopped
1 Tbsp shortening
1 can (8 oz) tomato sauce
1 can (14½ oz) sliced or stewed tomatoes
1 tsp dried leaf oregano
1 tsp salt
¼ tsp black pepper
¼ tsp garlic powder
½ lb mozzarella or American cheese, thinly sliced
¼ c grated parmesan cheese

1. Cook noodles for 30 minutes in boiling, salted water. Drain.
2. Brown ground venison and onion in shortening.
3. Stir in tomato sauce, tomatoes, oregano, salt, pepper, and garlic powder.
4. Cover and simmer (cook over low heat) until slightly thickened (about 15–20 minutes).
5. Fill a 1½-quart casserole by alternating layers of noodles, sliced cheese, tomato-meat mixture, and parmesan cheese.
6. Bake in 375°F oven 20–25 minutes or until bubbly and heated thoroughly.
7. Let sit 15 minutes before serving.

Storage tip: Refrigerate leftovers promptly.

Mincemeat Pie Filling

(makes 7 quarts)

7–8 lb tart apples (5 qt, chopped)
2 c (1 lb) suet, finely chopped
4 lb ground beef or ground venison
2 lb dark seedless raisins
1 lb white raisins
2 qt apple cider
2 Tbsp ground cinnamon
2 tsp ground nutmeg
5 c sugar
1 Tbsp salt

1. Peel, core, and quarter apples.
2. Put meat, suet, and apples through food grinder using a medium blade.
3. Combine all ingredients in a large saucepan and simmer 1 hour or until slightly thickened. Stir often.
4. To can, fill quart jars with hot mixture right away, leaving 1-inch headspace:
   - Put on lids and screw down bands firmly tight.
   - Process jars for 90 minutes at 240°F (10 pounds pressure with a weighted gauge; 11 pounds pressure with a dial gauge). Increase the pressure at higher elevations (see Canning instructions, page 34).

Preserving Game Meat

After butchering, you'll probably want to store some cuts for later use. Although you can refrigerate game meat for a short period of time, it will soon start to spoil. For long-term storage, you'll need to rely on freezing or canning to maintain quality.

Freezing

Remove visible fat from meat cuts before freezing. (The fat sometimes has a strong, game-like flavor.)

To avoid "freezer burn" and off-flavors, it is important to use the right type of packaging materials when you freeze. Game meat will stay top quality if you wrap it first in plastic wrap to keep air out of the package. Then wrap in moisture/vapor-resistant freezer paper. (Many commercial butchers will do a plastic underwrap on request.)

Choose the wrap method that will cling most closely to the meat (see figures 29 and 30). For example, "butcher wrap" may be the quickest and tightest wrap for hamburger, stew meat, and small boneless steaks. "Drugstore wrap" may be a better choice for odd-shaped or bone-in steaks and roasts. Be sure to put the shiny or coated side of the freezer paper toward the meat.

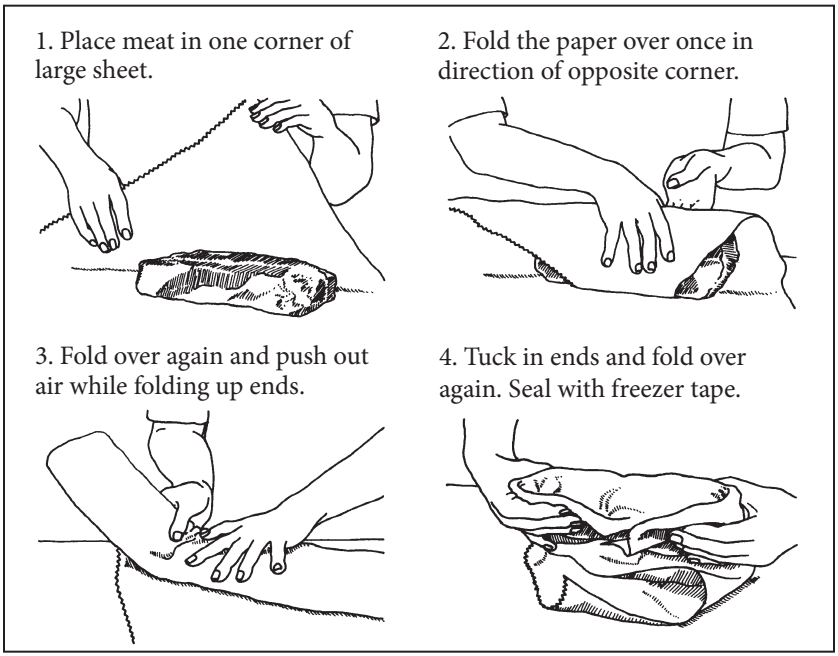

Figure 29. Butcher wrap steps.

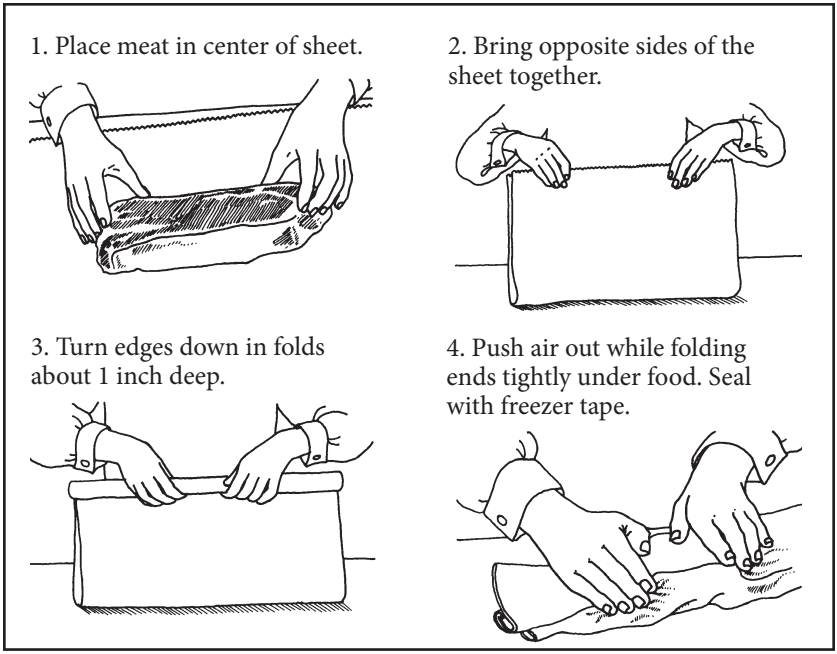

Figure 30. Drugstore wrap steps.

Use freezer tape to close the package. Other masking tapes will come loose at freezer temperatures.

Label packages so you know what is inside. Use a black or dark-colored grease pencil, crayon, or permanent ink marker that will be easy to read after freezing. Include the date and type of cut. It is also helpful to add a suggested cooking method (such as stewing for less tender cuts).

You also may have your meat cuts vacuum packaged in plastic bags. Some commercial butchers offer vacuum packaging for an extra fee. Home vacuum-sealing devices are on the market, too. Vacuum packaging is effective for odd-shaped pieces of meat that may dry out in traditional wrapping. Freeze the meat as quickly as possible. If your home freezer is too full to spread packages out, take the meat to a local freezer plant for quick freezing.

The meat will remain safe to eat as long as it is frozen. However, it is best to use frozen meat cuts within 6 to 9 months for highest quality. Date each package and use oldest packages first. To keep track of your inventory, make a list of meat cuts (and dates frozen) and post the list on the front of your freezer along with your game tags, which are required by law.

Canning

To can game meats, you will need pint or quart canning jars, canning lids, and a large pressure canner with a dial or weighted gauge.

The procedures for canning game are the same as for other meats:

- Choose good quality chilled meat.
- Remove excess fat and large bones.
- Soak strong-flavored wild meats in brine (1 Tbsp of salt per quart) for 1 hour. Rinse.
- Cut meat into strips, cubes, or chunks.

Pack either hot or raw:

Hot pack—Precook meat until rare (still pink inside) by roasting, stewing, or browning in a small amount of fat. Add salt, if desired (½ tsp per pint; 1 tsp per quart). Fill jar with meat pieces and add boiling broth, meat drippings, water, or tomato juice. Leave 1-inch headspace.

Raw pack—Add salt, if desired (½ tsp per pint; 1 tsp per quart). Fill jars with raw meat pieces, leaving 1-inch headspace. Do not add liquid.

Put on lids and screw down bands firmly tight. Process at 240°F (10 pounds with a weighted gauge; 11 pounds with a dial gauge): 75 minutes for pints; 90 minutes for quarts. Increase pressure at higher elevations as follows:

Weighted gauge—Process at 15 pounds for altitudes above 1,000 feet.

Dial gauge—Process at 12 pounds for 2,001–4,000 feet in elevation, 13 pounds for 4,001–6,000 feet or 14 pounds for 6,001–8,000 feet.

After processing, remove canner from heat and wait until pressure returns to zero. Remove weight or open the petcock. Wait 10 minutes. Unfasten the canner lid and remove it carefully.

For an added margin of safety, boil all home-canned meat 10 minutes before eating. For further information on canning procedures, contact your county Extension office.

Drying

Venison, elk, and antelope make excellent jerky. Any cut of game meat can be used, but the loin, round, and flank make the best jerky.

Take special precautions to prevent foodborne illness. Heat the jerky to a temperature high enough to destroy *E. coli* O157:H7 bacteria, which can grow in the intestines of deer and cattle. Because most home food dehydrators aren't designed to reach an adequate tempera-

ture, the jerky must be heated in another way to guarantee safety. This can be done by cooking in marinade.

Cooking in marinade shortens drying time and makes a more tender jerky. The color and texture will be different from conventional jerky, but the cooked jerky still is tasty.

To precook jerky:

1. Freeze game meat first so that it will be easier to slice.
2. Cut partially thawed meat into long slices that are no more than ¼-inch thick. For tender jerky, cut across the grain (at a right angle to the long muscles). Remove as much fat as possible to reduce "off" flavors.
3. Prepare 1 to 2 cups marinade in a large saucepan (recipe below).
4. Bring marinade to a full rolling boil over medium heat. Add a few meat strips, making sure the marinade covers them. Reheat to a full boil.
5. Remove pan from the range. Using tongs, immediately remove meat from marinade to prevent overcooking. Repeat Steps 4 and 5 until all meat has been cooked. Add more marinade if needed.
6. Place cooked strips in single layers on drying racks. Do not overlap pieces.
7. Dry in a dehydrator or smoker. Test for doneness by letting a piece cool. When cool, it should crack but not break when bent. There should not be any moist or underdone spots.
8. Refrigerate the jerky overnight in a plastic freezer bag. Then check again for doneness. If necessary, dry further.
9. Keep jerky in the refrigerator or freezer for long-term storage.

Caution: Don't soak meat strips overnight in marinade. Bacteria will be spread in the kitchen when the marinated strips are drained before precooking. Putting unmarinated strips directly into boiling marinade minimizes a cooked flavor and maintains safety.

You can use your favorite marinade recipe to precook the jerky. Season to taste. This sample recipe has seasonings you might like to try.

Sample Marinade Recipe

1 c soy sauce
1 Tbsp Worcestershire sauce
1 tsp garlic salt
1 tsp seasoning pepper
1 tsp liquid smoke (optional)

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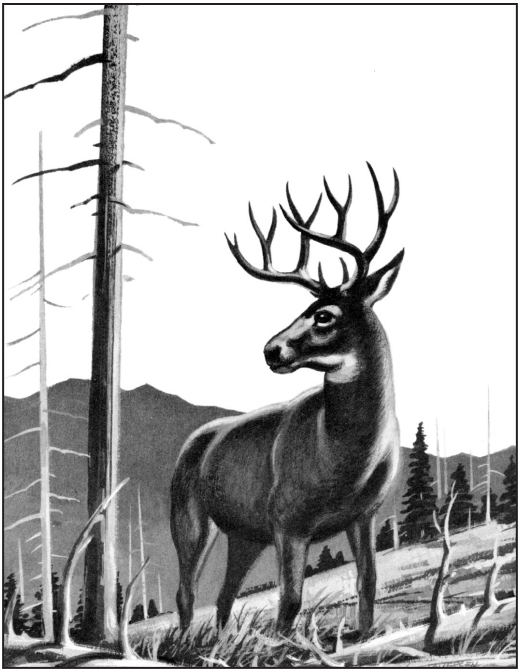

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